

Homes and Communities Agency

Cinderford Regeneration Site

Ecological Appraisal Report

May 2009

Entec UK Limited

Report for
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Homes and Communities Agency

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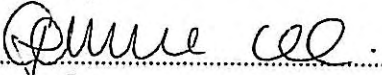
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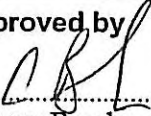
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Document Revisions

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1. Introduction

1.1 Background

Entec was commissioned in summer 2007 by English Partnerships (now the Homes and Communities Agency) to undertake a comprehensive ecological appraisal of part of the proposed Cinderford Regeneration Site (see Section 1.3 below), located to the north-west of Cinderford, Gloucestershire. The need for ecological survey work was identified by Halcrow in spring 2007 working on behalf of the Cinderford Regeneration Board, of which Homes and Communities Agency are part (see Section 1.3).

1.2 Site context

The area surveyed (referred to as 'the survey area') was larger than the area that would be available for future development (referred to as 'the site'). This was to ensure that any ecological features adjacent to the site were adequately recorded, such that potential effects could be determined at a later stage. The survey area is shown on Figure 1.1 and the site is illustrated within the Cinderford Business Plan Executive Summary (2007) (<http://www.fdean.gov.uk/content.asp?id=17731>).

The survey area is bordered to the north, south and west by coniferous plantation woodland and to the east by the Cinderford Business Park. It is characterised by:

- an operational brickworks, a waste sorting depot and several small industrial units;
- a large fishing lake; and
- large areas of re-vegetated grassland and planted woodland habitat on land previously mined for coal.

The site excludes the large fishing lake and much of the conifer woodland in the north and south. Instead, the site comprises primarily existing buildings and hardstanding, grassland and scrub.

In the wider context, Cinderford is surrounded by mixed conifer/broadleaved woodland, with scattered small woodland ponds and open rides. Previously, Cinderford and the surrounding area supported several large collieries, of which two were located within the site, namely Bowson Colliery and Northern United (which closed in 1965). Clay extraction pits are also present as a result of the brickworks on site. This legacy means the site is dominated by disturbed ground, with a very uneven topography, and scattered with water filled depressions and the occasional derelict building and structure.

1.3 Proposed Development

The site considered by this report forms only part of a wider re-development vision for Cinderford under the National Coalfields Programme, which is being progressed by the Cinderford Regeneration Board. The Board comprised the Forest of Dean District Council (FoDDC), Gloucestershire County Council (GCC), the Forestry Commission, the South West Regional Development Agency (SWRDA) and the Homes and Communities Agency (HCA).

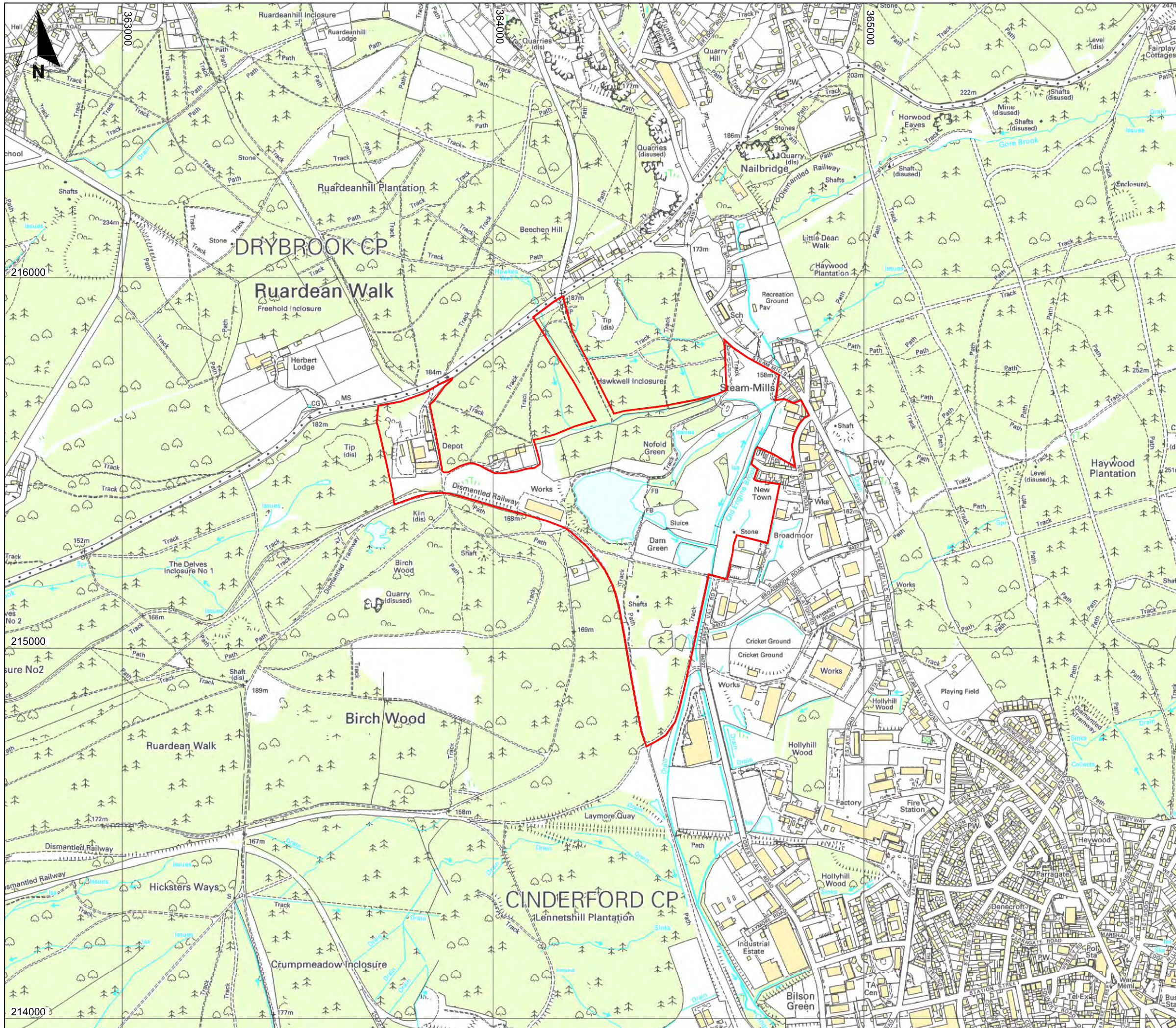
The overall aim of the regeneration scheme is to create new employment, homes, leisure facilities and public space. In 2007 the Business Plan for the regeneration area was published and this outlined the key proposals for the area considered in this report (known as the Northern Quarter). These comprise:

- A new tree-lined avenue linking the A4136 to Valley Road;
- A new college campus adjacent to Steam Mills Lake;
- A new hotel in a visible location adjacent to the new road and enjoying views across the Forest, which would be located next to the college and have links to hospitality, catering and training facilities;
- A mixed use development on Northern United, potentially incorporating a biomass plant (within the site or on adjacent land) to provide a sustainable source of power for the regeneration area;
- A site for high quality employment, including offices, adjacent to the new road;
- An area of residential led mixed use development which is well integrated to the natural landscape;
- A new flagship multi-use activity centre, located close to the new college campus and adjacent to new housing areas;
- Areas of retained and improved woodland and grassland;
- New footway and cycle links integrating both with cross county routes such as the Gloucestershire Way, and linking with the town centre;
- The retention of the Local Plan allocation Cinderford 5 for housing (albeit reduced to take account of likely flood risk issues);
- Retention and enlargement of Local Plan site Cinderford 2, to incorporate land to the east; and
- Improvements to Steam Mills lake, with access retained for anglers, walkers and cyclists.

In 2008 and 2009, these proposals will be progressed via a new Area Action Plan (AAP) and a Masterplan.

1.4 Purpose of this Report

This report details the findings of the ecological appraisal undertaken for the Cinderford site. It describes the desk study (Section 2) and field surveys (section 3). The biodiversity value of the site is evaluated in Section 4, whilst Section 5 presents a summary of the potential effects on receptors and proposed mitigation. A summary and conclusions are presented in Section 6.



Key
 Site boundary

0 m 500 m
 Scale 1:10,000 @ A3

Cinderford Ecological Appraisal Report

Figure 1.1
 Site Boundary

December 2008
 20998-W06.dwg parkj



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2. Desk study

2.1 Methodology

A desk-based assessment of the Cinderford site was undertaken in 2007, in accordance with guidelines produced by the Institute of Environmental Assessment (IEA, 1995) and the Institute of Ecology and Environmental Assessment (IEEM, 2006).

Statutory and non-statutory nature conservation sites and/or records of species that are afforded legal protection or are otherwise notable were requested from within a 2km radius of the site (see **Box 2.1**). A larger search area of 4km was used to identify Special Protection Areas (SPA) and Special Areas of Conservation (SAC) as the species that are often part of the designation (e.g. birds, bats, otters etc) can be highly mobile and use habitats some distance from the designated site. These search areas were determined using existing guidance and professional judgement to consider the likely zone of influence of the proposed development.

The following organisations were contacted to obtain existing information pertaining to the site and surrounding search area:

- Gloucestershire Centre for Environmental Records (GCER) was contacted to provide information relating to non-statutory designated sites of nature conservation interest and/or records of species that are afforded legal protection or are otherwise of nature conservation importance;
- Bird records for the study area were obtained from the County Bird Recorder/Gloucestershire Ornithological Co-ordinating Committee (GOCC) and the RSPB;
- Records pertaining to badger (*Meles meles*) were obtained from Gloucestershire Badger Group;
- Records pertaining to bats were obtained from Gloucestershire Bat Group;

Additional information was also obtained from websites and existing reports:

- The Multi-Agency Geographical Information System (MAGIC) website was consulted to obtain the location and reference for any statutory sites of nature conservation importance;
- The National Biodiversity Network (NBN) Gateway was consulted for information regarding the presence of protected species with the 10km grid square that the site is located within;
- The United Kingdom Biodiversity Action Plan (UK BAP) and Biodiversity Action Plan for Gloucestershire (LBAP);
- Steam Mills, Cinderford EIA (2003). Keystone Environmental Report for SWRDA;

- Northern United: Forest of Dean Roost Monitoring Report 2006 (2007). Keystone Environmental Report for SWRDA;
- The Forest of Dean What's Special publication (no date);
- Cinderford Linear Park Management Plan (Revised Draft, 2002); and
- Various documents relating to the Cinderford Regeneration Arc (2002).

Note that due to the way data are collected and stored within the local ornithological group (i.e. to the 1km square level only), in order to fully cover the 2km search area a 3km x 3km area was used. Also, GCER only provided four-figure grid references for the data within the search area (i.e. also to the 1km square level only).

Box 2.1 Designated wildlife sites and protected and notable species

Statutory nature conservation sites

Natural England notifies sites that are of international and national importance for nature conservation as Sites of Special Scientific Interest (SSSIs) (although some sites that are of national importance for certain species have not been so designated). Internationally important sites may also be designated as Special Areas of Conservation (SACs), classified as Special Protection Areas (SPAs) and/or listed as Ramsar sites.

Natural England has also designated some areas which have national value to wildlife as National Nature Reserves (NNRs). Most of these sites tend to have a broad ecological value rather than particularly rare species and have an important educational and recreational role. Local Nature Reserves (LNRs) serve a similar role but at a local level.

Non-statutory nature conservation sites

Non-statutory nature conservation sites in Gloucestershire are notified as Key Wildlife Sites (KWS). These sites contain nationally or regionally important habitats, wild plants and animals which are identified in local Biodiversity Action Plans.

Legally protected species

Many species of animal and plant receive some degree of legal protection (see Appendix A for further details). For the purposes of this study, legal protection refers to:

- species included on Schedules 1, 5 and 8 of the *Wildlife and Countryside Act 1981* (as amended), excluding species that are only protected in relation to their sale;
- species included on Schedules 2 and 4 of The Conservation (Natural Habitats, &c.) Regulations as amended 1997 (SI 1994 No. 2716); and
- badgers, which are protected under the Protection of Badgers Act 1992.

Notable habitats and species

There are a number of habitats and species, which, whilst not receiving statutory protection, are of importance to nature conservation. These are referred to in this report as notable, and include:

- UK, county and local Biodiversity Action Plan (BAP) priority habitats and species;
- habitats and species of principal importance for the conservation of biological diversity in England. These are defined in Section 74 of the *Countryside and Rights of Way (CROW) Act 2000*. PPS9 requires that these are a material consideration in determination of planning applications. In practice these are the same as the UK BAP priority habitats and species;
- species listed in the relevant UK Red Data Book (RDB);
- nationally scarce species - these are recorded from 16-100 10km squares of the national grid; and
- birds included on the Birds of Conservation Concern red list (Gregory *et al.*, 2002).

2.2 Results

2.2.1 Statutory designated sites of nature conservation interest

There are three statutory designated sites of nature conservation interest within 2km of the survey area. These are Wye Valley and Forest of Dean (Bat Sites) SAC, the Westbury Brook Ironstone Mine SSSI and Edgehill Quarry SSSI. Within 4km of the survey area are further component sites of the Wye Valley and Forest of Dean (Bat Sites) SAC and the River Wye SAC.

The Wye Valley and Forest of Dean (Bat Sites) SAC (central grid reference SO 605 044) is a complex of small sites situated in the Forest of Dean, one of which is located approximately 1.5km to the north-east of the survey area boundary (with further component sites located within 4km of the site). It supports the greatest concentration of lesser horseshoe bat (*Rhinolophus hipposideros*) in the UK, totalling about 26% of the national population. It has been selected on the grounds of the exceptional breeding population and the majority of sites within the complex are maternity roosts. The SAC also supports greater horseshoe bat (*Rhinolophus ferrumequinum*), with about 6% of the UK population present. Both species of bat are believed to hibernate in the many disused mines in the Forest.

Westbury Brook Ironstone Mine SSSI (SO 662166), part of the Wye Valley and Forest of Dean (Bat Sites) SAC and also 1.5km to the north-east of the survey area, and has also been designated for its resident population of lesser and greater horseshoe bats.

Edgehill Quarry SSSI is a designated for its geological interest and is located 1.7km to the east of the survey area. As the quarry has been designated for its geological resource, and is buffered from the site by 1.7km, this receptor will not be affected by the proposed development. This SSSI is not considered further in this report.

The River Wye SAC is a large site that encompasses the vast majority of the River Wye, from its lower reaches where it meets the Bristol Channel to the upper reaches in mid-Wales. Part of this designated site lies approximately 3.9km to the north-west of the proposed development site. The River Wye SAC has been designated primarily for the type of watercourse it is, the vegetation present as a result and for the following species; white-clawed crayfish, sea lamprey, brook lamprey, river lamprey, twaite shad, Atlantic salmon, bullhead and otter. The Old Engine Brook (the only watercourse on site) drains into the River Severn catchment; therefore there is no direct hydrological link between the River Wye SAC and the site, which would prevent most of the designated features occurring at the site. The exception to this is the otter, which will travel across land between river catchments and therefore could occur at the site.

Figure 2.1 illustrates the locations of the statutory designated sites within the locality of the site.

2.2.2 Non-statutory sites for nature conservation

Fourteen non-statutory designated sites (locally referred to as key wildlife sites) are located within 2 km of the survey area and these are listed in **Table 2.1** and shown on **Figure 2.2**.

Table 2.1 Non-statutory designated sites of nature conservation importance

Map Label	Reserve Name	Grid Ref.	Habitat	Location from survey area
A	Cinderford Linear Park	SO644153	Ponds, watercourse, semi-natural grassland, marsh, bog, swamp, mire tall herb fen with plant, invertebrate and vertebrate species interest.	Includes approximately 80% of survey area and 70% of the site
B	Laymoor Quag GWT Nature Reserve	SO644146	Marsh, bog, swamp, mire and tall herb fen and lowland heath with plant interest.	Adjacent to the southern tip of the survey area.
C	Hawkwell Inclosure (compartment 219a)	SO640156	Ancient semi-natural broad-leaved woodland site.	Partly within northern part of survey area
D	Serridge Green	SO626148	Marsh, bog, swamp, mire & tall herb fen.	0.6km to the west
E	Heywood Inclosure (compartment 318a)	SO657146	Ancient semi-natural broad-leaved woodland site.	1km to the south –east
F	Ruardean Hill	SO634170	Semi-natural grassland.	1.2km to the north
G	Edgehills Bog Gloucestershire Wildlife Trust (GWT) Nature Reserve	SO660154	Marsh, bog, swamp, mire and tall herb fen and lowland heath.	1.6km to the east
H	Merring Meend GWT Nature Reserve	SO658169	Pond, marsh, bog, swamp, mire and tall herb fen and lowland heath with plant, invertebrate and bird interest.	1.6km to the north-east
I	Fairplay Iron Mine Reservoir GWT Nature Reserve	SO659165	Ponds, marsh, bog, swamp, mire and tall herb fen and lowland heath with plant and invertebrate interest.	1.6km to the north-east
J	Westbury Brook Mine Reservoir GWT Nature Reserve	SO658168	Ponds with plant and invertebrate interest.	1.7km to the north-east
K	Woorgreens Lake & Marsh GWT Nature Reserve & Crabtree Hill	SO630127	Lakes and reservoirs, marsh, bog, swamp, mire and tall herb fen and lowland heathland with plant, invertebrate and vertebrate species interest.	1.8km to the south west
L	Plump Hill Picnic Site	SO660168	Semi-natural grassland	1.8km to the north-east
M	Cinderford Roughts	SO652129	Semi-natural grassland	1.8km to the south
N	Plump Hill Dolomite Quarry GWT Nature Reserve	SO661172	Semi-natural grassland and plant interest	1.9km to the north-east

2.2.3 Legally protected species records

The following protected species (as defined in Box 2.1) have been recorded within 2 km of the survey area within the last 10 years:

- 8 records for common lizard (*Zootoca vivipara*);
- 7 records for slow-worm (*Anguis fragilis*);

- 3 records for grass snake (*Natrix natrix*);
- 1 record for adder (*Vipera berus*);
- 1 record for goshawk (*Accipiter gentiles*);
- 3 records for great crested newts (*Triturus cristatus*);
- 1 record for otter (*Lutra lutra*);
- bat records include one of each of the following; greater horseshoe, lesser horseshoe, whiskered (*Myotis mystacinus*), brandt's (*Myotis brandti*), natterer's (*Myotis nattereri*), bechstein's (*Myotis bechsteini*), brown long-eared (*Plecotus auritus*) and common pipistrelle (*Pipistrellus pipistrellus*); and
- 10 records for bluebell (*Hyacinthoides non-scripta*).

Of those records supplied the following species have been recorded from within the site boundary; bluebell, common lizard, slow-worm, great crested newt and otter.

In addition, the NBN gateway holds records for hazel dormouse (*Muscardinus avellanarius*) from the past 10 years, for the 10km grid square that the site is located within.

The Gloucestershire Bat Group supplied no additional information pertaining to bats. The local badger recorder had no existing information in relation to this species for the region.

The County Bird Recorder/Gloucestershire Ornithological Co-ordinating Committee (GOCC) supplied a large quantity of data pertaining to local bird populations. Of those records supplied the species protected under Schedule 1 of the *Wildlife and Countryside Act (1981)* listed in Table 2.2 below have been recorded in the vicinity of the site in small numbers during the breeding season, (and are either confirmed to be breeding in the area or are likely to be breeding in the area), wintering or on passage. All these species are also included on the Birds of Conservation Concern amber list (Gregory *et al.*, 2002).

Table 2.2 Bird species recorded in the vicinity of the site which are listed on Schedule 1 of the W&CA

Species	Location	Date recorded
Breeding		
Kingfisher (<i>Alcedo atthis</i>)	Washery Woods	2003
Black redstart (<i>Phoenicurus phoenicurus</i>)	Birch Wood	2003
Wintering		
Redwing (<i>Turdus iliacus</i>)	Harrow Hill	2004
Passage		

Species	Location	Date recorded
Osprey (<i>Pandion haliaetus</i>)	Steam Mills	2003

Additional records were also supplied for brambling (*Fringilla montifringilla*), common crossbill (*Loxia curvirostra*) and goshawk (*Accipiter gentilis*) that are also known to be present in the locality of the site (but no exact locations or dates of the records were provided).

2.2.4 Notable species and habitats

In addition to the legally protected species listed above, a large number of records for other fauna and flora were obtained, some of which are considered to be notable (see **Box 2.1**).

The following UKBAP species, that are not legally protected, have been recorded within the 1km grid squares that cover the site:

- Small pearl-bordered fritillary (*Boloria selene*);
- Pearl-border fritillary (*Boloria euphrosyne*) (also LBAP);
- Silver-washed fritillary (*Argynnis paphia*);
- Common toad (*Bufo bufo*);
- Common frog (*Rana temporaria*);
- Western gorse (*Ulex gallii*);
- Swallow (*Hirundo rustica*);
- Great tit (*Parus major*).

A full list of the records provided from GCER is provided in **Appendix B**.

Other records supplied by the County Bird Recorder/Gloucestershire Ornithological Coordinating Committee (GOCC) within the search area and that are Birds of Conservation Concern red listed are shown below in **Table 2.3**.

Table 2.3 Species recorded in the vicinity of the site and which are red listed

Species	Location	Date	BAP
Breeding			
Bullfinch (<i>Pyrrhula pyrrhula</i>)	Northern United Area	2004	LBAP
Nightjar (<i>Caprimulgus europaeus</i>)	Birch Wood, and Plump Hill	2002- 2006	UKBAP and LBAP

Song thrush (<i>Turdus philomelos</i>)	Harrow Hill	2006	UKBAP and LBAP
Turtle dove (<i>Streptopelia turtur</i>)	Birch Hill, Drybrook Road Station and Plump Hill	2002- 2005	UKBAP and LBAP
Willow tit (<i>Parus montanus</i>)	Drybrook Road Station and Plump Hill	2003-2005	UKBAP
Wintering			
Reed bunting (<i>Emberiza schoeniclus</i>)	Bilson Green (probably residential)	2003	UKBAP and LBAP
Passage			
Spotted flycatcher (<i>Muscicapa striata</i>)	Plump Hill	2005	UKBAP and LBAP

A number of habitat action plans have also been prepared as part of the Gloucestershire LBAP and those most pertinent to the site are listed below:

- Rivers and streams;
- Standing open waters; and
- Woodlands.

For each habitat and species, the LBAP sets objectives and targets and lists the actions required to achieve them in order to guide nature conservation over the coming years.

2.2.5 Results of previous surveys

Northern United

Previous survey work carried out on behalf of the South West Regional Development Agency (SWRDA) in 2003 revealed the presence of a breeding colony of approximately 100 lesser horseshoe bats at a former colliery buildings located in the western part of the site (known as Northern United). Monitoring in subsequent years (2004-2007) by Keystone Environmental indicated that the number of lesser horseshoe bats using the old colliery buildings reached a maximum count in 2006 of approximately 200 individuals, reducing slightly in 2007 to 192 (possibly due to poor weather conditions and disturbance from trespassers). Greater horseshoe and brown long-eared bats have also been recorded in the buildings in low numbers. The Main Office and Bath House buildings support the greatest number of lesser horseshoe bats (the bats often showing a preference to one or other depending on external and internal environmental conditions), with a single male thought to repeatedly use the Canteen building, possibly as a lekking roost. A small number of bats occasionally remain within the buildings during November but no evidence of bats using the buildings for hibernation has been found.

A specially designed bat house (incorporating warmer upper and cooler lower sections) was built for the lesser horseshoe colony in 2003, for the 2004 season. The numbers of lesser horseshoe bats using the bat house has increased since its construction, and following minor alterations to improve the internal environmental conditions, from one lesser horseshoe in 2005 to a maximum count of six in 2007. Brown long-eared bats have been recorded within the new bat house (Keystone Environmental, 2008). Given the limited numbers of bats using the new

bat house (in comparison with the number of bats using the existing buildings), monitoring of the environmental conditions in both the old and new roosts was carried out in 2007 using temperature/humidity data loggers. **Table 2.4** below summarises the average temperature and relative humidity recorded throughout the buildings sampled.

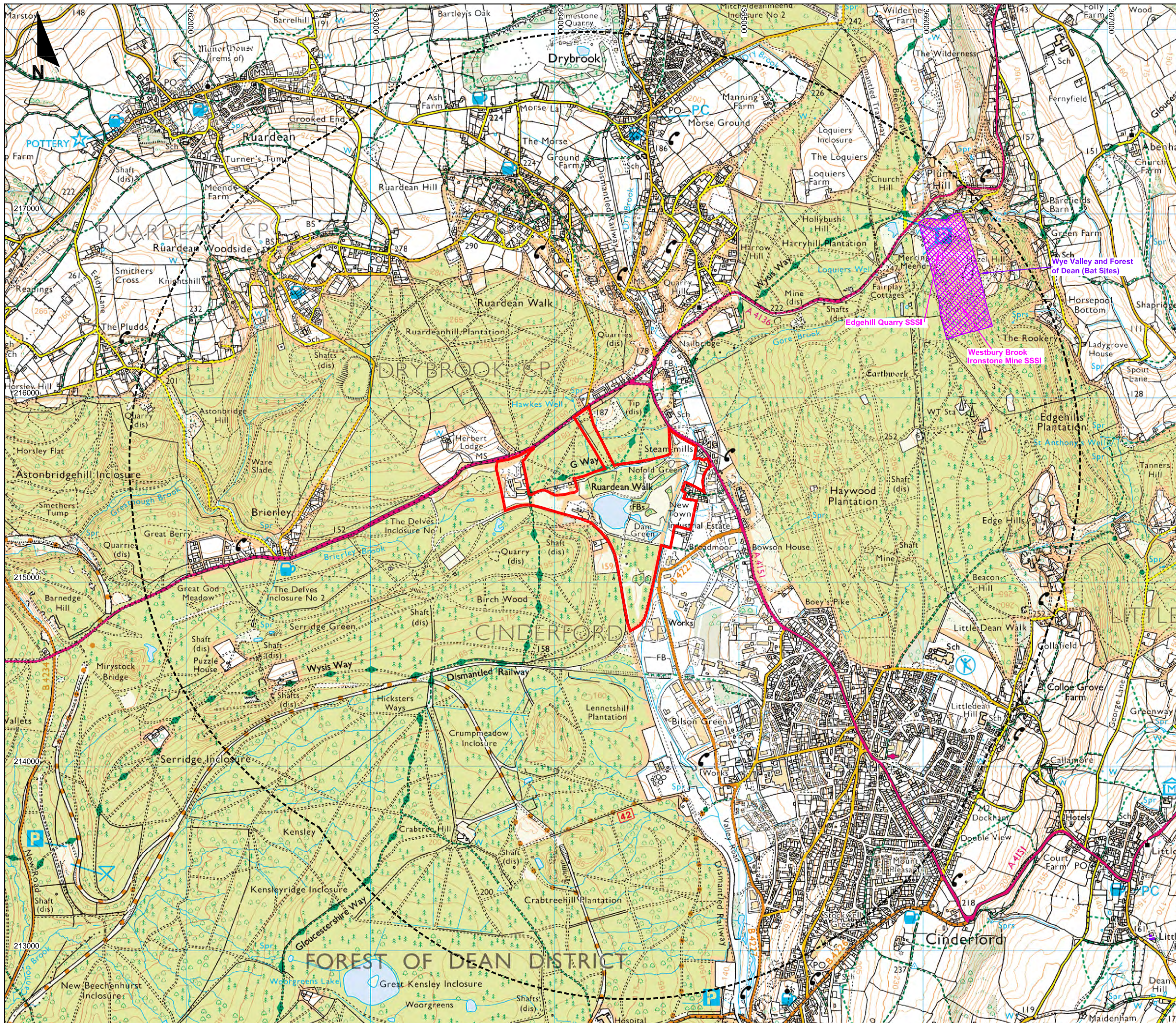
Table 2.4 Summary of average temperature and relative humidity within the existing buildings and the new bat house

Location	Average Temperature (between April and September 2007)	Average Relative Humidity (between April and September 2007)
Main Office 1	16.7°C	73.5%
Main Office 2	17.7°C	76.5%
Main Office all	17.2°C	75%
Bath House 1	15.5°C	84.3%
Bath House 2	15.5°C	95.9%
Bath House all	15.5°C	90.1%
Canteen	14.8°C	29.9%
New Bat House	16.1°C	82.2%

As indicated in the Keystone Environmental Roost Monitoring Update Report (2008), the environmental conditions within the new bat house are broadly similar to the Main Office and Bath House, with both the average temperature and humidity of the new roost falling between the averages of the Main Office and Bath House. The Canteen provides much lower average temperatures and humidity.

Remainder of site

Baseline surveys completed by Keystone Environmental in 2003 in the northern part of the site (Steam Mills and around the Brickworks) found the main habitats on site are semi-improved grassland, plantation woodland, scrub, waterbodies and watercourses. No evidence of badger or great crested newt was found (although the amphibian surveys were completed outside the recommended survey period). A small lesser horseshoe roost was found to occur within a house on the eastern survey boundary, although the entry point (through a window) was shut at the time of survey. No other bat roosts were found. During the evening surveys at the buildings common pipistrelle, soprano pipistrelle (*Pipistrellus pygmaeus*) and noctule (*Nyctalus noctula*) were recorded foraging across the survey area. Three species of reptile were recorded as present at the site, with good populations recorded of common lizard and slow-worm and a low population of adder recorded.



Key

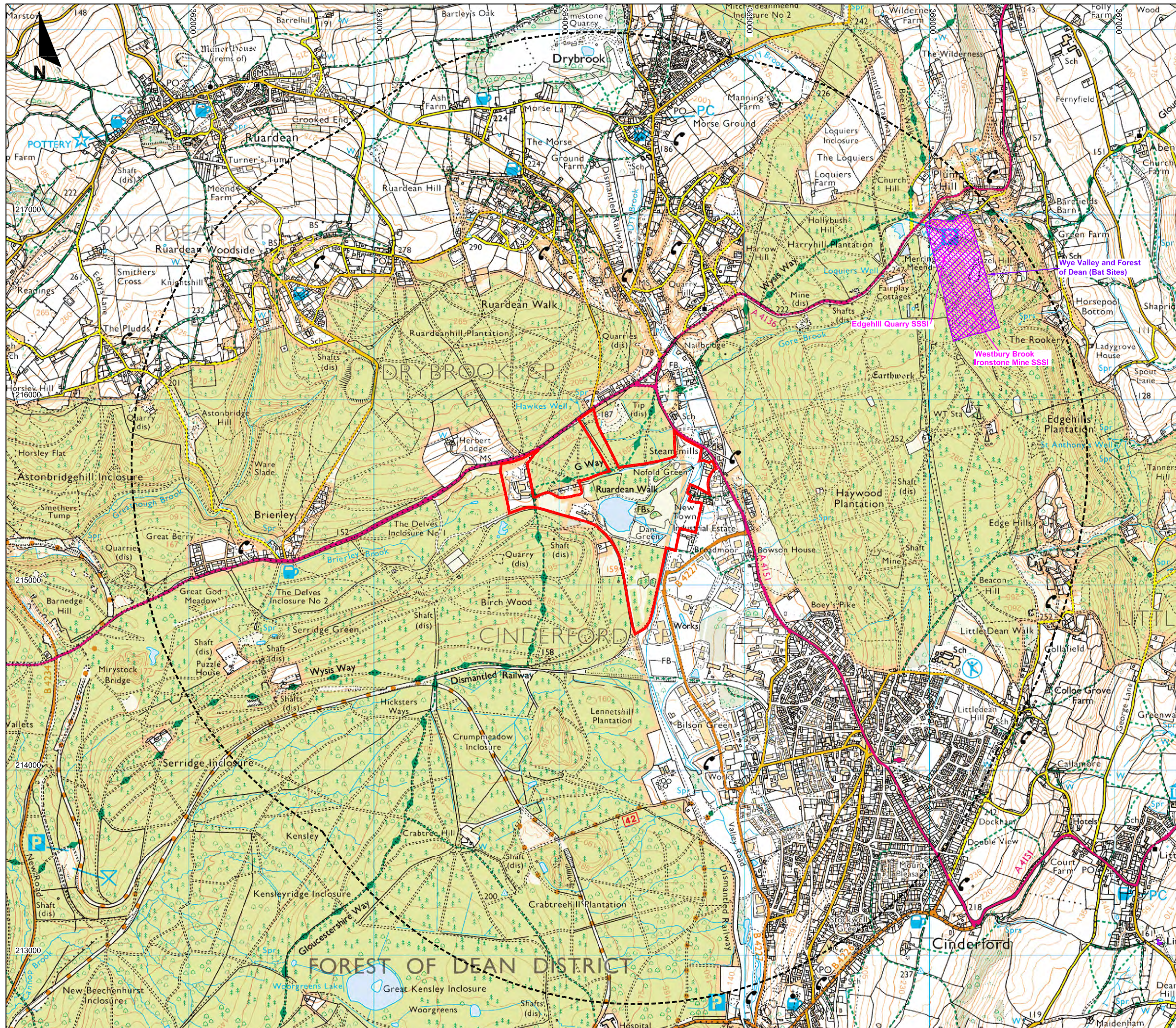
- Site boundary
- 2km buffer
- SSSI
- SAC

0 m 1000 m
 Scale 1:20,000 @ A3

Cinderford Ecological Appraisal Report

Figure 2.1
Statutory Designated Sites

Based upon the Ordnance Survey Map with the permission of the Controller of Her Majesty's Stationery Office. © Crown Copyright. Entec UK Ltd. AL100001776.



Key

- Site boundary
- 2km buffer
- SSSI
- SAC

0 m 1000 m
 Scale 1:20,000 @ A3

Cinderford Ecological Appraisal Report

Figure 2.1
 Statutory Designated Sites

Based upon the Ordnance Survey Map with the permission of the Controller of Her Majesty's Stationery Office. © Crown Copyright. Entec UK Ltd. AL100001776.

3. Field Survey

3.1 Methodology

3.1.1 Overview

Drawing on the previously completed survey work and desk study, an initial scoping exercise was carried out to determine the survey area (which comprises the site boundary and a minimum of a 50m buffer from the site boundary as shown in **Figure 3.1**), highlight features of potential ecological interest and to inform the specification for further and more detailed surveys. This was followed by an extended Phase 1 Habitat survey, the results of which were used to further refine the more detailed surveys planned.

Detailed surveys were undertaken of the species and habitats listed below. The survey methods and results are presented in the subsequent Sections.

- Broad habitats, plant species and plant communities (Phase 1 habitat survey and National Vegetation Classification);
- Amphibians (primarily great crested newt);
- Reptiles;
- Breeding and crepuscular birds;
- Bats;
- Water vole (*Arvicola terrestris*);
- Otter;
- Badger;
- Dormouse; and
- Invertebrates.

Incidental records of other mammals were also recorded.

3.1.2 Habitats

Extended Phase 1 Habitat Survey

A Phase 1 Habitat survey was undertaken by Caroline Chipperfield, Consultant Ecologist, BSc (Hons) AIEEM on the 9th and 10 July 2007. Distinct habitats were identified and mapped by identifying characteristic plant species and compositions of species as per the Phase 1 Handbook (JNCC, 2003). Any features of nature conservation interest were subject to a more detailed description in a target note (TN).

As the standard Phase 1 Habitat survey methodology is, in the main, concerned only with vegetation communities, the survey was extended (IEA, 1995) to allow for the provision of information on other ecological features, particularly to identify the presence/potential presence of legally protected species not previously highlighted.

National Vegetation Classification survey

Using the results of the Phase 1 Habitat survey, four areas of species-rich grassland within the survey area were highlighted as having the potential to support a more species-rich flora and as such require further detailed botanical assessment (**Figure 3.2**). Three of these areas lie within the site, whilst the fourth is located to the south of the site. The vegetation in each area was therefore sampled in accordance with the National Vegetation Classification (NVC) methodology (e.g. Rodwell 1992). Hence, within each of the four different areas, five semi-random quadrats were surveyed, taking care to avoid areas of atypical vegetation (e.g. scuffed ground, paths, scrub). A quadrat size of 2mx2m (4m²) was used.

