



## **Brucefield Estate Pods: Extended Phase 1 Habitat Survey** ***Including Confidential Annex***

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## Non-Technical Summary

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Caledonian Conservation Ltd was commissioned by Victoria Bruce-Winkler to carry out an update to the Extended Phase 1 habitat survey and desk-based study carried out by Caledonian Conservation in 2018. The current survey targets ten proposed pod sites at six different locations across the Estate.

Brucefield Estate is located in Clackmannanshire.

An Extended Phase 1 habitat survey was updated to map habitats on the site. The 'Extended' element included a search for signs of and habitat suitability for protected mammals. This was carried out within the footprint of the proposed pod sites and access tracks where appropriate, plus a 200 m buffer. An updated desk-based study involved a search for designated sites and notable species records based on records available for commercial use via NBN Atlas, and records held by Caledonian Conservation Ltd collected during previous surveys.

The desk-based study identified a number of protected mammal records including red squirrel sighting and squirrel dreys, pine marten, badger sightings and setts and bat records within Brucefield Estate, including within the 200 m survey buffers of the proposed pod locations.

Although several Schedule 1 bird species have been recorded at Brucefield Estate, the only species confirmed to breed was barn owl in 2020.

The key issues identified during the extended Phase 1 survey were potential bat roost features, active and inactive mammal holes, stick nests, squirrel feeding signs and rhododendron.

### Habitats

Construction footprints of the proposed pods are sited in areas of mixed plantation woodland (Red Yetts, Scaurs, Low Field, Hartshaw Clump) and Scots pine plantation (Sawmill and Hartshaw Farm).

There is semi-natural broadleaved birch woodland within the survey area of Hartshaw Farm. There are no plans to fell trees within this area of woodland. General good practice mitigation should be followed including pollution prevention, to avoid disturbance and deadwood (both standing and fallen) should be retained.

At each location there are existing forest plans for thinning with the objective of removing non-native conifers and woodland management is proposed with the aim of improving the site for biodiversity.

The majority of the rhododendron bushes at Brucefield Estate were cleared by flailing or chainsaw cutting in 2020. Regrowth of cut stumps and remaining low foliage is still widespread and plans for follow-up treatment are due to be put in place. In the meantime, where rhododendron was recorded (largely young shoots of recently cut stumps), 10 m exclusion zones should be set up to avoid any spread of this species.

### Bats

Within the survey area, one tree with moderate bat roost potential was recorded over 100 m from the proposed pod location at Hartshaw Clump, and one Scots pine and two rowan trees with moderate potential were recorded within 30 m of the proposed pod locations at Hartshaw Farm.

No felling is planned pertaining to development.

- Targeted bat surveys are required to determine presence of roosting bats at Hartshaw Farm in order to determine presence of roosting bats and avoid disturbance to trees with bat roost potential within 30 m.

- If works are to take place within 30m of the identified trees and/or if felling of any of the identified trees with low or moderate potential is required and cannot be avoided targeted bat surveys will be undertaken to determine presence of roosting bats including further detailed mitigation measures.
- During the construction phase, lighting should be placed to minimise disturbance to foraging bats. Lighting for pods during the operational phase should be designed to minimise light pollution to the surrounding area, in order to minimise disturbance to foraging bats and their invertebrate prey.
- A watching brief is recommended during works pertaining to the development. Should any bats be found, all work in the vicinity of the bats should immediately cease and advice be obtained from a licensed bat worker.

### **Badger**

The survey recorded further active setts. Badger activity is present across Brucefield Estate and there is one recorded active sett within the current survey area of Scaurs Wood. A 30 m exclusion zone should be marked up on the ground and a watching brief maintained during construction operations. No works should take place within the exclusion zone. All works should be undertaken during daylight hours.

### **Red squirrel**

Red squirrels are active across Brucefield Estate. Stick nests recorded during this survey within the survey area may be used by red squirrel on a temporary basis but are not considered suitable for breeding.

- It is recommended that works should be undertaken outside the breeding season for squirrel where possible (breeding is between February and September so works to be carried out between October to January inclusive).
- Where work is undertaken within the breeding season, no works should take place within 50 m of breeding dreys.
- Pre-operational surveys should be carried out to check if the status of the recorded nest changes or any new active dreys have arisen between the time of this survey and the start of works. It is recommended that checks are carried out within less than three weeks of proposed works.
- If pre-operational surveys confirm a drey is not used for breeding, smaller protection zones will be required (5 m or to the nearest neighbouring tree, whichever is less).
- Where works cannot avoid the required buffer zones, the work will require a licence from NatureScot before they can proceed; so as to avoid the risk of committing an offence under the Wildlife and Countryside Act 1981 as amended.

### **General Mitigation Measures for Protected Mammals**

It is possible that protected mammals (badger, red squirrel, pine marten, otter) may pass through the site while foraging or commuting. Mitigation measures should be implemented to reduce risk to protected mammals that may occasionally move through the site. These measures include pre-construction checks, installation of

escape ramps in open trenches during construction, and enforcement of a low speed limit for vehicles on site.

### **Nesting birds**

Suitable nesting habitat is present at all sites and some small stick nests were recorded. The breeding season for most bird species occurs from March to August, inclusive, but can extend into September depending on the weather. It is recommended that tree-felling works take place outwith the breeding bird season if possible. If tree felling must take place during the breeding bird season, checks for nesting birds should be carried out within 24 hours prior to any tree-felling. If any active nests are found, they will be monitored and felling of trees will not commence until breeding has ended.

Crossbill may breed at any time of the year where there is a good cone crop and suitable habitat is present within the survey area. As such, pre-construction checks should be carried out for nesting crossbill in suitable areas of habitat (the survey area surrounding all pod locations have conifer trees which may provide suitable habitat for crossbill), within 24 hours prior to tree felling, regardless of date. If any active nests are found, the mitigation measures described above will be followed.

There is no sign of the erected barn owl box being in use. It is recommended that the box is re-sited to another appropriate location before the breeding season.

### **General recommendations for reptiles**

Since reptiles are known to be present across Brucefield Estate, a watching brief will be maintained for during the active season, and if a reptile is found works will stop as soon as it is safe to do so, and will not recommence until appropriate mitigation has been designed in consultation with an ecologist and NatureScot.

Note that there is no accepted mitigation to allow destruction of hibernaculum features during the hibernation season. Measures should be taken to mark and avoid likely hibernaculum features. It is recommended that works take place outwith the hibernation season (September to March inclusive).

# 1 Introduction

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Caledonian Conservation Ltd was commissioned by Victoria Bruce-Winkler to carry out an Extended Phase 1 habitat survey for proposed camping pods at Brucefield Estate.

The desk-based study and field surveys were undertaken by Julie Smith (Senior Ecologist) and Niall Currie (Senior Ecologist). Mapping was updated by Julie Smith. The assessment was completed by Julie Smith, Niall Currie, and Chris Cathrine (Director).

This document includes the following sections:

- The Development;
- Policy and Guidance;
- Methodology;
- Results;
- Summary and Conclusions; and
- References.

## 2 The Development

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The proposed development is for the erection of pods at various locations across Brucefield Estate. Brucefield Estate comprises a diverse range of habitats which extend for approximately 2 km north to south and 1.5 km east to west, centred around Brucefield House at NS956916.

The Estate is currently used for livestock farming, residential areas, and low level recreation as it is open to the public for non-motorised access.

Caledonian Conservation Ltd were initially contracted to undertake an Extended Phase 1 Habitat Survey and production of a Habitat Management Plan for the entirety of Brucefield Estate in 2018. Subsequently we have carried out targeted surveys across the Estate during 2019 and 2020, including for targeted breeding birds, protected mammals, vascular plants, bryophytes, invertebrates, rhododendron and bat roost surveys of Hartshaw House and Brucefield House. Caledonian Conservation are currently updating and extending the habitat management plans and are producing a 10 Year Habitat Management Plan for the Estate.

While the initial development is to comprise four pods, there are six proposed locations for the erection of ten pods at the following areas on the Estate:

- Red Yetts (one pod) (NS9596 492355)
- Scaurs Wood (two pods) (NS95730 92079; NS95676 92021)
- Low Field (two pods) (NS95430 91696; NS95326 91729)
- SawMill (two pods) (NS95337 91522; NS95241 91558)
- Hartshaw Clump (one pod) (NS95657 91341)
- Hartshaw Farm (two pods) (NS96061 915541; NS96033 91547)

The proposed pod locations are hereafter referred to as 'the site.' A 200 m buffer zone surrounding each pod location was surveyed and is hereafter referred to as 'the survey area'.

The pod locations are shown in Figure 1.



### 3 Policy and Guidance

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The following legislation, policy and guidance documents have been considered in undertaking this survey:

- Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Flora and Fauna (*Habitats Directive*);
- Directive 2009/147/EC on the Conservation of Wild Birds (the codified version of Council Directive 79/409/EEC as amended) (*Birds Directive*);
- The Conservation (Natural Habitats, &c.) Regulations 1994;
- Wildlife and Countryside Act 1981 (as amended in Scotland);
- Nature conservation (Scotland) Act 2004;
- The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2007;
- Wildlife and Natural Environment (Scotland) Act 2011;
- The Protection of Badgers Act 1992;
- Scottish Planning Policy 2020;
- Guidelines for Preliminary Ecological Appraisal (CIEEM 2017);
- Bat Conservation Trust Bat Surveys Good Practice Guidelines 3<sup>rd</sup> Edition (Collins 2016).

## 4 Legislation

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The following sections summarise relevant legislation.

### 4.1 The Habitats Directive

Otters are a European Protected Species (EPS) and are provisioned with legal protection under the EC Habitats and Species Directive. This is transposed into UK law by the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended in Scotland). This legislation defines European Protected Species (EPS) (Annex IV), and makes it an offence to deliberately or recklessly:

- Capture, injure or kill an EPS;
- Harass an EPS or group;
- Disturb an EPS at a place it uses for shelter or protection;
- Disturb an EPS while it is rearing or otherwise caring for its young;
- Obstruct access to a place an EPS uses for shelter or protection or to otherwise deny the animal use of that place;
- Disturb an EPS in a manner that is, or in circumstances which are, likely to significantly affect the local distribution or abundance of the species; or
- Disturb an EPS in a manner that is, or in circumstances which are, likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young.

It is also an offence to:

- Damage or destroy a breeding site or resting place of such an animal (note that this does not need to be deliberate or reckless to constitute an offence); and
- Keep, transport, sell or exchange or offer for sale or exchange any wild EPS or any part or derivative of one (if obtained after 10 June 1994).

Derogation licences may be granted for certain purposes that would otherwise be illegal. Regulation 44 (2e) of the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended in Scotland) allow licenses to be granted for:

- Preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment.

In order to satisfy the requirements for a license, the proposed development must fulfil the following:

- That there is no satisfactory alternative (including the alternative of doing nothing); and
- That the action authorised will not be detrimental to the maintenance of the otter population at a favourable conservation status in their natural range.

The Habitats Directive also identifies plant species (Annex V) and habitats which require conservation in their own right (Annex I). Another major provision of the Directive is the identification and classification of Special Areas of Conservation (SACs) for rare or vulnerable species and habitats.

## 4.2 The Birds Directive

Annex I of Directive 2009/147/EC on the conservation of wild birds (the 'Birds Directive') lists bird species that are of conservation importance at a European level.

One of the main provisions of the Directive is the identification and classification of Special Protection Areas (SPAs) for rare or vulnerable Annex I bird species, as well as for all regularly occurring migratory species.

Legislation prohibits activities that have a negative effect on the conservation objectives of an SPA.

## 4.3 The Wildlife and Countryside Act 1981 (as amended)

The Wildlife and Countryside Act 1981 (as amended in Scotland) is the primary legislation protecting animals, plants, and certain habitats in the UK, including all wild birds and their nests, eggs and chicks. Under this legislation, it is an offence to intentionally or recklessly kill, injure or take any wild bird or their eggs, or to take, damage, destroy, obstruct or otherwise interfere with the nest of any wild bird while it is in use or being built.

- **Schedule 1:** additional protection of birds at or around their nests is afforded to rare breeding species in the UK, and/or species under threat of human persecution. These species are listed on Schedule 1 of the Act.

Certain Schedule 1 raptor species are afforded further protection under Schedules 1A and/or A1 of the Act:

- **Schedule A1:** the nests of birds included on Schedule A1 of the Act are protected year round; and
- **Schedule 1A:** birds included on Schedule 1A of the Act are protected from harassment year round.

Note that it is not possible to obtain derogation licences to permit commercial forestry or development activities that are illegal under legislation that protects wild birds.

## 4.4 Protection of Badgers Act 1992

Badgers are protected under the Protection of Badgers Act 1992 (as amended in Scotland). This legislation makes it an offence to deliberately or recklessly:

- Kill, injure, take, possess or cruelly ill-treat a badger, or attempt to do so;
- Interfere with a sett by damaging or destroying it;
- Obstruct access to, or any entrance of, a badger sett; or
- Disturb a badger when it is occupying a sett.

Anyone found guilty of an offence is liable to a fine of up to £5,000 and/or six months imprisonment.

Derogation licences may be granted for certain purposes that would otherwise be illegal. A licence must be obtained from SNH for any work that may cause disturbance to a badger or involves the damage or destruction of a sett. Note that

licences are not generally issued during the badger breeding season (30<sup>th</sup> November to 1<sup>st</sup> July).

#### 4.5 Scottish Biodiversity List

The Scottish Biodiversity List (SBL) is a list of habitats and species that the Scottish Ministers consider to be of principal importance for biodiversity conservation in Scotland. It was developed to meet the requirements of Section 2 (4) of the Nature Conservation (Scotland) 2004 Act for the conservation of biodiversity, and (along with biodiversity lists from other UK countries) supersedes the UK Biodiversity Action Plan. Public bodies must consider SBL species when reporting on their 'Biodiversity Duty' (as defined and required by the Nature Conservation (Scotland) Act 2004 and Wildlife & Natural Environment (Scotland) Act 2011).

#### 4.6 UK Birds of Conservation Concern

The UK Birds of Conservation Concern (BoCC) is a periodic national review assessing the population and trends for UK breeding bird species. It uses a traffic light system to indicate an increasing level of conservation concern. Species that have a declining range and/or population, or that are vulnerable to population effects due to their small population size, are Red- or Amber-listed, depending on the extent of the decline or vulnerability, while those which are stable, increasing, or experiencing only small declines, are Green-listed. The most recent review (BoCC 4) was published in December 2015 (Eaton *et al.* 2015).

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## 5 Methodology

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An Extended Phase 1 habitat survey was conducted at each of the pod locations including a 200 m buffer (the survey area is shown in Figure 2). This survey involved searching for signs of protected species (particularly mammals) and mapping the habitats in this area to a Phase 1 level. Any other ecological features that would warrant additional surveys were also to be noted.

Additionally, a desk-based study was completed to identify potential sensitivities and to provide a wider context.

### 5.1 Desk-based Study

The desk-based study involved a search for designated sites and notable species records.

The National Biodiversity Network (NBN) Atlas<sup>1</sup> was searched for notable records of flora and fauna within 2 km of the centre of the estate. This included a search for protected species and invasive species. Only records with licences allowing commercial use were included (CC-BY, CCO, OGL).

In addition, there is a wealth of ecology information already available for the Estate. The results of previous Habitat Management Plans and detailed targeted surveys undertaken by Caledonian Conservation Ltd at Brucefield Estate were also considered, including breeding birds, protected mammals, vascular plants, bryophytes, invertebrates, rhododendron and bat roost surveys of Hartshaw House and Brucefield House.

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<sup>1</sup> NBN Atlas available at <https://nbnatlas.org/>

## 5.2 Extended Phase 1 Survey

An Extended Phase 1 habitat survey was conducted within the site boundary and 200m buffer.

### 5.2.1 Phase 1 Habitat Mapping

Standard Phase 1 Habitat methodology was used to map all habitats and identify habitat areas of ecological importance, as outlined in the Handbook for Phase 1 habitat survey published by the Joint Nature Conservancy Council (JNCC) (2010). Appropriate field guides, including Averis (2013) were also consulted. The survey included the site plus a 200m survey buffer, to provide context and aid assessment of habitat suitability for protected species.

Target notes regarding important habitat features were recorded on large scale maps, and locations marked using hand held GPS devices.

### 5.2.2 Protected Species Survey

A protected species survey was undertaken within the site and up to 200m buffer area. This survey targeted red squirrel (*Sciurus vulgaris*), badger (*Meles meles*), pine marten (*Martes martes*), otter (*Lutra lutra*), water vole (*Arvicola amphibius*), and bats (Chiroptera). Target Notes of all protected species signs were recorded on large scale maps, and locations marked using hand held GPS devices.