The frequency and cover of every plant species present in each quadrat was recorded using the Domin scale of cover/abundance (Table 3.1), and the data subsequently used to produce a floristic table for each survey area. Surveyor experience and detailed descriptions provided within Volume 3 Grasslands and Montane Communities of the British Plant Communities series (Rodwell, 1992) were subsequently used to assign the areas surveyed to an NVC community type.

Table 3.1 Domain scale

Score	Percentage cover by species
1	< 4%; few individuals
2	< 4%; several individuals
3	< 4%; many individuals
4	4 - 10%
5	11 - 25%
6	26 - 33%
7	34 - 50%
8	51 - 75%
9	76 - 90%
10	91 - 100%

3.1.3 Amphibians

The approach to surveying for amphibians, and specifically great crested newts, includes identification and screening of breeding habitat (ponds), detailed survey of breeding habitat and assessment of terrestrial habitat suitability.

Note that the names assigned to each pond are either historic names (i.e. Peter's Pond), names from previous studies (i.e. K, J, I, G/H and F) or from location (i.e. MC= Meadowcliff, SM = Steam Mills).

Breeding habitat identification and screening

A total of 16 ponds were identified from the OS 1:10,000 and 1:25,000 basemaps as either on-site or within 500m of the site. Each pond was visited to determine whether it was present and held water. If both these criteria were met the pond was then subject to a screening exercise, which incorporated the Habitat Suitability Index (HSI) developed by Oldham *et al* (2000) to provide a score of the suitability of a pond to support great crested newts.

In addition, for the off-site ponds, an assessment of the terrestrial habitat between the pond and the site was undertaken to determine the likelihood of any newts within a pond outside the site using habitat within the site. Ponds were then screened out of further survey where there was:

- a lack of suitable corridor habitat existing between the potential breeding pond and the site, e.g. unsuitable habitat forming a likely barrier to movement such as short amenity type or heavily grazed grassland, intensive arable land or hard standing, and where in all cases there was a lack of linking features (e.g. hedgerows, ditches etc);
- major boundaries to dispersal between the breeding habitat and the development area. These could include roads with long stretches of kerbs, areas of built environment, major railway lines (main line routes with no culverts), some larger watercourses;
- poor linkages (e.g. long hedgerow breaks) and the pond was more than 250m from the site boundary;
- another pond very suitable for supporting the species between the one being considered and the area of development, which would be surveyed in preference (presence of great crested newts would then be assumed in this pond); and
- areas of suitable terrestrial habitat lying between a pond more than 250m from the development site and the site and which is more likely to be used than the habitats within the site.

Presence/absence and population estimate surveys

Detailed survey to determine presence/absence of great crested newt was undertaken for those ponds identified as potentially suitable during the screening phase. The survey methodology followed that outlined in English Nature's 'Great Crested Newt Mitigation Guidelines' (English Nature, 2001).

Each pond was visited on four occasions to determine presence/absence. These visits were undertaken by licensed ecologists¹ on the 13th/14th March, 17th/18th April, 29th/30th April and 12th/13th May 2008, which are all within the appropriate survey period identified by Natural

¹ Surveyors hold Natural England Science and Education Licence with respect to great crested newts. Personnel were Caroline Chipperfield (Licence No. 20081274) and Gemma Lee (Licence No. 20080600).

England. Evening survey air temperatures were above 5 degrees Celsius and weather conditions suitable. The following survey methods were used:

- A torch lit survey: The entire accessible perimeter of each water body was walked whilst illuminating the water's edge with a powerful torch. The surveys were undertaken during the period between dusk and midnight;
- Bottle trapping: If appropriate, bottle traps constructed from 2 litre plastic bottles were set around the margins of the water bodies. They were revisited early next morning to ensure the welfare of any newts trapped; and
- Egg search: Suitable vegetation was searched for great crested newt (and other amphibian) eggs. This was only done until the presence of great crested newts had been confirmed for a pond.

Sweep net surveys were not undertaken as this method was restricted by low water levels, dense vegetation coverage or lack of suitable, safe, access.

A further two survey visits, to enable a standardised assessment of population size class (English Nature, 2001), was carried out for those ponds where great crested newts were identified as present. These were carried out on the 2nd/3rd June and the 10th/11th June 2008 in suitable weather conditions.

On each survey visit, only the most appropriate survey methods were employed, which depended on the pond conditions and previous survey results. For example Peters Pond supported dense vegetation that made torching impractical and trapping the best method, whereas Pond F had less vegetation and more newts were recorded using torching as opposed to trapping. **Table 3.2** indicates the methods used at each pond on each survey visit. **Figure 3.3** illustrates the locations of the ponds.

Table 3.2 Survey methods employed at each pond screened into the presence/absence surveys

Pond Name	13/03/08	17/04/08	29/04/08	12/05/08	02/06/08	10/06/08
MC1	Torch & trapping	Torch, trapping and egg search	Torch, trapping and egg search	Torch, trapping and egg search	Not required	Not required
MC2	Torch & trapping	Trapping and egg search	Trapping and egg search	Trapping and egg search	Not required	Not required
MC3	Torch & trapping	Torch, trapping and egg search	Torch, trapping and egg search	Torch, trapping and egg search	Not required	Not required
SM2	Torch & trapping	Torch, trapping and egg search	Torch, trapping and egg search	Torch, trapping and egg search	Not required	Not required

Pond Name	13/03/08	17/04/08	29/04/08	12/05/08	02/06/08	10/06/08
SM3 ²	Torch & trapping	Torch, trapping and egg search	Torch, trapping and egg search	Torch, trapping and egg search	Torch, trapping and egg search	Torch, trapping and egg search
SM5	Torch & trapping	Torch, trapping and egg search	Torch, trapping and egg search	Trapping and egg search	Not required	Not required
K	Torch & trapping	Torch, trapping and egg search	Trapping and egg search	Trapping and egg search	Trapping	Trapping
J	Torch & trapping	Torch, trapping and egg search	Trapping and egg search	Trapping and egg search	Trapping and egg search	Trapping and egg search
I	Torch & trapping	Torch & trapping	Torch & trapping	Torch & trapping	Torch & trapping	Torch & trapping
H/G	Torch & trapping	Torch & trapping	Torch & trapping	Torch & trapping	Torch & trapping	Torch & trapping
F	Torch & trapping	Torch & trapping	Torch & trapping	Torch & trapping	Torch only	Torch only
PETERS POND	Trapping only	Trapping only	Trapping only	Trapping only	Trapping only	Trapping only

3.1.4 Reptiles

The survey methodology followed guidance provided in Froglife’s Advice Sheet 10 “Reptile Survey, an introduction to planning, conducting and interpreting surveys for snake and lizard conservation” (Froglife, 1999). The methodology also took into account additional guidance provided by the Joint Nature Conservancy Council (JNCC) in the “Herpetofauna Workers’ Manual” (JNCC, 1998) and advice from English Nature “Reptiles: guidelines for developers” (English Nature, 2004).

Habitat suitability for reptiles was considered during the Phase 1 Habitat survey of the survey area, which highlighted suitable areas for basking, foraging and hibernation to be targeted by the survey.

Artificial refugia, comprising a range of different sized (minimum of 0.5m x 0.5m) roofing felt mats, were laid throughout the survey area focusing on suitable habitat. Froglife (1999) suggests placing between five and 10 refugia per hectare (ha). Although the total survey area is ~45ha, much of this comprises buildings and hardstanding, plantation woodland, improved grassland and waterbodies, which do not provide suitable habitat for reptiles. Hence, the area of potentially suitable reptile habitat (grassland, edges of bare ground and scrub mosaics) that was included in the survey is estimated to be 14ha. Based on this area and the Froglife guidance, a

² Following an incidental meeting on site with Chalkhill Environmental (who were surveying on behalf of the brickworks), Entec was informed that SM3 had been created as a mitigation pond for clay extraction. It was therefore decided to undertake the full six survey visits at this pond.

minimum of 70 refugia and a maximum of 140 refugia should be used. Within the survey area, this was increased to 205 to ensure maximum effort was concentrated in the areas most suitable to basking reptiles. A small number of the refugia were either moved by members of the public or lost during the survey period. However, as a minimum at least 160 refugia were checked on each survey occasion.

The survey area was divided into six compartments for ease of reptile recording and the aim was to demonstrate any differences in reptile populations or species composition across this area. The locations of the compartments are shown in **Figure 3.4**. Five of the six compartments lie within the site, one (Bowson's Colliery) lies to the south of the site.

The refugia were checked on 18 occasions throughout the optimal survey period during 2007 and 2008, in suitable weather conditions. **Appendix F** details the survey dates and weather conditions.

3.1.5 Birds

Breeding Birds

A breeding bird survey was carried out following a method based on the British Trust for Ornithology's (BTOs) Common Bird Census (CBC) methodology (Gilbert et al., 1998). The survey area comprised the entire site and neighbouring habitats which could be surveyed, at least in part, from the site³. Surveys commenced at dawn and lasted approximately three hours. On each visit the site was walked at a slow pace to enable all birds detected to be identified and located. All areas of suitable breeding habitat were approached. Weather conditions were good during all three visits (winds less than force 3 and no precipitation). The three visits were carried out on the 10th April, 20th May and 17th June 2008.

During the survey the location and activity of each bird detected (visually and/or aurally) was recorded. Birds were considered to be demonstrating breeding behaviour if they were singing, displaying, alarm calling, carrying food, undertaking distraction displays or if eggs or chicks were found. All birds engaged in other forms of behaviour were considered to be feeding, loafing or passing through. They were not, therefore, considered to be breeding in the location of observation. Bird locations were mapped using standard two-letter BTO Codes, and bird activity was recorded using BTO behaviour codes.

The maps from all three visits were analysed and combined to produce the final territory location map which was used to estimate the breeding densities of each species. As territory locations are derived from a combination of each visit map (as per the CBC methodology), it should be noted that these do not represent specific nest locations (this is not the aim of this survey method which was designed to estimate population sizes).

Crepuscular bird survey

A survey aimed primarily at detecting nightjar was deemed necessary as some suitable habitat is present on site and in areas immediately adjacent to it to the west. Furthermore this species has

³ This may result in a bias towards more vocal species off site such as song thrush, which were more likely to be recorded up to 200m from the site boundary, than smaller less vocal species. This is not thought to have a detrimental effect on the results, as the recording of species off site is not essential for this survey.

been recorded in the Haywood Plantation to the east of the site, on the opposite side of the A4151 road. Two males were recorded in song in this plantation in 2006. The Forest of Dean as a whole is one of the areas within Gloucestershire where this species breeds regularly (Gloucestershire Ornithological Coordinating Committee {GOCC}, 2007a and 2007b).

In addition to the dawn breeding bird survey visits, two evening visits were conducted to determine whether nightjar is present on site. Two surveyors were present on both survey visits. Methodology followed the guidelines for nightjar surveys set out in Gilbert *et al.* (1998), which recommend two visits between June and mid-July. The visits were carried out on the 16th June and 16th July 2008. The weather conditions on both evenings were optimal for nightjar surveys, with little or no wind (force 1-2) and no precipitation. The surveys were started at sunset and continued for 2 hours.

All areas of suitable habitat on site were surveyed from regularly spaced transects such that all points were approached to within 100m. The surveyors walked at a slow pace with frequent pauses in order to maximise the chances of hearing ‘churring⁴,’ wing clapping or calling birds. Any birds heard or seen were recorded. Other species noted during the surveys were also recorded.

3.1.6 Bats

The methodology for undertaking the bat survey work followed that advised in Bat Surveys-Good Practice Guidelines (BCT, 2007) and the Bat Mitigation Guidelines, (English Nature 2004). The work was carried by experienced ecologists with suitable bat surveying experience.

Potential roost assessment

Substantial monitoring at the site by Keystone Environmental in 2003 had already identified several roosts present onsite. This work was updated through high level appraisal of the buildings and trees present onsite in relation to their suitability to support bat roosts based on the potential roosting features present. This comprised a visual assessment of the outside of each feature from ground level only.

Activity survey

As substantial survey work has already been undertaken to monitor the roosts present, the objective was to supplement this with activity surveys to determine the species using the site and the locations of foraging and commuting activity. Surveys to record this activity were undertaken during the optimal survey period of 2008.

A total of four activity surveys were completed, one in each of the months June to September 2008, by four surveyors using Batbox duet heterodyne detectors and Edirol R-09 recording devices. The surveys occurring on the 18th June, 29th July and 27th and 28th August (note that the August survey was split over two nights) comprised evening surveys which started approximately 15 minutes prior to sunset and ended three hours after sunset (due to the presence

⁴ The territorial song of a male nightjar consists of a monotonous ‘churr,’ vaguely reminiscent of a cricket or cicada, which can carry for several hundred metres in calm conditions. Various other vocalisations, including a distinctive and far carrying di-syllabic flight call are also regularly made. Wing clapping, which may have both a territorial and display function, is also undertaken, but is audible over shorter distances (the bird is often visible when wing clapping).

of horseshoe bats). The survey on the 17th September comprised a dawn survey which started two hours prior to dawn and ended approximately at dawn. This level of effort accords with appropriate levels of survey effort typically adopted for detecting presence/absence of most species of bat.

Each of the evening surveys comprised a static survey point at which the surveyor stood for between 30 minutes and one hour, followed by a transect (see below) which concentrated on features of interest (e.g. the fishing lake and the known roost) and linear corridors (i.e. woodland edges).

The activity surveys comprised two key survey areas, one focussing on Northern United, the brickworks and Bowson Colliery (Red Route), and the other focussing on Dam Green, the fishing lake and Steam Mills (Purple Route). **Figures 3.5** show the routes of the transects taken. In each area two transects were undertaken, each one being completed at least once. The static survey points on the Red Route were adjacent to the Northern United buildings and had the aim of confirming that lesser horseshoe bats were continuing to use the buildings and noted which direction they left the roost. The static survey points on the Purple Route were on key locations along the Old Engine Brook.

Due to health and safety concerns relating to working at night on open access land, the transects were designed with regular meeting points for the surveyors and in some locations surveyors walked in pairs (e.g. around Steam Mills Lake where night fishing occurs).

The suitability of both areas for foraging bats influenced the routes of the transects which were defined to ensure that the full range of key potential feeding habitat features and commuting routes were sampled. Previous monitoring data for the site were also taken into account.

All the calls recorded during the surveys were analysed using the BatSound software.

In addition, an Anabat was deployed as a static recorder on two occasions, near to the proposed access road. On the first occasion (July 29th) the Anabat was left out for the duration of the transect survey adjacent to the clearing in Hawkwell Inclosure at grid reference SO642157. On the second occasion (September 3rd – 6th) the Anabat was left out for four days along the woodland edge of the Hawkwell Inclosure (grid reference SO642156, just north of survey point 3 on the Red Transect route).

Constraints

Despite a good weather forecast for the initial activity survey at the site, just prior to the start of the survey the weather deteriorated to persistent rain. It was decided to continue with the survey and bats were recorded leaving the Northern United buildings and at various locations around the site, although in lower numbers than were recorded on subsequent surveys. The weather conditions during the remainder of the survey visits were all optimal.

On the second and third survey visits some of the equipment used to record the bat echolocations from the bat detector failed. The result of this was that the bat species recorded by the surveyors could not be verified. However, this is not considered to have significantly affected the results as all the surveyors that had equipment fail are experienced and competent at bat identification and the data that could be analysed confirmed that the species recorded are present at the site.

3.1.7 Water vole and otter

Survey for field signs and activity

The banks of each ditch/watercourse/waterbody within the survey area were subject to a methodical search for the field signs typically left by water voles (following guidance provided in Strachan and Moorhouse, 2006), which are:

- footprints;
- droppings and latrines;
- feeding remains (characteristically nibbled grass shoots and leaves);
- burrows in the bank close to the waters edge; and
- obvious pathways through vegetation.

Evidence of the presence of otter was also searched for in the same areas. Typical signs left by otters include:

- footprints;
- spraints;
- feeding remains; and
- holts or resting places.

3.1.8 Badger

The methodology for undertaking a detailed badger survey followed guidance provided by a number of different sources⁵ (English Nature, 2002; Harris *et al* 1989; McDonald *et al* 1998).

Survey for field signs and activity

The survey area was subject to a methodical search for the field signs typically left by badger. This was undertaken in conjunction with other site visits for dormice, Phase 1 habitat survey, bat activity surveys and water vole/otter survey. In addition, a suitably experienced ecologist undertook a survey of any areas not covered by other site visits on the 14th October 2008.

Typical habitats commonly utilised by badger within the survey area include woodland, scrub, banks and areas of rough grassland.

The main features that indicate badger presence are:

- setts (described in more detail below);
- footprints;
- latrines;

⁵ There is no formal guidance for undertaking badger survey currently available from the statutory nature conservation agencies.

- fence push-ups;
- Scratched trees or soil;
- hair – outside a sett entrance or caught on wire or branches; and
- obvious pathways through vegetation.

The sett classification adopted in this study follows that detailed in *Badgers and Development* (Natural England, 2007), which refers to Thornton, P. S. (1988)⁶:

- **Main Sett:** These usually have a large number of holes with large spoil heaps, and the sett generally looks well used. They usually have well used paths to and from the sett and between sett entrances. Although normally the breeding sett is in continual use all year round, it is possible to find a main sett that has become disused because of excessive disturbance or for some other reason.
- **Annexe Sett:** These are always close to a main sett and are usually connected to the main sett by one or more obvious, well worn paths. They consist of several holes, but are not necessarily in use all the time, even if the main sett is very active.
- **Subsidiary Sett:** Often these have only a few holes, are usually at least 50 m from a main sett, and do not have an obvious path connecting them with another sett. They are not continuously active.
- **Outlying Sett:** These usually only have one or two holes, often have little spoil outside the hole, have no obvious path connecting them with another sett, and are only used sporadically.

3.1.9 Dormouse

The survey methodology adopted the guidance provided by Natural England in the “Dormouse Conservation Handbook” (English Nature, 2006). It also took into account advice given by the Mammal Society (undated, 1989, and 1992).

Dormice construct nests during the summer, usually made out of strips of honeysuckle bark woven with leaves. These can occur almost anywhere within a dense hedge or woodland but are usually off the ground and can be within holes in trees. This habit of nest building can be used to survey for the presence of the species.

Plastic dormouse tubes and wooden dormouse boxes were set out within and adjacent to the survey area during July and August 2007. As the site is disturbed by human activity these were located in the most optimal positions for dormice but taking into account levels of disturbance and safe accessibility for surveyor.

As such, the boxes were mainly sited on suitable trees along the boundary of the site and tubes were located in dense scrub largely associated with woodland edge habitats. Although the site supports limited hazel and honeysuckle, which is often associated with dormice, the site is well

⁶ Thornton, P. S. (1988) Density and distribution of badgers in south-west England - a predictive model. *Mammal Review*, 18, 11-23

connected into the landscape where this species is known to occur and nonetheless supports other plant species valuable to dormice for foraging.

A total of 85 tubes and 60 boxes were installed. The locations of the tubes and boxes are shown on **Figure 3.6**. Both tubes and boxes were set at intervals of approximately 20m apart. However, priority was given more optimal habitats and positions (e.g. in particularly dense, more species rich scrub) rather than sticking to this exact spacing.

The tubes and boxes were checked monthly between September and November 2007 and April and July 2008. Hence, a total of seven visits were undertaken.

Using the guidance provided by Natural England (English Nature, 2006), which provides an index of probability for finding dormice in tubes in each month between April and November, and based on the level of survey effort carried out, a maximum annual survey effort score of 20⁷ was achieved. The Natural England guidance suggests that scores of under 20 should not be used to conclude dormice are absent from a site. The survey effort at the site is equal to this threshold and it is therefore reasonable to conclude dormouse presence or absence can be confidently determined from this level of survey effort.

3.1.10 Other mammals

During the extended Phase 1 habitat survey, field signs (e.g. footprints, burrows, feeding remains, and droppings) and sightings of other mammals were recorded.

3.1.11 Invertebrates

An invertebrate survey was completed by Entec sub-consultant Andy Godfrey between the 27th and 30th September 2007 in good weather conditions. The survey area was divided into compartments supporting similar habitats; Zones 1 (grassland, north and south), 2 (wetland, north and south), and 3 (proposed road), Northern United Site, lake and brickworks ponds. These areas are illustrated in **Figure 3.7**.

The main survey methods involved sweep netting and direct searching (for butterflies and other conspicuous invertebrates). The sweep net used was a 16 inch diameter net and mounted on a 3-foot angling pole. Swept insects were selectively removed with an aspirator (pooter) and retained for later sorting and identification. Direct searching included searching for ground-dwelling invertebrates under stones, on flower-heads for flower visiting insects, recording plant galls and leafmines, etc. The taxa covered included a range of terrestrial invertebrates groups dominated by those that are normally caught with a sweep net.

Three-minute kick samples were taken from the lake and the main ponds and these were then washed and sieved on the banks until the water running from the sieve was clean. Each sample was then placed in a white tray and sorted on the bank for a period of about 45 minutes or until no new taxa were recorded. Vouchers of most taxa were taken for further identification, the only exception being conspicuous species which could be identified in the field. Actual or estimated counts were made of all aquatic species. All aquatic macro-invertebrates have been identified to species level except for certain difficult taxa (such as oligochaete worms and chironomid larvae).

⁷ Out of a maximum of 25.

3.2 Results

3.2.1 Habitats

Phase 1 habitat survey

The survey area comprises a mosaic of different habitat types, which are described below. **Figure 3.8** illustrates the extended Phase 1 habitat survey map of the survey area and surrounding areas included in the survey. Target notes for features of interest can be found in **Appendix C**.

Buildings and hardstanding

Within the survey area boundary, buildings and hard-standing occur at Northern United, the brickworks and New Town.

The buildings (circa early 1900s) occupying the former Northern United Colliery comprise dilapidated offices, a bathhouse, a canteen and site offices. These are largely constructed of brick with mixture of pre-fabricated sheet metal roofs and slate or clay tile roofs. All are single storey and vary in size. Several large warehouses are present and comprise pre-fabricated sheet metal clad over a metal frame. The majority of these buildings are derelict and have not been used since the colliery closed in the 1960s. The exceptions are those used by the waste haulage firm.

The buildings that comprise the brickworks are mainly warehouses with one or two brick offices attached. It is likely that they are of a later date (circa mid to late 1900s) and are constructed of pre-fabricated sheet metal over a metal and brick frame. These are still in use.

New Town comprises warehouses with brick walls and metal frame roofs clad in corrugated sheet metal and a two storey rendered dwelling with a pitched slate roof and gable ends. Adjacent to the house is a barn, which has two stories, stone walls with a slate tiled pitched roof, and is used by a carpet merchant. The majority of the warehouses are still in use, as is the dwelling and barn.

Hardstanding is restricted to sealed roads and walkways between buildings at the former Northern United Colliery. Ephemeral species are present in places along the edges of the hardstanding. Species include abundant bryophytes with frequent silverweed (*Potentilla anserina*), white clover (*Trifolium repens*), selfheal (*Prunella vulgaris*), black medick (*Medicago lupulina*), common toadflax (*Linaria vulgaris*) and lesser hawkbit (*Leontodon saxatilis*).

Coniferous plantation woodland

Throughout the survey area are areas of plantation woodland, populated with mature Corsican pine (*Pinus nigra subsp. laricio*). Norway spruce (*Picea abies*) has also been planted in a block to the north of the main fishing lake. Under-storey is lacking in most places and ground-flora is restricted to species such as bramble (*Rubus fruticosus agg.*), common nettle (*Urtica dioica*) and ivy (*Hedera helix*) with occasional grass species such as wood false-brome (*Brachypodium sylvaticum*). Hard shield-fern (*Polystichum aculeatum*) is also present in places and broad-leaved helleborine (*Epipactis helleborine*) was noted in the wood adjacent to the site at Bowson Colliery.

Broad-leaved plantation woodland

The survey area is poorly drained and this is likely to be the reason alder (*Alnus sp.*) carr has been planted. Small areas are present adjacent to Nofold Green and along the edge of the disused railway that forms the site boundary near the brickworks. Woodland structure is poor with little or no under-storey and minimal ground-flora which, where present, is mainly restricted to common shade tolerant species such as ivy, herb-Robert (*Geranium robertianum*) and wood avens (*Geum urbanum*).

A further block of alder carr is also present to the north of the brickworks and includes both common alder (*Alnus glutinosa*) and grey alder (*Alnus incana*). Woodland structure is a little more diverse with an under-storey of bramble, with frequent elder (*Sambucus nigra*) and hawthorn (*Crataegus monogyna*). In addition to the species recorded above, the ground flora also includes species such as remote sedge (*Carex remota*), moschatel (*Adoxa moschatellina*) and male-fern (*Dryopteris filix-mas*).

Mixed plantation woodland

Mixed plantation woodland surrounds the main fishing lake. A mixture of alder with occasional Norway spruce dominates the plantation. Ground flora is again sparse and mainly restricted to bracken (*Pteridium aquilinum*), bramble and common nettles.

Scattered trees

Numerous scattered trees are present throughout Nofold Green, whose growths appear impeded by the poor quality of the drainage present in this habitat. Scattered tree species include frequent alder, Norway spruce and Corsican pine.

In addition, there are scattered trees along the boundaries of the warehouses at New Town.

Dense and scattered scrub

Scrub is mainly dominated by bramble, common nettle and in places gorse (*Ulex europaeus*). Other species present include frequent rosebay willowherb (*Chamerion angustifolium*), wild angelica (*Angelica sylvestris*) and woody nightshade (*Solanum dulcamara*) and grass species common throughout the site such as cock's-foot (*Dactylis glomerata*) and Yorkshire-fog (*Holcus lanatus*). In less well drained places soft rush (*Juncus effusus*) and marsh thistle (*Cirsium palustre*) were abundant.

The areas supporting this habitat type include the Old Engine Brook along the boundary with New Town, the ditch in the Steam Mills part of the site and in patches adjacent to the built up parts of the Northern United colliery area.

The linear strip which extends through Hawkwell Inclosure, and was cut to accommodate power lines, is also dominated by dense scrub. Species which characterise this area include silver birch, hawthorn, blackthorn and grey willow saplings. The under-storey is dominated by bramble.

Semi-improved neutral grassland and marshy grassland

Neutral grassland dominates large parts of the survey area, all of which has grown on ground heavily disturbed by mining activity. The mining activity would have created spoil heaps which have been re-profiled to create an uneven and undulating topography. The majority of the survey area is inadequately drained, leaving low-lying areas prone to water-logging.

The pH throughout the survey area appears to vary considerably, which is reflected in the appearance of species more characteristic of extreme pH such as fairy flax (*Linum catharticum*), common restharrow (*Ononis repens*) and wild thyme (*Thymus praecox*).

Although the survey area is grazed by wild deer and rabbits, overall lack of management has resulted in a rank sward. This is especially the case to the north of the bricks works and at Steam Mills where false oat-grass (*Arrhenatherum elatius*) becomes more abundant. Where grass species have flourished the sward is longer and closed, such as to the north of the brickworks, while in other places it is sparser, with occasional open patches.

In areas where drainage is poor, such as Nofold green, water-logging is present and bryophytes are abundant. Intermediate areas are characterised by an abundance of marsh thistle, greater birds-foot trefoil (*Lotus pedunculatus*) and sedge species such as glaucous sedge (*Carex flacca*) and hairy sedge (*Carex hirta*). Soft and hard rush (*Juncus inflexus*) are frequent and become dominant in places along the south eastern edge of the survey area (outside the site boundary).

Grassland found to the north of the brickworks is more established and there is a noticeable lack of marsh thistle and rush species.

Species constant throughout the grassland habitat include tufted hair-grass (*Deschampsia cespitosa* subsp. *cespitosa*) (especially towards the eastern edge of the site), crested dog's-tail (*Cynosurus cristatus*), cock's-foot, Yorkshire fog and creeping bent (*Agrostis stolonifera*). There is also frequent Timothy (*Phleum pratense*), common bent (*Agrostis capillaris*) and red fescue (*Festuca rubra*). Forb species include abundant creeping cinquefoil (*Potentilla reptans*), selfheal, white clover, black medick, silverweed and meadow buttercup (*Ranunculus acris*). Common centaury (*Centaureum erythraea*) is also present in places.

A small area of marshy grassland, located in a depression is present in the eastern part of the site at New Town. This comprised similar species to those found in other areas of the survey area but also included marsh marigold (*Caltha palustris*), celery-leaved buttercup (*Ranunculus sceleratus*) and floating sweet-grass (*Glyceria fluitans*).

Poor semi-improved grassland

Two heavily, horse grazed fields are present along the eastern boundary of the site at Newtown. These are dominated by an assemblage of common species characteristic of intensively managed habitats. Species present include Yorkshire fog, crested dog's-tail, cock's-foot, creeping buttercup, meadow buttercup, broad-leaved dock (*Rumex obtusifolius*), common field horsetail (*Equisetum arvense*) and creeping thistle (*Cirsium arvense*). Hairy sedge was common in the sward, especially in the pasture to the south of this area.

Bare ground

Bare ground habitat has been created north of the brickworks by excavations in this area and is present as spoil mounds at Dam Green.

Heath

A small stand (5m by 5m) of heath is present directly to the west of the brickworks. Species present include dominant heather (*Calluna vulgaris*) with wavy hair-grass (*Deschampsia flexuosa*) and frequent tormentil (*Potentilla erecta*).

Open standing water

The main area of open water is the large, man-made fishing lake at the centre of the survey area (labelled as SM1 with SM2 as a small extension of this waterbody on Figure 3.3). This lake is substantial in size with largely shallow un-shaded margins. Grey willow (*Salix cinerea subsp. cinerea*) and alder occur along sections of the bank. Bank vegetation includes meadowsweet (*Filipendula ulmaria*), marsh willowherb (*Epilobium palustre*) and greater birds-foot-trefoil. Margins are dominated by rush species such as common spike-rush (*Eleocharis palustris*) and soft rush in the shallows which graduate into reedmace (*Typha latifolia*), branched bur-reed (*Sparganium erectum*), with frequent greater spearwort (*Ranunculus lingua*) and water mint (*Mentha aquatica*). Aquatic vegetation includes frequent Water-lily sp.

Adjacent to the main fishing lake at Dam Green are two further water bodies (SM3 and SM5 on Figure 3.3). The smaller of these is a water-filled depression in the middle of Dam Green, surrounded by bare ground and with sparsely vegetated margins. Limescale encrusted Canadian waterweed (*Elodea canadensis*) is present in the shallows and broad-leaved dock, scentless mayweed (*Tripleurospermum inodorum*) and white clover are present on the banks. Adjacent to this is a further water body with similar characteristics to the main fishing lake but with more shaded margins (SM5).

A series of small ponds is present along the eastern edge of the southern tip of the survey area (Ponds K, J, I, H, G and F on Figure 3.3). These vary in size from approximately 8m by 8m to approximately 30m by 50m and are generally shallow, with partially shaded margins and abundant riparian vegetation. Marginal vegetation includes species such as soft rush and common spike-rush, graduating into reed canary-grass (*Phalaris arundinacea*) and reedmace. Forb species include frequent common valerian (*Valeriana officinalis*), water mint, marsh-bedstraw (*Galium palustre*) and water forget-me-not (*Myosotis scorpioides*) with abundant rosebay willowherb and marsh willowherb. Water horsetail (*Equisetum fluviatile*) is present in places and a common spotted-orchid (*Dactylorhiza fuchsii*) was noted at Pond K. Bogbean (*Menyanthes trifoliata*) is present in Ponds J and K.

Running water

The main fishing lake is fed by a stream which flows through the site from Steam Mills, past Nofold Green and joins the north east corner of the lake. A stream leaves the lake and flows east to meet the course of the Old Engine Brook on the boundary with New Town. Riparian corridors border both streams and are dominated by silver birch (*Betula pendula*) and common alder creating a thick, dense canopy shading the streams. The under-storey is limited to bramble and an occasional elder. Ground vegetation is dominated by shade tolerant species such as wood avens, creeping-Jenny (*Lysimachia nummularia*), enchanter's-nightshade (*Circaea lutetiana*) and ground ivy (*Glechoma hederacea*). Himalayan balsam (*Impatiens glandulifera*) is present in places along the northern of these two streams (particularly adjacent to Steam Mills Lake).

Both streams are relatively narrow (1-1.5m in width) and quick flowing. Both are characterised by steep banks leading down to vertical, undercut sides (0.5m in height) held in place by tree roots. Submerged vegetation is limited and abundant liverworts are present near the waters edge.

Two further smaller streams are present. These flow from the wood to the north of the site, along the northern boundary, past Nofold Green, through Steam Mills to join the stream which flows down to the lake. Neither have established riparian corridor habitats and both are little

more than wet ditches. Species composition and diversity is characterised by surrounding habitats, although there is an abundance of soft rush, hard rush and compact rush (*Juncus conglomeratus*) in places such as to the north of Nofold Green.

Ditches

Several dry ditches are present throughout the site. These are stone filled and appear to be a drainage feature. In places rush species such as soft rush dominate these features.

National Vegetation Classification survey

All the areas surveyed to NVC level support a similar range of species, with tufted hair-grass and Yorkshire fog dominant throughout and found in almost every quadrat. Willowherb, marsh thistle and crested dog's-tail were also recorded at high densities. Other species that occurred frequently within the quadrats and often at high density include birds-foot trefoil, hairy sedge, red fescue and rush species.

Given the similar species that occur throughout the survey area, it is considered that the grassland present is a gradation of a single grassland community, with wetland species appearing where the underlying soil has become compacted and has impeded water drainage.

The grassland community present does not conform particularly closely to any recognised NVC community. However, this is probably because the grassland has developed on a non-natural substrate of the former coal mine spoil, resulting in soil with a relatively poor nutrient status. This has allowed relatively common species (often indicative of disturbed ground) to colonise. Further, due to the substrate, the communities that are present support species that in semi-natural conditions would be unlikely to occur together. Finally, the vegetation within the survey area has not been present for a sufficient time period to become naturalised and for species normally associated with tufted hair-grass and Yorkshire fog to colonise.

The grassland community within the survey area shows some affinity to the following NVC mesotrophic grassland (MG) communities by supporting some of the characteristic dominant species, but generally few of the less frequent associated species;

- MG5 crested dog's-tail – common knapweed (*Cynosurus cristatus* – *Centaurea nigra*):
- MG6 perennial rye-grass – crested dog's-tail (*Lolium perenne* – *Centaurea nigra*):
- MG9 Yorkshire fog – tufted hair-grass (*Holcus lanatus* – *Deschampsia cespitosa*): and
- MG10 Yorkshire fog – soft rush (*Holcus lanatus* – *Juncus effusus*).

Due to the dominance of Yorkshire fog and tufted hair-grass, the grassland is considered to be closest in affinity to MG9. This grassland community is characterised by the dominance of tufted hair-grass, and is typical of permanently moist, gleyed and periodically inundated circumneutral soils found throughout the British lowlands. Tufted hair-grass has the ability to survive and become dominant on mineral soils that can often be anaerobic and oligotrophic and therefore inhospitable to other neutral grassland species. Tufted hair-grass also has a tolerance of high levels of soil moisture and can survive in areas of inundation.

Whilst the MG9 community is not regarded as being especially botanically rich, the grassland does support a range of species, which although generally common, are characteristic of the unusual conditions present. The wetter areas in particular appeared to support a moderate diversity of species including some uncommon species such as grass vetchling (*Lathyrus nissolia*) adding to the diversity of species present.

3.2.2 Amphibians

Pond screening

The HSI score for all the waterbodies subject to screening is shown in **Table 3.3**. A full breakdown is shown in **Appendix D**. The categorisation of HSI scores are as follows:

<0.5	poor;
0.5-0.59	below average;
0.6-0.69	average;
0.7-0.79	good;
>0.8	excellent.

Note that Oldham *et al* (2000) states that the lowest HSI score obtained from a pond known to support breeding great crested newts is 0.43.