Suitable habitat was also noted for nesting birds.

Further information regarding specific protected mammal survey methods are provided below.

#### 5.2.2.1 Red Squirrel

A red squirrel survey was conducted following standard methodology and using appropriate field guides (Bang and Dahlstrøm 2006; Gurnell *et al.* 2009; Cresswell *et al.* 2012). Field signs included;

- Visual observations of animals;
- Squirrel dreys;
- Prints; and
- Feeding signs (such as conifer cones gnawed in a way characteristic to squirrels).

#### 5.2.2.2 Badger

A badger survey was conducted, following standard methodology and using an appropriate field reference guides and SNH guidance (Roper 2010; Bang and Dahlstrøm 2006; SNH 2001). Badger field signs include:

- Setts – burrows indicating badger setts (level of activity and other signs may allow determination of sett type, *i.e.* main sett, annexe sett, subsidiary sett or outlying sett);
- Prints;
- Latrines (and dung pits used as territorial markers);
- Hairs – highly distinctive, and often become snagged on fences;
- Feeding signs – snuffle holes (small scrapes where badgers have searched for earthworms, insects or tubers); and
- Paths.

#### 5.2.2.3 Pine Marten

A pine marten survey was carried out following standard methodology and using an appropriate field guide (Bang and Dahlstrøm 2006). Field signs included:

- Scats (faeces) – recognisable by their size, shape, and content, and also distinguishable from fox (*Vulpes vulpes*) droppings by their smell, if not desiccated<sup>2</sup>;
- Dens – usually in hollows in trees, but also subterranean dens amongst tree roots, should no suitable tree dens be present; and
- Prints – may be found on softer ground and can be differentiated from fox and other mustelids by size and shape;

#### 5.2.2.4 Otter

A full otter survey was conducted following standard methodology and using an appropriate field guide (Bang and Dahlstrøm 2006; Chanin 2003a; Chanin 2003b). Field signs included:

- Holts – below ground resting places;
- Couches – above ground resting places;
- Prints; and
- Spraints – faeces used as territorial markers, with a characteristic sweet odour.

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<sup>2</sup> If there is doubt over identity of scats DNA analysis can be used to identify whether they were deposited by pine marten (Davison *et al.* 2002).

#### 5.2.2.5 Water Vole

Areas of potentially suitable habitat were surveyed following standard methodology and using an appropriate field guide (Bang and Dahlstrøm 2006; Dean *et al.* 2016). This involved recording the following field signs:

- Faeces – recognisable by their size, shape, and content, and also distinguishable from rat droppings by their smell, if not desiccated;
- Latrines – faeces are often deposited at discrete locations known as latrines;
- Feeding stations – food items are often brought to feeding stations along pathways and haul out platforms, indicated by neat piles of chewed vegetation up to 10cm long;
- Burrows – appear as a series of holes along the water's edge distinguishable from rat burrows by size and position;
- Lawns – may appear as grazed areas around burrows;
- Nests – where the water table is high, above ground woven nests may be found;
- Footprints – tracks may occur at the water's edge leading into vegetation cover, and may be distinguishable from rat footprints by size; and
- Runways – low tunnels pushed through vegetation near the water's edge, which are less obvious than rat runs.

#### 5.2.2.6 Bats

The Bat Conservation Trust has produced guidelines (Collins 2016) to assess the suitability of both roosting and foraging/commuting habitat for bats. This involves a combination of preliminary ecological appraisal of habitats and preliminary roost assessments. Further surveys may or may not be implemented based on results of the preliminary assessment.

Table 1 (adapted from Collins 2016) summarises features of both roosting and foraging/commuting habitat in terms of suitability to bats. Roosting habitat should be assessed independently of foraging/commuting habitat, using professional judgement.



**Table 1. Guidelines for assessing the potential suitability of habitat features for bats.**

Suitability	Description	
	Roosting	Foraging/Commuting
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by foraging or commuting bats.
Low	<p>A structure with one or more potential roost sites that could be used by individual bats opportunistically, but not on a regular basis due to marginal conditions.</p> <p>A tree of sufficient size and age to contain potential roost features but with none seen from the ground, or with very limited potential.</p>	Habitat that could be used by small numbers of foraging or commuting bats, but which is isolated from surrounding habitat (e.g. gappy hedgerow or unvegetated stream).
Moderate	A structure or tree with one or more potential roost sites that could be used by bats, but unlikely to support a roost of high conservation status (with respect to roost type only).	Continuous habitat connected to the wider landscape that could be used by foraging or commuting bats, such as lines of trees or scrub.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and for longer periods of time.	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging or commuting bats (e.g. river valleys, woodland edge, tree-lined watercourses).

Preliminary assessments of trees for potential roost features (PRFs) are carried out from the ground. This involves a detailed visual inspection of the tree from all angles for PRFs and evidence of bats. PRFs in trees can include:

- Woodpecker holes;
- Rot holes;
- Other vertical or horizontal cracks and splits in stems or branches;
- Partially detached platey bark;
- Natural or man-made holes or cavities (e.g. knot holes, cavities from flush cuts);
- Cankers in which cavities have developed;
- Double-leaders forming compression forks with included bark and potential cavities;
- Gaps between overlapping stems or branches;
- Partially detached ivy with stem diameters in excess of 50mm;
- Bat, bird, or dormouse boxes.

Accessible PRFs are examined for evidence of bats, including:

- Presence of bats;
- Bat droppings in, around, or below a PRF;
- Odour emanating from a PRF;
- Audible squeaking at dusk or in warm weather;
- Staining below the PRF.

Areas of roosting habitat with moderate or high suitability for bats that will be affected by development are likely to require further surveys. Similarly, where moderate or high-suitability PRFs or evidence of bats are found during a preliminary ground level roost assessment, further surveys should be carried out. If no PRFs or low-suitability PRFs are found, no further surveys are required (Collins 2016).

As part of the Extended Phase 1 survey, a preliminary ground level roost assessment was carried out for mature broadleaved trees located at the site entrance. This involved a visual search of the trees for obvious PRFs used by bats. No structures (e.g. buildings, bridges) were located within the site boundary, and the few buildings within the 200m site buffer were not assessed for roosting habitat suitability as they would not be affected by the low-impact development.

Foraging and commuting habitat suitability for bats was noted on site as part of the Extended Phase 1 survey.

## 6 Results

The baseline results are described in detail below.

### 6.1 Desk-based Study

#### 6.1.1 Designated Sites

A search of digital datasets indicates that there is one statutory designation of international importance (Firth of Forth Ramsar), one designation of European importance (Firth of Forth Special Area of Conservation [SAC]), six designations of national importance (Craigmad Wood Sites of Special Scientific Interest [SSSI], Lochshaw Mosses SSSI, Firth of Forth SSSI, Damhead Wood SSSI, Linn Mill SSSI and Gartmorn Dam SSSI) and one non-statutory site of local importance (Gartmorn Dam Local Nature Reserve) within 5 km of the proposed pod sites. There were no statutory sites of international importance identified within 5km of the proposed development site. Table 2 provides details of sites of national importance within 5 km of the site. Full citations for statutory designated sites can be requested from Caledonian Conservation Ltd or can be obtained at <https://sitelink.nature.scot/home>.

**Table 2. Designated sites within 5 km of the site.**

Site name	Designation	Features	Distance and direction
Firth of Forth	SPA	Regularly supporting populations of European importance: red-throated diver ( <i>Gavia stellata</i> ), Slavonian grebe ( <i>Podiceps auritus</i> ), golden plover ( <i>Pluvialis apricaria</i> ) and bar-tailed godwit ( <i>Limosa lapponica</i> ), sandwich tern ( <i>Sterna sandvicensis</i> ) (during the passage period). Regularly supporting populations of European importance of the migratory species : pink-footed goose ( <i>Anser brachyrhynchus</i> ); shelduck ( <i>Tadorna tadorna</i> ); knot ( <i>Calidris canutus</i> ); redshank ( <i>Tringa totanus</i> ) and turnstone ( <i>Arenaria interpres</i> ). Regularly supporting in excess of 20,000 individual waterfowl and 50,000 waders including nationally important populations.	4 km SW of Pod 2 (Saw Mill).

Site name	Designation	Features	Distance and direction
Firth of Forth	RAMSAR	Spring/autumn: Pink-footed goose ( <i>Anser brachyrhynchus</i> ), Common redshank ( <i>Tringa totanus totanus</i> ). Winter: Slavonian grebe ( <i>Podiceps auritus</i> ), Red knot ( <i>Calidris canutus islandica</i> ), Bar-tailed godwit ( <i>Limosa lapponica lapponica</i> )	4 km SW of Pod 2 (Saw Mill)
Craigmad Wood	SSSI	Upland oak woodland Lowland dry heath	280 m NE of Pod 8 (Hartshaw Farm)
Lochshaw mosses	SSSI	Raised Bog	2 km E of Pod 8 (Hartshaw Farm)

Site name	Designation	Features	Distance and direction
Firth of Forth	SSSI	<p>Maritime cliff Saltmarsh Sand dunes Mudflats Saline lagoon Lowland neutral grassland Fens: Transition grassland Vascular plant assemblage Beetle assemblage Northern brown argus (<i>Aricia artaxerxes</i>) Non-breeding birds: Red-throated diver (<i>Gavia stellata</i>), Great crested grebe (<i>Podiceps cristatus</i>), Slavonian grebe (<i>Podiceps auritus</i>), Cormorant (<i>Phalacrocorax carbo</i>), Pink-footed goose (<i>Anser brachyrhynchus</i>), Shelduck (<i>Tadorna tadorna</i>), Mallard (<i>Anas platyrynchos</i>), Wigeon (<i>Anas penelope</i>), Scaup (<i>Aythya marila</i>), Eider (<i>Somateria mollissima</i>), Long-tailed duck (<i>Clangula hyemalis</i>), Common scoter (<i>Melanitta nigra</i>), Velvet scoter (<i>Melanitta fusca</i>), Goldeneye (<i>Bucephala clangula</i>), Red-breasted merganser (<i>Mergus serrator</i>), Oystercatcher (<i>Haematopus ostralegus</i>), Ringed plover (<i>Charadrius hiaticula</i>), Golden plover (<i>Pluvialis apricaria</i>), Grey plover (<i>Pluvialis squatarola</i>), Lapwing (<i>Vanellus vanellus</i>), Knot (<i>Calidris canutus</i>), Dunlin (<i>Calidris alpina alpina</i>), Bar-tailed godwit (<i>Limosa lapponica</i>), Curlew (<i>Numenius arquata</i>), Redshank (<i>Tringa totanus</i>), Turnstone (<i>Arenaria interpres</i>), Sandwich tern (<i>Sterna sandvicensis</i>)</p> <p>Birds breeding: Eider (<i>Somateria mollissima</i>), Shelduck (<i>Tadorna tadorna</i>), Ringed plover (<i>Charadrius hiaticula</i>)</p>	4 km SW of Pod 2 (Saw Mill)

Site name	Designation	Features	Distance and direction
Linn Mill	SSSI	Upland mixed ash woodland	2.7 km WNW of Pod 2 (Saw Mill)
Gartmorn Dam	SSSI	Eutrophic loch Open water transition fen	3.3 km NW of Pod 2 (Saw Mill)
Damhead Wood	SSSI	Wet woodland	4.5 km N of Pod 7 Red Yetts.
Gartmorn Dam	LNR		3.4 km NW of Pod 2 (Saw Mill)

### 6.1.2 Data Search Results

NBN Atlas was searched within 2km of the centre of the proposed pod locations. Only records with licences allowing commercial use were included (CC-BY, CCO, OGL). Additionally, records held by Caledonian Conservation as a result of surveys carried out on Brucefield Estate were included in the data search.

Details of species records, sources, and citations are provided in Table A3.1 in Appendix 3 and Table C3 in the Confidential Annex for sensitive species.

A summary of protected species records present within 200 m of the proposed pod locations are provided in Table 3 and relevant records are summarised below.

**Table 3. Protected species records within 200 m of the pod locations. Details of sensitive species are included in the Confidential Annex.**

Site	Pod within 200 m	Feature	Grid Reference	Notes
Scaurs wood	5 & 6		See Confidential Annex Table C1	
Low Field	3 & 4		See Confidential Annex Table C1	
	3		See Confidential Annex	
	3	Tawny owl breeding site	NS 95581 91829	Breeding confirmed in 2020.
Saw Mill	1 & 2	Badger sett	See Confidential Annex	.
	1 & 2	Squirrel drey	NS 95421 91502	Not in active use when surveyed in 2019.
Hartshaw Clump	10	Squirrel drey	NS 95696 91272	Not in active use when surveyed in 2019.
Hartshaw Farm	8 & 9	Squirrel drey	NS 96169 91616	Two dreys in Burnbrae and fresh squirrel feeding signs.

### 6.1.2.1 Protected mammals

- **Red squirrel:** Caledonian Conservation holds nine records of red squirrel at Brucefield Estate and a further five records of squirrel dreys were identified. Only one drey has been confirmed as being in active use by red squirrels (recorded at Burnbrae wood, with an incidental sighting of a red squirrel leaving the drey in June 2019). Additionally 28 records were identified from the search of NBN Atlas Records (Scottish Wildlife Trust records), five of which were within the boundaries of Brucefield Estate.
- **Pine marten:** eight records of pine marten in locations across Brucefield Estate are held by Caledonian Conservation, however no den sites have been confirmed (Monir & Smith 2019).
- **Badger:** this species is known to be active across Brucefield Estate, based on 14 records (Caledonian Conservation). Six continuously active setts and a further four outlier setts were identified in 2019 (Monir & Smith 2019).
- **Bats:** common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*) and brown long-eared (*Plecotus auritus*) bats have been recorded roosting in Hartshaw House (pipistrelles only) in 2019 (Spray & Smith 2019) and Brucefield House in 2020 (Gebhart 2020).

### 6.1.2.2 Ornithology

Note that conservation status is indicated, including species that are Red or Amber Listed in Birds of Conservation Concern 4 (Eaton *et al.* 2015).

- **Raptors:** an osprey (*Pandion haliaetus*) (Schedule 1) was recorded flying over Brucefield Estate in 2019 (Caledonian Conservation record), but there is no evidence of this species breeding within the search area. A merlin (*Falco columbarius*) was also recorded in winter 2019, but this species would not be expected to breed in the lowland habitat present at Brucefield Estate. Buzzard was confirmed to breed at Brucefield Estate in 2019. Sparrowhawk (*Accipiter nisus*) and kestrel (*Falco tinnunculus*) have also been recorded within Brucefield Estate on several occasions (Caledonian Conservation records).
- **Owls:** Barn owl (*Tyto alba*) (Schedule 1) bred at Brucefield Estate in 2020 and this species was also recorded in 2019 (Caledonian Conservation records). Additionally, tawny owl (*Strix aluco*) (Amber Listed) was confirmed to breed at Brucefield Mains in 2020 and a pair was recorded near Hartshaw Farm in 2019.
- **Passerines:** crossbills (*Loxia* sp.) (Schedule 1) were recorded at Chapel Knowe at Brucefield Estate (Caledonian Conservation records) in 2019 displaying breeding behaviour (Cathrine *et al.* 2019). Fieldfare (Schedule 1) have also been recorded at Brucefield Estate, however this species is unlikely to breed on the estate. Additionally a number of records of SBL Priority list and Birds of Conservation Concern Red List passerine species (Eaton *et al.* 2015) have been recorded at Brucefield Estate (Caledonian Conservation records). Red Listed: grey wagtail (*Motacilla cinerea*), Linnet (*Linaria cannabina*) (SBL), Mistle thrush (*Turdus viscivorus*), Skylark (*Alauda arvensis*), Song thrush (*Turdus philomelos*) (SBL), Starling (*Sturnus vulgaris*) (SBL), Tree sparrow (*Passer montanus*) (SBL), Wheatear (*Oenanthe oenanthe*) and Yellowhammer (*Emberiza citrinella*) (SBL). SBL Priority species: Bullfinch (*Pyrrhula pyrrhula*), Reed bunting (*Emberiza schoeniclus*) and Siskin (*Carduelis spinus*).
- **Waders:** curlew (*Numenius arquata*) (Red Listed and SBL), lapwing (*Vanellus vanellus*) (Red Listed and SBL), ringed plover (*Charadrius hiaticula*) (Red Listed), woodcock (*Scolopax rusticola*) (Red Listed and SBL) (Caledonian



Conservation 2019 & 2020 records) have been recorded in open habitats at various locations within Brucefield Estate.

#### 6.1.2.3 Amphibians and Reptiles

No protected amphibian species records were found within the search area. Common lizard (*Zootoca vivipara*) has been recorded at several locations across Brucefield Estate including numerous observations at Craigmad Heath in 2019 and 2020, as well as at the unnamed road south of Craigmantoy (NS 94449069) and unnamed road between Easter and Wester Clashies (NS 95495 90889) (Caledonain Conservation records). Adder (*Viperus berus*) was recorded in 2013 near the cycle track, to the western extent of the estate (NS94499187) (Caledonain Conservation records).

#### 6.1.2.4 Invertebrates

A number of invertebrate species with conservation statuses have been recorded at Brucefield Estate including small-pearl bordered fritillary (*Boloria selene*) (Near Threatened, Scottish Biodiversity List [SBL]), *Megasternum concinnum* (SBL), *Allomengea vidua* (Nationally Scarce [NS]), *Gymnetron veronicae* (NS), *Pherbellia griseola* (NS), *Tetanocera phyllophora* (NS) *Thamiocolus viduatus* (NS), *Tropiphorus terricola* (NS) and *Quedius fulvicollis* (NS) (Caledonian Conservation records). A list of invertebrate species with conservation designations recorded at locations within Brucefield Estate is provided in Table 4.

**Table 4. Invertebrate species with conservation designations recorded at locations within Brucefield Estate.**

Location	Species name	Conservation status
Brucefield House Meadow	<i>Tropiphorus terricola</i>	NS
Craigmad Wood	<i>Megasternum concinnum</i>	SBL
Hartshaw Grassland	<i>Pherbellia griseola</i>	NS
	<i>Gymnetron veronicae</i>	NS
Low Field	<i>Allomengea vidua</i>	NS
	<i>Quedius fulvicollis</i>	NS
	<i>Thamiocolus viduatus</i>	NS
	<i>Megasternum concinnum</i>	SBL
Prooch's Field	<i>Allomengea vidua</i>	NS
	<i>Thamiocolus viduatus</i>	NS
	<i>Megasternum concinnum</i>	SBL
	<i>Boloria selene</i>	NT, SBL
	<i>Tetanocera phyllophora</i>	NS

#### 6.1.2.5 Plants

A number of notable plant species are known to occur at Brucefield Estate, most of which are arable marginal species (Caledonian Conservation records) including shepherd's-needle (*Scandix pecten-veneris*), (Nationally Critically Endangered), corn marigold (*Glebionis segetum*) (Nationally Vulnerable), corn spurrey (*Spergula arvensis*) (Nationally Vulnerable), hairy buttercup (*Ranunculus sardous*) (SBL), white mustard (*Sinapis alba*) (SBL), sun spurge (*Euphorbia helioscopia*) (SBL), black-bindweed (*Fallopia convolvulus*) (SBL), and charlock (*Sinapis arvensis*) (SBL). Greater butterfly-orchid (*Platanthera chlorantha*) (Nationally Near Threatened), has been recorded near Brucefield Mains, in fields south of the old railway line, and by a derelict building south of Hartshaw Clump.

The Nationally Scarce bryophytes (*Calypogeia integristipula* (Bluther Burn) and *Ulota calvescens* (Slack Wood) were also identified (Caledonian Conservation records).

#### 6.1.2.6 Invasive Non-native species (INNS)

Rhododendron (*Rhododendron ponticum*) has been recorded widely across Brucefield Estate (Cathrine & Currie 2019), but a programme of control is currently underway across the Estate.

A stand of Japanese knotweed (*Fallopia japonica*) was recorded on Old Gartarry track in 2018 (Caledonian Conservation record), however no other records of this species were identified within the survey area.

## 6.2 Weather

Timings and weather conditions during the Extended Phase 1 habitat survey update are provided in Table 5 below. Weather conditions were excellent during the survey.

**Table 5. Extended Phase 1 Habitat Survey Weather Conditions**

Date	Surveyor	Start Time	Hour	Visibility	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Frost	Snow
01/03/2021	JS	11:00	1	2	2	E	0	2	2	0	0
			2	2	2	E	0	2	2	0	0
			3	2	2	E	0	1	2	0	0
			4	2	2	E	0	1	2	0	0
			5	2	1	E	0	1	2	0	0
			6	2	1	E	0	2	2	0	0
02/03/2021	JS	10:00	1	2	3	E	0	8	1	0	0
			2	2	3	E	0	7	2	0	0
			3	2	3	E	0	5	2	0	0

### Key

- *Visibility:* 0 = <1km; 1 = 1-2km; 2 = ≥2km
- *Wind direction:* according to 16-point compass
- *Wind strength:* according to the Beaufort scale
- *Cloud cover:* in eighths of sky
- *Cloud height:* 0 = <150m; 1 = 150-500m; 2 = >500m
- *Rain:* 0 = None; 1 = Drizzle/Mist; 2 = Light showers; 3 = Heavy showers; 4 = Heavy rain
- *Frost:* 0 = None; 1 = Ground; 2 = All day
- *Snow:* 0 = None; 1 = Onsite; 2 = On high ground only
- *Surveyor:* JS = Julie Smith

## 6.3 Phase 1 Habitats

A Phase 1 Habitat Map of the site is provided in Appendix 1, Figure 2.

Target Notes are listed in Table 6 below and their locations shown in Appendix 1, Figure 3-6.

Photographs are provided in Appendix 2.

### 6.3.1 Red Yetts

#### Habitats

The proposed pod location (NS 9596 9235) is situated within a fenced area of mixed plantation with a small open area of ruderal vegetation to the north.

The open ruderal area is dominated by bracken (*Pteridium aquilinum*) with frequent raspberry (*Rubus idaeus*), occasional bramble (*Rubus fruticosus* agg.), rosebay willowherb (*Chamaenerion angustifolium*), occasional common sorrel (*Rumex acetosa*), broad-leaved dock (*Rumex obtusifolius*) frequent creeping buttercup (*Ranunculus repens*) and carpets of garden yellow archangel (*Lamium galeobdolon* ssp. *argentatum*).

The footprint of the pod location is proposed to sit just within the southern fence, with views of Brucefield Estate to the south, with the adjacent agriculturally improved grazed field in the foreground with patches of gorse scrub. The footprint of the pod stands within an area of open canopy semi-mature planted beech (*Fagus sylvatica*) and Norway spruce (*Picea abies*).

The block of plantation to the immediate west is a dense stand of Sitka spruce (*Picea sitchensis*) with occasional beech and locally frequent elder (*Sambucus nigra*) saplings. To the east is a mixed stand of Scots pine (*Pinus sylvestris*), Norway spruce and occasional rowan (*Sorbus acuparia*) and silver birch (*Betula pendula*). Hybrid larch (*Larix x marschlinsii*) is also present. The ground flora within the woodland is largely comprised of needles but there is a mossy ground flora of *Kindbergia praelonga* and *Atrichum undulatum* with sparse grasses, including creeping soft-grass (*Holcus mollis*). To the north and north east is an open area of ruderal vegetation with occasional exotic non-native garden shrubs and trees including Japanese red-cedar (*Cryptomeria japonica*), Western red-cedar (*Thuja plicata*), Lawson's cypress (*Cupressus lawsoniana*), tulip tree (*Liriodendron* sp.), butterfly bush (*Buddleja davidii*), cotoneaster (*Cotoneaster* sp.), barberry (*Berberis* spp.) and planted yew (*Taxus baccata*).

#### Protected species

A disused small mammal hole was recorded in the plantation to the east (see Appendix, Target Note 1). There was an old scat at the entrance, likely pine marten, and old bark scrapings on an adjacent tree.

A small defunct (not intact) stick nest was recorded in the dense Sitka plantation (see Appendix, Target Note 2).

**Table 6. Extended Phase 1 habitat survey Target Notes (shown in Figure 2)**

Target Note	Site	Grid reference	Description
1	Red Yetts		See Confidential Annex Table C2
2		NS9595192395	Stick nest
3	Scaurs	NS9566092030	Rhododendron
4			See Confidential Annex Table C2
5			See Confidential Annex Table C2
6		NS9564191931	Bat Roost Feature
7	Low Field	NS9543391700	Deadwood
8		NS9543691719	Bat Roost Potential
9		NS9537491738	Bat Roost Potential
10		NS9539491733	Stick nest
11	Saw Mill	NS9528991537	Stick nest
12		NS9528091608	Stick nest
13		NS9518591557	Stick nest
14		NS9533691561	Deadwood
15	Hartshaw Clump	NS9561691351	Rhododendron
16		NS9564791334	Rhododendron
17		NS9570491363	Small mammal hole
18		NS9576291349	Bat Roost Feature
19		NS9565391345	Bat Roost Potential
20		NS9566191341	Bat Roost Potential
21		NS9568491318	Bat Roost Potential
22		NS9571591331	Bat Roost Potential
23		NS9572591320	Bat Roost Potential
24		NS9571091304	Bat Roost Potential
25		NS9576691366	Bat Roost Potential
26		NS9573691350	Bat Roost Potential
27		NS9566691329	Stick nest
28	Hartshaw Farm	NS9615291530	Rhododendron
29		NS9605791586	Bat Roost Feature (rowan)
30		NS9602991553	Bat Roost Feature (rowan)
31		NS9606491544	Bat Roost Feature (Scots pine)
32		NS9610391558	Bat Roost Potential
33		NS9614791438	Bat Roost Potential
34		NS9615591580	Bat Roost Potential
35		NS9607791609	Bat Roost Potential
36		NS9604791561	Bat Roost Potential
37		NS9603491558	Owl box
38		NS9604191582	Bird box
39		NS9609591466	Stick nest
40		NS9613991613	Open Water

### 6.3.2 Scaurs Wood

#### Habitats

The proposed pod locations are sited on a wooded knoll of mixed plantation woodland, with open canopy silver birch, and hybrid larch with occasional oak (*Quercus* sp.). Bracken is abundant in areas of open canopy. Young rhododendron shoots are present in the plantation to the south west of the knoll (Target Note 3).

Sitka spruce forms a dense canopy to the west with occasional Scots pine of plantation origin.

The field to the east, known as Prooch's field, is mapped as fen habitat. There is a tall, dense sward of soft-rush (*Juncus effusus*), sharp-flowered rush (*J. acutiflorus*), meadowsweet (*Filipendula ulmaria*), water horsetail (*Equisetum fluviatile*) and common valerian, as well as grey willow (*Salix cinerea*) scrub.

A small area of soft rush dominated vegetation is present in the adjacent grazed pasture to the north. This is beyond a dry ditch which runs along the northern boundary of the wood.

#### Protected species

See Confidential Annex for sensitive species.

The knoll is accessed off the road via an old track and over a small bridge crossing over the aforementioned ditch. Mature oak, birch and Scots pine are present along the track with scrubby elder. There is low bat roost potential in a mature oak near the existing bridge (Target Note 6). The other mature trees have superficial crevices. Adjacent Scots pine (*Pinus sylvestris*) had no obvious bat roost potential features, but a stick nest which appears intact was recorded here.

### 6.3.3 Low Field

The proposed pod locations are sited within mixed plantation woodland on a gentle south facing slope with a view towards Low Field. This is a dense and relatively young plantation dominated with larch and Sitka spruce. There are occasional semi-mature silver birch and standing dead birch within the plantation (Target Note 7). To the east of the block are some beech and lodgepole pine (*Pinus contorta*) which appear to have needle blight.

A narrow band of young elder shoots have grown along the northern boundary where cleared scrub has previously been laid down.

This block of plantation woodland has been recently fenced with barb wire fencing, separating the woodland from the improved fields to the north and south.

Access to the site is made from the road to the east, along an existing forest route. It is a grassy vegetated track with tufted hair grass (*Deschampsia cespitosa*), creeping soft grass, and occasional blinks (*Montia fontana*), indicating damp soil conditions. A damp ditch runs along the northern margin of the track with low occasional gorse, beyond which are two mature Scots pine and mature oak.

Along the southern margin is a wet ditch which flows east to west. Broad-leaved pondweed (*Potamogeton natans*) is frequent in the shallow running water and the ditch sides are dominated with tufted hair grass and occasional soft rush.

The field to the south beyond the barbed wire fence is an Improved grassland with areas dominated by soft rush. A narrow margin of young elder shoots have grown up along the inside of the improved field, from elder scrub which has been cleared and laid down.

### Protected Species

There is some low bat roost potential in the mature trees to the north of the existing forest track. There are two mature Scots pine with splits and crevices, located beyond the ditch (Target Note 8). Fallen limbs with cracks and splits in a mature oak also exhibit some low bat roost potential (Target Note 9).

A stick nest was recorded in one of the mature Scots pine to the north of the track (Target Note 10).

The wet ditch along the southern boundary of the woodland block has some potential for water vole with suitable bank edges for burrowing and some, albeit limited vegetation on the banks for foraging. No water vole signs were recorded.

### 6.3.4 Sawmill

#### Habitats

The proposed pods are located within a tall stand of Scots pine plantation, mapped as coniferous plantation. Mature larch are present and standing dead birch occasional. The ground flora has a semi-natural character dominated by a spongy carpet of mosses with cushions of *Polytrichum commune* and carpets of *Hypnum andoi*, *Pleurozium schreberi*, *Hylocomium splendens* and bright green tufts of *Dicranum majus*. These are all typical semi-natural woodland mosses.

There is occasional to locally frequent Sitka spruce regeneration in the understorey and deadwood is frequent.

Further to the west of this woodland is a stand of tall dense Norway spruce.

#### Protected species

Within the Scots pine plantation three small stick nests were recorded. One defunct nest was recorded high in a mature Larch (Target Note 11), one intact nest was high in a larch (Target Note 12) and one other intact nest was high in a Scots pine (Target Note 13).

There is a standing dead birch tree with a deep woodpecker hole (Target Note 14).

Access to the pods is via an existing tarmac track to the sawmill. A grass dominated track continues westwards into the woodland where the pod locations are sited just off the track.

### 6.3.5 Hartshaw Clump

#### Habitats

The proposed pod location is sited on a wooded knoll surrounded by dense Sitka and Norway spruce. Mature Scots pine and oak with occasional beech are present in an open canopy across the knoll and surrounding forest. The mature broadleaves here stand tall and are well spaced amidst the conifers which were underplanted in more recent years (approximately 25 years old). The groundflora is dominated by leaf litter and a carpet of moss with frequent wood sorrel (*Oxalis acetosella*).

Rhododendron regrowth was recorded in two locations from cut stumps which are due to be treated (Target Note 15 and 16).

Access to the pod location is through an old stone wall from the roadside, through dense Sitka.



### Protected species

Small mammal holes were recorded with fresh diggings around two entrance holes. There is a fallen larch covering the holes (Target Note 17).

Moderate bat roost potential was recorded in a mature tree with a hole near the base of the trunk where the entrance was found to continue well into the trunk of the tree (Target Note 18).

Several other mature trees were recorded across the knoll and surrounding woodland with low bat roost potential. The potential is assessed as low as no features were recorded but there is limited visibility of trees which exhibit features with potential for roosting bats (Target Notes 19 to 26).

A small stick nest was recorded high in a tall majestic Scots pine (Target Note 27).

### 6.3.6 Hartshaw Farm

#### Habitats

There are two proposed pod locations. One is sited on a wooded knoll with an open canopy of tall mature Scots pine. There is no understorey and the ground flora is dominated by bracken with a carpet of moss (*Hypnum andoi*) with frequent wood sorrel and rarely occurring chickweed wintergreen (*Lysimachia europaea*).

The second pod location is sited at the base of the wooded knoll in closer proximity to the semi-natural birch wood to the north, and dense Sitka plantation to the east.

The birch wood has a semi-natural ground flora with mossy cushions, and carpets of *Sphagnum girgensohnii*, *Sphagnum capillifolium*, *Pluerozium schreberi* and *Dicranum majus*. Blaeberry (*Vaccinium myrtillus*) is frequent with occasional ling heather (*Calluna vulgaris*) and frequent deadwood. Scots pine is frequent in the canopy and immature beech are occasional in the understorey. Herbivory by deer appears to be high as the blaeberry and ling heather are suppressed and there are high levels of recent browsing.

A treated rhododendron stump was recorded (Target Note 28).

#### Protected Species

Bat roost potential was recorded in several of the Scots pine and two rowan trees on the knoll. A small crevice in a semi-mature rowan offers moderate potential (Target Note 29) and a deep crevice in the trunk of a mature rowan that continues up into the trunk is considered to have moderate potential (Target Note 30). The mature Scots pines present across the knoll and surrounding woodland are tall and majestic. The majority have straight trunks with limited signs of bat roosting features, but one mature pine in close proximity to a proposed pod location has a large deep crevice high in the trunk with limited visibility (Target Note 31). There is some potential that this crevice may be used as a resting site for small mammal (e.g. red squirrel) or nesting birds. Several other pine trees with potential bat roost features with low potential were recorded (Target Notes 32 to 36).