Table 3.3 Summary of results HSI results (those ponds shaded are within the site)

Pond	Description	HSI score
MC1	Small woodland pond. Located 90m to the west of the site. Central grid ref: SO 636 153	0.35-Poor
MC2	Small woodland pond. Located 156m to the west of the site. Central grid ref: SO 636 152	0.61-Average
MC3	Small woodland pond. Located 156m to the west of the site. Central grid ref: SO 636 152	0.61-Average
MC3a	Large woodland waterbody stocked with fish. Located 76m to the west of the site. Central grid ref: SO 636 152	0.31-Poor
SM1	Large fish stocked lake. Located onsite at Dam Green. Central grid ref: SO 643 153	0.34 -Poor
SM2	Extension of large fish stocked lake. Located onsite at Dam Green. Central grid ref: SO 643 153	0.35-Poor

Pond	Description	HSI score
SM3	Small pond created from the extraction of clay (possibly as a mitigation pond). Located onsite at Dam Green. Central grid ref: SO 644 153	0.70-Good
SM4	Small depression created from nearby extraction of clay. Located onsite at Dam Green. Central grid ref: SO 644 152	0.57-Below average
SM5	Large waterbody created from the extraction of clay. Located onsite at Dam Green. Central grid ref: SO 643 152	0.84-Excellent
K	Medium sized pond on the edge of woodland at Bowson Colliery site. Forms part of a linear chain of ponds. Possibly man-made and managed by the Forestry Commission. Located within the survey area but 40m to the south of the site. Central grid ref: SO 645 151	0.67-Average
J	Medium sized pond on the edge of woodland at Bowson Colliery site. Forms part of a linear chain of ponds. Possibly man-made and managed by the Forestry Commission. Located within the survey area but 60m to the south of the site. Central grid ref: SO 645 151	0.81-Excellent
I	Small sized pond on the edge of woodland at Bowson Colliery site. Forms part of a linear chain of ponds. Possibly man-made and managed by the Forestry Commission. Located within the survey area but 100m to the south of the site. Central grid ref: SO 645 151	0.81-Excellent
H/G ⁸	Medium sized pond on the edge of woodland at Bowson Colliery site. Forms part of a linear chain of ponds. Possibly man-made and managed by the Forestry Commission. Located within the survey area but 170m to the south of the site. Central grid ref: SO 645 150	0.81-Excellent
F	Medium sized pond on the edge of woodland at Bowson Colliery site. Forms part of a linear chain of ponds. Possibly man-made and managed by the Forestry Commission. Located within the survey area but 200m to the south of the site. Central grid ref: SO 645 149	0.81-Excellent
E	Very heavily silted supporting damp grassland and no long holds water Located within the survey area but 300m to the south of the site.	N/A
PETER'S POND	Medium sized pond on the edge of woodland forming part of, although slightly separated to the south by rough grassland, a linear chain of ponds. Possibly man-made. Located adjacent to the survey area and 470m to the south of the site. Central grid ref: SO 645 147	0.80-Excellent
Offsite 1	Medium sized pond surrounded by business park Located 380m to the southeast of the site. Central grid ref: SO 646 148	0.45- Poor

⁸ Linear ponds H and G are connected and therefore have been considered as a single pond.

Few onsite features present barriers to newt dispersal, as the site largely comprises semi-natural habitats and tracks. In addition, the Meadowcliff ponds (MC 1, 2, 3 and 3a) and Peter's Pond are located in woods near to the site and are therefore well connected to the site. The survey area is bordered to the east by Cinderford Industrial Estate. Offsite 1 is located in here and is partially fragmented from the site by roads and areas of hardstanding. Due to this partial fragmentation and the low HSI score this pond was screened out of further survey work, as it was considered unlikely to support great crested newts.

From the HSI screening exercise it was determined that the linear ponds (i.e. K, J, I, G/H and F) and Peter's Pond, together with MC2, MC3, SM3 and SM5, could be suitable breeding ponds as they have a HSI score of 0.5 or above. Moreover, MC1, MC2 and MC3 and SM2 were not screened out as they are all in close proximity and well-connected (via habitat corridors) to other potential breeding ponds and, although sub-optimal, could therefore be used by breeding newts.

Presence/Absence survey

The presence/absence survey established that great crested newts are present in waterbodies K, J, I, G/H, F and Peter's Pond. Egg searches on the first or second visit confirmed the presence of great crested newts in I, G/H, F and Peter's Pond indicating that breeding occurs. No great crested newt eggs were found in J or K. However, these ponds support high numbers of three-spined stickleback (*Gasterosteus aculeatus*) which could restrict breeding. **Tables 3.4** and **3.5** provide a summary of the number of great crested newts recorded by trapping and torching. Full results are provided in **Appendix E**.

Smooth newts (*Lissotriton vulgaris*) and/or palmate newts (*Lissotriton helveticus*) were also present in all the ponds apart from MC2, SM2, and SM5, which do not appear to support any species of newt. Tadpoles were also recorded in SM3.

Table 3.4 Summary of great crested newt results from bottle trapping effort

Pond	Survey visit 1	Survey visit 2	Survey visit 3	Survey visit 4	Survey visit 5	Survey visit 6
Date	13/03/08	17/04/08	29/04/08	12/05/08	02/06/08	10/06/08
K	0	0	0	1	0	0
J	0	0	0	0	0	3
I	0	1	2	2	3	3
H/G	0	1	2	6	0	2
F	0	3	27		No trapping	
Peters Pond	2	2	2	15	0	5

Table 3.5 Summary of great crested newt results from torching survey effort

Pond	Survey visit 1	Survey visit 2	Survey visit 3	Survey visit 4	Survey visit 5	Survey visit 6
Date	13/03/08	17/04/08	29/04/08	12/05/08	02/06/08	10/06/08
K	0	0		Torching was not used.		
J	0	0		Torching was not used.		
I	2	0	23	1	7	3
H/G	4	0	1	0	1	3
F	3	0	40	15	2	3
Peters Pond	Torching was not used					

As the linear ponds, together with Peter's Pond, are within close proximity to each other (each less than 100m apart from the next) the population they collectively support can be considered a meta-population, with interchange of individuals between ponds expected. The population size class estimate is established using the maximum count of great crested newts recorded at the ponds within the meta-population, on a single survey visit, using the same survey method. At the site this occurred on the 29th of April using the torch counting method when a total of 64 great crested newts were recorded. Based on this population size class estimate, the great crested newt population present within the survey area is considered to be of medium size⁹. Using the criteria described in the Gloucestershire Species Action Plan for great crested newts the site supports a 'large' population (over 50 individuals counted by torchlight).

The results of the amphibian survey are considered to remain valid for two years. This is based on information provided in the current Natural England licence application and the likely scope of development.

3.2.3 Reptiles

The results of the presence/absence survey concluded that the survey area supports grass snake, common lizard, adder and slow-worm. Juveniles of slow-worm, common lizard and adder were recorded during the survey, indicating that these species are breeding at the site.

The results are detailed, along with weather conditions, in full in **Appendix F**. A summary of the total number of each reptile species found through the survey and the maximum count of reptile species recorded in a single survey visit are provided for each compartment in **Table 3.6**.

⁹Great Crested Newt Mitigation Guidelines (English Nature, 2001).

Table 3.6 Summary results of reptile survey (those locations shaded are within the site)

Location	Slow-worm		Common lizard		Grass snake		Adder	
	Total Count	Max Count	Total Count	Max Count	Total Count	Max Count	Total Count	Max Count
Northern United	163	20	22	5	2	1	1	1
Brickworks	90	13	21	5	13	2	4	2
Dam Green	0	0	18	7	4	2	2	1
Steam Mills	9	2	17	8	1	1	1	1
Stone Mound	4	2	75	14	3	1	0	0
Bowson Colliery	30	7	15	3	2	1	1	1

Note – Total and Max counts exclude juveniles

Northern United

The reptiles within this compartment were consistently recorded throughout the survey period, contributing to the highest total count at the site. The highest maximum count of any reptile species was also recorded within this compartment, with 20 slow-worms recorded on the 11th June 2008. Slow-worm was therefore the most frequently encountered reptile present in this area and was recorded on every survey visit, although small numbers of common lizard, grass snake and adder were also recorded. The reptiles found in this compartment were spread throughout the area, predominantly using the edge habitats.

Brickworks

This compartment also supported high numbers of slow-worm, utilising the refugia placed on sloping east and south-facing ground and in tall grassland. Similar numbers of grass snake, common lizard and adder were found this area as at Northern United, but both grass snake and adder were recorded more frequently.

Dam Green

This is a small and relatively isolated compartment, which is reflected in the lower numbers of reptiles recorded. No slow-worms were recorded here, with the most frequently encountered reptile being common lizard, which was recorded on seven of the 18 visits. Small numbers of grass snake and adder were also recorded using the east facing slopes.

Steam Mills

The fewest number of reptiles were recorded within this compartment located in the north-eastern part of the site. Common lizard was recorded in the highest numbers but was only present on six of the survey visits. Small numbers of slow-worm also occurred and only one grass snake and one adder were recorded throughout the survey period.

Stone Mound

Stone Mound was found to support only three reptile species (slow-worm, common lizard and grass snake), although it is likely small numbers of adder would also use this area. Common

lizard was the most frequently encountered recorded reptile species and was present on 14 of the 18 survey visits. Small numbers of slow-worm and grass snake were also recorded.

Bowson Colliery

Slow-worm was the most frequently encountered reptile recorded in this compartment, although both slow-worm and common lizard were recorded on over half the survey visits (11 and ten respectively). Small numbers of grass snake and adder were also found to be present.

3.2.4 Birds

Full results of the breeding bird and crepuscular surveys (including figures) are provided in **Appendix G** but a summary is presented below.

Breeding birds

A total of six Red listed species were recorded within the survey area, all of which are also UK BAP Priority Species (bullfinch, house sparrow, linnet, nightjar, reed bunting and song thrush). These are also listed under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. One of these (nightjar) is also a species listed on Annex I of the Birds Directive. All of these Red listed species, aside from nightjar, are thought to be breeding within the survey area. Of these, bullfinch, linnet, reed bunting and song thrush have been found to be breeding on site. Crossbill is the only Schedule 1 species recorded within the survey area.

Twelve amber listed species were also recorded within the survey area. Of these, the cuckoo and dunnock are also UK BAP Priority Species and Section 41 species.

The species in the survey area with the highest number of territories were willow warbler, robin, wren, goldcrest, chiffchaff, blackbird and dunnock. This reflects the dominant types of habitat present.

Less common species at the county level included a singing male redstart in the northwest spur of the site. Four territories of tree pipit were recorded, evenly distributed throughout the site's more open habitats. At least one, possibly two, territories of grey wagtail were recorded on site, with one male singing to the west of the brickworks and a pair to the southeast of Steam Mills Lake during the third survey visit. A cuckoo was heard calling and seen overflying the site during the second breeding bird survey visit.

Nightjar

Nightjar was recorded during the July survey. A bird was heard calling in flight over an area of thicket stage spruce plantation adjacent to the western site boundary. This type of habitat is often used by nightjar for foraging (Cleere and Nurney, 1998), however, young or recently felled plantation habitats are not present on site. The grassland with scattered trees in the north east and southern spurs of the site may be suitable, though no birds were recorded in these areas. The remaining habitats present (mature plantation and developed areas) are not thought to offer suitable foraging or breeding opportunities. The bird detected may have been foraging within this area, but it is not known whether it bred here.

A roding woodcock was recorded during the first nightjar survey visit moving throughout the central and southern areas of the site.

3.2.5 Bats

Potential Roost Assessment

Buildings and Structures

A preliminary assessment of the potential for the buildings within the survey area to support bats found that most of the buildings provide limited roosting opportunities due to their construction or the level of lighting and disturbance around them. **Table 3.7** gives a brief description of the buildings, highlights the potential roosting or access features and rates the potential of the building to support bats.

Table 3.7 Summary of potential bat building roost assessment

Building reference	Brief description	Potential for roosting bats and rationale
Brickworks	Brick building with a corrugated metal roof. High levels of disturbance (both noise and light) at the building day and night.	Low potential. The building offers limited roosting potential due to its construction, and any residual potential roosting locations (e.g. cracks in brickwork) are unlikely to be used due to level of disturbance.
Northern United	Six brick buildings with tile roofs, part of the disused Northern United Colliery, and now derelict. Numerous features for roosting including missing tiles, roof spaces, cracked brickwork etc. Also, many entry points into buildings through broken windows, open doorways and gaps in brickwork.	High potential. At least two of the buildings are known roosts for a large maternity colony of lesser horseshoe bats, but other bats have also been recorded (greater horseshoe and brown long-eared). Crevice dwelling bats could also be present.
New Town	Newtown comprises five warehouses, all with brick walls and metal frame roofs clad in corrugated sheet metal, a two storey rendered dwelling with a pitched slate roof and gable ends, and a two story barn like structure with stone walls and a slate tiled pitched roof. The majority of these buildings are in a marginal state of repair with cracks and crevices resulting from neglect. The house has several missing & raised tiles. The barn like structure has unmeshed vents which lead into the roof area.	Medium potential. The warehouses have a moderate potential to support crevice dwelling species of bats in the numerous cracks and crevices which they support. The dwelling and the barn like structure have a medium potential to support roosting bats. The dwelling could support crevice dwelling bats. The barn could support crevice dwelling or free hanging bats, depending on the internal structure of the roof.

Trees

The preliminary assessment of the potential for the trees within the survey area to support bat roosts found limited roosting opportunities as the majority of the trees are either semi-mature or are scrub species (e.g. alder) which do not support suitable roosting features. Of the mature trees within the survey area, most are coniferous, which are infrequently used for roosting in England as they generally do not have suitable cracks, broken branches or other roosting features.

Adjacent to the site, particularly in the Hawkwell Inclosure and along the edge of Zone 3 (proposed road), a greater number of mature trees are present, including mature oak trees with cracks and holes that have high potential to be used by tree roosting bat species.

Activity Surveys

The data collected during the surveys is presented in **Appendix H**. A summary description is provided in the following sections and **Figures 3.9a-h** illustrate the results.

Red Route

Lesser horseshoe bats were seen to emerge from the main roost building on all three evening survey visits. The bats appeared to be following established flight lines for exiting the roost with the main two being east into the Hawkwell Inclosure and north into the conifer plantation along the main road. The numbers of bats seen to exit the roost were low compared to that recorded in 2006 (when up to 200 bats were present, Keystone Environmental, 2007), with the maximum seen being around 20. However, the aim of the static survey point was not to determine numbers of bats present, and therefore not all the exit points were observed by surveyors and the roost was not observed for the full emergence period. Common pipistrelle bats were also recording commuting and foraging around Northern United on all three evening survey visits and on the first survey visit one was seen to exit the Bathhouse building. A noctule bat was recorded during August.

The surveys found that the entire transect route was used by bats. The areas that appear to be subject to the greatest level of use (based on the frequency of bats recorded) are the tracks leading from Bowson Colliery south to Peter's Pond. Both pipistrelle species, noctule, serotine and *Myotis* sp. were recorded in this location and the pipistrelle activity was often constant for several minutes. Other linear features that bats were recorded using was the vehicle track through the centre of the site, the bund between the brickworks and the garage and the edges of the alder plantations.

Table 3.8 provides a summary of the diversity of species detected per survey event, together with some commentary.

Table 3.8 Summary of bat species detected per survey (Red Route)

Survey event	Species detected	Observations
1 (June) Evening	Lesser horseshoe	Eight bats seen exiting roost into Hawkwell Inclosure, 1 st bat approximately 8 minutes after sunset.
	Common pipistrelle	One bat seen to exit the Bathhouse Building. Three bats recorded along the transect, adjacent to the brickworks, Bowson Colliery and along the southern boundary of the site.
2 (July) Evening	Lesser horseshoe	Seven bats seen exiting the roost into Hawkwell Inclosure, 1 st seen approximately one minute after sunset.
	Common pipistrelle	Recorded throughout the transect, particularly along the bund, the vehicle track and south from Bowson Colliery
	Soprano pipistrelle	Recorded where the Red Transect passes near to Steam Mills Lake i.e. north and east of the brickworks and Bowson Colliery.
	Pipistrelle	Pipistrelle (not identified to species) were also recorded along the vehicle track and disused railway to the west of the brickworks.
	Noctule	Recorded on two occasions, once south of Northern United and once south of Bowson Colliery.
	Serotine	Two passes recorded (but likely to be same bat) at survey point 3,

Survey event	Species detected	Observations
		Bowson Colliery
3 (August) Evening	<i>Myotis</i> sp. Lesser horseshoe	One pass at survey point 3, Bowson Colliery. 16 bats seen exiting the roost into Hawkwell Inclosure and six seen exiting north to road, 1 st seen approximately ten minutes after sunset. One bat also recorded 2.5 hours after sunset by the west entrance to the brickworks.
	Common pipistrelle	Recorded throughout the transect, particularly along the bund and around Bowson Colliery and the tracks to the south. First bat recorded 2 minutes before sunset at Northern United.
	Soprano pipistrelle	Recorded mainly in the southern part of the transect, near to Steam Mills Lake and Bowson Colliery.
	Noctule	Recorded on three occasions, once at Northern United (ten minutes after sunset) and twice along the bund near to the brickworks (although this is likely to be the same bat).
	<i>Myotis</i> sp.	Three passes recorded in the middle section of the transect, to the west of Bowson Colliery.
4 (September) Dawn	Noctule	One pass at survey point 4, the southern boundary of the site approximately 35mins before sunrise.

Purple Route

The most frequently encountered species recorded during the surveys on this transect was common pipistrelle, which was found to be using all parts of the transect for foraging and commuting, although the greatest level of activity was recorded from around Steam Mills Lake. Soprano pipistrelle was also regularly recorded, primarily from around Steam Mills Lake (foraging with other bat species), but also along the smaller watercourses. *Myotis* sp. is the final species that was recorded in any number on this transect and which was also frequently recorded around Steam Mills Lake and along the watercourses. Due to the shape of the call, peak frequency and habitat locations it is considered likely that the *Myotis* sp. is Daubenton's, although it is difficult to confidently assign species with *Myotis* calls as they are all very similar.

A single pass of both noctule and serotine were recorded during the third survey visit (August). The noctule was recorded by Steam Mills Lake, whilst the serotine was recorded by Hawkwell Inclosure.

Table 3.9 provides a summary of the diversity of species detected per survey event, together with some commentary.

Table 3.9 Summary of bat species detected per survey (Purple Route)

Survey event	Species detected	Observations
1 (June) Evening	Common pipistrelle	Four passes recorded along the transect, three along Old Engine Brook (1 st 25 minutes after sunset) and one at survey point 4 (Nofold Green)

Survey event	Species detected	Observations
2 (July) Evening	Common pipistrelle	Commonest bat recorded, mainly along the western part of the transect along the edge of Hawkwell Inclosure, Nofold Green and high levels of activity around Steam Mills Lake.
	Soprano pipistrelle	Recorded primarily around the edge of Steam Mills Lake and by Nofold Green.
	<i>Myotis</i> sp. (possibly Daubentons)	Recorded six times around Steam Mills Lake and Nofold Green.
3 (August) Evening	Common pipistrelle	Recorded throughout the transect, with greatest activity around Steam Mills Lake, but also present along the edge of Hawkwell Inclosure and Old Engine Brook.
	Soprano pipistrelle	Recorded primarily around the edge of Steam Mills Lake (area of greatest activity), but also along Old Engine Brook, the edge of Hawkwell Inclosure and the stream that flows into the Lake.
	Noctule	One pass recorded at survey point 6, adjacent to Steam Mills Lake.
	Serotine	One pass recorded at survey point 3, along the southern edge of the Hawkwell Inclosure.
4 (September) Dawn	<i>Myotis</i> sp. (possibly Daubentons)	Greatest activity recorded around Steam Mills Lake, but also recorded along Old Engine Brook and the stream that flows into the Lake.
	Common pipistrelle	Recorded twice along the edge of Hawkwell Inclosure (once at survey point 3 and once at Steam Mills).
	Soprano pipistrelle	Recorded once at the western edge of Steam Mills Lake.
	<i>Myotis</i> sp. (possibly Daubentons)	Recorded twice in the north eastern part of the site (once at Steam Mills and once along the stream that flows into the Lake).

Anabat Surveys

During the three hours that the Anabat was used on the evening of the 29th of July 2008, 206 registrations of common pipistrelle were recorded between 21.53 and 00.05. This equates to several calls each minute, almost every minute during the survey period, which suggests a high level of activity, although it is considered likely that most of the activity recorded will be the result of a small number of bats continuously foraging in the clearing. Six registrations of soprano pipistrelle were also recorded throughout the period, with activity from this species appearing to increase later in the evening (this species was the last recorded at 00.06). *Myotis* sp. were recorded on five occasions, twice at 21.55 and 21.56 and then later in the evening at 23.15, 23.45 and 23.56. Given the brief registrations, it is considered likely the bats were commuting past the Anabat.

Significantly fewer bat registrations were recorded during the September survey, with no bats recorded on the first night. On subsequent nights the maximum number of registrations was sixteen (on the final night) when four species were recorded; common pipistrelle, soprano pipistrelle, noctule and *Myotis* sp. Small numbers of common pipistrelle and soprano pipistrelle were also recorded on the second and third survey nights.

3.2.6 Water vole and otter

Habitat suitability

The few ditches present within the survey area are considered to provide sub-optimal conditions for water voles, as they are small, narrow and shaded, with limited water flow. With the exception of the Old Engine Brook they are also poorly connected into other nearby watercourses. These ditches are also considered to provide poor foraging habitat for otter, but could be used for resting (due to the amount of vegetation cover) and are highly likely to act as corridors between more optimal areas of habitat (especially the Old Engine Brook).

The waterbodies are considered to provide suitable habitat for both water vole and otter. For water vole there is extensive, species-diverse bankside and emergent vegetation for foraging and the banks of the lake and the rushes around the other waterbodies could be used to create burrows and nests. The waterbodies would also provide a good foraging resource for otters comprising both fish (from the stocked lake) and amphibians from the smaller ponds.

Field signs

No field signs to indicate the presence of water voles were identified during the survey and therefore water vole are considered to be absent from the site at present. However, water voles are known to occur within the Forest of Dean (FoD What's Special report, no date) and there is therefore potential for the site to be colonised in the future given the areas of suitable habitat available and the off-site connectivity via the Old Engine Brook.

A single otter spraint was found on a prominent rock adjacent to the smaller waterbody that is connected to the large fishing lake (SM2, Grid ref SO 644153) during the first great crested newt survey (14th March 2008). No further evidence of otter was found at the site during the surveys. However, given the large size of otter territories, the site is likely to form only a small part of the area that could be used by a single otter. Although the survey area provides good foraging and extensive areas of cover, it is also regularly disturbed by members of the public and dogs reducing the likelihood of extensive otter use and the potential for holts (particularly breeding holts) to occur. The absence of further evidence of otter activity supports this and suggests the site is used relatively infrequently by otter.

3.2.7 Badger

Habitat suitability

Whilst the survey area provides a habitat mosaic that offers some foraging potential within the grassland and woodland areas, it also comprises largely 'made ground' and as such does not currently support a rich topsoil layer that would be likely to contain an abundance of invertebrates such as earthworms. The expanse of made ground within the site also reduces the habitat available for sett construction.

The habitat surrounding the survey area comprises a greater proportion of semi-natural and urban habitats such as gardens, which are likely provide more diverse foraging and a wider range of habitats for sett construction and therefore may be more favoured by badgers.

Field signs

A badger sett has been constructed beneath the remains of section of Bowson Colliery (which lies within the survey area but outside the site) at grid reference SO 644 151 and comprises two

active entrances. Evidence of badger activity around the sett was restricted to a well-used latrine and some foraging holes during the period of the survey work at the site.

No further definitive evidence of badger activity was found within the remainder of the survey area. There are numerous tracks across the site, particularly in Hawkwell Inclosure that could be used by badgers but which appear to be predominantly used by deer and wild boar. Old, collapsed holes were also noted in Hawkwell Inclosure and New Town, however they were clearly disused to the extent that it was not possible to determine whether they were old badger setts. No badgers were observed during the nocturnal surveys.

Based on the survey results, the sub-optimal nature of the habitat provided across most of the site and the good habitat provided off-site, it is considered unlikely the site is well used by badgers.

3.2.8 Dormouse

No dormice were found in the nest tubes or boxes. No signs of dormouse, such as feeding remains (including nuts) or nests were found. Given the survey effort achieved, it is reasonable to conclude that dormouse is not currently present within the survey area (English Nature, 2006).

A number of the tubes were utilised by wood mouse during the course of the survey, within Hawkwell Inclosure and the alder plantations in particular. The wood mice constructed loose nests made of predominantly dry leaves and grass.

It is considered that the survey area supports few areas of habitat suitable for dormouse, limited to areas of planted alder, scrub along Old Engine Stream and predominantly conifer plantation around Bowson Colliery. None of these areas support extensive hazel, oak or honeysuckle, which are the favoured food sources where they occur. However, the areas of planted alder nonetheless provide suitable habitat for dormouse due to the complex canopy structure and associated areas of bramble (another important food source). The conifer plantations also may support a good invertebrate based food source and provide extensive cover and arboreal connectivity. Therefore, despite the likely absence of this species, the survey area is considered to provide good habitat for dormouse.

The areas of adjacent mixed woodland sampled as part of the survey are also considered to provide reasonable habitat for dormouse because, although arboreal connections are relatively poor, a wide range of plant species are present, including oak and bramble.

Although the survey area provides good but limited habitat for dormouse, the areas of suitable habitat types that do occur are fairly well linked to the wider countryside, which contains larger areas of suitable habitat, particularly the broad-leaved woodland areas of the Forest of Dean, that have a greater potential of supporting dormouse. Therefore, given the suitable habitat within the survey area and the habitat connections to areas off-site, there is potential for the survey area to be colonised by existing local populations in the future.

3.2.9 Other mammals

Wild boar were recorded using the mature woodland to the north of the site (Hawkwell Inclosure) during August and September 2008 and were also seen during the breeding bird surveys.

3.2.10 Invertebrates

A total of 210 terrestrial invertebrates and 114 aquatic invertebrates were identified from the material collected. The species lists for the survey area include one Red Data Book and six Nationally Scarce species. In addition, one other species was recorded, which has only recently been added to the British list, is only known from four sites (Chandler 2001), and consequently would appear to warrant Red Data Book status.

Lake and brickwork ponds (within the site)

The Nationally Scarce harvestman *Dicranopalpus ramosus* was recorded from the lake margins and the Nationally Scarce water beetle *Enochrus melanocephalus* was recorded from the southwestern and western edges of the lake (it tended to be found in open, base-rich ponds including coastal pools and ditches with a brackish influence). Several other uncommon species were recorded from this area, namely the smooth ram's-horn snail *Gyraulus laevis*, the slender groundhopper *Tetrix subulata* and a native cockroach (*Ectobius* sp) nymph. Odonata were reasonably well represented in the lake both as nymphs and adults and included the formerly Notable ruddy darter (*Sympetrum sanguineum*). A large number of native plant species were noted and these include many species that are important food plants, nectar or pollen sources or simply provide a wide range of vegetation structures that enable invertebrates to seek shelter, hunt, perch, mate, etc. Also, some of the lakeside alders appeared to have a disease but this is likely to help rather than hinder invertebrates.

Three Nationally Scarce water beetle species were recorded from the brickwork ponds, namely *Hydroglyphus pusillus* (most characteristic of recently created still water sites with a clay or mud substrate), *Rhantus suturalis* and *Enochrus ochropterus* (usually found in mesotrophic mires including small base-riched sections of nutrient-poor bogs, base-flushed peat cuttings, dune slacks and ox-bows). A number of other infrequent species were recorded including the lauxaniid *Sapromyza sexpunctata*.

Zone 1 grassland south (within the site)

The Red Data Book parasite fly *Cistogaster globosa* (and its common host, the bishop's mitre shieldbug *Aelia acuminata*) were recorded by sweep netting. The hoverfly *Platycheirus occultus* has been described relatively recently and may be considered infrequent.

The grassland in this area was tussocky and tussocks are important for invertebrates as they offer a sheltered environment which may be insulated from adverse weather conditions outside. A relatively large number of poorly known and under-recorded invertebrates including many insects that have adapted to a crawling or hopping lifestyle and have given up flight to live more or less permanently in this microhabitat.

Zone 2 wetland south (outside the site)

From Zone 2 Wetland South the Nationally Scarce water beetles *Hydroglyphus pusillus* and *Enochrus ochropterus* were recorded. A number of infrequent species were also recorded including the backswimmer *Notonecta obliqua*, the dolichopodid *Thrypticus* sp (only represented by a single female) and the snail-killing fly *Tetanocera silvatica*. The ponds appeared to be good for Odonata with a range of damselfly and dragonfly species present both as nymphs and adults and including the previously Notable ruddy darter.

The ponds have a large number of features that would make them attractive to invertebrates including shallow depths, emergent, submerged and floating vegetation, continuous marginal fringes, open with only small shading, unpolluted and lack of eutrophication.

Zone 3 proposed road (within the site)

The Nationally Scarce harvestman *Dicranopalpus ramosus* was recorded from compartment Zone 3 Proposed Road along with the flat-footed fly *Agathomyia cinerea*, which has only recently been reported as a British species. Local species here included the tree damsel bug *Himacerus apterus* and the lauxaniid *Sapromyza sexpunctata*.

Dead or decaying trees and fallen woody debris were frequent along and to either side of the route. This type of habitat from native broadleaved trees can be very important for invertebrates and the species that depend on this include the largest group (known as saproxylic invertebrates) of rare and endangered species in Britain.

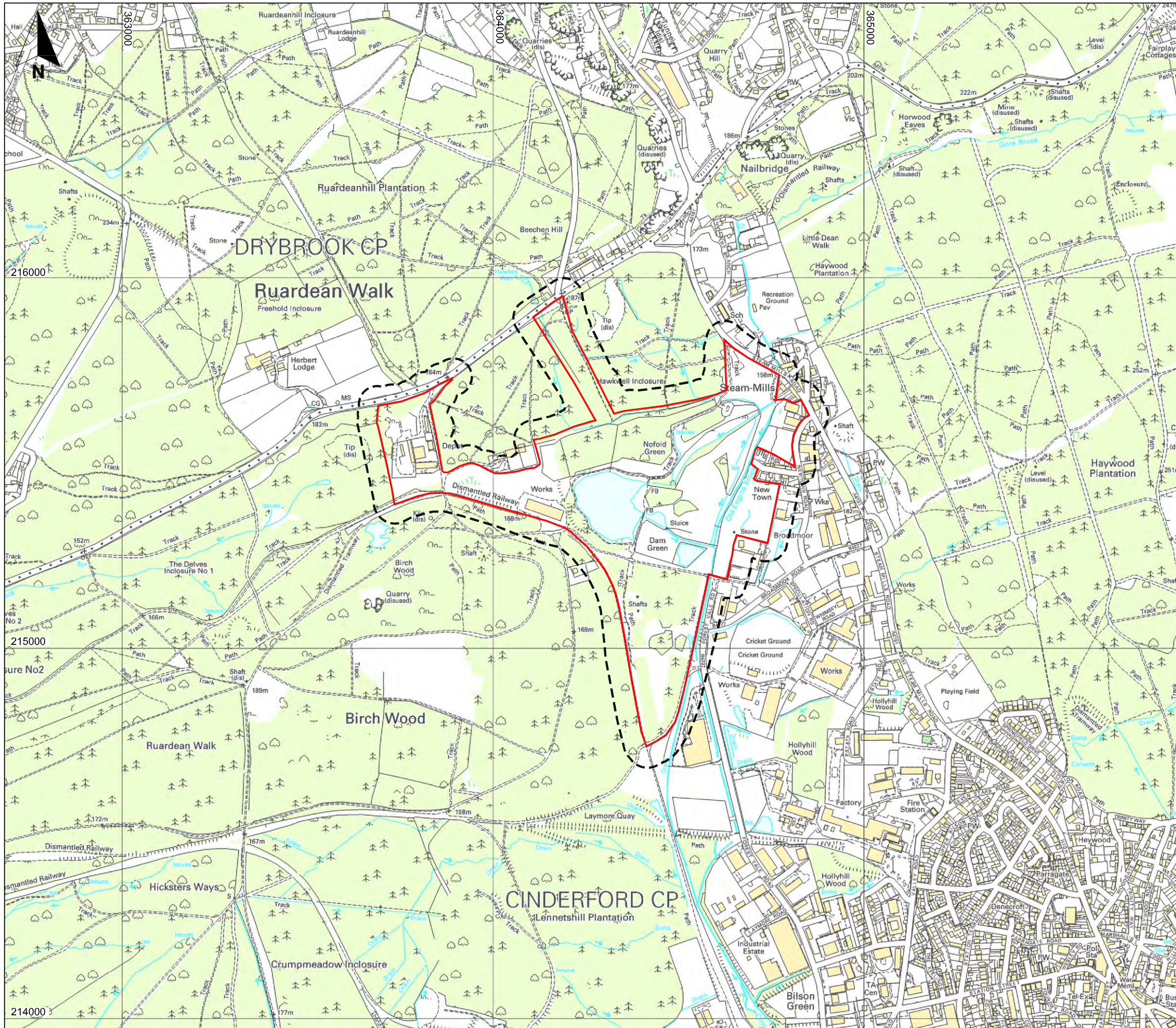
Other compartments

No rare or uncommon species were recorded from compartments Zone 1 Grassland North, Zone 2 Wetland North or Northern United, although the formerly Notable orange ladybird *Halysia 16-guttata* was found at the latter compartment.

Zone 1 Grassland North is similar to Zone 1 Grassland South in the habitat it provides, except that this compartment was nearer a large plantation and contained more woody scrub and so might be expected to support more invertebrates associated with these habitats compared with simply species of open grassland.

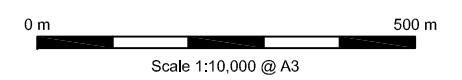
Additionally, the surveyor who undertook the invertebrate surveys has recorded white-clawed crayfish (*Austropotamobius pallipes*) in the stream connecting Soudley Ponds between Lower Soudley and Cinderford, into which the Old Engine Brook drains. Therefore, there is some potential for this species to occur at the site within the Old Engine Brook and the stream flowing into Steam Mills Lake.

Detailed results from the invertebrate surveys are provided in **Appendix I**.