An owl box was recently erected on a mature Scots pine tree within close proximity to the proposed pod location (Target Note 37).

A bird box was recently sited on a tree on the wooded knoll (Target Note 38).

A stick nest was recorded high in a mature Scots pine amongst an area underplanted with semi-mature conifer due to be felled rushes (Target Note 39).

A small waterbody, approximately 10x10 m, was recorded to the north of the knoll, with gradual sloping edges, peaty substrate and mossy vegetation on margins with occasional rushes (Target Note 40).

## 7 Conclusions and Recommendations

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### 7.1 Habitats

Construction footprints of the proposed pods are sited in areas of mixed plantation woodland (Red Yetts, Scaurs, Low Field, Hartshaw Clump) and Scots pine plantation (Sawmill and Hartshaw Farm).

There is semi-natural broadleaved birch woodland within the survey area of Hartshaw Farm. There are no plans to fell trees within this area of woodland. General good practice mitigation should be followed including pollution prevention, to avoid disturbance and deadwood (both standing and fallen) should be retained.

Marshy grassland is present to the north of the pod location at Scaurs Wood. This is located in an adjacent field beyond a dry ditch. It is a small area of soft rush dominated vegetation characteristic of MG10 (NVC community<sup>3</sup> *Holcus lanatus*-*Juncus effusus* rush pasture) (while MG10 is considered a potential ground water dependent habitat<sup>4</sup>, this area is not considered to be hydrologically linked to the site and botanically has negligible conservation value).

Marshy grassland characteristic of MG10 with patches of M23 (NVC community *Juncus effusus/acutiflorus*-*Galium palustre* rush pasture) is present at Low Field in the open ground beyond a wet ditch and grass covered track to the south of Low Field pod locations. This is not considered to be hydrologically connected to the site.

At each location there are existing forest plans for thinning with the objective of removing non-native conifers and woodland management is proposed with the aim of improving the site for biodiversity.

The majority of the rhododendron bushes at Brucefield Estate were cleared by flailing or chainsaw cutting in 2020 (Cathrine & Currie 2019). Regrowth of cut stumps and remaining low foliage is still widespread and plans for follow-up treatment are due to be put in place. In the meantime, where rhododendron was recorded (largely young shoots of recently cut stumps), 10 m exclusion zones should be set up to avoid any spread of this species.

See Table 7 below for a summary of ecological sensitivities found at each of the proposed survey areas and corresponding mitigation recommendations.

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<sup>3</sup> Rodwell, J.S. (Ed.). 1992. *British Plant Communities Volume 3: Grasslands and montane communities*. Cambridge University Press, Cambridge.

<sup>4</sup> <https://www.sepa.org.uk/media/144266/lups-gu31-guidance-on-assessing-the-impacts-of-development-proposals-on-groundwater-abstractions-and-groundwater-dependent-terrestrial-ecosystems.pdf>

**Table 7. Summary of the ecological sensitivities found at each of the proposed pod locations and corresponding mitigation recommendations.**

Site	Feature	Distance from central grid reference of proposed pod locations	Mitigation
<b>Red Yetts</b>	Inactive small mammal hole	60 m east	<p>The mammal hole was considered inactive at the time of survey.</p> <p>Preconstruction surveys will be required to check the status of the mammal hole within 48 hours of any works commencing.</p> <p>See further guidance below regarding mitigation for protected mammals.</p>
	Defunct stick nest	40 m north west	<p>The stick nest was not intact and was considered inactive at the time of survey.</p> <p>Preconstruction nesting bird checks will be required if works are undertaken during the breeding bird season (March-August).</p>
<b>Scaurs</b>	See Confidential Annex for sensitive species recommendations.		
	Low bat roost potential	100 m to the nearest proposed pod location. Within 10 m of the existing access track requiring upgrade.	<p>No plans to fell this tree in relation to proposed development.</p> <p>Follow general mitigation guidance outlined below to minimise disturbance.</p>

Site	Feature	Distance from central grid reference of proposed pod locations	Mitigation
	Intact stick nest	100 m to the nearest proposed pod location. Within 10 m of the existing access track requiring upgrade.	<p>No plans to fell in relation to proposed development.</p> <p>Preconstruction nesting bird checks will be required if works are undertaken during the breeding bird season (March-September).</p> <p>Mark up a 5 m exclusion zone for potential non-breeding use by squirrel.</p> <p>Follow general mitigation guidance outlined below to minimise disturbance.</p>
<b>Low Field</b>	Low bat roost potential	Over 40 m	<p>No plans to fell these trees in relation to proposed development. They are sited to the north of the existing access track. Pod development is to the south.</p> <p>Follow general mitigation guidance outlined below to minimise disturbance.</p>
	Intact stick nest	Over 40 m	<p>No plans to fell the mature Scots pine in relation to proposed development. It is sited to the north of the existing access track. Pod development is to the south.</p> <p>Follow general mitigation guidance outlined below to minimise disturbance.</p>

Site	Feature	Distance from central grid reference of proposed pod locations	Mitigation
<b>Sawmill</b>	Stick nests	Over 50 m	<p>Nests not confirmed to be in active use. Potential for nesting bird or temporary use by squirrel.</p> <p>No plans to fell in relation to proposed development.</p> <p>Carry out preconstruction checks for nesting birds.</p> <p>Mark up a 5 m exclusion zone for potential non-breeding use by squirrel.</p> <p>See guidance below for further detailed mitigation for nesting birds and squirrel.</p> <p>Follow general mitigation guidance outlined below to minimise disturbance.</p>
	Deadwood	Over 40 m	<p>No plans to fell this tree in relation to proposed development.</p> <p>Retain deadwood.</p>
<b>Hartshaw Clump</b>	Rhododendron	<p>Approx. 10 m</p> <p>Nearest rhododendron bush is approx. 10 m while second bush is over 40m distant.</p>	<p>A 10 m exclusion zone should be marked on the ground to avoid disturbance to rhododendron and its root system. This may require micro-siting the pod footprint.</p> <p>See further mitigation guidance outlined below.</p>
	Small mammal holes	Over 50 m north east.	<p>Not confirmed active. As precaution, maintain a minimum 30 m exclusion zone.</p> <p>See further guidance below regarding general mitigation for protected mammals.</p>
	Moderate bat roost potential	100 m east	<p>No felling pertaining to development.</p> <p>See general mitigation guidance below.</p>

Site	Feature	Distance from central grid reference of proposed pod locations	Mitigation
	Low bat roost potential	Two mature trees within 10 m (a mature Scots pine with flaky bark and limited view, a mature oak with crevice over 15m above ground level)  One mature beech with split limb 30 m east.  Remaining six trees are sited over 60 m to the east.	There are plans to thin this mixed woodland to remove non-native spruce as part of existing forestry plans, but there are no plans to fell mature broadleaves or Scots pine during forest operations or pod construction.  If felling of any of the identified trees is required and cannot be avoided, targeted bat surveys will be undertaken to determine presence of roosting bats including further detailed mitigation measures.  See mitigation measures outlined below recommended to minimise disturbance to any potential roosting bats in neighbouring trees.
	Stick nests	15 m east	Nest not confirmed to be in active use. Potential for nesting bird or temporary use by squirrel.  There are no plans to fell this or surrounding mature broadleaves or Scots pine.  Carry out preconstruction checks for nesting birds to avoid disturbance during breeding bird season  Mark up a 5 m exclusion zone for potential non-breeding use by squirrel.  See guidance below for further detailed mitigation for nesting birds and squirrel.
<b>Hartshaw Farm</b>	Rhododendron	Approx. 90 m east	A 10 m exclusion zone should be marked on the ground to avoid disturbance to rhododendron and its root system.  See further mitigation guidance outlined below.

Site	Feature	Distance from central grid reference of proposed pod locations	Mitigation
	Low and moderate bat roost potential	<p>Within 10 m (Moderate potential in mature rowan, with a deep crevice that continues up into trunk)</p> <p><b>Within 10 m (Moderate potential in mature Scots pine, with large crevice high in tree out of reach)</b></p> <p>Approx. 30 m (Moderate potential in mature rowan with small crevice)</p> <p>Between 40-140 m (trees with low bat roost potential)</p>	<p>No felling is planned pertaining to development.</p> <p>Further targeted bat surveys are required to determine presence of roosting bats in order to avoid disturbance to trees with bat roost potential within 30 m.</p> <p>If felling of any of the identified trees is required and cannot be avoided, targeted bat surveys will be undertaken to determine presence of roosting bats including further detailed mitigation measures.</p> <p>See general mitigation measures outlined below recommended to minimise disturbance to any potential roosting bats in neighbouring trees.</p> <p>The large crevice high in the trunk of the Scots pine tree highlighted <b>in bold</b> (Target Note 31) has potential to offer a resting site for other small mammal (e.g. red squirrel) or nesting birds. Due to the proximity of the tree to the proposed pod location further survey work is required to assess active use by any of these species and appropriate mitigation put in place as outlined below (e.g. exclusion zones to avoid disturbance if necessary). Unless the crevice is found to be inactive there may be a requirement to resite the proposed pod location due to its close proximity.</p>



Site	Feature	Distance from central grid reference of proposed pod locations	Mitigation
	Owl box	Approx 10 m from nearest pod.	Owl box is recently erected and not in use.  To arrange re-siting to another appropriate location prior to works.  Otherwise preconstruction checks required as outlined below.
	Bird box	Over 30 m from nearest pod.	Bird box is recently erected and not in use.  To arrange re-siting to another appropriate location prior to works.  Otherwise, preconstruction checks required for nesting birds as outlined below.
	Stick nest	Over 100 m from nearest pod.	Nest not confirmed to be in active use. Potential for nesting bird or temporary use by squirrel.  No felling is planned pertaining to development and nest is sited over 70 m outside appropriate exclusion zones.  No further action required.
	Waterbody	Over 60 m north of nearest pod.	No targeted great crested newt surveys have been carried out at the estate. No protected amphibian species have been recorded at Brucefield Estate during previous surveys carried out by Caledonian Conservation or identified during the desk study.  <b>Pre-construction checks should involve marking any potential amphibian hibernation sites.</b>

## 7.2 Bats

Within the survey area, one tree with moderate bat roost potential was recorded over 100 m from the proposed pod location at Hartshaw Clump, and one Scots pine and two rowan trees with moderate potential were recorded within 30 m of the proposed pod locations at Hartshaw Farm.

Numerous trees were recorded as having low bat roost potential, based on limited visibility of roost features in mature trees. Low suitability only means that the probability of bat use of the feature is low, not that bats are definitely absent.

Additionally, good bat roosting and foraging habitat is present within Brucefield Estate and the wider landscape. The desk-based study identified three species of bat roosting in buildings on the estate.

No felling is planned pertaining to development.

- Targeted bat surveys are required to determine presence of roosting bats at Hartshaw Farm in order to determine presence of roosting bats and avoid disturbance to trees with bat roost potential within 30 m.
- If works are to take place within 30 m of the identified trees and/or if felling of any of the identified trees with low or moderate potential is required and cannot be avoided targeted bat surveys will be undertaken to determine presence of roosting bats including further detailed mitigation measures.
- During the construction phase, lighting should be placed to minimise disturbance to foraging bats. Lighting for pods during the operational phase should be designed to minimise light pollution to the surrounding area, in order to minimise disturbance to foraging bats and their invertebrate prey.
- A watching brief is recommended during works pertaining to the development. Should any bats be found, all work in the vicinity of the bats should immediately cease and advice be obtained from a licensed bat worker.

## 7.3 Badger

See Confidential Annex section 8.3.

Badger activity is present across Brucefield Estate and there is one recorded active sett within the current survey area. A 30 m exclusion zone should be marked up on the ground and a watching brief maintained during construction operations. No works should take place within the exclusion zone. All works should be undertaken during daylight hours.

## 7.4 Red squirrel

The widely distributed presence of squirrel dreys and feeding signs at several locations, sightings of red squirrel adults, and the sighting of a young red squirrel during July 2019, indicates that the Estate is likely to be used by red squirrel for breeding. A squirrel drey was recorded within 200 m west of the proposed pods at Sawmill in 2019, but at that time was not in active use. Two further dreys were recorded over 90 m north of the proposed pods at Hartshaw Farm, in Burnbrae Wood where signs of fresh squirrel feeding were present.

Stick nests recorded during this survey within the survey area may be used by red squirrel on a temporary basis but are not considered suitable for breeding.

- It is recommended that works should be undertaken outside the breeding season for squirrel where possible (breeding is between February and September so works to be carried out between October to January inclusive).
- Where work is undertaken within the breeding season, no works should take place within 50 m of breeding dreys.
- Pre-operational surveys should be carried out to check if the status of the recorded nest changes or any new active dreys have arisen between the time of this survey and the start of works. It is recommended that checks are carried out within less than three weeks of proposed works.
- If pre-operational surveys confirm a drey is not used for breeding, smaller protection zones will be required (5 m or to the nearest neighbouring tree, whichever is less).
- Where works cannot avoid the required buffer zones, the work will require a licence from NatureScot before they can proceed; so as to avoid the risk of committing an offence under the Wildlife and Countryside Act 1981 as amended.

## 7.5 General Mitigation Measures for Protected Mammals

It is possible that protected mammals (badger, red squirrel, pine marten, otter) may pass through the site while foraging or commuting. Mitigation measures should be implemented to reduce risk to protected mammals that may occasionally move through the site. These measures include pre-construction checks, installation of escape ramps in open trenches during construction, and enforcement of a low speed limit for vehicles on site.

## 7.6 Nesting birds

Suitable nesting habitat is present at all sites and some small stick nests were recorded<sup>5</sup>. The breeding season for most bird species occurs from March to August, inclusive, but can extend into September depending on the weather. It is recommended that tree-felling works take place outwith the breeding bird season if possible. If tree felling must take place during the breeding bird season, checks for nesting birds should be carried out within 24 hours prior to any tree-felling. If any active nests are found, they will be monitored and felling of trees will not commence until breeding has ended.

No signs of crossbill (*Loxia* sp.) (Schedule 1<sup>6</sup>) were observed during the Extended Phase 1 survey, but suitable habitat is present within the survey area and crossbills were recorded at Chapel Knowe at Brucefield Estate (Caledonian Conservation records) in 2019.

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<sup>5</sup> All wild nesting birds are protected under the Wildlife and Countryside Act 1981 (as amended).

<sup>6</sup> Crossbill is a Schedule 1 protected species under the Wildlife and Countryside Act, as well as an SBL priority species.

Crossbill may breed at any time of the year where there is a good cone crop. As such, pre-construction checks should be carried out for nesting crossbill in suitable areas of habitat (the survey area surrounding all pod locations have conifer trees which may provide suitable habitat for crossbill), within 24 hours prior to tree felling, regardless of date. If any active nests are found, the mitigation measures described above will be followed.

There is no sign of the erected barn owl<sup>7</sup> box being in use. It is recommended that the box is re-sited to another appropriate location before the breeding season.

## 7.7 General recommendations for reptiles

Since reptiles are known to be present across Brucefield Estate, a watching brief will be maintained for during the active season, and if a reptile is found works will stop as soon as it is safe to do so, and will not recommence until appropriate mitigation has been designed in consultation with an ecologist and NatureScot.

Note that there is no accepted mitigation to allow destruction of hibernaculum features during the hibernation season. Measures should be taken to mark and avoid likely hibernaculum features. It is recommended that works take place outwith the hibernation season (September to March inclusive).

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<sup>7</sup> Barn owl is a Schedule 1 protected species under the Wildlife and Countryside Act, as well as an SBL priority species.

## 7.8 General recommendations for invertebrates and plants

Although several notable invertebrate and plant species are known to occur at Brucefield Estate, none of the pod locations are anticipated to directly impact these populations. Standard construction best practice measures to prevent runoff polluting wetland habitats and watercourses (e.g. use of silt traps and ditches) should be followed. All deadwood should be retained or moved to a suitable location if clearance is required.

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## APPENDIX 1: Figures

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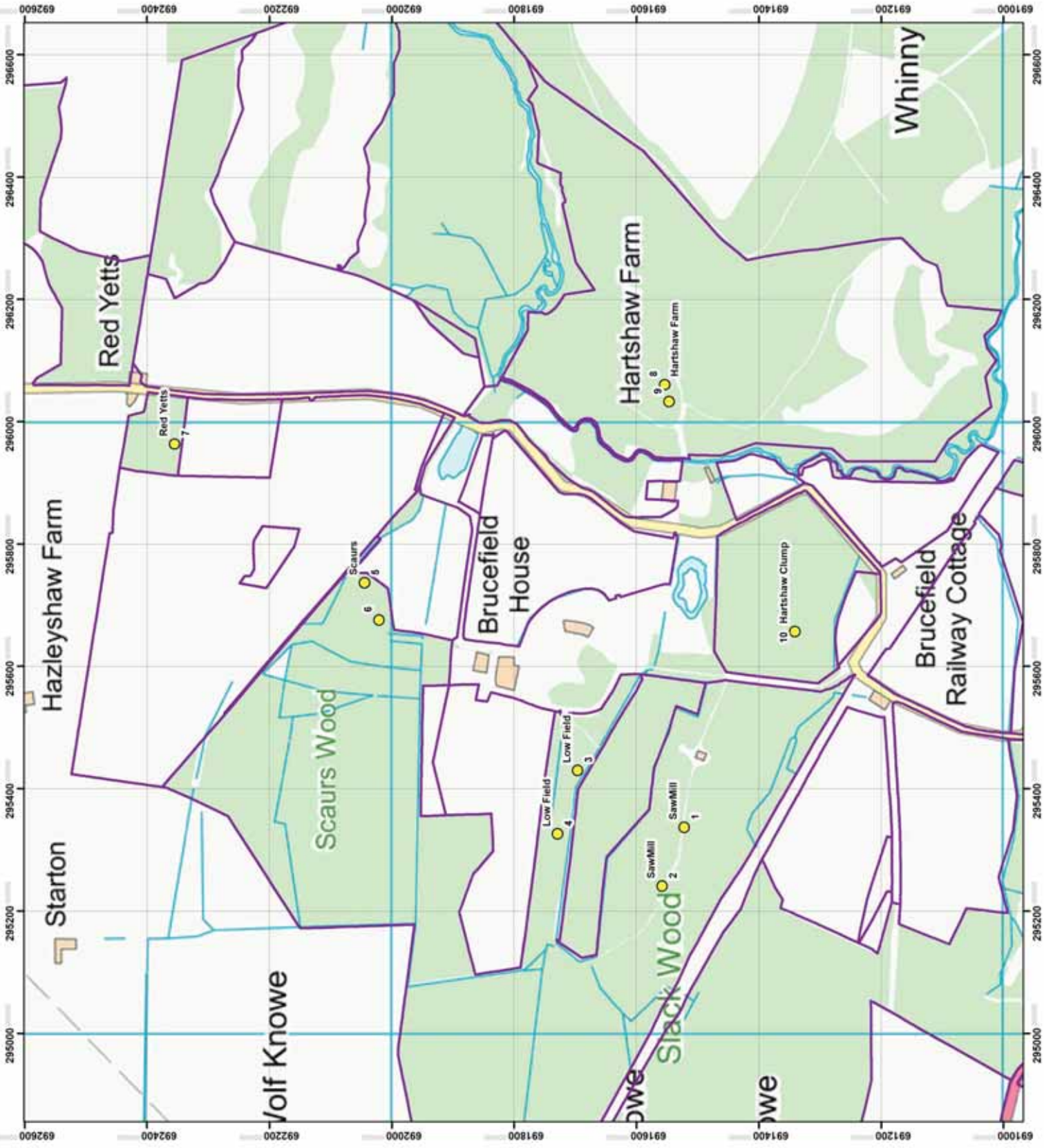
**Key**

- Brucefield Estate boundaries
- Pod locations



Brucefield Estate

**Figure 1**  
Pod Locations



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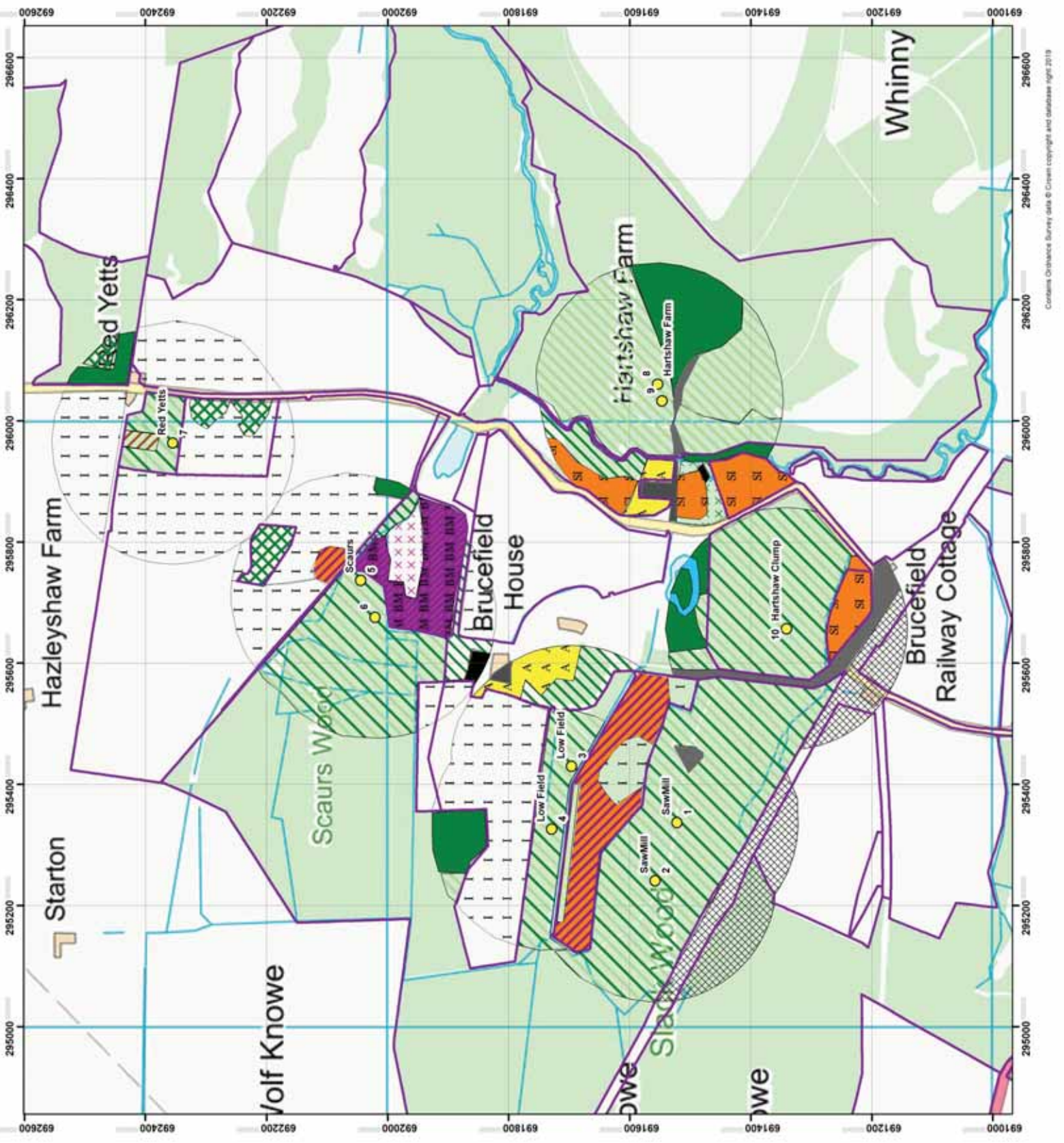
**Key**

- Brucefield Estate boundaries
- Pod locations
- Phase 1 Habitats**
  - Amenity
  - Buildings
  - Buildings (Hardstanding)
  - Buildings (Tracks)
  - Dense Scrub
  - Elder scrub
  - Fen (Scrub)
  - Improved grassland
  - Marshy grassland
  - Mixed plantation woodland
  - Not Surveyed
  - Open water
  - Plantation broadleaved woodland
  - Plantation coniferous woodland
  - Ruderal vegetation
  - Scattered Scrub
  - Semi-improved neutral grassland
  - Semi-natural broadleaved woodland
  - Willow scrub (Fen)

Scale 1:6,000 @ A3  
0 25 50 100 150 200 m

**Brucefield Estate**

**Figure 2**  
**Phase 1 Habitats**



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**Key**

- Pod location
- Brucefield Estate boundaries
- Stick nest

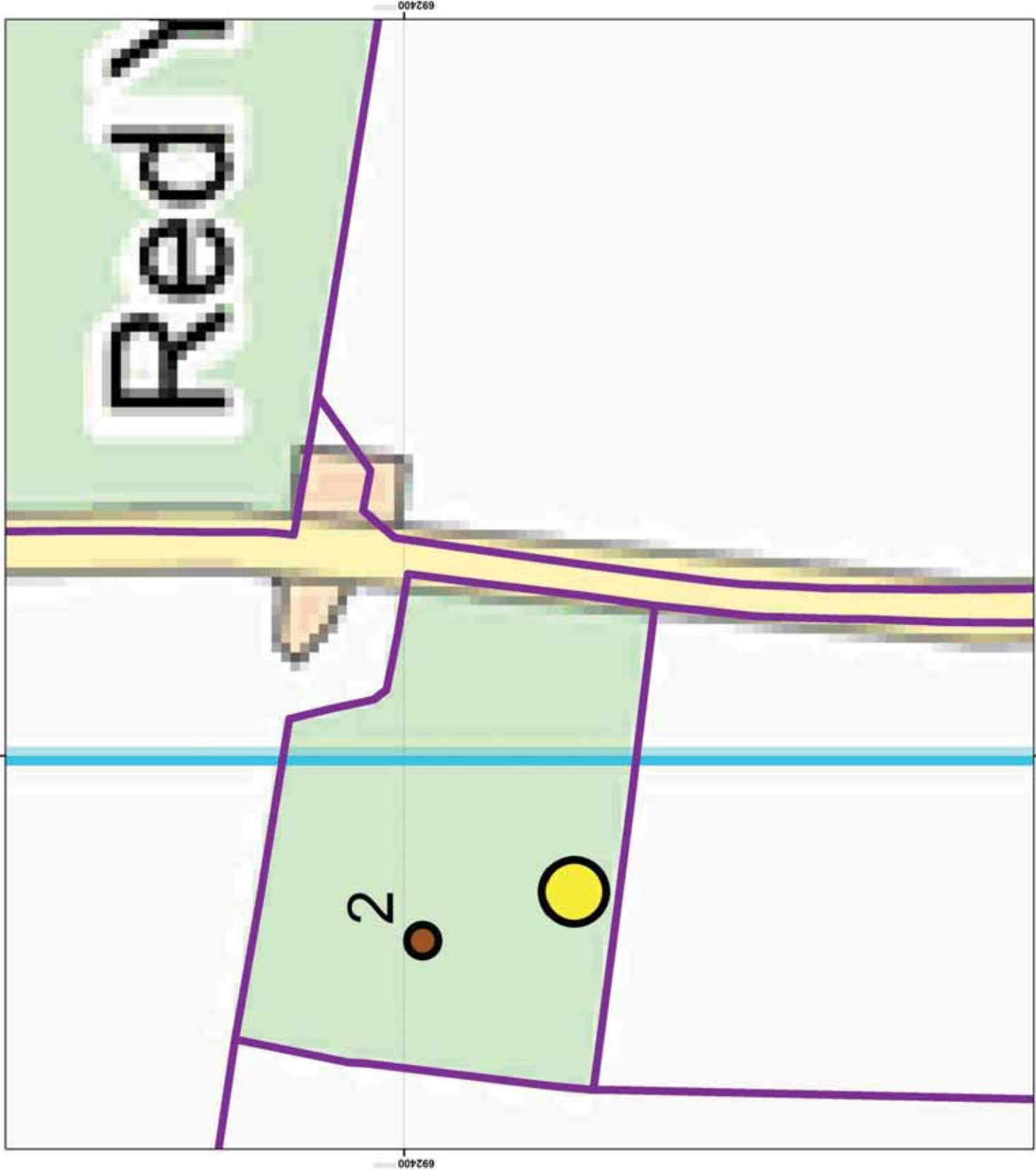


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**Brucefield Estate**

**Figure 3 Target Notes  
Red Yetts**





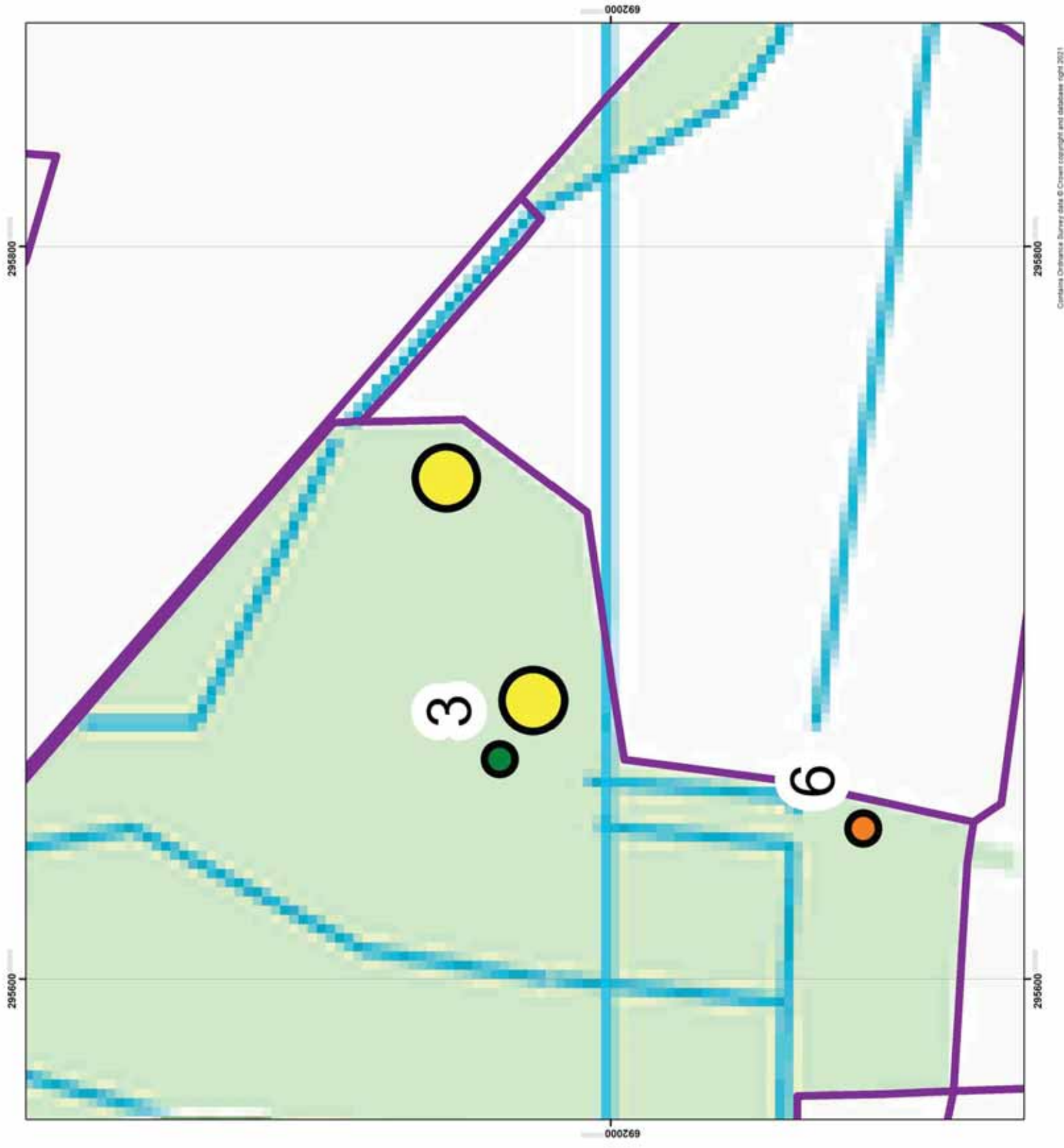
**Key**

- Brucefield Estate boundaries
- Pod location
- Target Notes**
- Bat Roost Feature
- Rhododendron