Key

- Site boundary
- Survey area - 50m buffer around site boundary



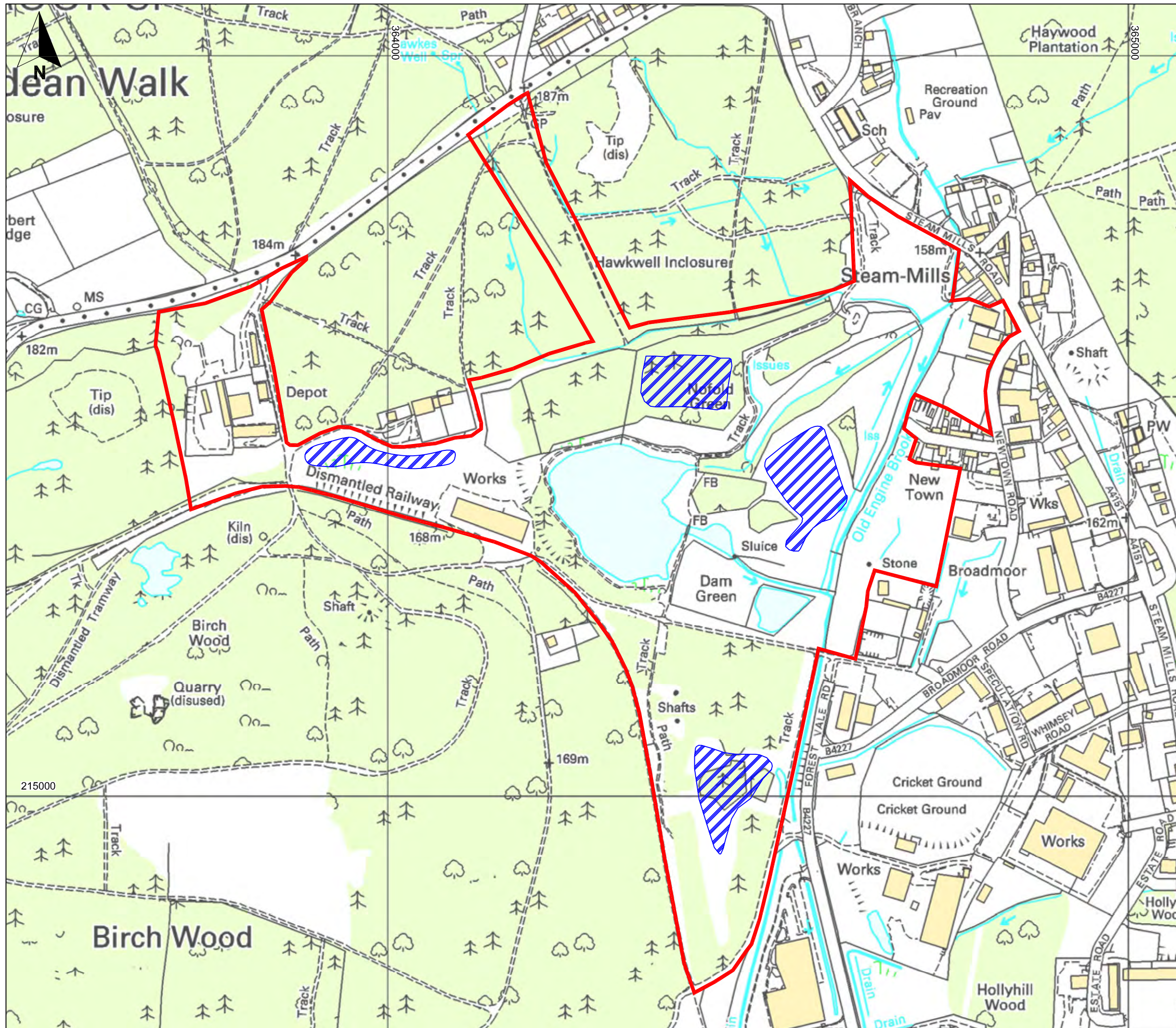
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Figure 3.1
Survey Area

December 2008
20998-W09.dwg parkj



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Key

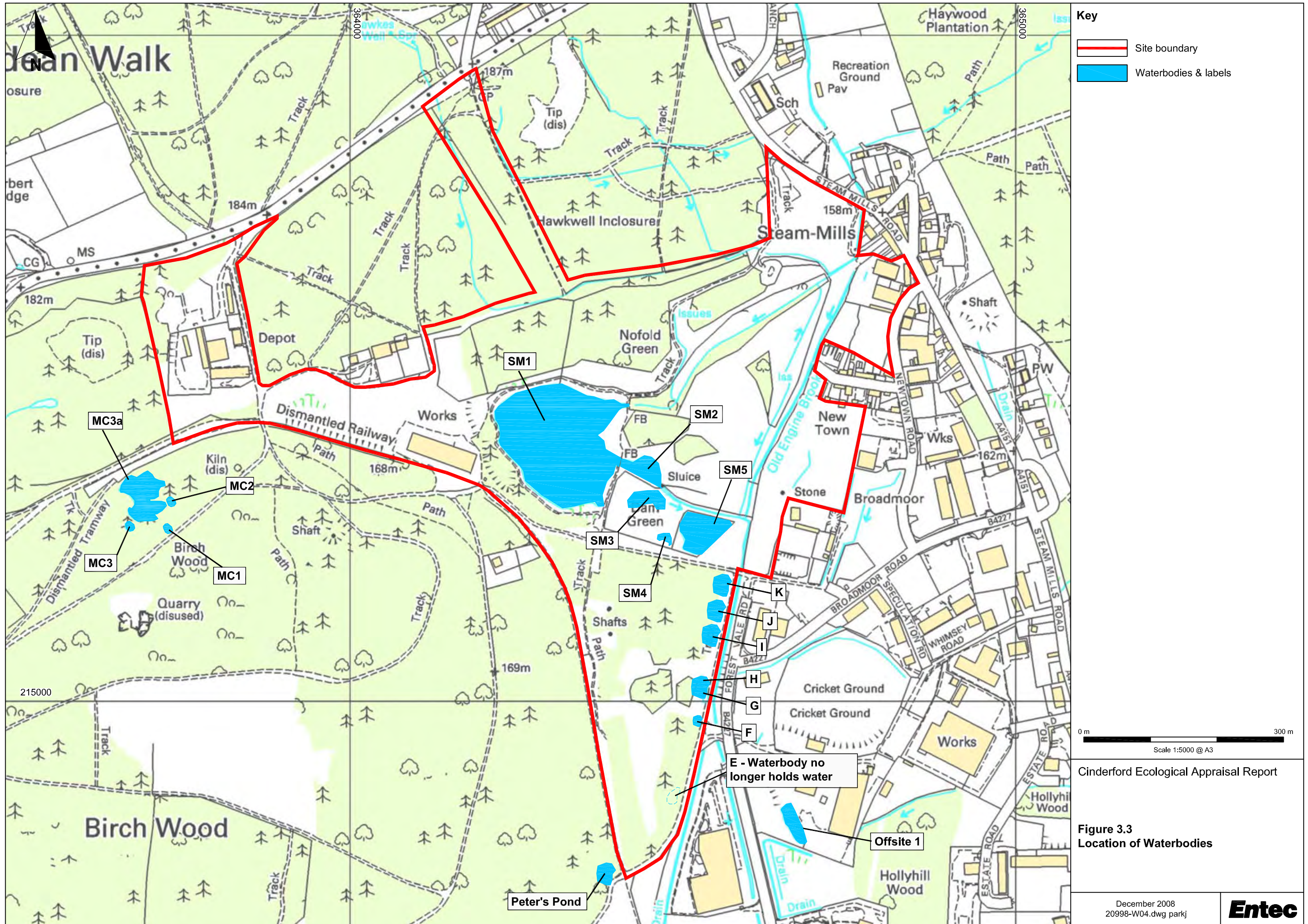
- Site boundary
- NVC survey area

0 m 300 m
 Scale 1:5000 @ A3

Cinderford Ecological Appraisal Report

Figure 3.2
 Location of NVC Survey Areas

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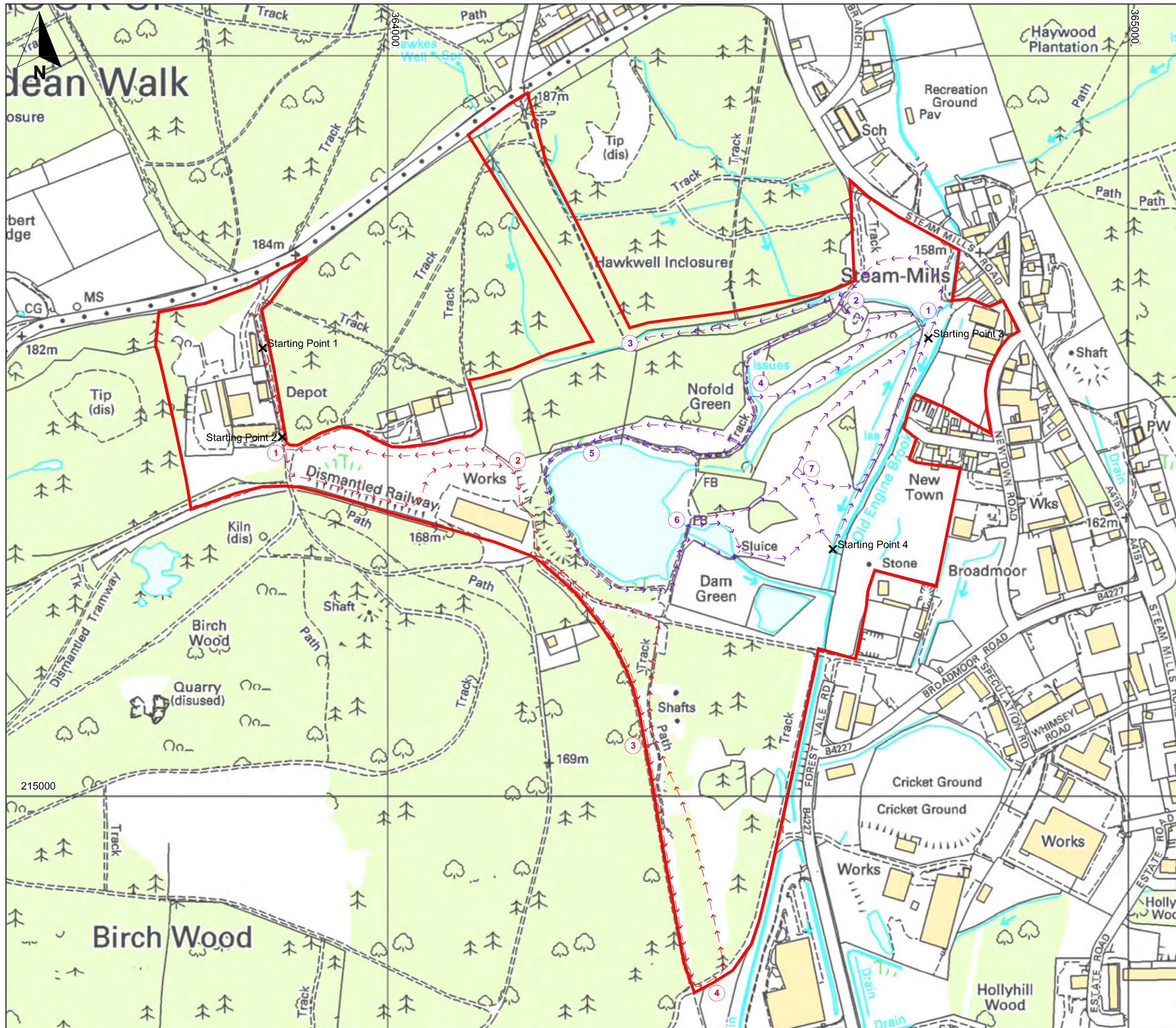
Key	
	Site boundary
	Reptile survey area
	Name of area as referred to in report
	Number of refugia used in area

0 m 300 m
 Scale 1:5000 @ A3

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Figure 3.4
Location of Reptile Survey
Compartments

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Key

- Site boundary
- 1 Purple route
- 1 Red route

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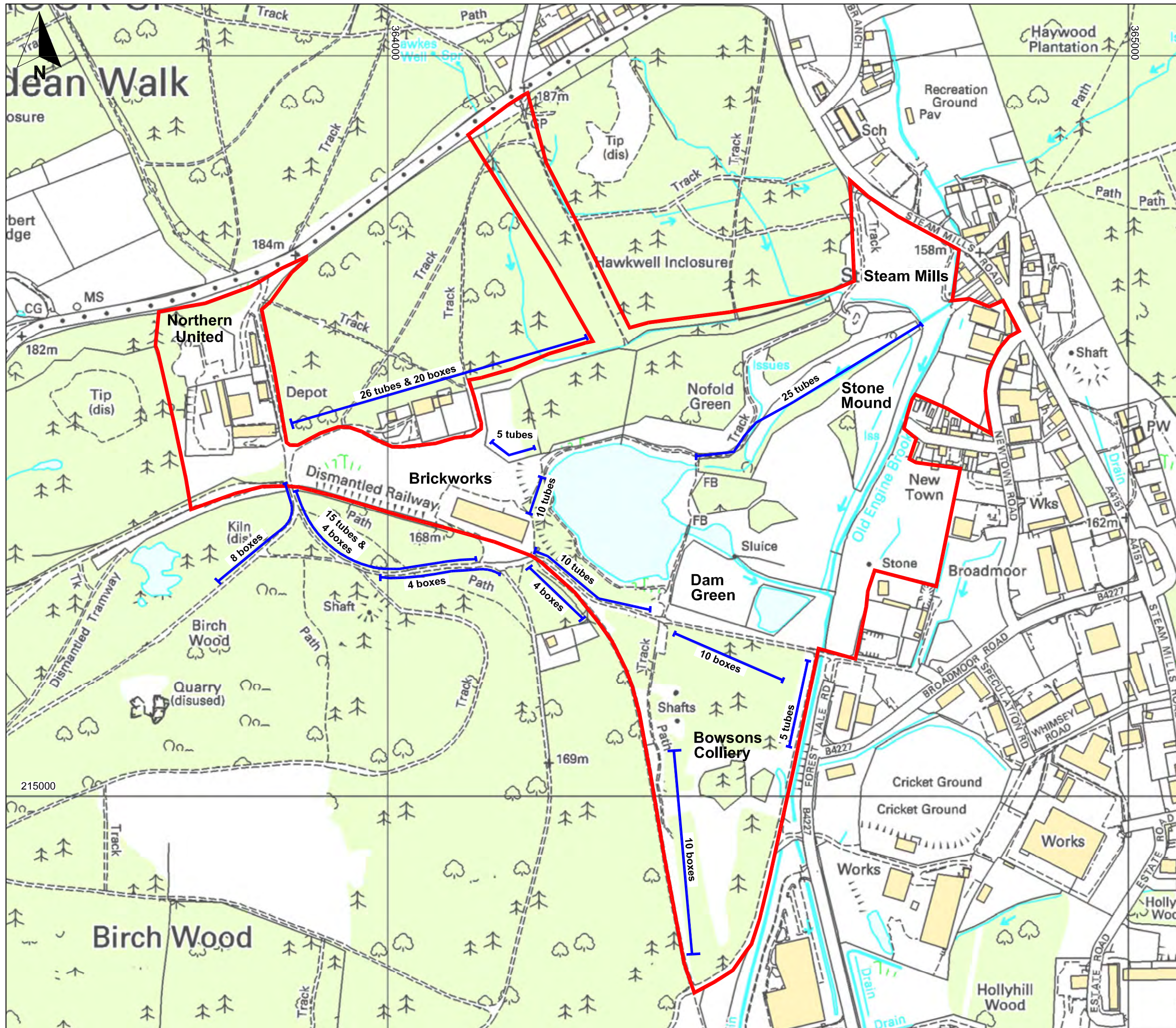
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Figure 3.5
Bat Survey Transects

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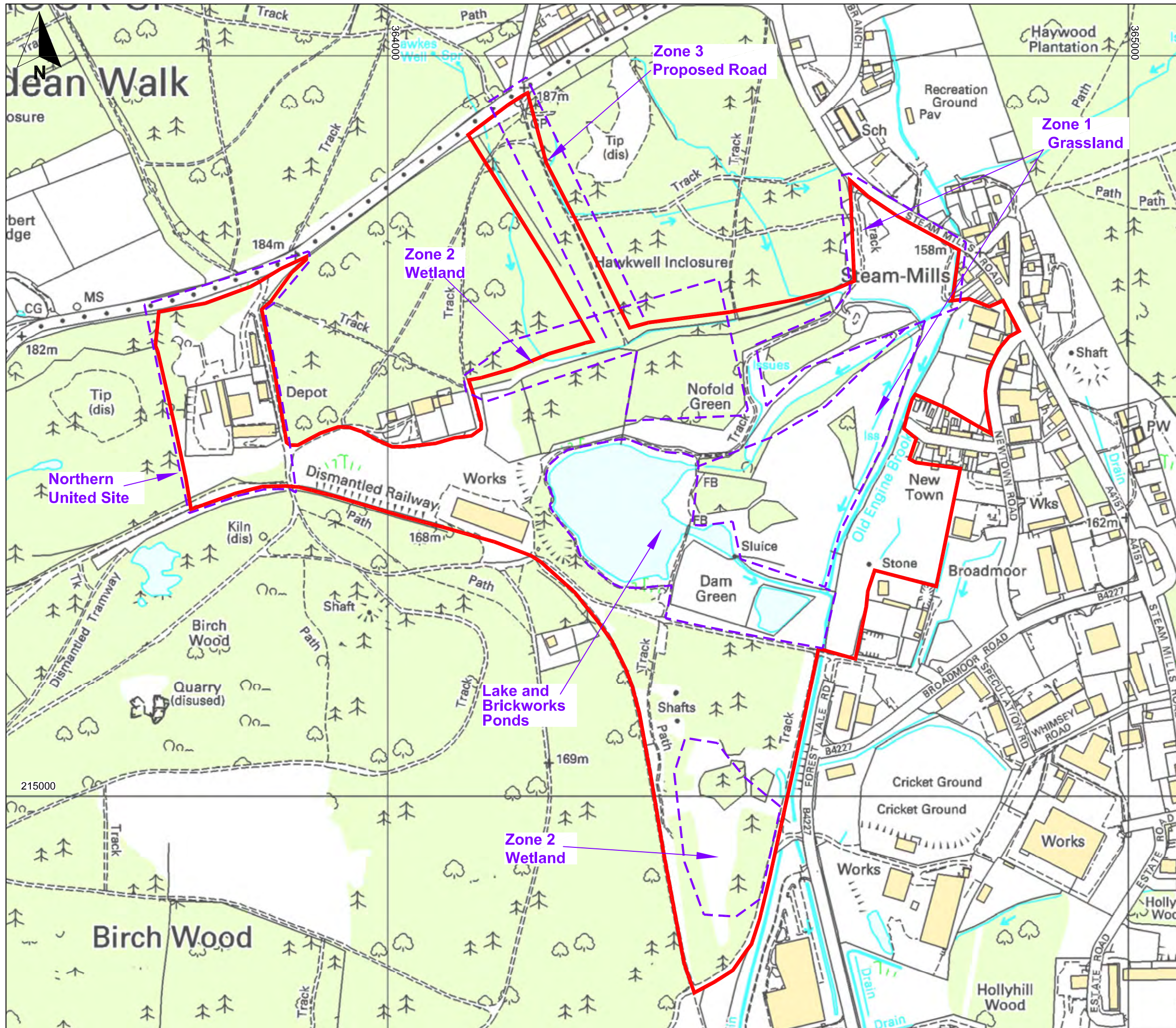
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Figure 3.6
Location of Dormice Tubes and Boxes

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20998-W05.dwg parkj

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Key

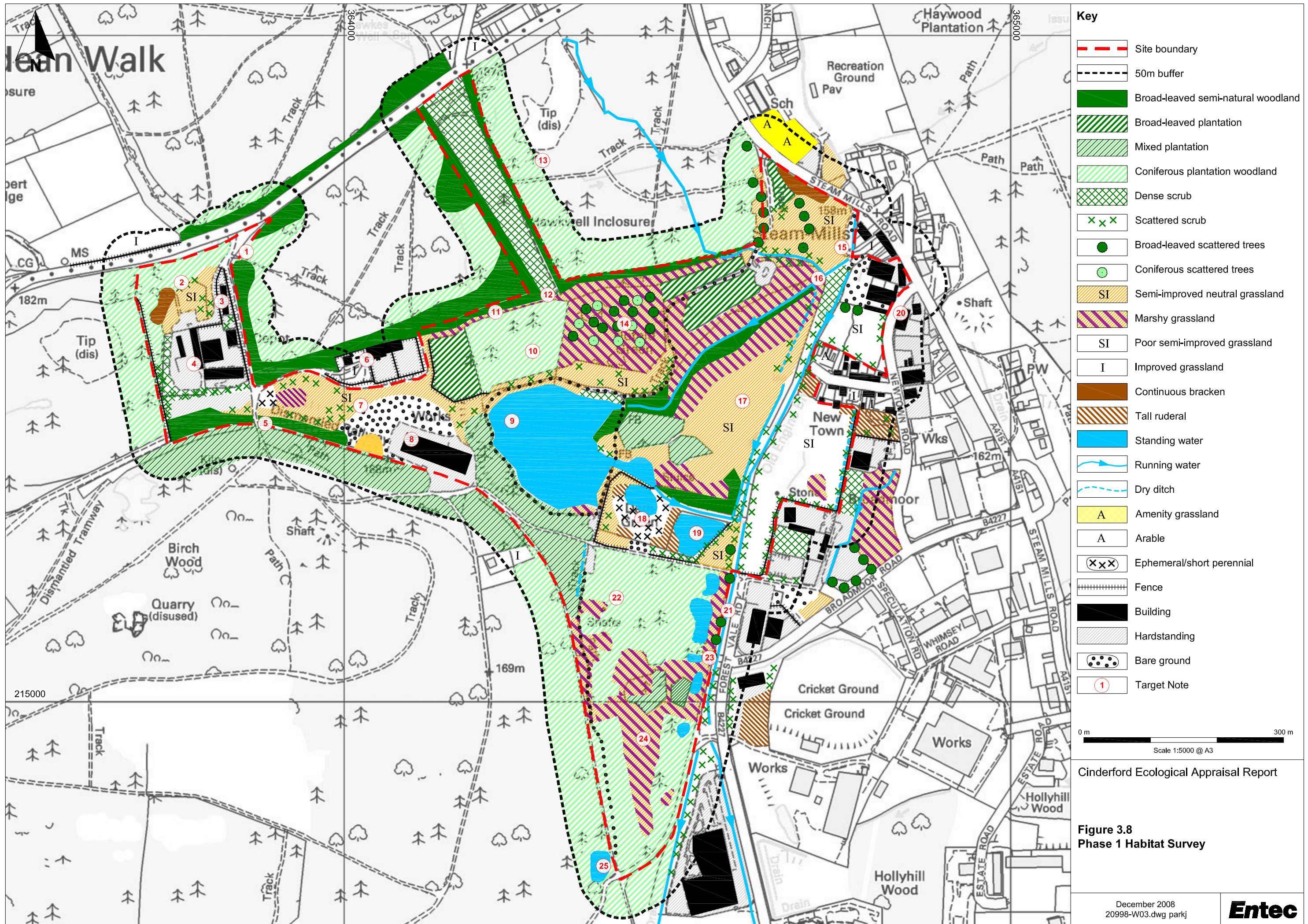
- Site boundary
- Invertebrate survey zone

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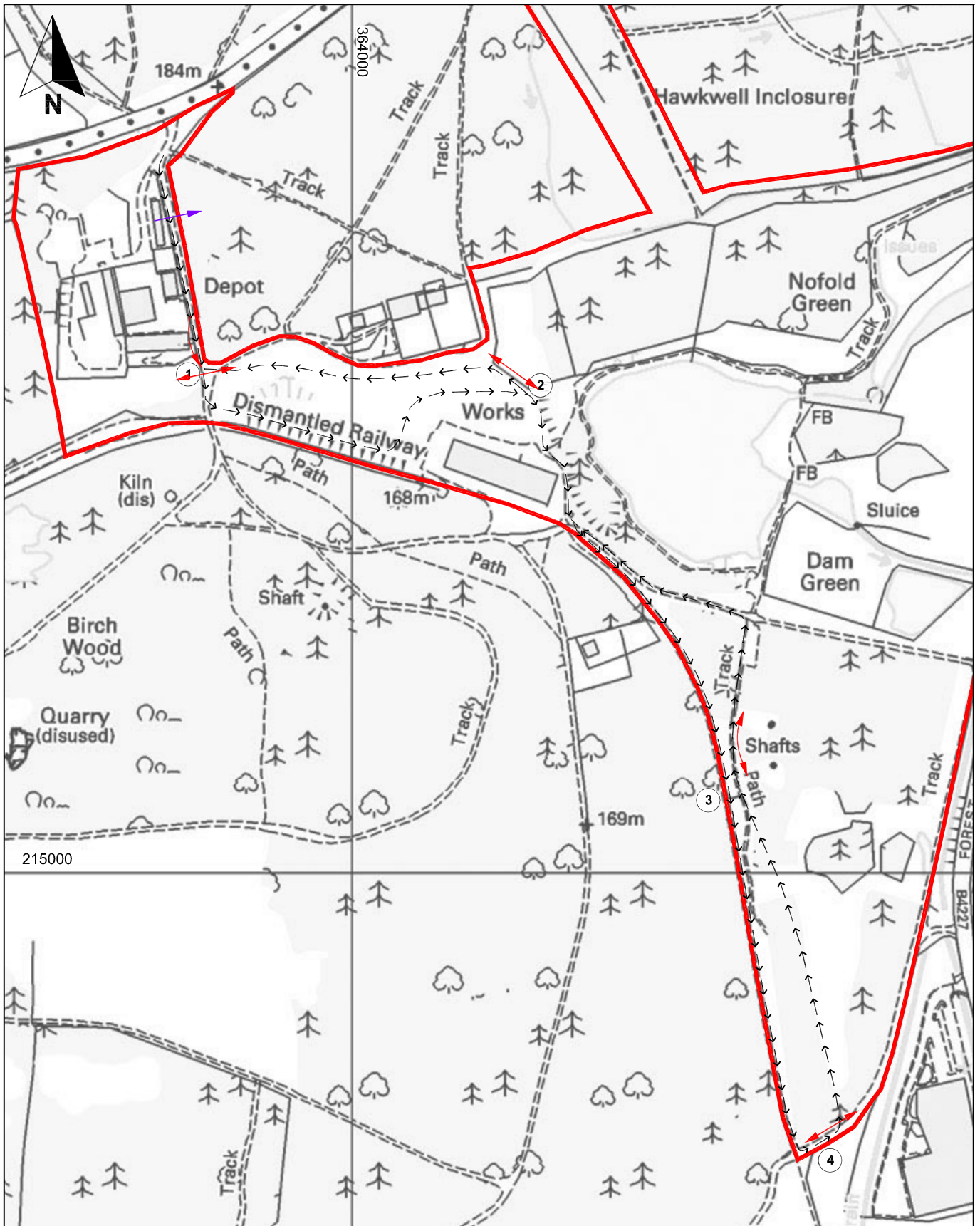
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Figure 3.7
Invertebrate Survey Zones

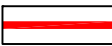

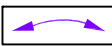
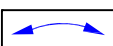
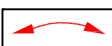

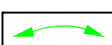

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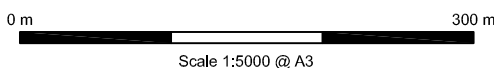


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Key

- | | | | |
|-------------------------------------------------------------------------------------|----------------------|-------------------------------------------------------------------------------------|------------|
|  | Site boundary |  | Myotis spp |
|  | Lesser horseshoe bat |  | Noctule |
|  | Common pipistrelle |  | Serotine |
|  | Soprano pipistrelle | | |
|  | Pipistrelle spp | | |

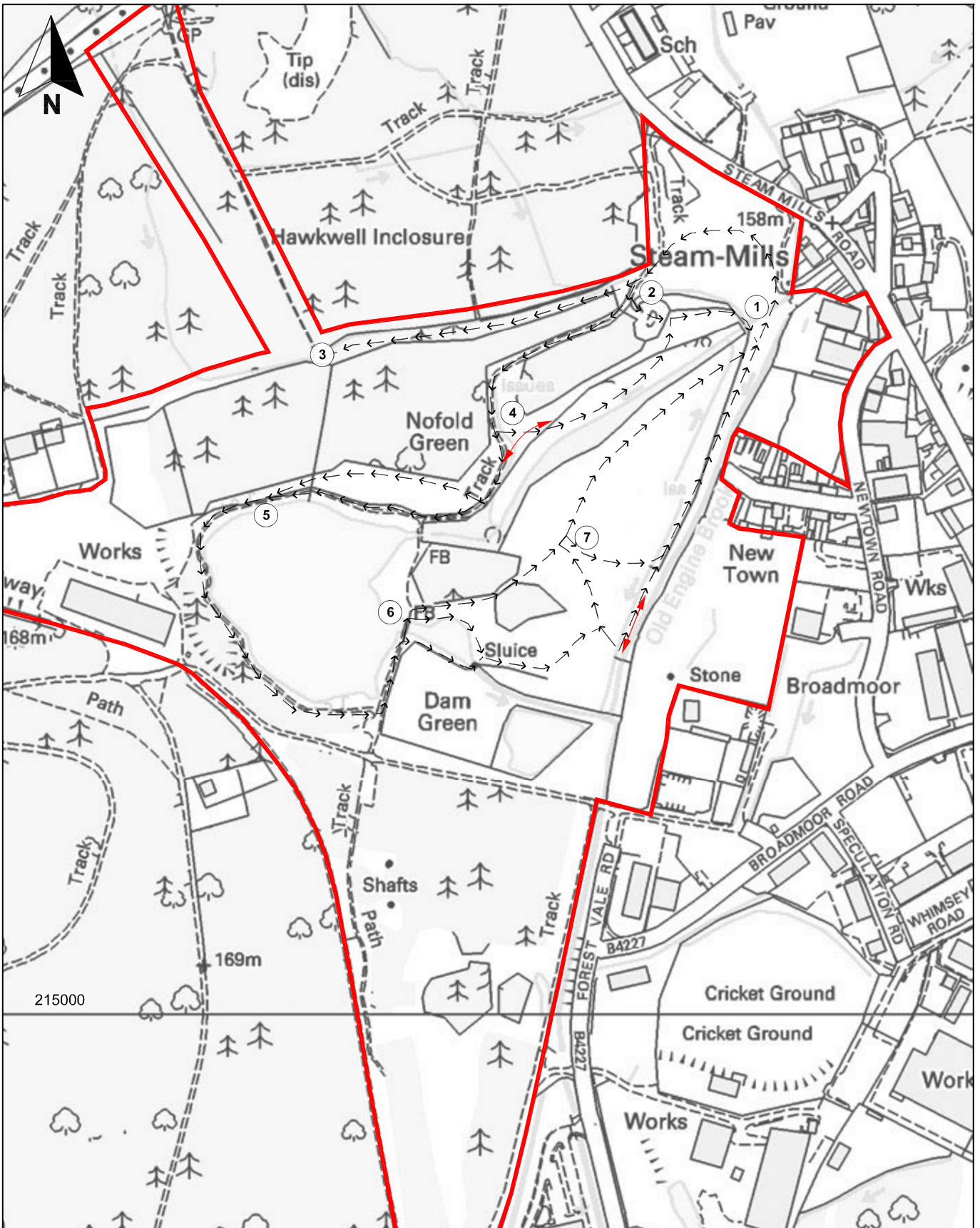


Cinderford Ecological Appraisal Report


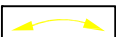

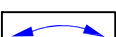
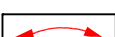
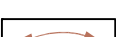
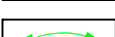
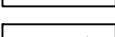
Figure 3.9a
Bat Survey Results
Survey 1 (dusk 18th June) - Red Route

December 2008
 20998-W14.dwg parkj

Entec



Key

- | | | | |
|-------------------------------------------------------------------------------------|----------------------|-------------------------------------------------------------------------------------|------------|
|  | Site boundary |  | Myotis spp |
|  | Lesser horseshoe bat |  | Noctule |
|  | Common pipistrelle |  | Serotine |
|  | Soprano pipistrelle | | |
|  | Pipistrelle spp | | |

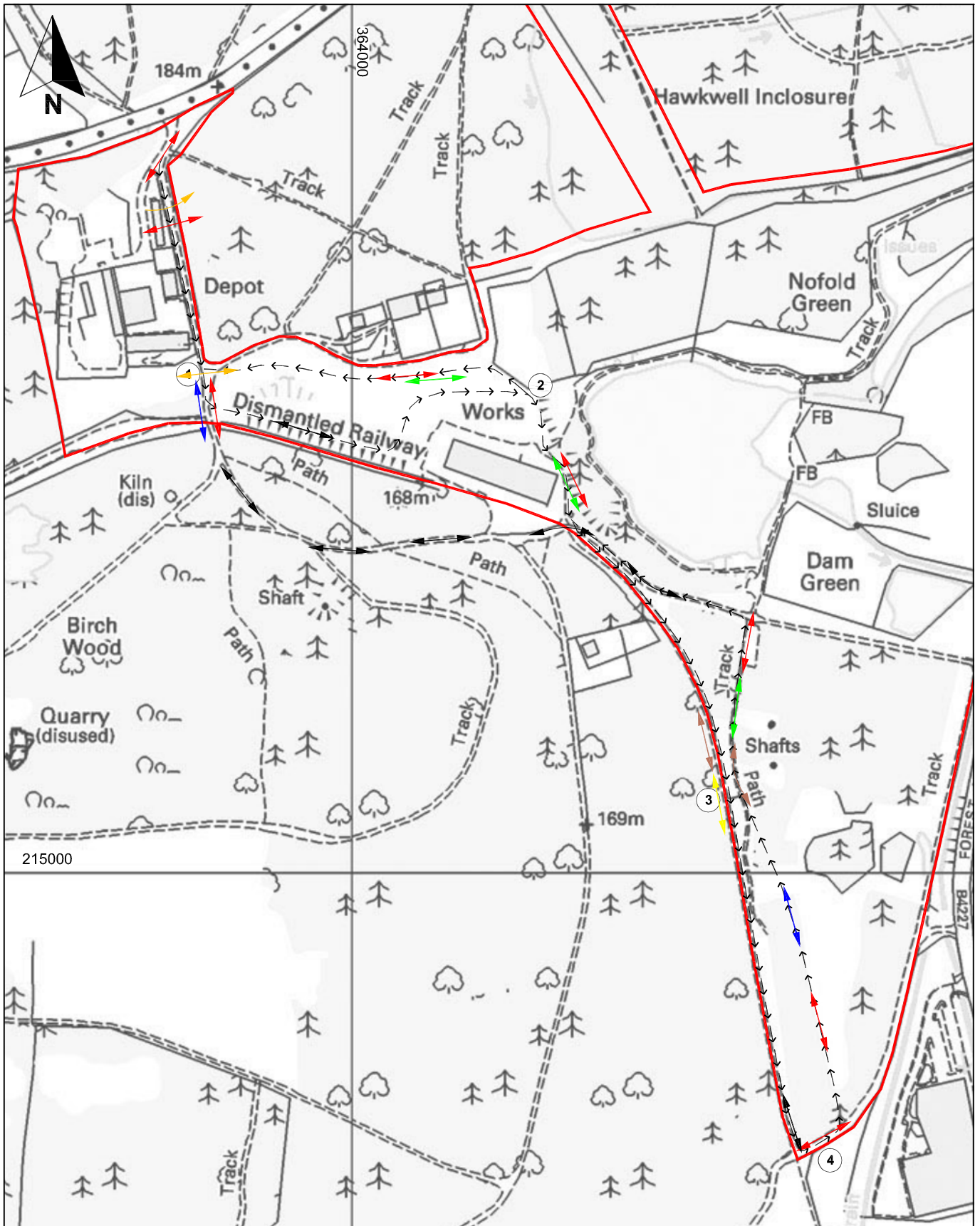
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Cinderford Ecological Appraisal Report

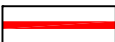


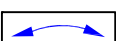
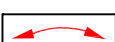

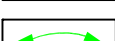
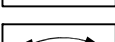
Figure 3.9b
Bat Survey Results
Survey 1 (dusk 18th June) - Purple
Route

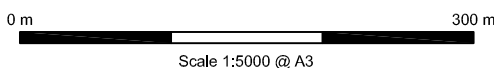
December 2008
 20998-W15.dwg parkj

Entec



Key

- | | | | |
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|  | Lesser horseshoe bat |  | Noctule |
|  | Common pipistrelle |  | Serotine |
|  | Soprano pipistrelle | | |
|  | Pipistrelle spp | | |