**Brucefield Estate**

**Figure 4  
Target Notes Scours**





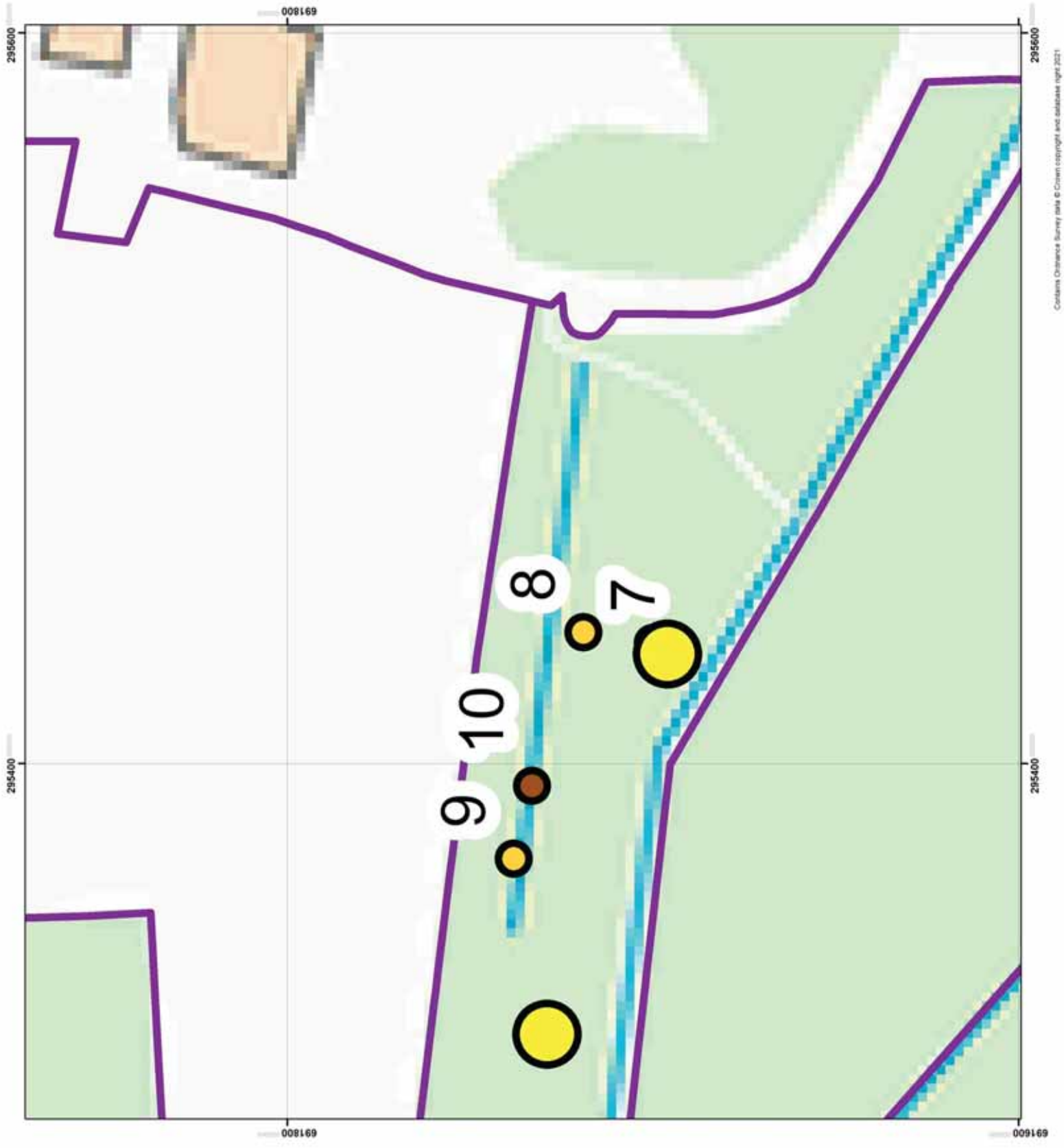
**Key**

- Brucefield Estate boundaries
- Pod location
- Target Notes**
  - Bat Roost Potential
  - Deadwood
  - Stick nest



**Brucefield Estate**

**Figure 5**  
**Target Notes Low Field**



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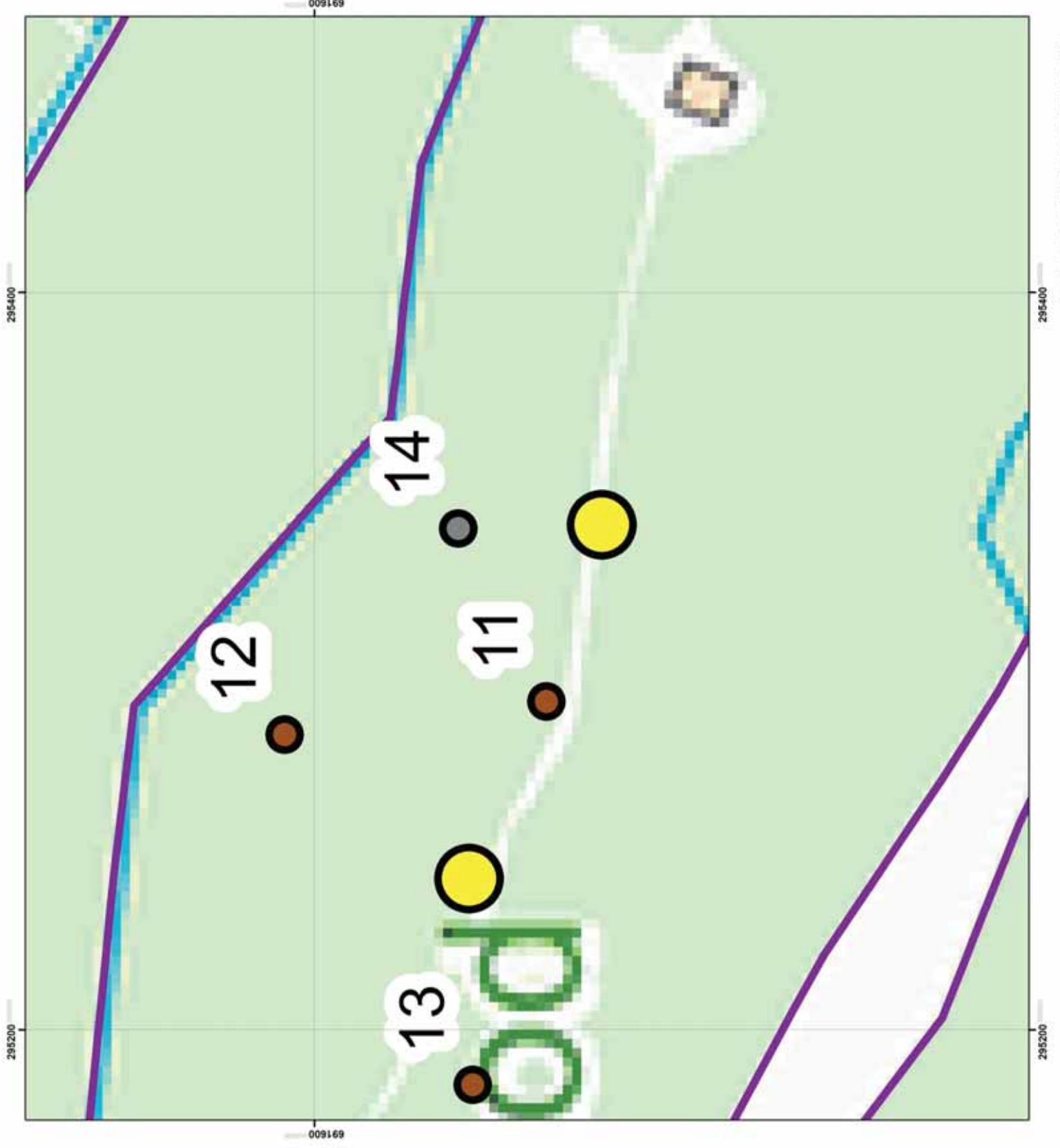
**Key**

- Brucefield Estate boundaries
- Pod location
- Target Notes**
  - Deadwood
  - Stick nest



**Brucefield Estate**

**Figure 6**  
**Target Notes Sawmill**



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**Key**

- Brucefield Estate boundaries
- Pod location
- Target Notes**
- Bat Roost Feature
- Bat Roost Potential
- Rhododendron
- Small mammal hole
- Stick nest

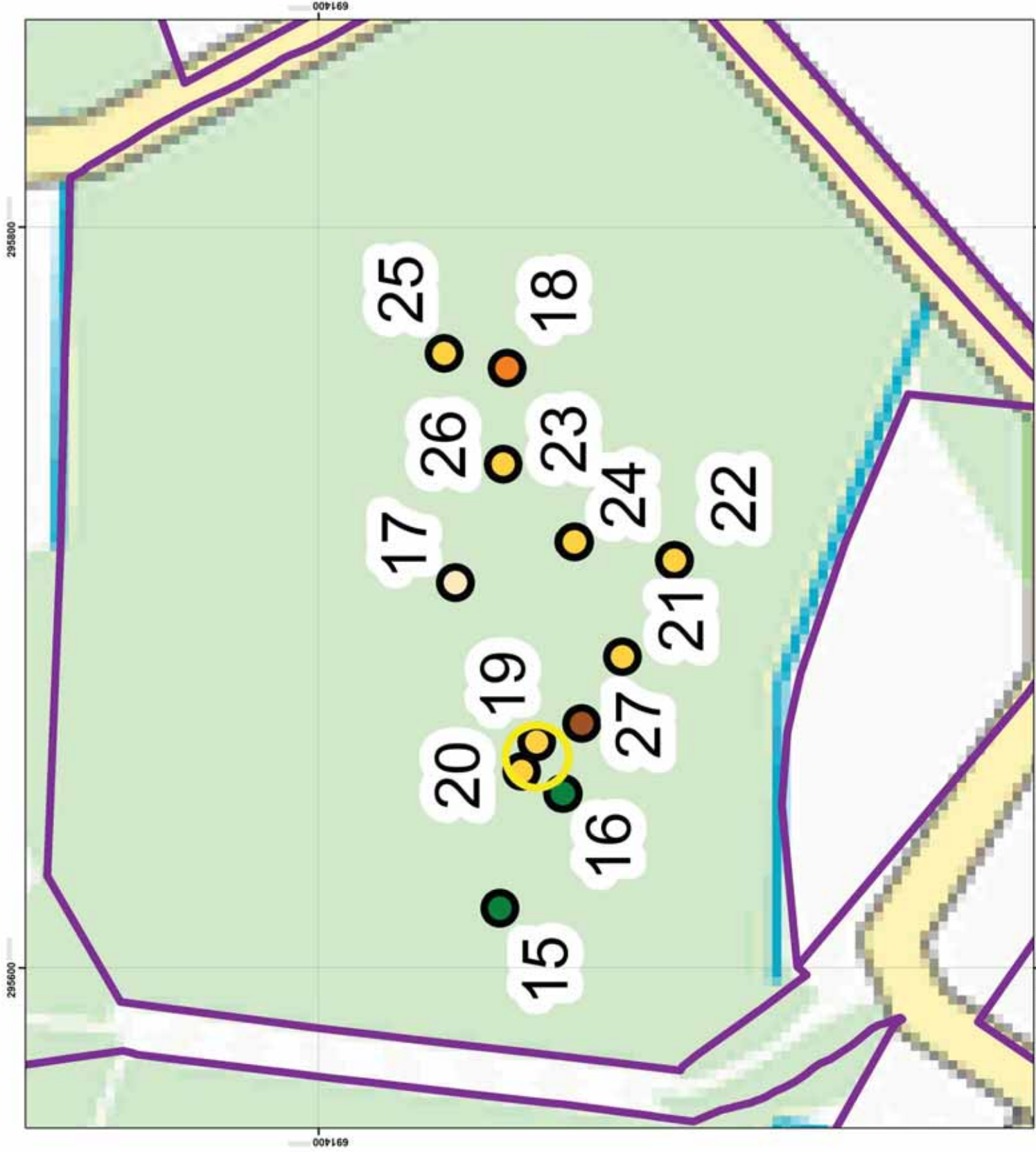


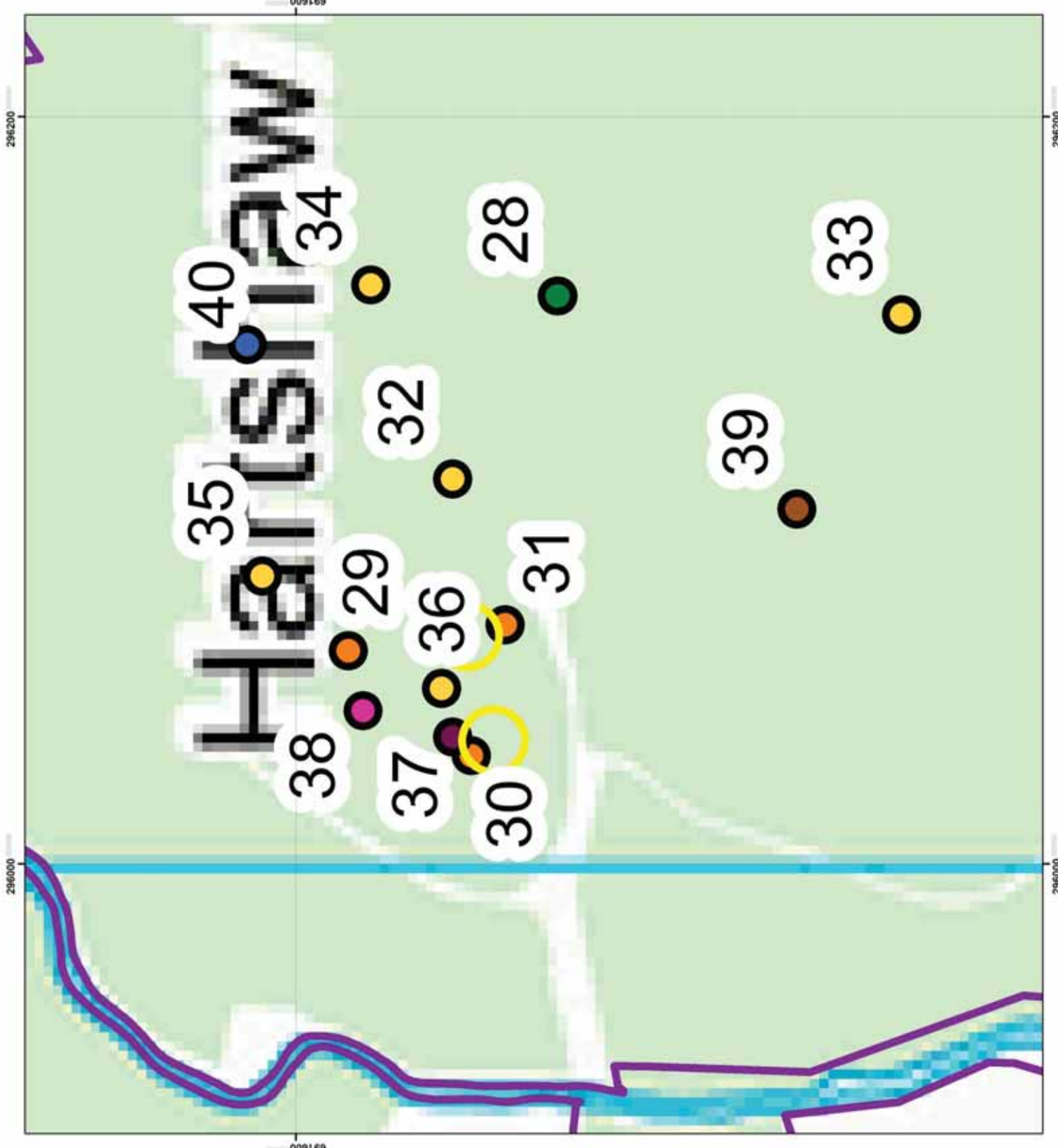
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**Brucefield Estate**

**Figure 7 Target Notes  
Hartshaw Clump**





- Key**
- Brucefield Estate boundaries
  - Pod location
- Target Notes**
- Rhododendron
  - Bat Roost Feature (Scot's pine)
  - Bat Roost Feature (rowan)
  - Bat Roost Potential
  - Bird box
  - Owl box
  - Stick nest
  - Open Water



Brucefield Estate

Figure 8 Target Notes  
Hartshaw Farm

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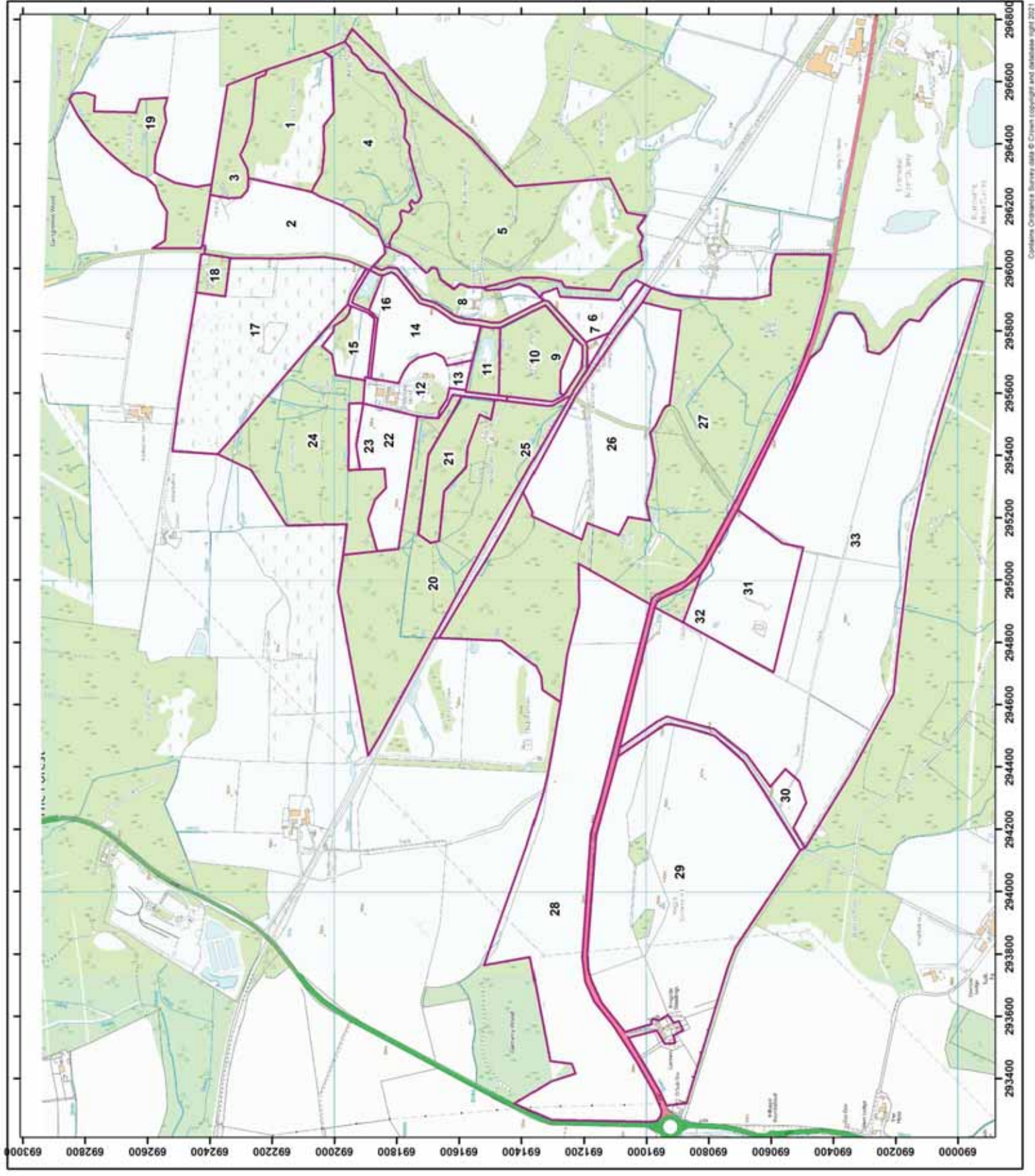
Key

Management Areas (1-33)



Brucefield Estate

Figure 9  
Botanical Management  
Areas



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## APPENDIX 2: Photographs

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**Photo 1: Red Yetts. View of Pod Location with proposed view over fenceline looking south over the estate.**



**Photo 2. Scaurs Wood. View of pod location.**



**Photo 3. Target Note 4. Badger Sett.**



**Photo 4. Low Field. Proposed pod location.**



**Photo 5. Low Field. Target Note 8. Mature Scots pine with low BRP.**



**Photo 6. Low Field. Target Note 9. Mature oak with low BRP.**



**Photo 7. Low Field. Target Note 10. Mature Scots pine with stick nest.**



**Photo 8. Sawmill. Access to plantation Scots pine woodland looking west. Proposed pod locations sited further along grassy track just off the track to the north.**



**Photo 9. Hartshaw Clump. Target Note 21. Low BRP in mature beech.**





Photo 10. Hartshaw Clump. Target Note 22. BRP in Scots pine.



**Photo 11. Harthshaw Clump. Target Note 23. Low BRP in mature beech.**



**Photo 12. Hartshaw Clump. Target Note 17. Small mammal hole.**



**Photo 13. Hartshaw Farm. Target Note 28. Rhododendron.**



**Photo 14. Hartshaw Farm. Target Note 29. BRP in rowan.**



**Photo 15. Harthshaw Farm. Target Note 29. close up of BRP feature in rowan.**



Photo 16. Harthshaw Farm. Target Note 30. BRP in rowan



**Photo 17. Harthshaw Farm. Target Note 30. Close up of BRP feature in rowan.**



**Photo 18. Hartshaw Farm. Target Note 31. Moderate BRP in mature Scots pine with potential use by other small mammals and nesting birds.**





**Photo 19. Hartshaw Farm. Target Note 31. Closer view of crevice high in Scots pine tree.**



**Photo 20. Hartshaw Farm. Target Note 37. Owl box.**



**Photo 21. Hartshaw Farm. Target Note 40. Small waterbody.**

## **APPENDIX 3: Desk-based Study Data Search Details**

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Table A3.1. Details of species records and sources provided by desk-based study

## Mammals

Species/feature	Legislation/conservation status	Date	Location	Grid reference	Record Source	Notes	
Pine marten ( <i>Martes martes</i> )	Schedule 5 of the Wildlife and Countryside Act (1981) as amended; SBL Priority Species	June 2018	Brucefield House	NS 95551 91725	Caledonian Conservation	Brief incidental sighting of two pine marten recorded in close proximity to the old tree house immediately south west of Brucefield House.	
Pine marten ( <i>Martes martes</i> )		June 2018	Old saw mill	NS 95300 91500	Caledonian Conservation	Scratch marks on standing deadwood observed to the west of the old saw mill within Slack Wood were thought to be potentially made by pine marten.	
Pine marten ( <i>Martes martes</i> )		June 2019	Burnbrae Wood	NS 96244 91647	Caledonian Conservation	Adult pine marten caught on camera trap close to suspected den site.	
Pine marten ( <i>Martes martes</i> )		June 2019	Old drive	NS 95366 91747	Caledonian Conservation	Pine marten caught on camera trap in the woods north of Low field.	
Pine marten ( <i>Martes martes</i> )		June 2019	Slack Wood	NS 95123 91703	Caledonian Conservation	Pine marten caught on camera trap in Slack Wood west of Low Field.	
Pine marten ( <i>Martes martes</i> )		June 2019	Hartshaw Clump	NS 95807 91412	Caledonian Conservation	Pine marten caught on camera trap in Hartshaw Clump.	
Pine marten ( <i>Martes martes</i> )		June 2019	Scaurs Wood	NS 95259 92158	Caledonian Conservation	Pine marten caught investigating bait in Scaurs Wood.	
Red squirrel ( <i>Sciurus vulgaris</i> )		Schedule 5 of the Wildlife and Countryside Act (1981) as amended; SBL Priority Species	11/07/2019	Red Yetts	NS 95026 90900	Caledonian Conservation	Two dreys in Wester Clashes. Signs of fresh squirrel feeding .
Red squirrel ( <i>Sciurus vulgaris</i> )			11/07/2019	Red Yetts	NS 96061 92449	Caledonian Conservation	An incidental sighting of a young squirrel crossing the road at Red Yetts.
Red squirrel ( <i>Sciurus vulgaris</i> )			23/07/2019	Scaurs Wood	NS 95413 92219	Caledonian Conservation	An incidental sighting of an adult male red squirrel in central Scaurs Wood.
Red squirrel ( <i>Sciurus vulgaris</i> )	20/06/2019		Burnbrae Wood	NS 96423 91916	Caledonian Conservation	An incidental sighting of a red squirrel in Burnbrae.	
Red squirrel ( <i>Sciurus vulgaris</i> )	21/06/2019		Burnbrae Wood	NS 96702 92023	Caledonian Conservation	An incidental sighting of a red squirrel leaving a drey within Burnbrae.	
Red squirrel ( <i>Sciurus vulgaris</i> )	20/06/2019		Birney Knowe	NS 94910 91625	Caledonian Conservation	An incidental sighting of a red squirrel on the fringe of Birney Knowe.	
Red squirrel ( <i>Sciurus vulgaris</i> )	11/06/2019		Red Yetts	NS 96350 92614	Caledonian Conservation	Red squirrel approached during morning observation.	
Red squirrel ( <i>Sciurus vulgaris</i> )	11/07/2019		Burnbrae Wood	NS 96169 91616	Caledonian Conservation	Two further dreys recorded in Burnbrae. Signs of fresh squirrel feeding were present.	
Red squirrel ( <i>Sciurus vulgaris</i> )	July 2019		Burnbrae Wood	NS 96244 91647	Caledonian Conservation	Red squirrel caught on camera trap.	
Red squirrel ( <i>Sciurus vulgaris</i> )	10/12/2018		Forest Mill (Clackmannanshire)	NS957931	The Scottish Squirrel Database, data provider Scottish Wildlife Trust		
Red squirrel ( <i>Sciurus vulgaris</i> )	11/03/2017	Parklands Pl, Forestmill, Alloa FK10 3QJ, UK	NS950937	The Scottish Squirrel Database, data provider Scottish Wildlife Trust			
Red squirrel ( <i>Sciurus vulgaris</i> )	27/03/2017	Parklands Pl, Forestmill, Alloa FK10 3QJ, UK	NS946934	The Scottish Squirrel Database, data provider Scottish Wildlife Trust			
Red squirrel ( <i>Sciurus vulgaris</i> )	24/03/2017	School Wood, United Kingdom	NS948931	The Scottish Squirrel Database, data provider Scottish Wildlife Trust			
Red squirrel ( <i>Sciurus vulgaris</i> )	13/06/2017	Alloa FK10 3QF, UK	NS950909	The Scottish Squirrel Database, data provider Scottish Wildlife Trust			
Red squirrel ( <i>Sciurus vulgaris</i> )	13/01/2018	Parklands Pl, Forestmill, Alloa FK10 3QJ, UK	NS948934	The Scottish Squirrel Database, data provider Scottish Wildlife Trust			

Red squirrel ( <i>Sciurus vulgaris</i> )	10/03/2015	Forestmill, United Kingdom	NS959910	The Scottish Squirrel Database, data provider Scottish Wildlife Trust
Red squirrel ( <i>Sciurus vulgaris</i> )	17/01/2020	Forestmill, Clackmannanshire (Hamlet)	NS950937	The Scottish Squirrel Database, data provider Scottish Wildlife Trust
Red squirrel ( <i>Sciurus vulgaris</i> )	20/03/2011		NS956932	The Scottish Squirrel Database, data provider Scottish Wildlife Trust
Red squirrel ( <i>Sciurus vulgaris</i> )	19/03/2011	Gartlove	NS94249292	The Scottish Squirrel Database, data provider Scottish Wildlife Trust
Red squirrel ( <i>Sciurus vulgaris</i> )	04/01/2020	Bath Hill, Fife (Hill Or Mountain)	NS969912	The Scottish Squirrel Database, data provider Scottish Wildlife Trust
Red squirrel ( <i>Sciurus vulgaris</i> )	13/02/2020	Hartshaw Clump, Clackmannanshire (Woodland Or Forest)	NS954906	The Scottish Squirrel Database, data provider Scottish Wildlife Trust
Red squirrel ( <i>Sciurus vulgaris</i> )	18/04/2015	Kincardine, Fife FK10 4AT, UK	NS965903	The Scottish Squirrel Database, data provider Scottish Wildlife Trust
Red squirrel ( <i>Sciurus vulgaris</i> )	27/04/2012	A977	NS946934	The Scottish Squirrel Database, data provider Scottish Wildlife Trust
Red squirrel ( <i>Sciurus vulgaris</i> )	15/10/2010	Forestmill	NS9593	The Scottish Squirrel Database, data provider Scottish Wildlife Trust
Red squirrel ( <i>Sciurus vulgaris</i> )	10/01/2014	Brucefield Estate.	NS95429197	The Scottish Squirrel Database, data provider Scottish Wildlife Trust
Red squirrel ( <i>Sciurus vulgaris</i> )	26/10/2013	Fife/Clackmanman Border	NS94009120	The Scottish Squirrel Database, data provider Scottish Wildlife Trust
Red squirrel ( <i>Sciurus vulgaris</i> )	26/08/2010	Forest Mill	NS952937	The Scottish Squirrel Database, data provider Scottish Wildlife Trust
Red squirrel ( <i>Sciurus vulgaris</i> )	08/07/2019	Burnbrae Wood, Fife (Woodland Or Forest)	NS962914	The Scottish Squirrel Database, data provider Scottish Wildlife Trust
Red squirrel ( <i>Sciurus vulgaris</i> )	08/05/2018	Forestmill, Alloa FK10 3QA, UK	NS942929	The Scottish Squirrel Database, data provider Scottish Wildlife Trust
Red squirrel ( <i>Sciurus vulgaris</i> )	07/04/2018	Alloa FK10 3PZ, UK	NS942930	The Scottish Squirrel Database, data provider Scottish Wildlife Trust
Red squirrel ( <i>Sciurus vulgaris</i> )	01/04/2017	Alloa FK10 3QF, UK	NS958916	The Scottish Squirrel Database, data provider Scottish Wildlife Trust
Red squirrel ( <i>Sciurus vulgaris</i> )	22/05/2018	Bogside, Alloa FK10 3QD, UK	NS966903	The Scottish Squirrel Database, data provider Scottish Wildlife Trust
Red squirrel ( <i>Sciurus vulgaris</i> )	27/10/2019	Slack Wood, Clackmannanshire (Woodland Or Forest)	NS949909	The Scottish Squirrel Database, data provider Scottish Wildlife Trust

Red squirrel ( <i>Sciurus vulgaris</i> )	08/09/2016	Alloa FK10 4DT, UK	NS956906	The Scottish Squirrel Database, data provider Scottish Wildlife Trust	
Red squirrel ( <i>Sciurus vulgaris</i> )	05/09/2019	North Plantation, Clackmannanshire (Woodland Or Forest)	NS948934	The Scottish Squirrel Database, data provider Scottish Wildlife Trust	
Red squirrel ( <i>Sciurus vulgaris</i> )	18/09/2010	Gartlove Forest	NS94509330	The Scottish Squirrel Database, data provider Scottish Wildlife Trust	
Red squirrel ( <i>Sciurus vulgaris</i> )	25/09/2018	Forest Mill (Clackmannanshire)	NS954935	The Scottish Squirrel Database, data provider Scottish Wildlife Trust	
Squirrel drey	June 2018	Slack Wood	NS 95421 91502	Caledonian Conservation	High in a Scots pine tree in Slack Wood where squirrel feeding signs were also seen. Not in active use at time of current survey.
Squirrel drey	June 2019	Hartshaw Clump	NS 95696 91272	Caledonian Conservation	In a beech tree in Hartshaw Clump. Not in active use at time of current survey.
Squirrel drey	June 2020	Red Yetts	NS 96299 92589	Caledonian Conservation	Northern extent of the Estate by Red Yetts. Not in active use at time of current survey.
Squirrel drey	June 2021	Red Yetts	NS 96335 92587	Caledonian Conservation	Northern extent of the Estate by Red Yetts. Not in active use at time of current survey.
Squirrel drey	11/07/2019	Red Yetts	NS 96464 92750	Caledonian Conservation	Red Yetts, with signs of fresh feeding at two feeding stations, all within close proximity. Drey not surveyed for activity during current survey.
Brown long-eared ( <i>Plecotus auritus</i> )	05/08/2020	Red Yetts	NS95666191698	Caledonian Conservation	
Brown long-eared ( <i>Plecotus auritus</i> )	18/08/2020	Brucefield House	NS95666191698	Caledonian Conservation	
Common pipistrelle ( <i>Pipistrellus pipistrellus</i> )	20/05/2019	Hartshaw House	NS9589591557	Caledonian Conservation	
Common pipistrelle ( <i>Pipistrellus pipistrellus</i> )	04/06/2019	Hartshaw House	NS9589591557	Caledonian Conservation	
Common pipistrelle ( <i>Pipistrellus pipistrellus</i> )	01/09/2020	Brucefield House	NS95666191698	Caledonian Conservation	
Soprano pipistrelle ( <i>Pipistrellus pygmaeus</i> )	20/05/2019	Hartshaw House	NS9589591557	Caledonian Conservation	
Soprano pipistrelle ( <i>Pipistrellus pygmaeus</i> )	04/06/2019	Hartshaw House	NS9589591557	Caledonian Conservation	
Soprano pipistrelle ( <i>Pipistrellus pygmaeus</i> )	18/08/2019	Hartshaw House	NS9589591557	Caledonian Conservation	
Soprano pipistrelle ( <i>Pipistrellus pygmaeus</i> )	05/08/2020	Brucefield House	NS95666191698	Caledonian Conservation	
Soprano pipistrelle ( <i>Pipistrellus pygmaeus</i> )	18/08/2020	Brucefield House	NS95666191698	Caledonian Conservation	
Soprano pipistrelle ( <i>Pipistrellus pygmaeus</i> )	01/09/2020	Brucefield House	NS95666191698	Caledonian Conservation	

European protected  
species, Conservation (Natural  
Habitats, &c.) Regulations  
1994 (as amended).