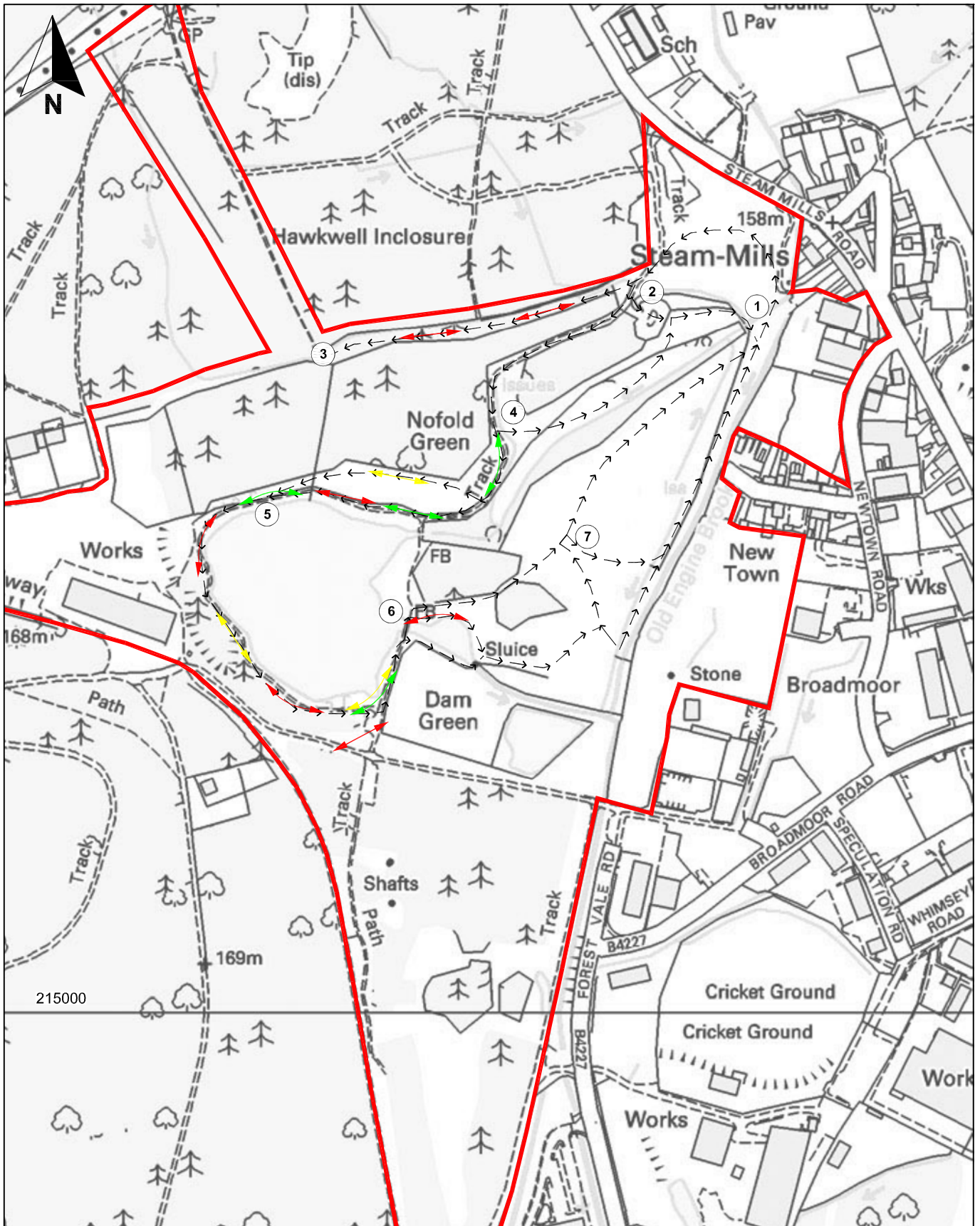


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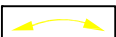

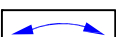
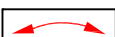

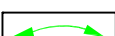

Figure 3.9c
Bat Survey Results
Survey 2 (dusk 29th July) - Red Route

December 2008
 20998-W16.dwg parkj

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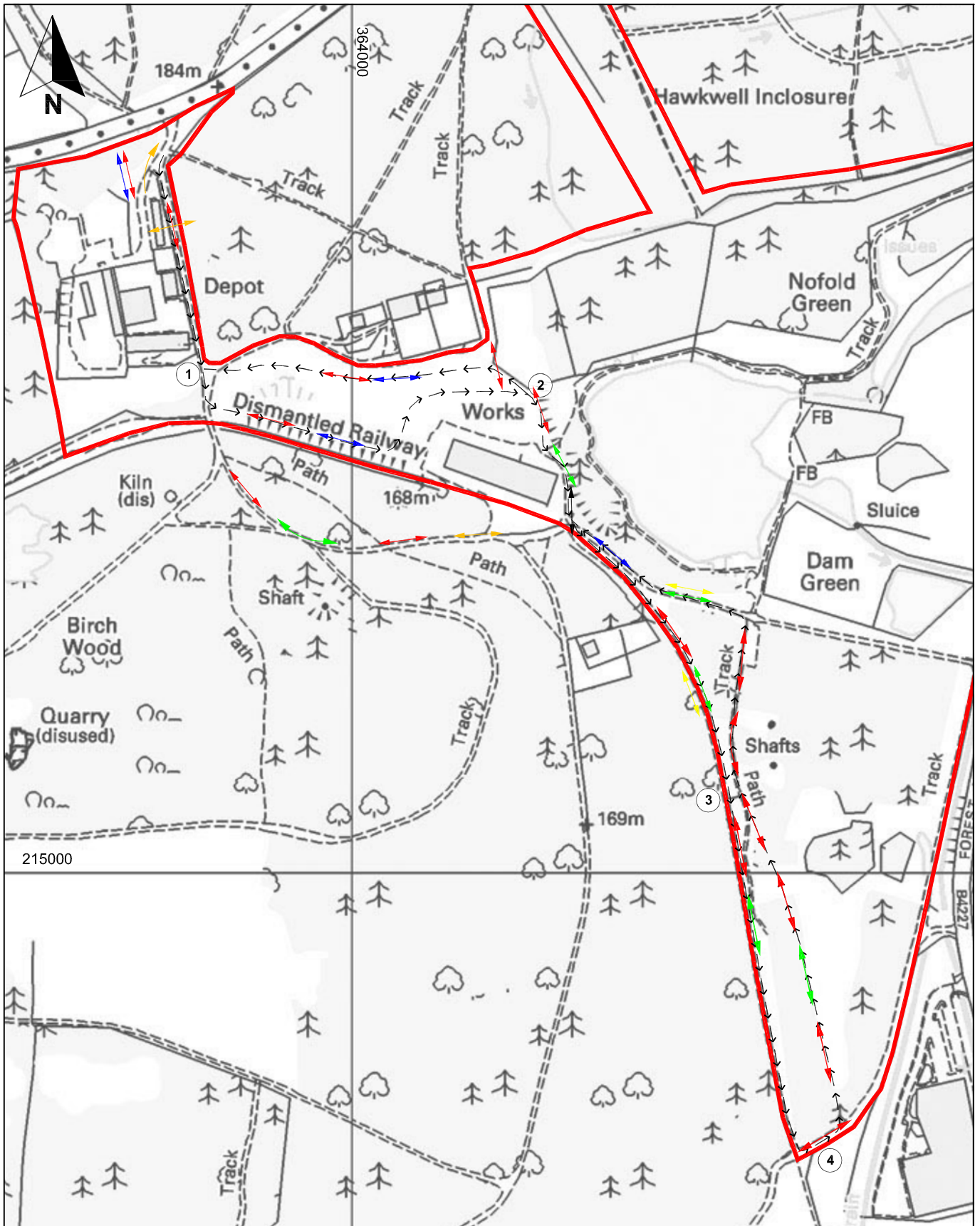


Key

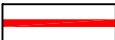
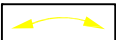

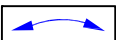
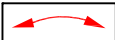
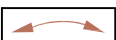
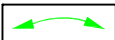

- | | | | |
|-------------------------------------------------------------------------------------|----------------------|-------------------------------------------------------------------------------------|------------|
|  | Site boundary |  | Myotis spp |
|  | Lesser horseshoe bat |  | Noctule |
|  | Common pipistrelle |  | Serotine |
|  | Soprano pipistrelle | | |
|  | Pipistrelle spp | | |


0 m 300 m
 Scale 1:5000 @ A3

Figure 3.9d
Bat Survey Results
Survey 2 (dusk 29th July) - Purple
Route



Key

- | | | | |
|-------------------------------------------------------------------------------------|----------------------|-------------------------------------------------------------------------------------|------------|
|  | Site boundary |  | Myotis spp |
|  | Lesser horseshoe bat |  | Noctule |
|  | Common pipistrelle |  | Serotine |
|  | Soprano pipistrelle | | |
|  | Pipistrelle spp | | |

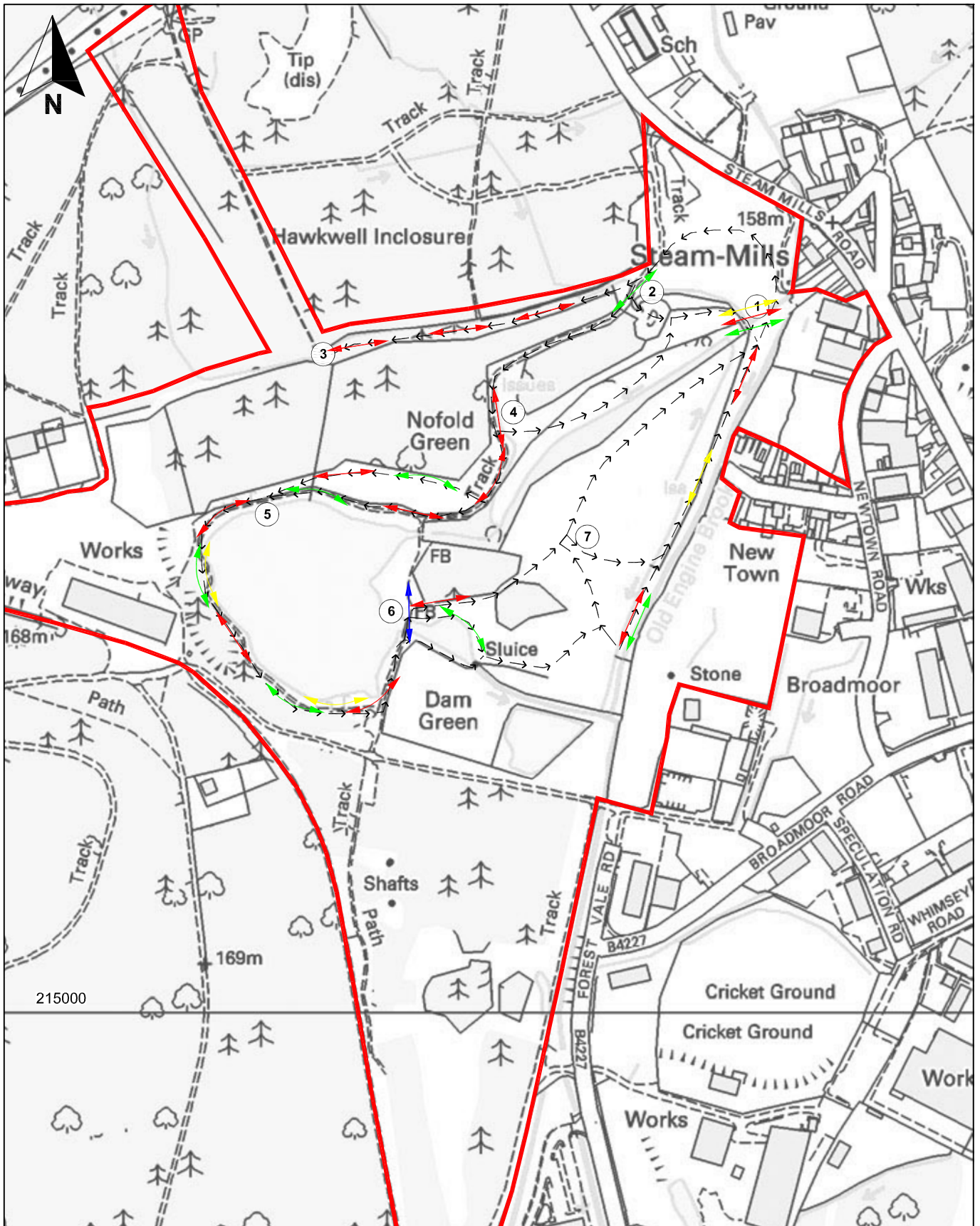
0 m  300 m
Scale 1:5000 @ A3

Cinderford Ecological Appraisal Report


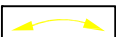

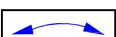
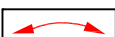

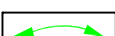

Figure 3.9e
Bat Survey Results
Survey 3 (dusk 27th August) - Red
Route

December 2008
20998-W18.dwg parkj

Entec



Key

- | | | | |
|-------------------------------------------------------------------------------------|----------------------|-------------------------------------------------------------------------------------|------------|
|  | Site boundary |  | Myotis spp |
|  | Lesser horseshoe bat |  | Noctule |
|  | Common pipistrelle |  | Serotine |
|  | Soprano pipistrelle | | |
|  | Pipistrelle spp | | |

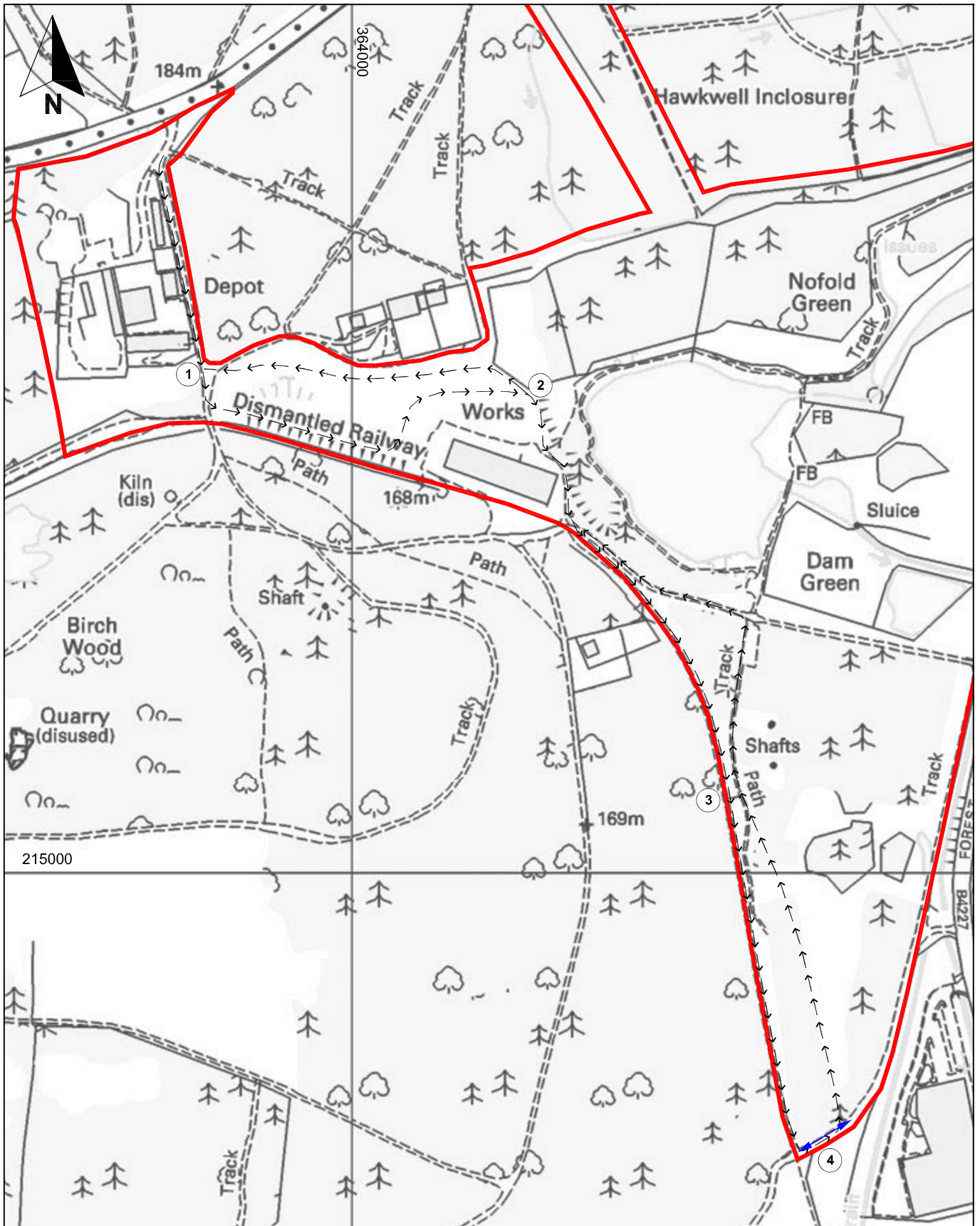
0 m 300 m
 Scale 1:5000 @ A3

Cinderford Ecological Appraisal Report

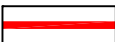


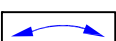
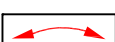

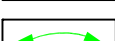
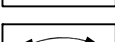
Figure 3.9f
Bat Survey Results
Survey 3 (dusk 28th August) - Purple
Route

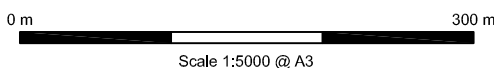
December 2008
 20998-W19.dwg parkj

Entec



Key

- | | | | |
|-------------------------------------------------------------------------------------|----------------------|-------------------------------------------------------------------------------------|------------|
|  | Site boundary |  | Myotis spp |
|  | Lesser horseshoe bat |  | Noctule |
|  | Common pipistrelle |  | Serotine |
|  | Soprano pipistrelle | | |
|  | Pipistrelle spp | | |

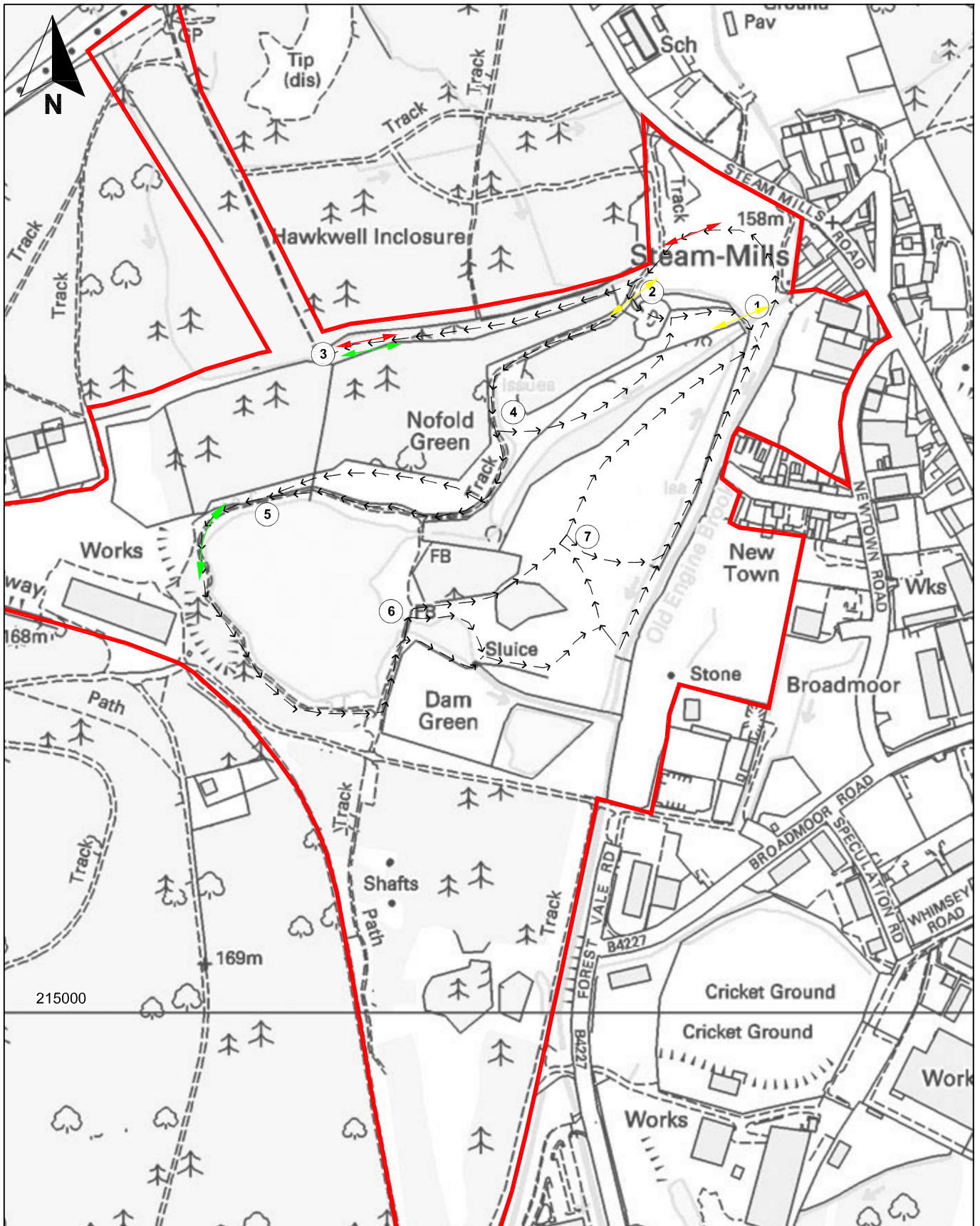


Cinderford Ecological Appraisal Report


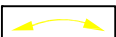

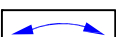
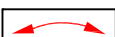

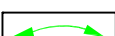

Figure 3.9g
Bat Survey Results
Survey 4 (dawn 17th September) - Red Route

December 2008
 20998-W20.dwg parkj

Entec



Key

- | | | | |
|-------------------------------------------------------------------------------------|----------------------|-------------------------------------------------------------------------------------|------------|
|  | Site boundary |  | Myotis spp |
|  | Lesser horseshoe bat |  | Noctule |
|  | Common pipistrelle |  | Serotine |
|  | Soprano pipistrelle | | |
|  | Pipistrelle spp | | |

0 m 300 m
 Scale 1:5000 @ A3

Cinderford Ecological Appraisal Report

Figure 3.9h
Bat Survey Results
Survey 4 (dawn 17th September) -
Purple Route

December 2008
 20998-W21.dwg parkj

Entec

4. Evaluation

4.1 Method

In order to assess the effects of any development on flora and fauna, it is necessary to define the habitat areas and species that need to be considered as part of the assessment. In identifying these receptors, it is important to recognise that a development can affect flora and fauna not only within the area of land-take required for the development but also ‘off-site’ (e.g. noise generation on the site of the development could affect bird populations that occur off-site).

The approach that has been taken in this document is to identify ‘valued ecological receptors/resources’ and, separately, to consider legally protected species (in accordance with guidelines produced by the Institute of Ecology and Environmental Management (IEEM)¹⁰. The use of these categories is explored below.

4.1.1 Identification of Valued Ecological Receptors/Resources

It is impractical and inappropriate for an assessment of the ecological effects of a development to consider every species and habitat that may be affected. Instead, the assessment focuses on species populations, habitats or designated nature conservation sites that are of sufficiently high value (notwithstanding legally protected species, which are discussed separately below) in terms of ‘biodiversity conservation’ (which relates to the need to conserve representative areas of different habitats and the genetic diversity of species populations) that an effect upon them could be significant – in these cases, the species population/habitat/site is treated as a receptor in its own right.

Biodiversity Conservation Value

For habitats and species, the identification of valued ecological receptors has been undertaken using the process set out in **Box 4.1**. This involves using a structured process to determine which species/habitats need to be subject to valuation and then making decisions about the value of species populations/habitats using professional judgement, informed by data derived from various sources.

¹⁰ Institute of Environmental Assessment (2006). *Guidelines for Ecological Impact Assessment in the United Kingdom*.

Box 4.1 Valuation of habitats and species

Information about the sources of data that were used to inform the valuations, as well as the results of the valuations, is set out in this report. The data sources include survey work that was undertaken specifically for the purpose of informing this document. It should be noted that the scope of this survey work was defined using the findings of desk studies and extended Phase 1 habitat survey, and with reference to the categories set out below. Thus if there was evidence from the desk study/Phase 1 survey of the presence/potential presence of any species/habitats that fall within these categories, further survey work was carried out in relation to the species/habitat, unless it was possible to undertake the valuation on the basis of the desk study/Phase 1 survey.

1. Sites designated as SACs, SPAs, Ramsar sites, SSSIs or Key Wildlife Sites.
2. Annexes I, II or IV of the Council Directive of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (92/43/EEC) (the Habitats Directive) – applies to species only. Enacted in the UK via the Habitats Regulations.
3. Schedules to the Wildlife and Countryside Act 1981 (as amended) – applies to species only.
4. The Protection of Badgers Act 1992.
5. Priority species and habitats under the UK Biodiversity Action Plan (BAP).
6. Priority species and habitats under the relevant county BAP.
7. Red and amber lists of birds of conservation concern (see Gregory *et al.* (2002) The population status of birds in the United Kingdom, Channel Islands and Isle of Man: an analysis of conservation concern 2002-2007. *British Birds*. 95: 410-450.
8. For species other than birds – UK Red Data Book species and Nationally/Regionally Notable species.
9. Listings of locally notable species.
10. Other reasons (e.g. all ancient semi-natural woodlands, good quality examples of other semi-natural habitats and other notable species populations).

Valuations have been undertaken only for sites/habitats/species that fall within at least one of these categories and that could be affected by the proposed development of the site. In the case of species/habitats, this is not because species/habitats in all of these categories are automatically considered to be valued ecological receptors. For example, some UK BAP priority species are still common and small populations of these species will often not be considered to be valued ecological receptors. Rather it reflects the expectation that all species/habitats that are of sufficient value that an effect upon them could be significant, would fall within at least one of the categories.

The use of the 10 categories therefore enables often lengthy lists of sites/habitats/species to be filtered to derive a short-list of sites/habitats/species that can be the focus of more detailed valuation work. For sites, this valuation is often quite straightforward given that there are accepted levels of value for most site designations. For species/habitats, the valuation has to be carried out using information about the characteristics of the species populations/habitats and their distributions. This has been obtained from published sources (e.g. atlases of species distribution), local records centres and other local sources. The information that has been obtained has then been interpreted using professional judgement in order to define the value of the species population/habitat. Those populations/habitats at or above the relevant threshold that could be affected by the Scheme (i.e. valued ecological receptors) are then subject to assessment work.

In terms of biodiversity conservation value, species' populations, habitats and sites have been valued using the following scale:

international;	county (i.e. Gloucestershire);
UK;	district;
national (i.e. England);	parish;
regional;	less than parish.

As indicated in Box 4.1 the valuation of sites makes use of established value systems (e.g. SSSIs are of at least national importance). Typically sites are only identified at the international, national and county levels, although in some areas of the country sites of lower value (e.g. district importance) are also identified. For each designated site, the habitats or species that qualify the site for designation have been identified.

In some circumstances sites may have become degraded (or more rarely subject to enhancement) since designation and thus upon survey may be considered by the surveyor to be of a different value to that which the designation would normally relate. Where such an evaluation relates to internationally/nationally designated sites the value of the designation still applies unless a site has been formally 'denotified'. For sites of lower value, the valuation is based on the surveyor's professional judgement excepting that the potential to recreate the lost interest is also taken into consideration.

The approach taken in this report is that valued ecological receptors are defined as:

species populations that are considered to be of county or greater importance in biodiversity conservation terms - therefore if a species population is considered to be of district value or less, there can be no significant effect on biodiversity; and

habitats and sites that are of district or greater importance - no significant biodiversity effect can therefore occur to habitats of lower value.

These thresholds have been defined using professional judgement to determine how valuable a receptor should be for an effect upon it to be material to the determination of a consent relating to any part of the Scheme. The selection of a lower threshold for habitats primarily reflects the fact that habitats are important for the communities of plants and the assemblages of animal species that they support. A district threshold therefore captures a very wide range of species as well as the land cover upon which they depend. However, this does not capture all important species populations, given the fact that some such populations occur on sites/habitats that are of below district value. In this context, it is considered that the county threshold will bring into the assessment those species effects that could be material to the determination of a consent relating to the proposed development of the site.

4.1.2 Legal Protection of Species

Notwithstanding what has been said above, there is also a need to identify all legally protected species (see **Box 2.1** and **Appendix A**) that could be affected by the proposed development in order that measures can be taken to ensure that contravention of the relevant legislation is avoided. Such measures must be acceptable to Natural England. By implication, therefore, it is inappropriate to assess the significance of effects within the context of species' legal protection - effects on such species have to avoid contravention of the law (i.e. to be 'non-significant'), otherwise the development cannot be taken forward.

In certain situations, however, adherence to measures that are designed to ensure that the law is not contravened may not prevent a significant effect relating to a species' biodiversity conservation, social or economic value (i.e. in the context of the species being a 'valued ecological receptor' - see above).

4.2 Results

Table 4.1 provides information on the value assigned to each feature identified through the desk study and the subsequent surveys. The value of the different areas surveyed for reptiles is also investigated in more detail in **Table 4.2**. The value of the site as a whole for each bat species recorded is undertaken in more detail in **Table 4.3**.

Table 4.1 Biodiversity evaluation¹¹

Receptor	Legal status ¹²	Policy status ¹³	Other conservation framework relevant? ¹⁴	Rationale	Value of receptor / value of the development site to the receptor ¹⁵	Valued ecological receptor?
Statutory designated sites	SSSI SAC			Although the statutory designated sites lie over 1.5km from the proposed development site, the bat species part of the designation are highly mobile and therefore could be affected by the development. These sites have been designated at the National and International level for the bat species they support.	International National	Yes
Non-statutory designated sites		KWS		Part of the site is designated for the habitats and species assemblages it supports. Based on the survey results it is considered the part of the KWS within the site continues to meet the KWS criteria. Further KWS are present adjacent and within 2km of the site. All these sites have been designated at the County level.	County	Yes
On-site Habitats: Plantation woodland, scattered trees,				These habitat types are common throughout Gloucestershire (and particularly the Forest of Dean) and the UK. At the site the habitats are relatively species-poor and do not support rare or notable plant species. Nonetheless, these types of habitat have the potential to support a range of other fauna such as birds and invertebrates and are therefore of Parish importance.	Parish	No

¹¹ To be read in conjunction with section 4.1 – Identification of valued ecological receptors.

¹² Habitats Regulations - Annex IV, SPA, SAC, Ramsar, W&C Act – SSSI/Sch. 1/5/8, Badgers Act.

¹³ County Wildlife Site (or equivalent), BAP priority species/habitat (UK or local), other planning policy requirement.

¹⁴ Habs. Dir. Annex I or II, Birds Dir. Annex I, Hedgerow Regs., BOCC red list, RDB, County red list, N. Notable A/B, R. Notable. Other.

¹⁵ On a scale of International, UK, National, Regional, County, District, Parish, Less than parish.

Receptor	Legal status ¹²	Policy status ¹³	Other conservation framework relevant? ¹⁴	Rationale	Value of receptor / value of the development site to the receptor ¹⁵	Valued ecological receptor?
scrub						
On-site Habitats: Grassland		UKBAP		<p>The grassland on site has been broadly classified as semi-natural neutral and marshy, but due to the previous land-use, species indicative of acidic and calcareous grassland also occur. Although none of the species are notable or rare, the unusual mosaic of habitats supports a relatively species-rich flora, which although possibly common in the Forest of Dean (due to its mining history), is likely to be uncommon in Gloucestershire.</p> <p>The majority of the grassland within the site falls within the boundary of Cinderford Linear Park KWS. However, at present grassland is not one of the reasons for the KWS designation. Whilst the surveys have demonstrated that plant communities similar to MG9 occur (part of the criteria for grassland KWS selection), the grassland on-site currently does not support the species-diversity required for the KWS criteria to be met. For this reason, the grassland on-site, whilst diverse, is considered to be of district value only.</p>	District	Yes
On-site Habitats: Running and standing water		UKBAP LBAP		<p>The lake and streams at the site support a variety of bankside plant species and provide habitat for a wide variety of fauna (e.g. birds, invertebrates and mammals such as otters and bats). The lake in the central part of the site is also part of the designation of Cinderford Linear Park KWS.</p> <p>Whilst none of the species found using this habitat type are notable or rare and the habitat is not uncommon in Gloucestershire or the UK, it nonetheless comprises a relatively large proportion of the site and is of importance for other species that depend on the habitat. Based on this, and the KWS criteria, this habitat is considered to be of county value.</p>	County	Yes
On-site Habitats: Bare ground, buildings, hard-standing		UKBAP		<p>These habitat types are common at the local and national level and are of little biodiversity value themselves. However, they can provide habitat for a range of fauna, for example roosting habitat for bats, and are therefore considered to be of parish importance</p>	Parish	No

Receptor	Legal status ¹²	Policy status ¹³	Other conservation framework relevant? ¹⁴	Rationale	Value of receptor / value of the development site to the receptor ¹⁵	Valued ecological receptor?
Great crested newt	W&C Act Habs Regs	UKBAP LBAP	Habs. Dir	<p>The total UK population of great crested newt is relatively large and has been estimated at around 400,000 individuals in 18,000 breeding sites (JNCC website). Within Gloucestershire, great crested newts are widely distributed, particularly in the Severn Vale, but they are not considered to be well recorded (Gloucestershire LBAP).</p> <p>A medium/large sized breeding meta-population is present within the survey area, but outside the developable site, using a minimum of six ponds. Both the aquatic and terrestrial habitat present within the survey area is ideal for great crested newts as it provides ample aquatic vegetation for egg-laying and complex and varied terrestrial habitat for foraging and hibernating.</p> <p>According to the Gloucestershire LBAP Species Action Plan for great crested newts all sites supporting great crested newts qualify as Key Wildlife Sites, although the KWS criteria produced by Gloucestershire Wildlife Trust state that only sites with ponds known to currently or historically support great crested newt should be considered for KWS designation. The ponds that support great crested newts are already within a Key Wildlife Site (Cinderford Linear Park - although great crested newts are not part of the reasons for designation), although these are outside the site. Therefore, although the ponds supporting great crested newt may be considered to be of county importance, the developable site is considered to be of only district importance for great crested newt, given the suitable good terrestrial habitat.</p>	District	No
Reptiles	W&C Act	UKBAP		<p>Gloucestershire supports all four common species of reptile (slow-worm, common lizard, grass snake and adder) in relatively high numbers and reptiles are particularly well represented in the Forest of Dean area due to the highly suitable habitat present.</p> <p>The site supports all four common reptile species and the results of the</p>	District	No

Receptor	Legal status ¹²	Policy status ¹³	Other conservation framework relevant? ¹⁴	Rationale	Value of receptor / value of the development site to the receptor ¹⁵	Valued ecological receptor?
				<p>survey indicate the presence of 'good' populations of slow worm and common lizard and 'low' populations of grass snake and adder¹⁶. The site qualifies as a 'Key Reptile Site' (Froglife, 1999) by meeting at least two of the criteria; supporting two snake species and supporting three or more reptile species. It is also likely the site could support adder hibernaculum, which would contribute to the reasons for designation of the Cinderford Linear Park KWS as this is one of the KWS criteria.</p> <p>In addition, the site is relatively large in size and provides a range of different habitat types and climatic conditions within the habitat mosaic present that could be used for basking, foraging and hibernating.</p> <p>Based on the number of species present and their relative abundances, the good quality habitat present and the potential for reptiles to contribute to the Cinderford Linear Park KWS status, the site is considered currently considered to be of District importance for reptiles.</p> <p>Table 4.2 below provides a detailed evaluation of the individual areas surveyed for reptiles.</p>		
Birds	W&C Act	UKBAP LBAP (selected species),	Birds Dir BOCC red list	<p>A single Schedule 1 species (crossbill) and a single Annex I species (nightjar) were recorded in the survey area, but neither were recorded using the site. A total of six Red Listed species, all of which are also UK BAP Priority and Section 41 species, and twelve Amber listed species were recorded on site, two of which are also UK BAP Priority and Section 41 species.</p> <p>Five breeding species that are considered uncommon at county level were recorded on site: tree pipit, woodcock, cuckoo, grey wagtail and redstart, of which three were considered to have definitely bred within the site boundary (the site is considered to form part of a cuckoo and</p>	District County (tree pipit, grey wagtail and redstart)	Yes

¹⁶ Froglife (1999) defines a 'good' population of slow-worm and common lizard as between five and 20 adults seen during one survey. A 'low' population of grass snake, adder, common lizard and slow-worm is defined as less than five seen during one survey.