## Birds

Species	Legislation/conservation status (All wild nesting birds are protected under the Wildlife and Countryside Act 1981 (as amended)).	Date	Location	Grid reference	Record Source	Notes
Grey partridge ( <i>Perdix perdix</i> )	SBL Priority species, Red Listed	2019	Maggie Duncan's Hill		Caledonian Conservation	
Osprey ( <i>Pandion haliaetus</i> )	Schedule 1	21/06/2019	Peat Hill	NS9510190327	Caledonian Conservation	
Merlin ( <i>Falco columbarius</i> )	Schedule 1, SBL Priority species, Red Listed	25/01/2019	Road near Whinny Field	NS9602191878	Caledonian Conservation	Wintering, unlikely to breed on estate
Buzzard ( <i>Buteo buteo</i> )		2019/2020	Brucefield Estate		Caledonian Conservation	
Sparrowhawk ( <i>Accipiter nisus</i> )		2019/2020	Brucefield Estate		Caledonian Conservation	
Kestrel ( <i>Falco tinnunculus</i> )	SBL Priority species, Amber Listed	2019/2020	Brucefield Estate		Caledonian Conservation	
Curlew ( <i>Numenius arquata</i> )	SBL Priority species, Red Listed	2019	Brucefield Estate		Caledonian Conservation	See Monir 2019 and Currie 2021 for details
Lapwing ( <i>Vanellus vanellus</i> )	SBL Priority species, Red Listed	2019/2020	Craigmantoy		Caledonian Conservation	
Ringed plover ( <i>Charadrius hiaticula</i> )	Red Listed	2019	Brucefield Estate		Caledonian Conservation	
Woodcock ( <i>Scolopax rusticola</i> )	SBL Priority species, Red Listed	2019	Brucefield Estate		Caledonian Conservation	
Cuckoo ( <i>Cuculus canorus</i> )	SBL Priority species, Red Listed	2019	Brucefield Estate		Caledonian Conservation	
Tawny owl ( <i>Strix aluco</i> )	Amber Listed	04/06/2019	Hartshaw House	NS9589491557	Caledonian Conservation	Incidental observation during a bat survey (Spray & Smith 2019) close to Hartshaw Farm - pair of tawny owls ( <i>Strix aluco</i> ), breeding not confirmed.
Tawny owl ( <i>Strix aluco</i> )	Amber Listed	06/05/2020	Brucefield Mains	NS9558191829	Caledonian Conservation	Incidental
Bullfinch ( <i>Pyrrhula pyrrhula</i> )	SBL Priority species, Amber Listed	2019	Brucefield Estate		Caledonian Conservation	
Crossbill ( <i>Loxia sp.</i> )	Schedule 1	14/05/2019	Chapel Knowe	NS9542190864	Caledonian Conservation	
Crossbill ( <i>Loxia sp.</i> )	Schedule 1	14/05/2019	Chapel Knowe	NS9552990923	Caledonian Conservation	
Fieldfare ( <i>Turdus pilaris</i> )	Schedule 1, Red Listed	2019	Brucefield Estate		Caledonian Conservation	
Grey wagtail ( <i>Motacilla cinerea</i> )	Red Listed	2019	Brucefield Estate		Caledonian Conservation	
Linnet ( <i>Linaria cannabina</i> )	SBL Priority species, Red Listed	2019/2020	Whinny Field and Craigmantoy		Caledonian Conservation	
Mistle thrush ( <i>Turdus viscivorus</i> )	Red Listed	2020	Brucefield Estate		Caledonian Conservation	
Reed bunting ( <i>Emberiza schoeniclus</i> )	SBL Priority species, Amber Listed	2019	Brucefield Estate		Caledonian Conservation	
Siskin ( <i>Carduelis spinus</i> )	SBL Priority species	2019	Brucefield Estate		Caledonian Conservation	
Skylark ( <i>Alauda arvensis</i> )	Red Listed	2019/2020	Whinny Field and Craigmantoy		Caledonian Conservation	



Song thrush ( <i>Turdus philomelos</i> )	SBL Priority species, Red Listed	2019/2020	Brucefield Estate	Caledonian Conservation
Starling ( <i>Sturnus vulgaris</i> )	SBL Priority species, Red Listed	2019/2020	Brucefield Estate	Caledonian Conservation
Tree sparrow ( <i>Passer montanus</i> )	SBL Priority species, Red Listed	2019/2020	Gartary	Caledonian Conservation
Wheatear ( <i>Oenanthe oenanthe</i> )	Red Listed	2020	Craigmantoy	Caledonian Conservation
Yellowhammer ( <i>Emberiza citrinella</i> )	SBL Priority species, Red Listed	2019/2020	Brucefield Estate	Caledonian Conservation

## Reptiles

Species	Legislation/conservation status	Date	Location	Grid reference	Record Source	Notes
Adder ( <i>Viper berus</i> )	Wildlife and Countryside Act 1981 (as amended).	2013	Cycle track west of estate	NS94499187	Caledonian Conservation	An incidental sighting amongst bracken, to the western extent of the Estate.
Common lizard ( <i>Zootoca vivipera</i> )	Common lizard ( <i>Zootoca vivipera</i> )	2019-2020	Craigmad Heath		Caledonian Conservation	Multiple sightings during reptile survey
Common lizard ( <i>Zootoca vivipera</i> )		2019	Unnamed road south of Craigmantoy.	NS94449069	Caledonian Conservation	
Common lizard ( <i>Zootoca vivipera</i> )		2019	Unnamed road between Easter and Wester Clashies	NS9549590889	Caledonian Conservation	

## Invertebrates

Species	Legislation/conservation status	Date	Location	Grid reference	Record Source	Notes
<i>Gymnetron veronicae</i>	NS	03/07/2019	Hartshaw Meadow	NS9585691554	Caledonian Conservation	A weevil
Little spine-palp spider ( <i>Allomengea vidua</i> )	NS	29/07/2019	Low Field	NS9529191675	Caledonian Conservation	A spider
Little spine-palp spider ( <i>Allomengea vidua</i> )	NS	29/08/2019	Prooch's Field	NS9585091936	Caledonian Conservation	A spider
Little spine-palp spider ( <i>Allomengea vidua</i> )	NS	29/07/2019	Low Field	NS9529191675	Caledonian Conservation	A spider
Little spine-palp spider ( <i>Allomengea vidua</i> )	NS	29/08/2019	Prooch's Field	NS9585091936	Caledonian Conservation	A spider
<i>Megasternum concinnum</i>	SBL	Multiple records July-Aug 2019	Low Field, Craigmad Wood S, Prooch's Field		Caledonian Conservation	A Hydrophilid beetle
<i>Pherbellia griseola</i>	NS	10/08/2020	Hartshaw grassland	NS9586691593	Caledonian Conservation	A true fly
<i>Queulus fulvicollis</i>	NS	29/07/2019	Low Field	NS9529191675	Caledonian Conservation	A rove beetle
Small pearl-bordered fritillary ( <i>Botulia selene</i> )	NT, SBL	2019/2020	Prooch's Field	NS9585091936	Caledonian Conservation	A butterfly
<i>Tetanocera phyllophora</i>	NS	16/06/2020	Prooch's Field	NS9575991910	Caledonian Conservation	A true fly

<i>Thamniocolus viduatus</i>	NS	2019	Prooch's Field/Low Field	NS9585091936/ NS9529191675	Caledonian Conservation	A weevil
<i>Trophiphorus terricola</i>	NS	17/07/2020	Brucefield House Meadow	NS9561791705	Caledonian Conservation	A weevil
<b>Plants</b>						
<b>Species</b>	Legislation/conservation status	Date	Location (management units, see Figure 9)	Grid reference	Record Source	Notes
Shepherd's-needle ( <i>Scandix pecten-veneris</i> )	Critically Endangered (UK Red List); Nationally Uncommon; Locally Rare (first VC87 record since 1850)	08/2020	33		Caledonian Conservation	
Sun Spurge ( <i>Euphorbia helioscopia</i> )	SBL priority species	08/2020	26		Caledonian Conservation	
Black-bindweed ( <i>Fallopia convolvulus</i> )	SBL priority species	08/2020	28,29		Caledonian Conservation	
Corn Mint ( <i>Mentha arvensis</i> )	SBL priority species	08/2020	20,21,33		Caledonian Conservation	Management units relevant to survey area: Slack Wood; Low Field
Charlock ( <i>Sinapis arvensis</i> )	SBL priority species	08/2020	33		Caledonian Conservation	
White Mustard ( <i>Sinapis alba</i> )	SBL priority species; Locally Rare. One previous record in VC87 since 1960s	08/2020	2,26,29,30,33		Caledonian Conservation	
Hairy Buttercup ( <i>Ranunculus sardous</i> )	SBL priority species; Locally Rare. Second and third records for VC87 since 1980s	08/2020	28		Caledonian Conservation	
Corn Marigold ( <i>Glebionis segetum</i> )	Vulnerable	08/2020	26		Caledonian Conservation	
Corn Spurrey ( <i>Spergula arvensis</i> )	Vulnerable (UK Red List)	08/2020	2,12,26,28,29,33		Caledonian Conservation	
<b>Invasive non-native species</b>	Legislation/conservation status	Date	Location (management units, see Figure 9)	Grid reference	Record Source	Notes
Rhododendron ( <i>Rhododendron ponticum</i> )	Schedule 9 invasive species	2019	Brucefield Estate		Caledonian Conservation	
Japanese knotweed ( <i>Fallopia japonica</i> )	Schedule 9 invasive species	2018	Old Gartarry		Caledonian Conservation	
Giant Knotweed	Schedule 9 invasive species	08/2020	29,30		Caledonian Conservation	

## CONFIDENTIAL ANNEX

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This Confidential Annex contains information and maps pertaining to the location of legally protected and sensitive species, and is therefore not suitable for public distribution.

The following pages provide records of sensitive species and a map of Target Notes relating to sensitive species.

**Table C1. Confidential desk-based study records within 200m survey area.**

Site	Pod within 200 m	Feature	Grid Reference	Notes
Scaurs wood	5 & 6	Badger sett	NS 95648 92096	Badger sett with several entrances, likely active in 2019.
	5	Badger sett	NS 95480 91984	Outlier sett. Occasional use in 2019.
Low Field	3 & 4	Badger sett	NS 95394 91731	Single sett entrance, confirmed active in 2019.
	4	Badger sett	NS 95233 91747	Outlier sett. Occasional use.
	3	Barn owl breeding site	NS 95602 91802	Breeding confirmed in 2020.
Saw Mill	1	Badger sett	NS 95118 91697	Sett with three entrances in Slack Wood, confirmed active in 2019.
	2	Badger sett	NS 95233 91747	Outlier sett. Occasional use.

**Table C2. Confidential Target Notes.**

Target Note	Site	Grid reference	Description
1	Red Yetts	NS9602292339	Badger sett (inactive)
4	Scaurs	NS9568792058	Badger sett (active)
5		NS9563692080	Badger sett (active)

### 8.1 Red Yetts sensitive species results

A disused small mammal hole (possible badger sett) was recorded in the plantation to the east (Target Note 1, see Table C2).

### 8.2 Scaurs Wood sensitive species results

An active badger sett was recorded under a canopy of larch, birch and oak. There are two holes with fresh diggings and print (Target Note 4 and 5, see Table C2).

### 8.3 Badger recommendations

Previous surveys undertaken by Caledonian Conservation in 2019 recorded active badger setts within 80 m of the proposed pod location at Scaurs Wood. The current survey recorded further active setts, but these are sited over 40 m west and south of the nearest pod location.

A single sett entrance, confirmed active, was recorded over 50 m from the proposed pods at Low Field in 2018. An additional outlier sett with occasional use was recorded further west. Preconstruction surveys should be undertaken to check the status of the sett within 48 hours of any works commencing.

A sett with three entrances within Slack Wood, approximately 200 m north west of the Sawmill pods was confirmed active in 2019.

Badger activity is present across Brucefield Estate and there is one recorded active sett within the current survey area of Scaurs Wood. A 30 m exclusion zone should be marked up on the ground and a watching brief maintained during construction operations. No works should take place within the exclusion zone. All works should be undertaken during daylight hours.

Where disused small mammal holes are present at Red Yetts and Hartshaw Clump it is recommended as a precaution that a minimum 30 m exclusion zone is maintained, otherwise, preconstruction surveys will be required to check the status of the mammal holes within 48 hours of any works commencing.

Table C3. Desk-based study confidential records relating to sensitive species.

Species/feature	Legislation/conservation status	Date	Location	Grid reference	Record Source	Notes
Badger ( <i>Meles meles</i> )	Protection of Badgers Act 1992 as amended by the Wildlife and Natural Environment (Scotland) Act 2011	July 2019	Burnbrae Wood	NS 96244 91647	Caledonian Conservation	Badger exploring the baited camera trap close to suspected pine marten den.
Badger ( <i>Meles meles</i> )		July 2019	Old Drive	NS 95394 91731	Caledonian Conservation	Emerging from a sett in the woods north of Low field. This is in location of previously recorded single sett entrance (see Target Note 26).
Badger ( <i>Meles meles</i> )		June-August 2019	Old Drive	NS 95233 91747	Caledonian Conservation	Outlier sett. Occasional use.
Badger ( <i>Meles meles</i> )		June-August 2019	Scaurs Wood	NS 95480 91984	Caledonian Conservation	Outlier sett. Occasional use.
Badger ( <i>Meles meles</i> )		June-August 2019	Red Yetts	NS 96154 92429	Caledonian Conservation	Outlier sett. Occasional use.
Badger ( <i>Meles meles</i> )		June-August 2019	Red Yetts	NS 96243 92423	Caledonian Conservation	Outlier sett. Occasional use.
Badger sett		June 2018	Slack Wood	NS 95118 91697	Caledonian Conservation	Sett with three entrances in Slack Wood. Badger caught on camera confirm sett in active use during current survey (see Target Note 30).
Badger sett		June 2018	Scaurs Wood	NS 95648 92096	Caledonian Conservation	Sett with several entrances considered likely to be active on the eastern extent of Scaurs Wood. Badger caught on camera confirm sett in active use during current survey (see Target Note 31).
Badger sett		June 2018	Scaurs Wood	NS 95250 92144	Caledonian Conservation	Single sett entrance on the western extent of Scaurs Wood. Fresh badger signs present at sett confirm sett in active use during current survey.
Badger sett		June 2018	Scourie Knowe	NS 95394 91731	Caledonian Conservation	Single sett entrance in the linear strip of wood south of Scourie Knowe. Badger caught on camera confirm sett in active use during current survey (see Target Note 32).
Badger sett		June 2018	Craigmad Heath	NS 96379 92195	Caledonian Conservation	Sett with several entrances surrounded by badger tracks on the south facing bracken covered slope at Craigmad Heath. Fresh badger signs present at sett confirm sett in active use during current survey.
Badger sett		July 2019	Slack Wood	NS 95118 91697	Caledonian Conservation	Badger caught on camera trap in Slack Wood west of Low Field. This is in location of previously recorded sett with three entrances (see Target Note 23).
Badger sett		July 2019	Scaurs Wood	NS 95648 92096	Caledonian Conservation	Pair caught on camera trap in Scaurs Wood. This is in location of previously recorded sett (see Target Note 24).
Badger sett		June 2018	Craigmad Wood	NS 96292 92330	Caledonian Conservation	Satellite sett within Craigmad Wood, thought to be in active use during current survey due to disturbance of nearby sett by cattle (Target Note 24).
Barn owl ( <i>Tyto alba</i> )	Schedule 1	20/05/2020	Brucefield Mains	NS9560291802.	Caledonian Conservation	Breeding site.



**Key**

- Brucefield Estate boundaries
- Pod location
- Badger sett (active)
- Badger sett (inactive)

**Confidential**

Scale 1:3,000 @ A3  
  
 0 25 50 m



**Brucefield Estate**

**Figure C1  
Badger Setts**