Receptor	Legal status ¹²	Policy status ¹³	Other conservation framework relevant? ¹⁴	Rationale	Value of receptor / value of the development site to the receptor ¹⁵	Valued ecological receptor?
				woodcock territory). Most of the remaining species recorded are common and the numbers recorded on site are not thought to reach the threshold of county importance. Nevertheless, on the basis of available information, it is likely that the site is of county importance for a number of nationally common (but locally uncommon) breeding passerines, and possibly also for woodcock. Adjacent areas of plantation may be of importance to one or more pairs of foraging nightjar, but there was no evidence of use of the site by this species.		
Bats	W&C Act Habs Regs	UKBAP (selected species), LBAP		Of the 16 species that are known to breed in the UK, 14 have been recorded in Gloucestershire (not all breeding, Gloucestershire LBAP), with many of the rarer species utilising habitat in the Forest of Dean and the Cotswolds. Hence, all of the species recorded on site are known to occur within the county. The Gloucestershire LBAP also refers specifically to <i>Pipistrelle</i> sp, due to the large population declines suffered by this species and to lesser and greater horseshoe bats, due to their restricted distribution. The site supports at least six species of bat, with brown long-eared and greater horseshoe bats also likely to use the site, given the relatively near known roosts, but possibly infrequently based on the slightly sub-optimal habitat available for these species. A large lesser horseshoe roost is also present on site and it is likely common pipistrelle also make use of the Northern United buildings for roosting. Activity on site from <i>Pipistrelle</i> species was high, where-as the other species were recorded comparatively infrequently. The lesser horseshoe roost is considered to be of national importance given the number of bats recorded using it. The remainder of the site is considered to be of district importance, based on the range of species recorded. Table 4.3 below provides a detailed evaluation of the value of the site for the individual species recorded.	District - National	Yes

Receptor	Legal status ¹²	Policy status ¹³	Other conservation framework relevant? ¹⁴	Rationale	Value of receptor / value of the development site to the receptor ¹⁵	Valued ecological receptor?
Otter	W&C Act Habs Regs	UKBAP LBAP		<p>The otter population declined dramatically during the 20th century, but has steadily increased and in recent years otters have started to re-colonise Gloucestershire (Gloucestershire LBAP).</p> <p>The site is likely to form only a very small proportion of the total territory size of any otter(s) using the site, despite the relatively good habitat and foraging resource present. The site is also unlikely to be used for breeding given the relatively high level of disturbance that occurs from the public and dog walking. Therefore, the site is considered to be of parish important for otters.</p>	Parish	No
Water vole	W&C Act	UKBAP LBAP		<p>The water vole population has declined significantly in the UK, such that a National Survey in 1989-90 failed to find signs of voles in 67% of sites where they were previously recorded (UKBAP). Within Gloucestershire a 1997 survey failed to find signs of water at 75% of sites previously occupied in 1984 (Gloucestershire LBAP).</p> <p>Despite previous records of water vole near to the site, it has been concluded that water vole are not currently present at the site. However, given the suitable habitat present at the site (mainly around the waterbodies) there is potential for colonisation.</p> <p>Nonetheless, given current absence of water vole the site is considered to be of parish value only for this species.</p>	Parish	No
Badger	Badgers Act			<p>Badgers are extremely common in south-west England and particularly in Gloucestershire. The survey has indicated the site is not well used by badgers and therefore is unlikely to be an important resource for the local population. It is therefore considered the site is of less than parish biodiversity value for this species.</p>	Less than parish	No
Dormouse	W&C Act Habs Regs	UKBAP LBAP		<p>The dormouse is thought to be widespread in Gloucestershire, but is only monitored at a few sites (Gloucestershire LBAP).</p> <p>Despite suitable habitat occurring at the site, it has been concluded that dormice do not currently occur. However, the site is well connected to other areas of the Forest of Dean (which is known to support dormice populations) and there is therefore potential for</p>	Parish	No

Receptor	Legal status ¹²	Policy status ¹³	Other conservation framework relevant? ¹⁴	Rationale	Value of receptor / value of the development site to the receptor ¹⁵	Valued ecological receptor?
				colonisation at a later date. By virtue of the habitat present, notwithstanding the absence of dormice, the site is considered to be of parish importance.		
Invertebrates			RDB Notable A/B Habs. Dir	All the waterbodies (lake, brickwork ponds, Zone 2 Wetland South ponds) were relatively species-rich in terms of invertebrates and reasonably good for groups such as Odonata and water beetles. In addition, most of the compartments had features that could be used by a range of invertebrates. Of the RDB and Notable species recorded none are dependant on habitats specific to the Cinderford site, although one species has only been recorded in three British localities previously (Hampshire, Surrey and Berkshire). There is also potential for white-clawed crayfish. It is considered that whilst none of the compartments are considered to be outstanding in terms of invertebrate composition individually, collectively the site comprises a relatively important resource for invertebrates at the District level.	District	No

Table 4.2 Biodiversity value of each survey area compartment for reptiles

Area	Species present (and estimated population size class estimate based on Froglife, 1999)				Habitat	Biodiversity value of site for receptor
	Common lizard	Grass snake	Slow-worm	Adder		
Within the site						
Northern United	✓ (good)	✓ (small)	✓ (good)		Variety of habitat provided, including hibernation sites in rubble piles. Adjacent to further areas of good habitat	District
Brickworks	✓ (good)	✓ (small)	✓ (small)	✓ (small)	Grassland and woodland edge main habitats present, but steep banks and areas of bare ground provide good basking habitat	District
Dam Green	✓ (good)	✓ (small)		✓ (small)	Limited grassland habitat present, but adjacent to waterbodies and contains steep slopes for basking. Comprises a rubble mound that may be suitable for hibernation.	Parish
Stone Mound	✓ (good)	✓ (small)			Habitats present limited to grassland and scrub, likely to be good for foraging. Also south facing slopes for basking.	Parish
Steam Mills	✓ (good)	✓ (small)		✓ (small)	Grassland and woodland edge habitat present for foraging, but limited connections to further areas of habitat (mainly towards Stone Mound only).	Parish
Outside the site						
Bowson Colliery	✓ (good)	✓ (small)	✓ (small)		Grassland, woodland edge and water habitats present which are good for foraging. Some connections to off-site suitable habitat	District

Table 4.3 Biodiversity value of site for the species of bat recorded

Receptor	Rationale	Biodiversity value of site for receptor
Common pipistrelle	Pipistrelle is listed on the UKBAP and LBAP, due to declines the population has suffered in recent decades. Common pipistrelle is the commonest bat species in the UK, found associated with most habitat types. The site is clearly well used by this species and it is possible that the few buildings at the site are used for roosting occasionally.	Parish
Soprano pipistrelle	Pipistrelle is listed on the UKBAP and LBAP, due to declines the population has suffered in recent decades. Soprano pipistrelle is also one of the commonest UK bat species and, although found in most habitat types, is particularly associated with water features. Hence, the usage of the site by this species is primarily around the large lake and smaller ponds, which appear to be a key resource for the local population	Parish
Lesser horseshoe	Lesser horseshoe is listed in the UKBAP and LBAP due to its restricted distribution in the UK. The Northern United buildings support a large maternity colony of lesser horseshoe bats, which given the size of the colony, is considered to be of national biodiversity value. The Bat Mitigation Guidelines (English Nature, 2004) also class this type of roost as of high conservation significance. The remainder of the site appears to be used little by this species (even taking into account the difficulties associated with recording lesser horseshoe) for foraging or commuting. However, this would be expected as lesser horseshoe bats generally prefer to forage in the canopy of broad-leaved woodland (BCT, 2007) and cluttered environments rather than open space.	National (roost) County (remainder of site)
Noctule	Noctule is listed on the Gloucestershire LBAP (under the general heading of bats). The noctule bat is found throughout England and Wales and considered to be fairly common (FSC, 2001). This species uses a wide variety of habitat types including woodland, water and pasture. Noctule was recorded a small number of times commuting across the site during the surveys, suggesting the site is not a key foraging resource but may be an important route between roost sites. The site offers limited potential tree roosting sites due to the lack of mature broad-leaved trees.	Parish/District
Serotine	Serotine is listed on the Gloucestershire LBAP (under the general heading of bats) but the Species Action Plan for bats notes that a breeding roost for serotine has not been found. This species is restricted in distribution to south and west England and Wales and is considered to be widespread but scarce (BCT, 2007). Like the noctule, serotine bats tend to forage over pasture and woodland edge. At the site, serotine was recorded on two occasions, suggesting occasional use by this species. The site also provides little roosting habitat for this species which has been found roosting in trees and residential houses.	District
<i>Myotis</i> sp	All <i>Myotis</i> sp are listed on the Gloucestershire LBAP (under the general heading of bats), with Bechsteins highlighted in particular. <i>Myotis</i> sp calls recorded with bat detectors are difficult to separate to species, however based on the habitat type at the site and the call characteristics it is likely the species recorded is daubentons. Daubentons and natterers are the most widespread and common <i>Myotis</i> sp and are found throughout the UK. At the site <i>Myotis</i> sp were recorded predominately around the lake and along the watercourses, but less frequently than the <i>Pipistrelle</i> species. The site therefore appears to be of importance for foraging but, with the exception of	District

Receptor	Rationale	Biodiversity value of site for receptor
	the Northern United buildings, provides little roosting opportunity.	

4.3 Summary

In summary, all the designated sites are considered to be valued ecological receptors on the basis of their designations. Of the habitats present at the site, the grassland and water habitats are considered to be valued ecological receptors based on their species-richness and the mosaic of the different types of these habitats present. Bats and a small number of bird species are also considered to be valued ecological receptors due to the species-diversity present, the high numbers of particular species present and the rarity of the species present.

Notwithstanding the valued ecological receptors identified above, great crested newts, otter, bats, birds, reptiles and badger are all legally protected and any development should comply with the legislation relating to these species (Appendix A).

5. Potential effects on receptors and proposed mitigation

5.1 Introduction

The extent of the ecological effects of development depend on the nature and duration of potential effects, the nature of the habitats and component species affected and the mitigation measures which are put in place in order to limit or avoid any adverse effects. The purpose of the surveys is to establish if any species or habitats of particular conservation interest are likely to be affected as a result of the proposed development and, if so, what mitigation might be provided to avoid or minimise those effects.

By examining those flora and fauna that occupy the specific survey area, their reaction to change may be assessed through consideration of patterns of response typical of the species present. Changes, whether beneficial or deleterious, would have the most effect on those species that are particularly sensitive to environmental changes.

At present there is little detailed information regarding the proposed development and construction. However, it is clear from the survey results that mitigation measures will be required for the valued ecological receptors and legally protected species. Enhancement measures are also likely to be required to comply with legislation (e.g. the NERC Act, 2006) and planning policy guidance (e.g. PPS9).

The sections below highlight potential mitigation and enhancement measures that may be required during development of the site based on the indicative masterplan of the preferred option for the Northern Quarter (Figure E.2 in the Cinderford Business Plan Executive Summary, December 2007).

5.2 General mitigation

In addition to the specific mitigation recommended for each receptor (detailed below), site wide, best practice mitigation measures are also proposed, which should be adopted during construction. These comprise the following:

- construction works and associated activities should be strictly limited to clearly defined working site boundaries;
- clearance of scrub, hedgerows or trees undertaken in the winter (October to February inclusive) should stop approximately 6inches above the ground to retain areas that could support reptiles or amphibians. The root bases should then be removed in April once animals are no longer in hibernation but within a mitigation strategy if potential for reptiles or great crested newts exists;
- all staff working at the site should be given an ecological tool box talk before construction begins and as necessary if new people start working at site;

- no rubbish or piles of materials should be left lying around within the construction area that could be used as shelter by animals and when materials or rubbish are moved they should be checked for the presence of animals; and
- all construction work should adhere to the Environment Agency's Pollution Prevention Guidelines (PPGs).

In the event of any protected species appearing close to works whilst they are in progress, the works should be stopped and advice sought immediately.

5.3 Specific mitigation and enhancement proposals

Table 5.1 indicates the potential effects on each receptor and provides a discussion on the potential mitigation and enhancement measures that may need to be implemented to avoid or reduce any negative effects. For some of the receptors, further survey work and monitoring may be required.

Table 5.1 Potential effects on valued ecological receptors and protected species

Receptor	Potential changes and effects	Potential mitigation and enhancement measures
Statutorily designated Sites (i.e. SSSI and SAC)	Damage or destruction of SSSI or SAC habitat and/or disturbance or death of designated features affecting the viability of the sites.	<p>Direct effects on the statutory designated sites though land-take will not occur due to the distance these sites are located from the development area. Indirect effects such as dust deposition and noise are also unlikely given the reason for designation (i.e. bats not habitats) and the distance from the development area respectively.</p> <p>It is unknown whether the lesser horseshoe bats roosting at the site also roost at sites that have been designated as an SAC¹⁷. If they did, consultation with Natural England (NE) would be required regarding the need for a Habitat Regulations screening and potentially a full Appropriate Assessment. Further survey work (e.g. radio tracking) could be undertaken to investigate whether the bats roosting within the SAC use this site also.</p> <p>However, measures have already been put in place, in consultation with NE, to encourage the bats to move and therefore it may be possible to show no likely significant effects would occur. Lesser horseshoe bats are considered further below.</p>
Non-statutorily designated sites (KWSs). Note, this includes the habitat valued ecological receptors grassland and water.	Damage or destruction of KWSs	<p>Of the 14 KWS within 2km of the site only two are considered to be at risk of direct effects from the development. Indirect effects on the remainder are also unlikely provided best practice construction methodologies are adopted e.g. PPG's and dust minimisation.</p> <p>Current proposals will result in the permanent loss of a small part of Hawkwell Inclosure KWS and approximately 25% of Cinderford Linear Park KWS. The FoDDC Local Plan (adopted 2005) states that development that affects the key features of a site must have social, economic or environmental benefits that clearly outweigh the potential harm and that compensation should be provided.</p> <p>The part of the area that would be lost within Hawkwell Inclosure has been</p>

¹⁷ Previous survey data does not mention rings on the bats present and radio-tracking has not been undertaken.

Receptor	Potential changes and effects	Potential mitigation and enhancement measures
Great Crested Newts	Construction activity causing death or injury, disturbance to individuals or damage to their habitats	<p>previously affected by the installation of power lines. However, the KWS has been designated for the ancient woodland it supports, which is a habitat that cannot be re-created or easily translocated. Off-site enhancement measures could be proposed, for example management of other ancient woodlands within the Forest of Dean.</p> <p>Within Cinderford Linear Park KWS the areas that would be lost comprise predominantly plantation woodland and grassland that has colonised previously disturbed ground. Whilst this area is an integral part of the KWS, the habitats are present as a result of past disturbance and therefore could potentially be recreated by translocating the existing substrate and seed bank.</p> <p>A licence for GCN from NE is only required where a significant effect is likely. At the site, the current development plans will not directly affect any GCN breeding ponds and the implementation of PPGs should also prevent indirect effects.</p> <p>However, the development will be within 500m of the breeding ponds and it will affect suitable terrestrial habitat. Therefore, there is potential for GCN to occur within the construction area. Given the medium to large population estimated to be present, it is likely a significant effect could occur and a licence will be required once planning permission is granted (and prior to construction). As part of the licence application, removal of GCN from the development area is likely to be required using methods such as pitfall trapping over a period of months during the summer months. Exclusion fencing around the development would also be required to prevent GCN accessing the site.</p> <p>In addition to disturbance of GCN, the development will also result in the permanent loss of high quality terrestrial habitat. Given the amount of suitable habitat in the surrounding area, this is unlikely to have a significant affect on the local GCN population. However, landscape planting and enhancement in relation to the other ecological features (e.g. the KWS) would also benefit newts.</p>
Reptiles	Construction activity causing death or injury to reptiles.	<p>The amount of habitat lost from the site as a result of the development is likely to preclude retaining the reptiles present on site e.g. within areas of landscape planting or enhancement. The high number of reptiles found within the area earmarked for development and at Bowson Colliery is also likely to preclude using the adjacent areas of habitat as a receptor site to move the reptiles to, because the areas of surrounding habitats are likely to also support large reptile populations.</p> <p>Therefore, it is considered likely that prior to construction, the reptiles present within the works area would need to be translocated to a suitable receptor site. Hence, consultation with NE, FoDDC Ecologist, Forestry Commission and the Gloucestershire Wildlife Trust is likely to be required to find a suitable receptor site, preferably within the Forest of Dean. Note that it is possible reptile surveys will be required at a receptor site to determine the existing reptile population size, which will inform whether the receptor site can accommodate further reptiles (this would follow a similar methodology to that applied on this site). Also, a site that is currently sub-optimal for reptiles would need to be managed and enhanced to provide capacity to receive the reptiles on site.</p> <p>As part of the translocation exercise, phased vegetation clearance from the site would be required during the summer months. Refugia would be used to catch reptiles and this is likely to occur over several months to ensure the site is clear prior to construction.</p> <p>A licence from NE is <u>not</u> required for these works, but NE may wish to see a method statement describing how the clearance will be undertaken.</p>
Birds	Damage or destruction of nests	<p>All site clearance works should be completed <u>outside the breeding bird season (which is March to end of July)</u>. Any areas of suitable habitat not cleared during this time should be surveyed by an ecologist for the presence of bird nests prior to clearance.</p> <p>Whilst not legally required, disturbance to habitats (and the birds breeding in</p>

Receptor	Potential changes and effects	Potential mitigation and enhancement measures
Bats	<p>Damage or destruction of roosts, disturbance to bats within roosts</p> <p>Loss of foraging and commuting routes</p>	<p>them) adjacent to the development could be minimised by using solid fencing or boarding around the edge of the site during construction.</p> <p>Whilst for a small number of species the site is considered to be of County biodiversity value in the context of Gloucestershire, within the Forest of Dean these species are relatively common and loss of suitable habitat is likely to have only a minimal effect on the local population. To compensate for the permanent loss of breeding and foraging habitat for these species (and the other species recorded at the site) any landscape planting should comprise native, locally sourced species and bird boxes could be installed on buildings and trees. If enhancement is available off-site, the creation of glades and more extensive edge habitat would benefit the species that would be displaced as a result of the development.</p> <p>Building roosts</p> <p>As a result of the development, the buildings supporting the large lesser horseshoe roost would be permanently lost, resulting in a high level of impact (according to guidance in English Nature, 2004). Any development works that will significantly affect bat roosts (including resulting in disturbance or potential death or injury) require a licence from Natural England to proceed. However, a licence can only be granted if the works meet the following regulations (from the Habitat Regulations, 1994 as amended):</p> <ul style="list-style-type: none"> ▪ Regulation 44(2)(e), for the purpose of 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; • ▪ Regulation 44(3)(a) that there is no satisfactory alternative; and ▪ Regulation 44(3)(b) that the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range. <p>It is therefore important that the proposed development is required for overriding reasons of public interest and that as part of the development there is no satisfactory alternative to removing the existing buildings. It must also be demonstrated that any effects on the roost on site would not be detrimental to the favourable conservation status of the lesser horseshoe bat population in Britain. Given the size of the roost at Northern United, its proximity to the nearby Wye Valley and Forest of Dean (Bat Sites) SAC and its potentially sizable contribution to the national lesser horseshoe population, this could be interpreted as needing to maintain the roost on site at favourable conservation status.</p> <p>If there is no alternative to removing the existing buildings, measures must be employed to ensure the bats have alternative roosting locations that meet their requirements. At present this has been addressed by constructing a new building a short distance from Northern United on the edge of mixed woodland, thereby providing vegetated flight line routes from the roost. Whilst the new roost contains two roosting spaces of different temperatures, it is likely to provide less space overall. Since it was constructed in 2004, usage of the building by lesser horseshoe bats has been limited compared to the number of lesser horseshoe bats present in the existing buildings (max count of six in 2007).</p> <p>It is clear from the monitoring data that the new roost is not providing conditions superior to those in the existing Northern United buildings (the environmental monitoring data suggest that temperature and relative humidity in the new roost are broadly comparable with the existing roosts) and therefore the lesser horseshoe bats have not been encouraged to passively move to the new building and leave the existing buildings. Additionally, given that the size of the maternity colony has increased since the initial survey and subsequent construction of the new roost, the smaller space provided by the new roost may now not be sufficient for the entire colony.</p>

Receptor	Potential changes and effects	Potential mitigation and enhancement measures
		<p>It is recommended further consultation with Natural England is undertaken, in light of the extensive monitoring information collected, to determine an appropriate future course of action with regard to the roost and the development proposals. Points of discussion could include:</p> <ul style="list-style-type: none"> ▪ whether the new bat house is of sufficient size and provides a large enough range of suitable roost locations to maintain the favourable conservation status of the maternity roost present in the Northern United buildings; ▪ if the new roost is deemed suitable, whether the bats can be excluded from the Northern United buildings despite the limited use of the new building; ▪ whether additional roosting provision is needed within any new buildings constructed as part of the development or possibly an extension to the existing new roost to provide a larger roosting space and more variety in internal environmental conditions; ▪ whether the new roost requires any further minor modifications or enhancements to increase its suitability; and ▪ to what extent future monitoring of the buildings is required in the short term (i.e. prior to development) and long term (i.e. post scheme monitoring). <p>It is recommended an internal inspection for evidence of bats is undertaken at the New Town buildings potentially affected by the development. Emergent/dawn surveys may also be required between May and August to detect crevice dwelling bats that often do not leave visible signs.</p> <p>Tree roosts</p> <p>Whilst the vast majority of the trees within the development area do not support features suitable for bats, there may be potential for works to affect a small number of mature oak trees (particularly adjacent to the proposed road (Zone 3). Once these trees have been identified, more detailed assessment should be undertaken to determine the likelihood of these trees being used as bat roosts and emergent/dawn surveys completed at those locations with medium to high potential. If roosts are found a licence from Natural England is likely to be required to fell the trees. Mitigation such as provision of bat boxes on trees in adjacent areas is also likely to be required and could be actioned regardless of whether roosts are present to provide enhancement.</p> <p>Foraging habitat</p> <p>As a result of the development, some areas of potential foraging habitat would be permanently lost. Although, the key foraging areas identified from the surveys (e.g. Steam Mills Lake, Bowson Colliery and the stream corridors) will not be developed and will continue to be available for foraging and commuting. However, the landscaped spine road proposed would sever the habitat corridor along the stream that flows into Steam Mills Lake and split the woodland to the north (Hawkwell Inclosure). In order to mitigate the potential impacts of this (which would be primarily preventing bats from moving between roosts and foraging areas), the road should be single carriageway, possibly with narrow sections (which could incorporate traffic calming) to provide easy crossing points. Lighting along the road would also need to be sensitively designed to include features such as sodium lamps, hoods/cowls to direct the light down and short lighting columns.</p> <p>The additional landscape planting proposed would provide additional edge habitat that could be used for foraging and commuting.</p> <p>Consultation with Natural England should be undertaken to determine whether further survey work is required in relation to lesser and greater horseshoe bats potentially foraging across the site.</p>

Receptor	Potential changes and effects	Potential mitigation and enhancement measures
Otter	<p>Damage or destruction of holts/lay up areas and otter habitat.</p> <p>Disturbance of otter whilst using a place of shelter or rest</p> <p>Loss of habitat</p>	<p>The site may be used infrequently for resting by otters, but is unlikely to be used extensively due to the level of disturbance from the public. However, it is recommended that the site is re-surveyed for the presence of otter holts and resting places prior to development, to ensure the current conditions have not changed significantly. If aholt or resting place was found during this survey, and disturbance was considered likely, a licence from NE could be required.</p> <p>As the proposed development largely avoids the water features at the site, disturbance to otters during construction, and subsequent use of the site, should be minimal, as should loss of habitat.</p>
Water Vole	<p>Construction activity causing death or injury, disturbance to individuals or damage to their habitats</p>	<p>Although not currently present on site, there is potential for water vole to re-colonise at a later date. Therefore, a re-survey of the water features at the site should be undertaken prior to construction (which could be combined with the otter re-survey). Should water vole occur on site at the time of construction a method statement, detailing how effects on this species will be minimised (e.g. stand-off distances from water features), may be required by NE. However, note that licensing is <u>not</u> required for this species.</p> <p>Development at the site should not preclude water vole from colonising post-construction as the plan indicates the lake and streams, including the associated riparian habitat, will remain. The habitat provided for water vole along the Old Engine Brook could be improved by some scrub removal to reduce shading, although this would need to be balanced with retaining sufficient vegetation to maintain the flight path for bats.</p>
Badger	<p>Construction activity within 30m of an active sett causing damage or destruction of setts, disturbance to badgers within setts, potential to injure a badger during construction</p>	<p>The active sett present within the site is outside the proposed development area and therefore is unlikely to be directly affected by the works.</p> <p>Given the habitat on site, there is low potential for further setts to be constructed within the main development area prior to construction. However, the area should be re-surveyed before the start of construction to confirm this. Should setts be found within ~30m of any works area a Natural England licence may be required. Licences for disturbing or closing setts are only issued between July and November (inclusive) to avoid disturbance during the breeding season.</p> <p>General mitigation measures should be adhered to through the site, including:</p> <ul style="list-style-type: none"> • keeping the site tidy; • providing a means of escape from trenches; and • not obstructing mammal pathways. <p>As the grassland areas appear to be infrequently used by badger for foraging, the loss of this habitat is unlikely to negatively affect the local population.</p>
Dormouse	<p>Damage or destruction of nests</p> <p>Disturbance of dormouse whilst using a place of shelter or rest</p> <p>Loss of habitat</p>	<p>Although not currently present on site, there is potential for dormouse to colonise at a later date. Therefore, a re-survey of the site should be undertaken if construction will not occur before 2012. Should dormouse be confirmed using the site a licence from Natural England may be required.</p>
Invertebrates	<p>Permanent loss of habitat required for Red Data Book or notable species.</p> <p>Construction activity causing death or injury to white-</p>	<p>The development would result in the permanent loss of habitat (grassland and dead wood) used by Red Data Book and Nationally Scarce species. Dead wood is not uncommon with the Forest of Dean and it may be possible to translocate pieces of dead wood to areas adjacent to the development to maintain the habitat in the local area. Although the areas of dead wood are outside Cinderford Linear site, this would compliment the objective with the Linear Park Management Plan to retain standing dead wood (where safe).</p>

Receptor	Potential changes and effects	Potential mitigation and enhancement measures
clawed crayfish.	<p>Most of the grassland supporting Red Data Book species will be lost as a result of the development. Translocating turfs or using the substrate to re-create this habitat on or off-site would maintain the habitat and also benefit invertebrates. Habitat features suitable for invertebrates could also be incorporated into landscaping such as areas of bare ground, banks and slopes and using tussock forming species.</p>	<p>At present, the development plans avoid impacts on water features. Should this change, a survey for white-clawed crayfish is recommended in the affected locations and suitable buffer area. This would need to be undertaken during the summer months (excluding June/July). If white-clawed crayfish occur a suitable mitigation strategy should be agreed with Natural England and the Environment Agency. This is likely to comprise a trapping exercise to move the crayfish from the affected stretch of watercourse. Note that NE licensing in respect to development is <u>not</u> required for works in relation to white-clawed crayfish, however a conservation licence is required if crayfish need to be moved.</p> <p>Maintenance and enhancement of the wetland zones and stream corridors during and post construction would also retain the existing species and possibly encourage colonisation of others.</p>

5.4 Invasive species

Himalayan balsam has been identified as being present alongside the watercourses and some of the waterbodies present on site. This species is not listed under the Wildlife and Countryside Act (1981, as amended) as an invasive species and therefore there is no legal obligation to prevent the spread of this species (including by moving contaminated soil). However, it is nonetheless an invasive non-native species and it would be considered best practice to treat the plants on site and to prevent any further spread during development. The most effective method to destroy the existing plants would be to spray with a herbicide (e.g. glyphosate) prior to flowering in the spring. Himalayan balsam plants produce many seeds, which can occur up to 6m from the plant and persist in the ground for up to three years. Therefore, several years of application could be required. Contaminated soil removed from the site should be carefully disposed of at specialist waste disposal sites.

6. Summary and conclusion

A wide range of detailed ecological surveys have been completed at the Cinderford Regeneration site in 2007 and 2008 following standard, recognised methodologies. The biodiversity evaluation of the ecological features recorded has identified the following valued ecological receptors present at the site:

- designated sites (statutory and non-statutory);
- species-rich grassland;
- water habitats (streams, lakes and ponds);
- birds (tree pipit, grey wagtail and redstart specifically); and
- bats (lesser horseshoe bat specifically).

The remaining habitats and species present on site are not considered to be valued ecological receptors. However, in addition to being valued ecological receptors, bats and birds and the non-valued reptiles, great crested newts, otter and badger, are all legally protected.

Given the number of valued ecological receptors and legally protected species present at the site, preliminary mitigation and enhancement measures have been proposed to minimise potentially significant effects on biodiversity as a result of the development. These should be refined as the development proposals progress and any further survey work recommended is completed.

7. References

- Anon (2002). Cinderford Linear Park Management Plan - Revised Draft.
- Bat Conservation Trust (2007). Bat surveys – Good Practice Guidelines. BCT London.
- Bright, P and Morris, P (1989). A Practical Guide to Dormouse Conservation. The Mammal Society.
- Bright, P, Morris, P and Mitchell-Jones, T, (2006). Dormouse Conservation Handbook. EN, Peterborough.
- Chandler, P.J. (2001) The Flat-footed Flies (Diptera: Opetiidae and Platypezidae) of Europe. Fauna Entomologica Scandinavica Volume **36**
- Cleere N. & Nurney, D. (1998). *Nightjars. A Guide to Nightjars and Related Nightbirds*. Pica Press, Sussex.
- English Nature. 2001. Great crested newt mitigation handbook. English Nature. Peterborough.
- English Nature. 2002. Badgers and Development. Peterborough.
- English Nature. 2004. Reptiles: guidelines for developers. English Nature, Peterborough.
- The Forest of Dean What's Special publication (no date)
- Field Studies Council (2001). A Guide to British Bats.
- Froglife (1999). Reptile survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife Advice Sheet 10. Froglife, Halesworth.
- Gilbert, G., Gibbons G, W., and Evans J. 1998. Bird Monitoring Methods A Manual of Techniques for Key UK Species Royal Society for the Protection of Birds
- Gloucestershire Wildlife Trust (no date). Key Wildlife Site Selection Criteria.
- Gregory et al (2002). The population Status of birds in the United Kingdom, Channel Isles and Isle of Man: an analysis of conservation concern 2002-2007. *British Birds*: 95, 410-450
- Harris, S. Cresswell, P., Jeffries, D. (1989). Surveying Badgers. An occasional publication of the Mammal Society No. 9. University of Bristol.
- Institute of Ecology and Environmental Management, (2006). Guidelines for Ecological Impact Assessment
- Institute of Environmental Assessment (1995), Guidelines for Baseline Ecological Assessment. Chapman and Hall.
- Joint Nature Conservation Committee, (1998). Herpetofauna Workers' Manual. Peterborough, JNCC. Gent, A.H, & Gibson, S.D, eds.
- Joint Nature Conservancy Committee, (2003). Handbook for Phase 1 Habitat Survey. Peterborough, UK.

Joint Nature Conservancy Committee, (2004). Bat Workers Manual. Peterborough. Mitchell-Jones, A.J, & McLeish, A.P. Ed. 3rd Edition

Keystone Environmental (2003). Steam Mills EIA Report (report for SWRDA)

Keystone Environmental (2007). Northern United: Forest of Dean Roost Monitoring Report 2006 (report for SWRDA)

Mammal Society. Undated. Dormouse nest tubes

Mitchell-Jones, A, (2004). Bat Mitigation Guidelines. EN, Peterborough.

Natural England (2007). Badgers and development – Interim Guidance. NE, Peterborough.

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

Rodwell, J.S (for the JNCC), (1992). British Plant Communities Volume 3 – Grassland and Montane Communities. Cambridge University Press.

Strachan, R and Moorhouse, T, (2006). Water Vole Conservation Handbook, Second Edition.

Appendix A

Protected Species Legislation

4 Pages

Birds

With certain exceptions¹⁸, all wild birds, their nests and eggs are protected by section 1 of the *Wildlife and Countryside Act 1981* (as amended). Therefore, it is an offence, *inter alia*, to:

- intentionally kill, injure or take any wild bird;
- intentionally take, damage or destroy the nest of any wild bird while it is in use or being built; or
- intentionally take or destroy the egg of any wild bird.

These offences do not apply to hunting of birds listed in Schedule 2 subject to various controls.

Bird species listed on Schedule 1 of the Act receive further protection, thus for these species it is also an offence to:

- intentionally or recklessly disturb any bird while it is nest building, or is at a nest containing eggs or young; or
- intentionally or recklessly disturb the dependent young of any such bird.

Bats (*Rhinolophidae* and *Vespertilionidae*)

All British bat species are listed in Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) and Schedule 2 of the *Habitats Regulations 1994*. They are afforded full protection under Section 9(4) of the Act and Regulation 39 of the Regulations. These make it an offence, *inter alia*, to:

- deliberately capture, injure or kill a bat;
- damage or destroy a breeding site or resting place of any bat; or
- deliberately disturb a bat (this applies anywhere, not just at its roost) in such a way as to be likely significantly to affect:
 - the ability of any significant group of bat species to survive, breed, or rear or nurture their young; or
 - the local distribution or abundance of that bat species.
- intentionally or recklessly obstruct access to any place that a bat uses for shelter or protection (this is taken to mean all bat roosts whether bats are present or not); or

¹⁸ Some species, such as game birds, are exempt in certain circumstances

-
- intentionally or recklessly disturb a bat while it is occupying a structure or place that it uses for shelter or protection.

In addition, five British bat species are listed on Annex II of the Habitats Directive. These are:

Greater horseshoe bat (*Rhinolophus ferrumequinum*)

Lesser horseshoe bat (*Rhinolophus hipposideros*)

Bechstein's bat (*Myotis bechsteinii*)

Barbastelle (*Barbastella barbastellus*)

Greater mouse-eared bat (*Myotis myotis*)

In certain circumstances where these species are found the Directive requires the designation of Special Areas of Conservation (SACs) by EC member states to ensure that their populations are maintained at a favourable conservation status. Outside SACs, the level of legal protection that these species receive is the same as for other bat species.

Dormouse (*Muscardinus avellanarius*) and European otter (*Lutra lutra*)

These species are listed in Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) and Schedule 2 of the *Habitats Regulations 1994*. They are afforded full protection under Section 9(4) of the Act and Regulation 39 of the Regulations. These make it an offence, *inter alia*, to:

- deliberately capture, injure or kill any such animal;
- damage or destroy a breeding site or resting place of any such animal; or
- deliberately disturb any such animal in such a way as to be likely to significantly affect:
 - the ability of any significant group of animals of that species to survive, breed, or rear or nurture their young; or
 - the local distribution or abundance of that species;
- intentionally or recklessly obstruct access to any place that any of these animals uses for shelter or protection; or
- intentionally or recklessly disturb any of these animals while it is occupying a structure or place that it uses for shelter or protection.

Water vole (*Arvicola terrestris*)

The water vole is listed in Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) and is afforded limited protection under Section 9 of this Act. This makes it an offence, *inter alia*, to:

- intentionally kill, injure, or take (handle) any a water vole (in England only);
- intentionally or recklessly damage or destroy or obstruct access to any structure or place which water voles use for shelter or protection; or

-
- intentionally or recklessly disturb water voles while they are using such a place.

Reptiles

The four widespread¹⁹ species of reptile that are native to Britain, namely common or viviparous lizard (*Lacerta vivipara*), slow worm (*Anguis fragilis*), adder (*Vipera berus*) and grass snake (*Natrix natrix*), are listed in Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) and are afforded limited protection under Section 9 of this Act. This makes it an offence, *inter alia*, to:

- intentionally kill or injure any of these species.

Great crested newt (*Triturus cristatus*)

The great crested newt is listed in Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) and Schedule 2 of the *Habitats Regulations 1994*. It is afforded protection under Section 9(4) of the Act and Regulation 39 of the Regulations. These make it an offence, *inter alia*, to:

- deliberately capture, injure or kill a great crested newt;
- damage or destroy a breeding site or resting place of a great crested newt;
- deliberately take or destroy the eggs of a great crested newt;
- deliberately disturb a great crested newt in such a way as to be likely to significantly affect:
 - the ability of any significant group of great crested newts to survive, breed, or rear or nurture their young; or
 - the local distribution or abundance of great crested newt.
- intentionally or recklessly obstruct the access to any place that a great crested newt uses for shelter or protection; or
- intentionally or recklessly disturb a great crested newt while it is occupying a structure or place that it uses for shelter or protection.

White clawed crayfish (*Austropotamobius pallipes*)

The white clawed crayfish is listed in Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) and is afforded limited protection under Section 9 of this Act. This makes it an offence, *inter alia*, to:

- intentionally take individuals of this species.

¹⁹ The other native species of British reptile (sand lizard and smooth snake) receive a higher level of protection under the *Habitats Regulations 1994* and (in England and Wales only) the *Wildlife and Countryside Act 1981* (as amended). However, the distribution of these species are restricted to only a very few sites. All marine turtles (Cheloniidae and Dermochelyidae) are also protected.

Badger

The *Protection of Badgers Act 1992* consolidates previous legislation (including the *Badgers Acts 1973* and *1991 Badgers (Further Protection) Act 1991*). It makes it a serious offence to:

- kill, injure or take a badger;
- attempt to kill, injure or take a badger; or
- damage or interfere with a sett.

All wild mammals (including rabbits and foxes)

Under the *Wild Mammals (Protection) Act 1996* it is an offence intentionally to cause unnecessary suffering to any wild mammal.

Appendix B

GCER Records

14 Pages

Full Name	Common Name	GRID SQ	Year	RDB	International Status	WCA Schedules	GB Status	BAP	Survey name
<i>Didea alneti</i>	a hoverfly	SO61	1897	1			RDB1	BAP3	David Iliffs Hoverfly Records
<i>Metasyrphus nitens</i>	a hoverfly	SO61	Unknown				Notable/Nb		David Iliffs Hoverfly Records
<i>Xylota florum</i>	a hoverfly	SO61	1897				Notable/Nb		David Iliffs Hoverfly Records
<i>Lacerta vivipara</i>	Viviparous Lizard	SO61	1979		Bern App III	5 (Killing, injuring, sale only)			Colin Twissell's Records
<i>Lampropteryx otregiata</i>	Devon Carpet	SO6114	1991				Notable/Nb		
<i>Pyrgus malvae</i>	Grizzled Skipper	SO6115	1992				Local		GM Butterfly Survey
<i>Leptidea sinapis</i>	Wood White	SO6115	2003			5 (Sale only)	Notable/Nb	BAP3	GM Butterfly Survey
<i>Boloria selene</i>	Small Pearl-bordered Fritillary	SO6115	1991				Local	BAP3	GM Butterfly Survey
<i>Boloria euphrosyne</i>	Pearl Bordered Fritillary	SO6115	1991			5 (Sale only)	Notable/Nb	BAP1_ BAPL	GM Butterfly Survey
<i>Argynnis paphia</i>	Silver-washed Fritillary	SO6115	1995				Local	BAP3	GM Butterfly Survey
<i>Lacerta vivipara</i>	Viviparous Lizard	SO6115	2005		Bern App III	5 (Killing, injuring, sale only)			Colin Twissell's Records
<i>Ladoga camilla</i>	White Admiral	SO61L	1983				Local		GM Butterfly Survey
<i>Boloria selene</i>	Small Pearl-bordered Fritillary	SO61L	1999				Local	BAP3	GM Butterfly Survey
<i>Argynnis paphia</i>	Silver-washed Fritillary	SO61L	1997				Local	BAP3	GM Butterfly Survey
<i>Ranunculus hederaceus</i>	Ivy-leaved Crowfoot	SO61m	1982					BAP3	Mark and Clare Kitchen General Records
<i>Minuartia hybrida</i>	Fine-leaved Sandwort	SO61m	1982				Nationally Scarce		Mark and Clare Kitchen General Records
<i>Ulex gallii</i>	Western Gorse	SO61m	1982					BAP3	Mark and Clare Kitchen General Records

Status and BAP information - Recorder 3.3

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Presence on this list does not indicate breeding status

Full Name	Common Name	GRID SQ	Year	RDB	International Status	WCA Schedules	GB Status	BAP	Survey name
<i>Marrubium vulgare</i>	White Horehound	SO61m	1982				Nationally Scarce		Mark and Clare Kitchen General Records
<i>Pyrgus malvae</i>	Grizzled Skipper	SO61M	1991				Local		GM Butterfly Survey
<i>Hipparchia semele</i>	Grayling	SO61M	1996				Local		GM Butterfly Survey
<i>Hyacinthoides non-scripta</i>	Bluebell	SO61n	1982			8		BAP3	Mark and Clare Kitchen General Records
<i>Pyrgus malvae</i>	Grizzled Skipper	SO6213	1990				Local		GM Butterfly Survey
<i>Ulex gallii</i>	Western Gorse	SO6214	1998					BAP3	Mark and Clare Kitchen General Records
<i>Hyacinthoides non-scripta</i>	Bluebell	SO6214	2002			8		BAP3	Mark and Clare Kitchen General Records
<i>Phyllonorycter muelleriella</i>	a micro-moth	SO6214	1999				Notable/Nb		Roger Gaunts Moths 1z3
<i>Glyphipterix forsterella</i>	a micro-moth	SO6214	1999				Notable/Nb		Roger Gaunts Moths 1ar
<i>Stathmopoda pedella</i>	a micro-moth	SO6214	1999				Notable/Nb		Roger Gaunts Moths 1ar
<i>Pyrgus malvae</i>	Grizzled Skipper	SO6214	1995				Local		GM Butterfly Survey
<i>Leptidea sinapis</i>	Wood White	SO6214	1998			5 (Sale only)	Notable/Nb	BAP3	GM Butterfly Survey
<i>Boloria selene</i>	Small Pearl-bordered Fritillary	SO6214	1997				Local	BAP3	GM Butterfly Survey
<i>Argynnis paphia</i>	Silver-washed Fritillary	SO6214	1997				Local	BAP3	GM Butterfly Survey
<i>Minoa murinata</i>	Drab Looper	SO6214	1999				Notable/Nb	BAP2_ BAP2+_ BAPL	Roger Gaunts Moths 1ar
<i>Lacerta vivipara</i>	Viviparous Lizard	SO6214	2003		Bern App III	5 (Killing, injuring, sale only)			Colin Twissell's Records
<i>Anguis fragilis</i>	Slow-worm	SO6214	1998		Bern App III	5 (Killing, injuring, sale only)		BAP3	Colin Twissell's Records
<i>Picus viridis</i>	Green Woodpecker	SO6214	2000					BAP3	
<i>Ulex gallii</i>	Western Gorse	SO6215	2001					BAP3	Mark and Clare Kitchen General Records

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Full Name	Common Name	GRID SQ	Year	RDB	International Status	WCA Schedules	GB Status	BAP	Survey name
<i>Marrubium vulgare</i>	White Horehound	SO6215	2001				Nationally Scarce		Mark and Clare Kitchen General Records
<i>Hyacinthoides non-scripta</i>	Bluebell	SO6215	2001			8		BAP3	Mark and Clare Kitchen General Records
<i>Pyrgus malvae</i>	Grizzled Skipper	SO6215	1991				Local		GM Butterfly Survey
<i>Leptidea sinapis</i>	Wood White	SO6215	2003			5 (Sale only)	Notable/Nb	BAP3	GM Butterfly Survey
<i>Ladoga camilla</i>	White Admiral	SO6215	1999				Local		GM Butterfly Survey
<i>Boloria selene</i>	Small Pearl-bordered Fritillary	SO6215	1995				Local	BAP3	GM Butterfly Survey
<i>Argynnis paphia</i>	Silver-washed Fritillary	SO6215	1999				Local	BAP3	GM Butterfly Survey
<i>Tetheella fluctuosa</i>	Satin Lutestring	SO6215	1995				Notable/Nb		Roger Gaunts Moths 1ar
<i>Lampropteryx otregiata</i>	Devon Carpet	SO6215	2004				Notable/Nb		Roger Gaunts Moths 1ar
<i>Pechipogon strigilata</i>	Common Fan-foot	SO6215	1995				Na	BAP2_ BAP2+_ BAPL	Roger Gaunts Moths 1ar
<i>Rana temporaria</i>	Common Frog	SO6215	2005		EC Annex Va; Bern App III	5 (Sale only)		BAP3	Colin Twissell's Records
<i>Buteo buteo</i>	Buzzard	SO6215	2001					BAP3	Mark and Clare Kitchen General Records
<i>Sitta europaea</i>	Nuthatch	SO6215	2001					BAP3	Mark and Clare Kitchen General Records
<i>Dama dama</i>	Fallow Deer	SO6215	2001		Bern App III		Naturalised		Mark and Clare Kitchen General Records
<i>Ulex gallii</i>	Western Gorse	SO6216	2001					BAP3	Mark and Clare Kitchen General Records
<i>Ulex gallii</i>	Western Gorse	SO6313	1999					BAP3	Mark and Clare Kitchen General Records
<i>Marrubium vulgare</i>	White Horehound	SO6313	1997				Nationally Scarce		Mark and Clare Kitchen General Records
<i>Synanthedon sphaeciformis</i>	White-barred Clearwing	SO6313	2004				Notable/Nb		Roger Gaunts Moths 1ar
<i>Epinotia demarniana</i>	a tortrix moth	SO6313	1998				Notable/Nb		Roger Gaunts Moths 1ar
<i>Phlyctaenia stachydalis</i>	a pyralid moth	SO6313	1997				pRDBK		Roger Gaunts Moths 1ar

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Full Name	Common Name	GRID SQ	Year	RDB	International Status	WCA Schedules	GB Status	BAP	Survey name
<i>Pyrgus malvae</i>	Grizzled Skipper	SO6313	2000				Local		GM Butterfly Survey
<i>Argynnis paphia</i>	Silver-washed Fritillary	SO6313	2003				Local	BAP3	GM Butterfly Survey
<i>Hipparchia semele</i>	Grayling	SO6313	2003				Local		GM Butterfly Survey
<i>Tethella fluctuosa</i>	Satin Lutestring	SO6313	1997				Notable/Nb		Roger Gaunts Moths 1ar
<i>Lampropteryx otregiata</i>	Devon Carpet	SO6313	1998				Notable/Nb		Roger Gaunts Moths 1ar
<i>Furcula bicuspis</i>	Alder Kitten	SO6313	2004				Notable/Nb		Roger Gaunts Moths 1ar
<i>Atolmis rubricollis</i>	Red-necked Footman	SO6313	1998				Notable/Nb		Roger Gaunts Moths 1ar
<i>Eilema sororcula</i>	Orange Footman	SO6313	2004				Notable/Nb	BAP3	Roger Gaunts Moths 1ar
<i>Conistra rubiginea</i>	Dotted Chestnut	SO6313	1999				Notable/Nb		Roger Gaunts Moths 1ar
<i>Pechipogon strigilata</i>	Common Fan-foot	SO6313	1998				Na	BAP2_ BAP2+_ BAPL	Roger Gaunts Moths 1ar
<i>Triturus vulgaris</i>	Smooth Newt	SO6313	2002		Bern App III	5 (Sale only)		BAP3	Colin Twissell's Records
<i>Bufo bufo</i>	Common Toad	SO6313	1999		Bern App III	5 (Sale only)		BAP3	Mark and Clare Kitchen General Records
<i>Rana temporaria</i>	Common Frog	SO6313	1997		EC Annex Va; Bern App III	5 (Sale only)		BAP3	Colin Twissell's Records
<i>Lacerta vivipara</i>	Viviparous Lizard	SO6313	2005		Bern App III	5 (Killing, injuring, sale only)			Colin Twissell's Records
<i>Anguis fragilis</i>	Slow-worm	SO6313	2002		Bern App III	5 (Killing, injuring, sale only)		BAP3	Colin Twissell's Records
<i>Natrix natrix</i>	Grass Snake	SO6313	1995		Bern App III	5 (Killing, injuring, sale only)		BAP3	Colin Twissell's Records
<i>Vipera berus</i>	Adder	SO6313	1995		Bern App III	5 (Killing, injuring, sale only)		BAP3	Colin Twissell's Records
<i>Accipiter gentilis</i>	Goshawk	SO6313	1999			1		BAP3	Mark and Clare Kitchen General Records

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<i>Dama dama</i>	Fallow Deer	SO6313	2002		Bern App III		Naturalised		Mark and Clare Kitchen General Records
<i>Ulex gallii</i>	Western Gorse	SO6314	1998					BAP3	Mark and Clare Kitchen General Records
<i>Hyacinthoides non-scripta</i>	Bluebell	SO6314	2002			8		BAP3	Mark and Clare Kitchen General Records
<i>Pyrgus malvae</i>	Grizzled Skipper	SO6314	1995				Local		GM Butterfly Survey
<i>Boloria selene</i>	Small Pearl-bordered Fritillary	SO6314	1996				Local	BAP3	GM Butterfly Survey
<i>Argynnis paphia</i>	Silver-washed Fritillary	SO6314	2003				Local	BAP3	GM Butterfly Survey
<i>Hipparchia semele</i>	Grayling	SO6314	1990				Local		GM Butterfly Survey
<i>Lacerta vivipara</i>	Viviparous Lizard	SO6314	2003		Bern App III	5 (Killing, injuring, sale only)			Colin Twissell's Records
<i>Vipera berus</i>	Adder	SO6314	1995		Bern App III	5 (Killing, injuring, sale only)		BAP3	Colin Twissell's Records
<i>Turdus philomelos</i>	Song Thrush	SO6314	2002					BAP1_ BAPL	Mark and Clare Kitchen General Records
<i>Bembecia scopigera</i>	Six-belted Clearwing	SO6315	2004				Notable/Nb		Roger Gaunts Moths 1ar
<i>Boloria selene</i>	Small Pearl-bordered Fritillary	SO6315	1995				Local	BAP3	GM Butterfly Survey
<i>Argynnis paphia</i>	Silver-washed Fritillary	SO6315	2003				Local	BAP3	GM Butterfly Survey
<i>Euphyia biangulata</i>	Cloaked Carpet	SO6315	1993				Notable/Nb		Roger Gaunts Moths 1ar
<i>Anguis fragilis</i>	Slow-worm	SO6315	2005		Bern App III	5 (Killing, injuring, sale only)		BAP3	Colin Twissell's Records
<i>Ulex gallii</i>	Western Gorse	SO6316	1998					BAP3	Mark and Clare Kitchen General Records
<i>Ulex gallii</i>	Western Gorse	SO6317	2005					BAP3	
<i>Boloria selene</i>	Small Pearl-bordered Fritillary	SO6412	1995				Local	BAP3	GM Butterfly Survey
<i>Hipparchia semele</i>	Grayling	SO6412	1995				Local		GM Butterfly Survey

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Full Name	Common Name	GRID SQ	Year	RDB	International Status	WCA Schedules	GB Status	BAP	Survey name
<i>Ulex gallii</i>	Western Gorse	SO6413	1994					BAP3	
<i>Synanthedon vespiformis</i>	Yellow-legged Clearwing	SO6413	2000				Notable/Nb		Roger Gaunts Moths 1ar
<i>Pyrgus malvae</i>	Grizzled Skipper	SO6413	1996				Local		GM Butterfly Survey
<i>Boloria selene</i>	Small Pearl-bordered Fritillary	SO6413	2002				Local	BAP3	GM Butterfly Survey
<i>Argynnis paphia</i>	Silver-washed Fritillary	SO6413	2003				Local	BAP3	GM Butterfly Survey
<i>Cerastis leucographa</i>	White-marked	SO6413	1990				Notable/Nb		Roger Gaunts Moths 1ar
<i>Bufo bufo</i>	Common Toad	SO6413	2004		Bern App III	5 (Sale only)		BAP3	Colin Twissell's Records
<i>Rana temporaria</i>	Common Frog	SO6413	1999		EC Annex Va; Bern App III	5 (Sale only)		BAP3	Colin Twissell's Records
<i>Lacerta vivipara</i>	Viviparous Lizard	SO6413	2004		Bern App III	5 (Killing, injuring, sale only)			Colin Twissell's Records
<i>Anguis fragilis</i>	Slow-worm	SO6413	1988		Bern App III	5 (Killing, injuring, sale only)		BAP3	Colin Twissell's Records
<i>Natrix natrix</i>	Grass Snake	SO6413	2002		Bern App III	5 (Killing, injuring, sale only)		BAP3	Colin Twissell's Records
<i>Vipera berus</i>	Adder	SO6413	1988		Bern App III	5 (Killing, injuring, sale only)		BAP3	Colin Twissell's Records
<i>Sphagnum auriculatum</i>	a bog moss	SO6414	1980		Appendix V of EC Species and Habitat Directive.		Common		
<i>Ulex gallii</i>	Western Gorse	SO6414	2002					BAP3	
<i>Marrubium vulgare</i>	White Horehound	SO6414	1980				Nationally Scarce		
<i>Hyacinthoides non-scripta</i>	Bluebell	SO6414	2004			8		BAP3	Mark and Clare Kitchen General Records
<i>Pyrgus malvae</i>	Grizzled Skipper	SO6414	2002				Local		GM Butterfly Survey
<i>Aricia agestis</i>	Brown Argus	SO6414	1991				Local		GM Butterfly Survey

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Full Name	Common Name	GRID SQ	Year	RDB	International Status	WCA Schedules	GB Status	BAP	Survey name
<i>Boloria selene</i>	Small Pearl-bordered Fritillary	SO6414	1997				Local	BAP3	GM Butterfly Survey
<i>Boloria euphrosyne</i>	Pearl Bordered Fritillary	SO6414	1990			5 (Sale only)	Notable/Nb	BAP1_ BAPL	GM Butterfly Survey
<i>Argynnis paphia</i>	Silver-washed Fritillary	SO6414	2003				Local	BAP3	GM Butterfly Survey
<i>Hipparchia semele</i>	Grayling	SO6414	1995				Local		GM Butterfly Survey
<i>Tetheella fluctuosa</i>	Satin Lutestring	SO6414	1999				Notable/Nb		Roger Gaunts Moths 1ar
<i>Triturus cristatus</i>	Great Crested Newt	SO6414	2005		EC Annex IIa, IVa; Bern App II	5		BAP1_ BAPL	Colin Twissell's Records
<i>Triturus vulgaris</i>	Smooth Newt	SO6414	2004		Bern App III	5 (Sale only)		BAP3	Colin Twissell's Records
<i>Triturus helveticus</i>	Palmate Newt	SO6414	2005		Bern App III	5 (Sale only)		BAP3	Colin Twissell's Records
<i>Bufo bufo</i>	Common Toad	SO6414	2003		Bern App III	5 (Sale only)		BAP3	Colin Twissell's Records
<i>Rana temporaria</i>	Common Frog	SO6414	2004		EC Annex Va; Bern App III	5 (Sale only)		BAP3	Colin Twissell's Records
<i>Lacerta vivipara</i>	Viviparous Lizard	SO6414	2003		Bern App III	5 (Killing, injuring, sale only)			
<i>Anguis fragilis</i>	Slow-worm	SO6414	2000		Bern App III	5 (Killing, injuring, sale only)		BAP3	Colin Twissell's Records
<i>Natrix natrix</i>	Grass Snake	SO6414	1997		Bern App III	5 (Killing, injuring, sale only)		BAP3	Colin Twissell's Records
<i>Vipera berus</i>	Adder	SO6414	1998		Bern App III	5 (Killing, injuring, sale only)		BAP3	Colin Twissell's Records
<i>Ulex gallii</i>	Western Gorse	SO6415	1999					BAP3	Mark and Clare Kitchen General Records

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Full Name	Common Name	GRID SQ	Year	RDB	International Status	WCA Schedules	GB Status	BAP	Survey name
<i>Marrubium vulgare</i>	White Horehound	SO6415	1999				Nationally Scarce		Mark and Clare Kitchen General Records
<i>Hyacinthoides non-scripta</i>	Bluebell	SO6415	1991			8		BAP3	
<i>Chordeuma proximum</i>	a millipede	SO6415	2000				Local	BAP3	
<i>Coenagrion pulchellum</i>	Variable Damselfly	SO6415	1996				Notable/Nb		
<i>Cordulegaster boltonii</i>	Golden-ringed Dragonfly	SO6415	2000				Nr		
<i>Aeshna juncea</i>	Common Hawker	SO6415	2000				Common		
<i>Sympetrum sanguineum</i>	Ruddy Darter	SO6415	2000				Notable/Nb		
<i>Sympetrum danae</i>	Black Darter	SO6415	1999				Common		
<i>Synanthedon vespiformis</i>	Yellow-legged Clearwing	SO6415	2000				Notable/Nb		
<i>Pyrgus malvae</i>	Grizzled Skipper	SO6415	1997				Local		
<i>Boloria selene</i>	Small Pearl-bordered Fritillary	SO6415	1999				Local	BAP3	GM Butterfly Survey
<i>Argynnis aglaja</i>	Dark Green Fritillary	SO6415	1983				Local		GM Butterfly Survey
<i>Argynnis paphia</i>	Silver-washed Fritillary	SO6415	1997				Local	BAP3	
<i>Hipparchia semele</i>	Grayling	SO6415	1999				Local		GM Butterfly Survey
<i>Didea fasciata</i>	a hoverfly	SO6415	2002				Notable/Nb		David Iliffs Hoverfly Records
<i>Triturus cristatus</i>	Great Crested Newt	SO6415	2003		EC Annex IIa, IVa; Bern App II	5		BAP1_ BAPL	
<i>Triturus vulgaris</i>	Smooth Newt	SO6415	2003		Bern App III	5 (Sale only)		BAP3	
<i>Triturus helveticus</i>	Palmate Newt	SO6415	2003		Bern App III	5 (Sale only)		BAP3	
<i>Bufo bufo</i>	Common Toad	SO6415	2003		Bern App III	5 (Sale only)		BAP3	
<i>Rana temporaria</i>	Common Frog	SO6415	2004		EC Annex Va; Bern App III	5 (Sale only)		BAP3	Colin Twissell's Records
<i>Anguis fragilis</i>	Slow-worm	SO6415	2005		Bern App III	5 (Killing, injuring, sale only)		BAP3	Colin Twissell's Records
<i>Hirundo rustica</i>	Swallow	SO6415	1991					BAP3	
<i>Parus major</i>	Great Tit	SO6415	1991					BAP3	

Status and BAP information - Recorder 3.3

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Presence on this list does not indicate breeding status

Full Name	Common Name	GRID SQ	Year	RDB	International Status	WCA Schedules	GB Status	BAP	Survey name
<i>Pipistrellus pipistrellus</i>	Pipistrelle	SO6415	2007		EC Annex IVa; Bern App III	5	Common	BAP1_ BAPL	
<i>Lutra lutra</i>	Otter	SO6415	2004		EC Annex IIa, IIIa; Bern App II	5		BAP1_ BAPL	
<i>Ulex gallii</i>	Western Gorse	SO6416	2005					BAP3	Mark and Clare Kitchen General Records
<i>Ulex gallii</i>	Western Gorse	SO6512	2000					BAP3	
<i>Bufo bufo</i>	Common Toad	SO6512	2000		Bern App III	5 (Sale only)		BAP3	Colin Twissell's Records
<i>Ulex gallii</i>	Western Gorse	SO6513	1995					BAP3	
<i>Nymphoides peltata</i>	Fringed Water-lily	SO6513	1995				Nationally Scarce		
<i>Cordulegaster boltonii</i>	Golden-ringed Dragonfly	SO6513	1999				Nr		
<i>Aeshna juncea</i>	Common Hawker	SO6513	1996				Common		
<i>Cordulia aenea</i>	Downy Emerald	SO6513	1996				Notable/Nb		
<i>Sympetrum sanguineum</i>	Ruddy Darter	SO6513	1996				Notable/Nb		
<i>Pyrgus malvae</i>	Grizzled Skipper	SO6513	1996				Local		GM Butterfly Survey
<i>Boloria selene</i>	Small Pearl-bordered Fritillary	SO6513	1995				Local	BAP3	GM Butterfly Survey
<i>Lacerta vivipara</i>	Viviparous Lizard	SO6513	2003		Bern App III	5 (Killing, injuring, sale only)			Colin Twissell's Records
<i>Natrix natrix</i>	Grass Snake	SO6513	2005		Bern App III	5 (Killing, injuring, sale only)		BAP3	Colin Twissell's Records
<i>Anas platyrhynchos</i>	Mallard	SO6513	1995					BAP3	
<i>Ulex gallii</i>	Western Gorse	SO6514	1994					BAP3	Mark and Clare Kitchen General Records
<i>Hyacinthoides non-scripta</i>	Bluebell	SO6514	2005			8		BAP3	Mark and Clare Kitchen General Records
<i>Turdus philomelos</i>	Song Thrush	SO6514	1991					BAP1_ BAPL	
<i>Parus caeruleus</i>	Blue Tit	SO6514	1991					BAP3	

Status and BAP information - Recorder 3.3

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Full Name	Common Name	GRID SQ	Year	RDB	International Status	WCA Schedules	GB Status	BAP	Survey name
<i>Parus major</i>	Great Tit	SO6514	1991					BAP3	
<i>Ulex gallii</i>	Western Gorse	SO6515	2005					BAP3	Mark and Clare Kitchen General Records
<i>Hyacinthoides non-scripta</i>	Bluebell	SO6515	2005			8		BAP3	Mark and Clare Kitchen General Records
<i>Boloria selene</i>	Small Pearl-bordered Fritillary	SO6515	1978				Local	BAP3	GM Butterfly Survey
<i>Anguis fragilis</i>	Slow-worm	SO6515	1995		Bern App III	5 (Killing, injuring, sale only)		BAP3	Colin Twissell's Records
<i>Ulex gallii</i>	Western Gorse	SO6516	2005					BAP3	Mark and Clare Kitchen General Records
<i>Hyacinthoides non-scripta</i>	Bluebell	SO6516	2005			8		BAP3	Mark and Clare Kitchen General Records
<i>Aeshna juncea</i>	Common Hawker	SO6516	1996				Common		
<i>Sympetrum sanguineum</i>	Ruddy Darter	SO6516	2003				Notable/Nb		
<i>Sympetrum danae</i>	Black Darter	SO6516	1990				Common		
<i>Bembecia scopigera</i>	Six-belted Clearwing	SO6516	2004				Notable/Nb		Roger Gaunts Moths 1ar
<i>Glyphipterix forsterella</i>	a micro-moth	SO6516	2003				Notable/Nb		Roger Gaunts Moths 1ar
<i>Pyrgus malvae</i>	Grizzled Skipper	SO6516	1999				Local		GM Butterfly Survey
<i>Ladoga camilla</i>	White Admiral	SO6516	1984				Local		GM Butterfly Survey
<i>Boloria selene</i>	Small Pearl-bordered Fritillary	SO6516	1998				Local	BAP3	GM Butterfly Survey
<i>Boloria euphrosyne</i>	Pearl Bordered Fritillary	SO6516	1989			5 (Sale only)	Notable/Nb	BAP1_ BAPL	GM Butterfly Survey
<i>Hipparchia semele</i>	Grayling	SO6516	2000				Local		Mark and Clare Kitchen General Records
<i>Tetheella fluctuosa</i>	Satin Lutestring	SO6516	1995				Notable/Nb		Roger Gaunts Moths 1ar
<i>Rheumaptera hastata</i>	Argent and Sable	SO6516	1993				Notable/Nb	BAP2_ BAP2- _BAPL	Roger Gaunts Moths 1ar
<i>Euphyia biangulata</i>	Cloaked Carpet	SO6516	1995				Notable/Nb		Roger Gaunts Moths 1ar

Status and BAP information - Recorder 3.3

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Full Name	Common Name	GRID SQ	Year	RDB	International Status	WCA Schedules	GB Status	BAP	Survey name
<i>Triturus cristatus</i>	Great Crested Newt	SO6516	1999		EC Annex IIa, IVa; Bern App II	5		BAP1_ BAPL	
<i>Triturus vulgaris</i>	Smooth Newt	SO6516	1999		Bern App III	5 (Sale only)		BAP3	
<i>Triturus helveticus</i>	Palmate Newt	SO6516	1999		Bern App III	5 (Sale only)		BAP3	
<i>Bufo bufo</i>	Common Toad	SO6516	2003		Bern App III	5 (Sale only)		BAP3	Colin Twissell's Records
<i>Rana temporaria</i>	Common Frog	SO6516	1999		EC Annex Va; Bern App III	5 (Sale only)		BAP3	Colin Twissell's Records
<i>Anguis fragilis</i>	Slow-worm	SO6516	2002		Bern App III	5 (Killing, injuring, sale only)		BAP3	Colin Twissell's Records
<i>Vipera berus</i>	Adder	SO6516	1984		Bern App III	5 (Killing, injuring, sale only)		BAP3	Colin Twissell's Records
<i>Anas platyrhynchos</i>	Mallard	SO6516	2002					BAP3	
<i>Ulex gallii</i>	Western Gorse	SO6517	1998					BAP3	Mark and Clare Kitchen General Records
<i>Boloria selene</i>	Small Pearl-bordered Fritillary	SO6517	1992				Local	BAP3	GM Butterfly Survey
<i>Ulex gallii</i>	Western Gorse	SO6614	2004					BAP3	
<i>Hyacinthoides non-scripta</i>	Bluebell	SO6614	2004			8		BAP3	
<i>Rana temporaria</i>	Common Frog	SO6614	2004		EC Annex Va; Bern App III	5 (Sale only)		BAP3	
<i>Lacerta vivipara</i>	Viviparous Lizard	SO6614	2004		Bern App III	5 (Killing, injuring, sale only)			
<i>Anguis fragilis</i>	Slow-worm	SO6614	2004		Bern App III	5 (Killing, injuring, sale only)		BAP3	
<i>Ulex gallii</i>	Western Gorse	SO6615	2005					BAP3	
<i>Hyacinthoides non-scripta</i>	Bluebell	SO6615	2005			8		BAP3	

Status and BAP information - Recorder 3.3

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Presence on this list does not indicate breeding status

Full Name	Common Name	GRID SQ	Year	RDB	International Status	WCA Schedules	GB Status	BAP	Survey name
<i>Bufo bufo</i>	Common Toad	SO6615	1993		Bern App III	5 (Sale only)		BAP3	Colin Twissell's Records
<i>Ulex gallii</i>	Western Gorse	SO6616	2005					BAP3	
<i>Hyacinthoides non-scripta</i>	Bluebell	SO6616	2005			8		BAP3	
<i>Pyrgus malvae</i>	Grizzled Skipper	SO6616	2002				Local		Roger Gaunts Moths 1ar
<i>Hipparchia semele</i>	Grayling	SO6616	1995				Local		GM Butterfly Survey
<i>Rana temporaria</i>	Common Frog	SO6616	2005		EC Annex Va; Bern App III	5 (Sale only)		BAP3	Mark and Clare Kitchen General Records
<i>Buteo buteo</i>	Buzzard	SO6616	2005					BAP3	
<i>Rhinolophus ferrumequinum</i>	Greater Horseshoe Bat	SO6616	1998		EC Annex IIa, IVa; Bern App II	5		BAP1_ BAPL	
<i>Rhinolophus hipposideros</i>	Lesser Horseshoe Bat	SO6616	1998		EC Annex IIa, IVa; Bern App II	5		BAP2+_ BAPL	
<i>Myotis mystacinus</i>	Whiskered Bat	SO6616	1997		EC Annex IVa; Bern App II	5			
<i>Myotis brandti</i>	Brandt's Bat	SO6616	1998		EC Annex IVa; Bern App II	5			
<i>Myotis nattereri</i>	Natterer's Bat	SO6616	1998		EC Annex IVa; Bern App II	5			
<i>Myotis bechsteini</i>	Bechstein's Bat	SO6616	1998		EC Annex IIa, IVa; Bern App II	5		BAP2_ BAP2+_ BAPL	
<i>Plecotus auritus</i>	Brown Long-eared Bat	SO6616	1998		EC Annex IVa; Bern App II	5	Common		

Status and BAP information - Recorder 3.3

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Appendix C

Target Notes

2 Pages

Target note	Description
1	Artificial bat roost, constructed in 2004, with block walls and slate pitched roof. The roost is set in a small artificial clearing adjacent to a large forest ride. No access was available at time of survey.
2	Remains of reptile exclusion fencing. The fencing appears to encompass Northern United only and is currently in a poor state with many damaged panels. Optimal reptile habitat is present especially around the edges of hard standing and adjacent to bramble scrub.
3	Known lesser horseshoe roost. The roost is largely present in a building to the west of the site which is believed to have been used as offices when the colliery was operational. Egress points include the chimney and over the roller doors.
4	Northern United consists of derelict auxiliary buildings associated with former mining activities undertaken at the site and areas of hardstanding and scrub. All the buildings present are single storey with a mixture of pitched and flat roofs and are in a degraded state of repair with broken windows and doors.
5	The remains of a railway line runs south east towards the brickworks and occupies a man made linear depression adjacent to the site. This area is filled with dense scrub.
6	Offsite and adjacent to the site boundary is a bungalow, warehouse and two small compounds. These are also occupied and presently in use.
7	Area of rough grassland with large expanse of south facing slope. This area supports habitat which is optimal for reptiles (i.e. basking on south facing slope, rubble under which they can hibernated and invertebrates for foraging).
8	An operational brickworks housed in a large warehouse style building with metal frame clad in corrugated sheet asbestos and metal (both walls and roof). A large area of bare ground associated with clay extraction is present to the north. A small area of dry acid heath habitat occupies a patch of land to the west and adjacent to the clay extraction workings.
9	Large fish stocked lake which is regularly used for fishing. Banks are well vegetated with grassland, scrub and broad-leaved plantation woodland. Lily is also present within the waterbody.
10	Plantation woodland dominated by poorly growing Corsican pine. Habitat is poorly drained.
11	Area of woodland comprising an inner plantation of Norway spruce but with a dense edge habitat of semi-natural broadleaved woodland. Water filled depressions are present in places. Ground flora is limited and bramble is abundant.
12	Near the centre of the wood a clearing has been made to accommodate electricity power lines. This habitat is dominated by dense scrub comprising willow spp, blackthorn, hawthorn and bramble.
13	Plantation woodland, dominated by Corsican pine and patches of silver birch, with a large disused spoil tip present in the middle. This woodland is also bounded by semi-natural broadleaved trees.
14	Poorly drained grassland supporting a mixture of acid and neutral grassland species with an abundance of bryophytes and frequent sedge species. Hawthorn and blackthorn scrub is present in places.
15	Area of scrub clearance. This has exposed the banks of the brook and may be a flood elevation initiative.
16	Stream corridor with associated riparian corridor dominated by alder. Himalayan balsam is abundant in places.
17	Dry grassland habitat occupying a raised section of the site. Drainage channels, filled with stone, are present on the sides of the slope. This habitat is optimal for reptile species and in particular common lizard.
18	Artificially created receptor pond for newts. Some bulrush is present in places and Canadian

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- waterweed dominates the aquatic vegetation present.
- 19 Large clay extraction pit with steep sides. Banks are densely vegetated with ruderal species and scrub but aquatic vegetation is absent.
- 20 Barn like building with stone walls and pitched tiled roof. This building has the potential to support roosting bats if a roof void is present. It is presently used by a carpet merchant.
- 21 Old Engine Brook supports a riparian corridor dominated by scrub. Banks are steep and channel supports a moderately good water flow.
- 22 Building foundations and piles of stone occupy the former Bowson Colliary site. A badger sett is present in the woodland adjacent.
- 23 A series of ponds with abundant aquatic vegetation. These ponds support a known population of great crested newts and are managed by the Forestry Commission. Management includes the clearance of bulrush by mechanical excavation.
- 24 Woodland clearing supporting a further area of marshy grassland. A regularly used cycle path borders this area to the west and to the east is a well worn footpath beyond which is the Cinderford Business Park.
- 25 Peters Pond is a large pond with abundant aquatic, emergent and marginal vegetation. It too supports a known population of great crested newts.
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Appendix D

Pond HSI Scores

2 Pages

Pond	Location	Pond area	Pond drying	Water quality	Shade	Fowl	Fish	Ponds	Terrestrial habitat	Macrophytes	Score
m1	1	0.9	0.9	0.67	1	0.01	0.01	1	1	0.5	0.349424
m2	1	0.2	0.5	0.67	0.2	0.67	1	1	1	0.8	0.610417
m2a	1	0.2	0.5	0.67	0.2	0.67	1	1	1	0.8	0.610417
m3	1	0.2	0.1	0.01	0.2	0.67	1	1	1	0.3	0.309404
SM1	1	0.9	0.9	0.67	1	0.01	0.01	1	1	0.4	0.341713
SM2	1	0.8	0.9	0.67	1	0.01	0.01	1	1	0.6	0.351687
SM3	1	0.5	0.9	0.67	1	0.67	0.33	1	1	0.4	0.695975
SM4	1	0.1	0.5	0.33	1	0.67	0.67	1	1	0.5	0.571295
SM5	1	0.9	0.9	1	1	0.67	0.67	1	1	0.5	0.843258
K	1	0.4	1	0.67	1	0.67	0.33	1	1	0.3	0.66832
J	1	0.4	1	0.67	1	0.67	1	1	1	0.7	0.812701
I	1	0.4	1	0.67	1	0.67	1	1	1	0.7	0.812701
H/G	1	0.4	1	0.67	1	0.67	1	1	1	0.7	0.812701
F	1	0.4	1	0.67	1	0.67	1	1	1	0.7	0.812701
E	Pond no-longer holds water										
Peters Pond	1	0.8	0.9	1	1	0.67	0.33	1	1	0.7	0.802975

Pond	Location	Pond area	Pond drying	Water quality	Shade	Fowl	Fish	Ponds	Terrestrial habitat	Macrophytes	Score
Offsite 1	1	0.2	1	0.01	1	1	1	1	0.67	0.3	0.457533

Appendix E

Great crested newt survey results

10 Pages Results of Torch Survey

Pond	Survey event	Date	Great Crested Newt					Smooth newt			Palmate newt			Smooth / palmate female	Other	
			M	F	Juv	Efts	Total	M	F	Juv	M	F	Juv			
M1	1	13/03/2008	0	0	0	0	0	0	0	0	0	0	0	0	0	
M1	2	17/04/2008	0	0	0	0	0	0	0	0	0	0	0	0	0	
M1	3	29/04/2008	0	0	0	0	0	0	0	0	0	0	0	0	0	
M1	4	12/05/2008	0	0	0	0	0	0	0	0	0	0	0	0	0	
M1	5	02/06/2008	Not Required													
M1	6	10/06/2008	Not Required													
M2	1	13/03/2008	0	0	0	0	0	0	0	0	0	0	0	0	0	
M2	2	17/04/2008	Not Torched													
M2	3	29/04/2008	Not Torched													
M2	4	12/05/2008	Not Torched													
M2	5	02/06/2008	Not Required													
M2	6	10/06/2008	Not Required													
M3	1	13/03/2008	0	0	0	0	0	0	0	0	0	0	0	0	0	
M3	2	17/04/2008	0	0	0	0	0	0	0	0	0	0	0	0	0	

Pond	Survey event	Date	Great Crested Newt					Smooth newt			Palmate newt			Smooth / palmate female	Other	
			M	F	Juv	Efts	Total	M	F	Juv	M	F	Juv			
M3	3	29/04/2008	0	0	0	0	0	0	0	0	0	0	0	0		
M3	4	12/05/2008	0	0	0	0	0	0	0	0	0	0	0	0		
M3	5	02/06/2008	Not Required													
M3	6	10/06/2008	Not Required													
SM2	1	13/03/2008	0	0	0	0	0	0	0	0	0	0	0	0		
SM2	2	17/04/2008	0	0	0	0	0	0	0	0	0	0	0	0	Fish	
SM2	3	29/04/2008	0	0	0	0	0	0	0	0	0	0	0	0		
SM2	4	12/05/2008	0	0	0	0	0	0	0	0	0	0	0	0	Fish	
SM2	5	02/06/2008	Not Required													
SM2	6	10/06/2008	Not Required													
SM3	1	13/03/2008	0	0	0	0	0	0	0	0	0	0	0	0		
SM3	2	17/04/2008	0	0	0	0	0	0	0	0	0	0	0	0	Fish	
SM3	3	29/04/2008	0	0	0	0	0	0	0	0	0	0	0	0		
SM3	4	12/05/2008	0	0	0	0	0	0	0	0	0	0	0	0		
SM3	5	02/06/2008	Not Torched													
SM3	6	10/06/2008	Not Torched													
SM5	1	13/03/2008	0	0	0	0	0	0	0	0	0	0	0	0		
SM5	2	17/04/2008	0	0	0	0	0	0	0	0	0	0	0	0	Fish	
SM5	3	29/04/2008	0	0	0	0	0	0	0	0	0	0	0	0		

Pond	Survey event	Date	Great Crested Newt					Smooth newt			Palmate newt			Smooth / palmate female	Other
			M	F	Juv	Efts	Total	M	F	Juv	M	F	Juv		
SM5	4	12/05/2008	0	0	0	0	0	0	0	0	0	0	0	0	0
SM5	5	02/06/2008	Not Required												
SM5	6	10/06/2008	Not Required												
F	1	13/03/2008	1	2	0	0	3	12	0	0	4	0	0	0	0
F	2	17/04/2008	0	0	0	0	0	10	0	0	5	0	0	0	0
F	3	29/04/2008	24	16	0	0	40	24	0	0	30	0	0	40	0
F	4	12/05/2008	14	1	0	0	15	14	0	0	12	0	0	18	0
F	5	02/06/2008	2	0	0	0	2	4	0	0	1	0	0	8	0
F	6	10/06/2008	1	2	0	0	3	0	0	0	17	8	0	0	0
H/G	1	13/03/2008	2	2	0	0	4	8	0	0	8	0	0	0	0
H/G	2	17/04/2008	0	0	0	0	0	11	0	0	0	0	0	0	0
H/G	3	29/04/2008	1	0	0	0	1	12	0	0	10	0	0	12	0
H/G	4	12/05/2008	0	0	0	0	0	8	0	0	8	0	0	8	0
H/G	5	02/06/2008	1	0	0	0	1	1	0	0	2	0	0	4	0
H/G	6	10/06/2008	3	0	0	0	3	0	0	0	4	2	0	0	0
I	1	13/03/2008	1	1	0	0	2	17	0	0	0	0	0	0	0
I	2	17/04/2008	0	0	0	0	0	0	0	0	8	0	0	0	0
I	3	29/04/2008	12	11	0	0	23	10	0	0	14	0	0	20	0
I	4	12/05/2008	0	1	0	0	1	0	0	0	0	0	0	0	0

Pond	Survey event	Date	Great Crested Newt					Smooth newt			Palmate newt			Smooth / palmate female	Other
			M	F	Juv	Efts	Total	M	F	Juv	M	F	Juv		
I	5	02/06/2008	3	4	0	0	7	2	0	0	1	0	0	2	
I	6	10/06/2008	1	2	0	0	3	0	0	0	7	2	0	0	
J	1	13/03/2008	0	0	0	0	0	0	0	0	0	0	0	0	Fish
J	2	17/04/2008	0	0	0	0	0	0	0	0	0	0	0	0	Fish
J	3	29/04/2008	Not Torched												
J	4	12/05/2008	Not Torched												
J	5	02/06/2008	Not Torched												
J	6	10/06/2008	Not Torched												
K	1	13/03/2008	0	0	0	0	0	0	0	0	0	0	0	0	Fish
K	2	17/04/2008	0	0	0	0	0	0	0	0	1	0	0	0	Fish
K	3	29/04/2008	Not Torched												
K	4	12/05/2008	Not Torched												
K	5	02/06/2008	Not Torched												
K	6	10/06/2008	Not Torched												
Peters Pond	Torching not used														

Results of Bottle Trapping

Pond	Survey Event	Date	Night time air temp	Turbi dity	Veg Cover	Great Crested Newt					Smooth newt			Palmate newt			Efts-Smooth or Palmate	Other	
						M	F	Juv	Efts	Total	M	F	Juv	M	F	Juv			
M1	1	13/03/2008	5	3	4	Traps Stolen													
M1	2	17/04/2008	5	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	
M1	3	29/04/2008	7	2	2	0	0	0	0	0	0	0	0	0	1	0	0	0	
M1	4	12/05/2008	10	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
M1	5	02/06/2008	Not Required																
M1	6	10/06/2008	Not Required																
M2	1	13/03/2008	5	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	
M2	2	17/04/2008	5	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	
M2	3	29/04/2008	7	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	
M2	4	12/05/2008	10	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	
M2	5	02/06/2008	Not Required																

Pond	Survey Event	Date	Night time air temp	Turbidity	Veg Cover	Great Crested Newt					Smooth newt			Palmate newt			Efts-Smooth or Palmate	Other
						M	F	Juv	Efts	Total	M	F	Juv	M	F	Juv		
M2	6	10/06/2008	Not Required															
M3	1	13/03/2008	5	2	2	0	0	0	0	0	0	0	0	1	0	0	0	
M3	2	17/04/2008	5	2	2	0	0	0	0	0	0	0	0	0	0	0	0	
M3	3	29/04/2008	7	1	1	0	0	0	0	0	0	0	0	0	1	0	0	
M3	4	12/05/2008	10	1	3	0	0	0	0	0	3	0	0	0	0	0	0	
M3	5	02/06/2008	Not Required															
M3	6	10/06/2008	Not Required															
SM2	1	13/03/2008	5	2	3	0	0	0	0	0	0	0	0	0	0	0	0	
SM2	2	17/04/2008	5	2	3	0	0	0	0	0	0	0	0	0	0	0		
SM2	3	29/04/2008	7	2	2	0	0	0	0	0	0	0	0	0	0	0		
SM2	4	12/05/2008	10	1	2	0	0	0	0	0	0	0	0	0	0	0	0	Fish
SM2	5	02/06/2008	Not Required															

Pond	Survey Event	Date	Night time air temp	Turbidity	Veg Cover	Great Crested Newt					Smooth newt			Palmate newt			Efts-Smooth or Palmate	Other
						M	F	Juv	Efts	Total	M	F	Juv	M	F	Juv		
SM2	6	10/06/2008	Not Required															
SM3	1	13/03/2008	5	5	2	0	0	0	0	0	0	0	0	0	0	0	0	
SM3	2	17/04/2008	5	5	2	0	0	0	0	0	0	0	0	0	0	0	0	
SM3	3	29/04/2008	7	5	1	0	0	0	0	0	0	0	1 ²⁰	0	0	0	0	
SM3	4	12/05/2008	10	3	2	0	0	0	0	0	2	0	0	0	0	0	0	Fish & Tadpoles
SM3	5	02/06/2008	11	4	2	0	0	0	0	0	0	0	0	0	0	0	0	
SM3	6	10/06/2008	12	4	2	0	0	0	0	0	0	0	0	0	0	0	0	Fish
SM5	1	13/03/2008	5	2	2	0	0	0	0	0	0	0	0	0	0	0	0	
SM5	2	17/04/2008	5	2	2	0	0	0	0	0	0	0	0	0	0	0	0	
SM5	3	29/04/2008	7	2	2	0	0	0	0	0	0	0	0	0	0	0	0	
SM5	4	12/05/2008	10	1	3	0	0	0	0	0	0	0	0	0	0	0	0	
SM5	5	02/06/2008	Not Required															

²⁰ Newt was dead when traps checked

Pond	Survey Event	Date	Night time air temp	Turbidity	Veg Cover	Great Crested Newt					Smooth newt			Palmate newt			Efts-Smooth or Palmate	Other
						M	F	Juv	Efts	Total	M	F	Juv	M	F	Juv		
SM5	6	10/06/2008	Not Required															
F	1	13/03/2008	5	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0
F	2	17/04/2008	5	2	4	1	2	0	0	3	0	0	0	0	3	0	0	0
F	3	29/04/2008	7	1	3	13	14	0	0	27	3	2	0	4	2	0	0	0
F	4	12/05/2008	10	1	2	Not Trapped												
F	5	02/06/2008	11	3	2	Not Trapped												
F	6	10/06/2008	12	3	2	Not Trapped												
H/G	1	13/03/2008	5	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0
H/G	2	17/04/2008	5	1	2	0	0	0	0	0	0	0	0	0	2	0	0	0
H/G	3	29/04/2008	7	2	2	0	2	0	0	2	1	1	0	0	0	0	0	0
H/G	4	12/05/2008	10	2	3	1	5	0	0	6	4	15	0	2	1	0	0	0
H/G	5	02/06/2008	11	3	2	0	0	0	0	0	6	2	0	3	3	0	3	3
H/G	6	10/06/2008	12	3	2	2	0	0	0	2	4	0	0	0	0	0	0	8
I	1	13/03/2008	5	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0

Pond	Survey Event	Date	Night time air temp	Turbidity	Veg Cover	Great Crested Newt					Smooth newt			Palmate newt			Efts-Smooth or Palmate	Other
						M	F	Juv	Efts	Total	M	F	Juv	M	F	Juv		
I	2	17/04/2008	5	0	1	0	0	0	0	0	2	1	0	2	0	0	0	
I	3	29/04/2008	7	2	2	1	1	0	0	2	1	2	0	1	1	0	0	
I	4	12/05/2008	10	1	3	0	2	0	0	2	5	0	0	8	4	0	0	
I	5	02/06/2008	11	3	3	2	1	0	0	3	10	2	0	13	0	0	4	
I	6	10/06/2008	12	3	3	3	0	0	3	6	0	0	0	0	1	0	0	
J	1	13/03/2008	5	3	3	0	0	0	0	0	0	0	0	0	0	0	0	
J	2	17/04/2008	5	3	3	0	0	0	0	0	0	0	0	0	0	0	0	Fish
J	3	29/04/2008	7	4	2	0	0	0	0	0	0	1	0	1	0	0	0	
J	4	12/05/2008	10	4	3	0	0	0	0	0	6	3	0	3	3	0	0	Fish
J	5	02/06/2008	11	4	2	0	0	0	0	0	3	2	0	6	1	0	2	
J	6	10/06/2008	12	4	2	3	0	0	0	3	0	0	0	0	1	0	0	Fish
K	1	13/03/2008	5	4	3	0	0	0	0	0	0	0	0	0	0	0	0	Fish
K	2	17/04/2008	5	4	3	0	0	0	0	0	0	0	0	0	0	0	0	Fish
K	3	29/04/2008	7	4	2	0	0	0	0	0	0	0	0	0	0	0	20	Fish
K	4	12/05/2008	10	4	2	1	0	0	0	1	1	0	0	0	0	0	0	Fish
K	5	02/06/2008	11	4	2	0	0	0	0	0	1	0	0	0	0	0	0	

Pond	Survey Event	Date	Night time air temp	Turbidity	Veg Cover	Great Crested Newt					Smooth newt			Palmate newt			Efts-Smooth or Palmate	Other	
						M	F	Juv	Efts	Total	M	F	Juv	M	F	Juv			
K	6	10/06/2008	12	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	Fish
Peters Pond	1	13/03/2008	5	3	4	0	2	0	0	2	0	0	0	0	0	0	0	0	
Peters Pond	2	17/04/2008	5	3	4	0	0	0	0	0	0	0	0	10	3	0	0	0	
Peters Pond	3	29/04/2008	7	2	4	3	0	0	0	3	7	6	0	0	0	0	0	0	
Peters Pond	4	12/05/2008	10	1	4	2	13	0	0	15	14	5	0	13	5	0	0	0	
Peters Pond	5	02/06/2008	11	2	5	0	0	0	0	0	2	2	0	2	2	0	2	0	
Peters Pond	6	10/06/2008	12	2	5	4	1	0	2	7	2	0	0	0	0	0	0	0	

Appendix F

Reptile survey results

10 Pages

Location	Event	Date	Time	Temp	Weather	Slow worm			Common Lizard		Grass Snake	Adder		Notes
						M	F	J	Adult	J		M	F	
Bowsons Colliery	1	17/08/2007	AM	18	Sunny in patches	2	0	0	1	0	0	0	0	
Bowsons Colliery	2	31/08/2007	AM	18	Overcast	0	3	0	1	0	0	0	0	1 great crested newt
Bowsons Colliery	3	14/09/2007	AM	16	Sunny patches	2	2	0	3	0	1	0	0	
Bowsons Colliery	4	25/09/2007	AM	14	Sunny patches	0	0	8	1	0	0	0	0	1 Great crested newt
Bowsons Colliery	5	15/10/2007	AM	15	Sunny	0	0	8	0	0	0	0	0	1 Great crested newt
Bowsons Colliery	6	18/04/2008	AM	13	Sunny	0	0	8	0	0	0	0	0	
Bowsons Colliery	7	12/05/2008	PM					8	1					Toad, 1 Great crested newt
Bowsons Colliery	8	11/06/2008	AM	17	Overcast	1	3	0	0	0	1	0	0	
Bowsons	9	03/09/2008	PM	12	Mixed (Sun and	1	1	2	2	0	0	0	0	

Location	Event	Date	Time	Temp	Weather	Slow worm			Common Lizard		Grass Snake	Adder		Notes
						M	F	J	Adult	J		M	F	
Colliery					Showers)									
Bowsons Colliery	10	17/09/2008	PM	16.5	Hazy sunshine, still	3	4	3	1	3	0	1	0	2 Great crested newt (juv)
Bowsons Colliery	11	18/09/2008	AM	15	Sunny with breeze	0	2	0	0	3	0	0	0	2 Great crested newt (juv)
Bowsons Colliery	12	19/09/2008	PM	18	Sunny	2	0	0	0	0	0	0	0	1 Great crested newt (juv)
Bowsons Colliery	13	22/09/2008	PM	16.5	Overcast	0	1	5	3	2	0	0	0	
Bowsons Colliery	14	23/09/2008	AM	12	Overcast	0	0	0	0	1	0	0	0	
Bowsons Colliery	15	25/09/2008	PM	16	Patchy cloud with sunny breaks	0	1	8	1	4	0	0	0	1 Great crested newt (juv)
Bowsons Colliery	16	26/09/2008	PM	18	Sunny	1	1	0	1	2	0	0	0	2 Great crested newt (juv)
Bowsons Colliery	17	30/09/2008	PM	14	Patchy cloud	0	0	1	0	2	0	0	0	1 Great crested newt (juv)
Bowsons Colliery	18	08/10/2008	PM	15	Sunny with some cloud	0	0	3	0	3	0	0	0	1 Great crested newt
Brickworks	1	17/08/2007	AM	18	Sunny in	5	6	0		0	1	0	0	

Location	Event	Date	Time	Temp	Weather	Slow worm			Common Lizard		Grass Snake	Adder		Notes
						M	F	J	Adult	J		M	F	
					patches									
Brickworks	2	31/08/2007	AM	18	Overcast	6	7	9	4	0	1	0	0	
Brickworks	3	14/09/2007	AM	16	Sunny patches	4	6	3	3	0	0	0	0	
Brickworks	4	25/09/2007	AM	14	Sunny patches	0	2	3	0	0	0	0	0	
Brickworks	5	15/10/2007	AM	15	Sunny	3	2	13	0	0	0	0	0	
Brickworks	6	18/04/2008	AM	13	Sunny	5	2	0	2	0	0	1	1	
Brickworks	7	12/05/2008	PM						5					
Brickworks	8	11/06/2008	AM	17	Overcast	5	6	3	2	0	1	0	0	
Brickworks	9	03/09/2008	PM	12	Mixed (Sun and Showers)	1	1	5	1	2	1	0	0	
Brickworks	10	17/09/2008	PM	16.5	Hazy sunshine, still	2	4	9	0	0	1	0	0	
Brickworks	11	18/09/2008	AM	15	Sunny with breeze	1	3	3	2	2	1	0	0	
Brickworks	12	19/09/2008	PM	18	Sunny	3	0	10	0	3	1	0	0	
Brickworks	13	22/09/2008	PM	16.5	Overcast	3	3	2	0	0	1	0	0	
Brickworks	14	23/09/2008	AM	12	Overcast	0	1	0	0	0	1	0	0	
Brickworks	15	25/09/2008	PM	16	Patchy cloud with sunny breaks	1	4	5	1	2	1	0	0	
Brickworks	16	26/09/2008	PM	18	Sunny	0	2	5	0	1	1	1	0	The adder was juvenile

Location	Event	Date	Time	Temp	Weather	Slow worm			Common Lizard		Grass Snake	Adder		Notes
						M	F	J	Adult	J		M	F	
Brickworks	17	30/09/2008	PM	14	Patchy cloud	0	2	2	0	1	0	0	0	(20cm)
Brickworks	18	08/10/2008	PM	15	Sunny with some cloud	0	0	2	1	0	2	1	0	The adder was juvenile (20cm)
Dam Green	1	17/08/2007	AM	18	Sunny in patches	0	0	0	0	0	0	0	0	
Dam Green	2	31/08/2007	AM	18	Overcast	0	0	0	2	0	0	0	0	
Dam Green	3	14/09/2007	AM	16	Sunny patches	0	0	0	3	0	1	0	0	
Dam Green	4	25/09/2007	AM	14	Sunny patches	0	0	0	7	0	2	0	0	
Dam Green	5	15/10/2007	AM	15	Sunny	0	0	0	0	0	0	0	0	
Dam Green	6	18/04/2008	AM	13	Sunny	0	0	0	0	0	0	0	0	1 Palmate newt
Dam Green	7	12/05/2008	PM										1	
Dam Green	8	11/06/2008	AM	17	Overcast	0	0	0	1	0	0	0	0	
Dam Green	9	03/09/2008	AM	12	Mixed (Sun and Showers)	0	0	0	2	2	0	0	0	
Dam Green	10	17/09/2008	PM	16.5	Hazy sunshine, still	0	0	0	0	0	0	1	0	
Dam Green	11	18/09/2008	AM	15	Sunny with breeze	0	0	0	0	1	0	0	0	

Location	Event	Date	Time	Temp	Weather	Slow worm			Common Lizard		Grass Snake	Adder		Notes
						M	F	J	Adult	J		M	F	
Dam Green	12	19/09/2008	PM	18	Sunny	0	0	0	2	0	0	0	0	
Dam Green	13	22/09/2008	PM	16.5	Overcast	0	0	0	1	3	0	0	0	
Dam Green	14	23/09/2008	AM	12	Overcast	0	0	0	0	0	0	0	0	
Dam Green	15	25/09/2008	PM	16	Patchy cloud with sunny breaks	0	0	0	0	3	1	0	0	
Dam Green	16	26/09/2008	PM	18	Sunny	0	0	0	0	0	0	0	0	
Dam Green	17	30/09/2008	PM	14	Patchy cloud	0	0	0	0	2	0	0	0	
Dam Green	18	08/10/2008	PM	15	Sunny with some cloud	0	0	0	0	2	0	0	0	
Northern United	1	17/08/2007	AM	18	Sunny in patches	7	7	0	3	0	0	0	0	
Northern United	2	31/08/2007	AM	18	Overcast	5	8	6	2	0	1	0	0	
Northern United	3	14/09/2007	AM	16	Sunny patches	4	5	6	0	0	0	0	0	
Northern United	4	25/09/2007	AM	14	Sunny patches	1	3	0	5	0	0	0	0	
Northern United	5	15/10/2007	AM	15	Sunny	0	3	1	0	0	1	0	0	
Northern United	6	18/04/2008	AM	13	Sunny	7	8	3	1	0	0	0	0	
Northern United	7	12/05/2008	PM			3	1		5			1		

Location	Event	Date	Time	Temp	Weather	Slow worm			Common Lizard		Grass Snake	Adder		Notes
						M	F	J	Adult	J		M	F	
Northern United	8	11/06/2008	AM	17	Overcast	11	9	6	4	0	0	0	0	
Northern United	9	03/09/2008	AM	12	Mixed (Sun and Showers)	2	5	4	0	0	0	0	0	
Northern United	10	17/09/2008	PM	16.5	Hazy sunshine, still	2	7	2	0	0	0	0	0	
Northern United	11	18/09/2008	AM	15	Sunny with breeze	4	10	1	1	1	0	0	0	
Northern United	12	19/09/2008	PM	18	Sunny	5	8	7	0	0	0	0	0	
Northern United	13	22/09/2008	PM	16.5	Overcast	3	5	5	0	1	0	0	0	Common Toad
Northern United	14	23/09/2008	AM	12	Overcast	2	6	7	0	0	0	0	0	Common Toad
Northern United	15	25/09/2008	PM	16	Patchy cloud with sunny breaks	3	6	5	0	1	0	0	0	Common Toad
Northern United	16	26/09/2008	PM	18	Sunny	1	2	4	0	0	0	0	0	Common Toad
Northern United	17	30/09/2008	PM	14	Patchy cloud	1	5	4	1	0	0	0	0	
Northern United	18	08/10/2008	PM	15	Sunny with some cloud	0	4	1	0	1	0	0	0	
Steam Mills	1	17/08/2007	AM	18	Sunny in patches	0	0	0	0	0	0	0	0	

Location	Event	Date	Time	Temp	Weather	Slow worm			Common Lizard		Grass Snake	Adder		Notes
						M	F	J	Adult	J		M	F	
Steam Mills	2	31/08/2007	AM	18	Overcast	0	1	0	2	0	0	0	0	
Steam Mills	3	14/09/2007	AM	16	Sunny patches	1	0	1	0	0	0	0	0	
Steam Mills	4	25/09/2007	AM	14	Sunny patches	0	0	0	8	0	0	0	0	
Steam Mills	5	15/10/2007	AM	15	Sunny	0	0	0	0	0	0	1	0	
Steam Mills	6	18/04/2008	AM	13	Sunny	1	1	0	2	0	1	0	0	
Steam Mills	7	12/05/2008	PM											
Steam Mills	8	11/06/2008	AM	17	Overcast	0	0	1	0	0	0	0	0	
Steam Mills	9	03/09/2008	AM	12	Mixed (Sun and Showers)	0	1	0	0	0	0	0	0	
Steam Mills	10	17/09/2008	PM	16.5	Hazy sunshine, still	0	0	2	2	2	0	0	0	
Steam Mills	11	18/09/2008	AM	15	Sunny with breeze	0	1	0	0	1	0	0	0	
Steam Mills	12	19/09/2008	PM	18	Sunny	1	1	2	0	4	0	0	0	
Steam Mills	13	22/09/2008	PM	16.5	Overcast	1	0	0	0	3	0	0	0	
Steam Mills	14	23/09/2008	AM	12	Overcast	0	0	0	0	2	0	0	0	
Steam Mills	15	25/09/2008	PM	16	Patchy cloud with sunny breaks	0	0	0	2	1	0	0	0	
Steam Mills	16	26/09/2008	PM	18	Sunny	0	0	1	1	0	0	0	0	
Steam Mills	17	30/09/2008	PM	14	Patchy cloud	0	0	1	0	1	0	0	0	

Location	Event	Date	Time	Temp	Weather	Slow worm			Common Lizard		Grass Snake	Adder		Notes
						M	F	J	Adult	J		M	F	
Steam Mills	18	08/10/2008	PM	15	Sunny with some cloud	0	0	0	0	1	0	0	0	
Stone Mound	1	17/08/2007	AM	18	Sunny in patches	0	0	0	0	0	0	0	0	
Stone Mound	2	31/08/2007	AM	18	Overcast	0	0	0	8	0	0	0	0	
Stone Mound	3	14/09/2007	AM	16	Sunny patches	0	0	0	5	0	0	0	0	
Stone Mound	4	25/09/2007	AM	14	Sunny patches	0	0	0	14	0	0	0	0	
Stone Mound	5	15/10/2007	AM	15	Sunny	0	0	0	7	0	1	0	0	
Stone Mound	6	18/04/2008	AM	13	Sunny	0	0	0	3	0	0	0	0	
Stone Mound	7	12/05/2008	PM				2	3						
Stone Mound	8	11/06/2008	AM	17	Overcast	0	0	0	3	0	0	0	0	
Stone Mound	9	03/09/2008	AM	12	Mixed (Sun and Showers)	0	0	0	5	3	0	0	0	
Stone Mound	10	17/09/2008	PM	16.5	Hazy sunshine, still	0	0	0	6	5	1	0	0	
Stone Mound	11	18/09/2008	AM	15	Sunny with breeze	0	0	0	5	0	0	0	0	

Location	Event	Date	Time	Temp	Weather	Slow worm			Common Lizard		Grass Snake	Adder		Notes
						M	F	J	Adult	J		M	F	
Stone Mound	12	19/09/2008	PM	18	Sunny	1	0	0	4	9	1	0	0	
Stone Mound	13	22/09/2008	PM	16.5	Overcast	0	0	1	0	3	0	0	0	
Stone Mound	14	23/09/2008	AM	12	Overcast	0	0	0	1	1	0	0	0	
Stone Mound	15	25/09/2008	PM	16	Patchy cloud with sunny breaks	0	0	0	3	5	0	0	0	
Stone Mound	16	26/09/2008	PM	18	Sunny	0	0	0	7	6	0	0	0	
Stone Mound	17	30/09/2008	PM	14	Patchy cloud	0	0	0	0	0	0	0	0	
Stone Mound	18	08/10/2008	PM	15	Sunny with some cloud	1	0	0	4	11	0	0	0	

Appendix G

Breeding and crepuscular bird report

14 Pages

Cinderford: Breeding Bird Survey Report

1. Introduction

1.1 Purpose of this Technical Note

There is a proposal to develop an area of land north of the town of Cinderford, Gloucestershire, for mixed use. This technical note summarises the findings of a nightjar survey, and generic breeding bird surveys, undertaken at the site in 2008. It has been produced to inform the evaluation of effects contained within an ecological baseline report, which in turn may be used to inform an Environmental Impact Assessment for the site.

1.2 Site description and context

The site covers approximately 40 hectares and is located to the north of Cinderford, Gloucestershire, central grid reference SO 643 153. The site boundary is plotted on **Figure 1**. It comprises a varied patchwork of habitats including buildings, hard standing, coniferous, broad-leaved and mixed plantation woodland, semi-improved neutral and marshy grassland, dense and scattered scrub, scattered trees, open standing water, running water and ditches. The majority of the eastern side of the site comprises open habitats such as grassland with scattered trees. The north and west areas of the site are dominated by hard standing and buildings, connected by paved and unpaved vehicle tracks open to public access. The northwest spur area comprises mainly industrial units, which are largely disused other than a large active waste management centre. A further developed area, which is occupied by an active brickworks, is located on the western side of the site. The plantation woodlands are located in the southern spur of the site, with a further area along the northern boundary of the site. The eastern area of the centre of the site features a large angling lake with two smaller ponds to the southeast of this. A stream runs from the northeast spur of the site down to the main lake. From here water flows through a sluice to the smaller ponds and then off site to the east.

The site is bordered to the north, west and southwest by large expanses of plantation woodland that comprise part of the Forest of Dean. To the east and southeast the site adjoins residential and industrial development on the outskirts of Cinderford.

The site is open to public access with the vehicle tracks being regularly used by dog walkers' and anglers' vehicles. The combined disturbance resulting from recreational and commercial use appears high.

2. Methodology

2.1 Generic breeding bird survey

A generic breeding bird survey was carried out following a method based on the British Trust for Ornithology's Common Bird Census (CBC) methodology (Gilbert et al., 1998). The survey area comprised the entire site and immediately adjacent habitats which could be surveyed from

within the site boundary¹. Surveys commenced at dawn and lasted approximately 3 hours. On each visit the site was walked for at least 3 hours at a slow pace to enable all birds detected to be identified and located. All areas of suitable breeding habitat were approached. Weather conditions were good during all three visits (winds less than force 3 and no precipitation). The three visits were carried out on the 10th April, 20th May and 17th June 2008.

During the survey the location and activity of each bird detected (visually and/or aurally) was recorded. Birds were considered to be demonstrating breeding behaviour if they were singing, displaying, alarm calling, carrying food, undertaking distraction displays or if eggs or chicks were found. All birds engaged in other forms of behaviour were considered to be feeding, loafing or passing through. They were not, therefore, considered to be breeding in the location of observation. Bird locations were mapped using standard two-letter BTO Codes, and bird activity was recorded using BTO behaviour codes.

The maps from all three visits were analysed and combined to produce the final territory location map which was used to estimate the breeding densities of each species. As territory locations are derived from a combination of each visit map (as per the CBC methodology), it should be noted that these do not represent specific nest locations (this is not the aim of this survey method which was designed to estimate population sizes).

2.2 Nightjar survey

A survey for nightjar was undertaken as some suitable habitat is present on site and in area immediately adjacent to it to the west. Furthermore this species has been recorded on the Haywood Plantation to the east of the site, on the opposite side of the A4151 road (two males were recorded holding territory in this plantation in 2006). The Forest of Dean as a whole is one of the areas within Gloucestershire where this species breeds regularly (Gloucestershire Ornithological Coordinating Committee [GOCC], 2007a and 2007b).

In addition to the dawn visits, two evening visits were conducted to determine whether nightjar were present on site. Two surveyors were present on both survey visits. Methodology followed the guidelines for nightjar surveys set out in Gilbert *et al.* (1998), which recommend two visits between June and mid-July. The visits were carried out on the 16th June and 16th July 2008. The weather conditions on both evenings were optimal for nightjar surveys, with little or no wind (force 1-2) and no precipitation. The surveys were started at sunset and continued for 2 hours.

All areas of suitable habitat on site were approached to within 100m. The areas of habitat with moderate and low potential targeted by the survey are plotted on **Figure 2**. The surveyors walked at a slow pace with frequent pauses in order to maximise the chances of hearing ‘churring²,’ wing clapping or calling birds. Any birds heard or seen were recorded. Other species noted during the surveys were also recorded.

¹ This may result in a bias towards more vocal species off site such as song thrush, which were more likely to be recorded up to 200m from the site boundary, than smaller less vocal species. This is not thought to have a detrimental effect on the results, as the recording of species off site was not essential for this survey.

² The territorial song of a male nightjar consists of a monotonous ‘churr,’ vaguely reminiscent of a cricket or cicada, which can carry for several hundred metres in calm conditions. Various other vocalisations, including a distinctive and far carrying di-syllabic flight call are also regularly made. Wing clapping,

3. Results

3.1 Generic breeding bird survey

The numbers of pairs of each breeding species recorded on the site and in the survey area as a whole is presented in Table 3.1 below. Table 3.2 lists the conservation status of the species recorded in the survey area of Amber status or above. Indicative territory locations are shown on **Figure 1**.

Table 3.1 Numbers of Breeding Birds Recorded on Site (in Voous order).

English Name	Scientific Name	Pairs on site	Pairs in Survey Area but off site
Mandarin duck	<i>Aix galericulata</i>	1	0
Mallard	<i>Anas platyrhynchos</i>	1	0
Buzzard	<i>Buteo buteo</i>	0	1
Moorhen	<i>Gallinula chloropus</i>	2	1
Coot	<i>Fulica atra</i>	1	0
Wood pigeon	<i>Columba palumbus</i>	9	8
Stock dove	<i>Columba oenas</i>	0	1
Collared dove	<i>Streptopelia decaocto</i>	2	1
Green woodpecker	<i>Picus viridis</i>	1	4
Great spotted woodpecker	<i>Dendrocopos major</i>	1	1
Swallow	<i>Hirundo rustica</i>	3	1
House martin	<i>Delichon urbicum</i>	1	0
Tree pipit	<i>Anthus trivialis</i>	4	0
Grey wagtail	<i>Motacilla cinerea</i>	2	0
Pied wagtail	<i>Motacilla alba</i>	1	1
Wren	<i>Troglodytes troglodytes</i>	24	20
Duncock	<i>Prunella modularis</i>	7	8
Robin	<i>Erithacus rubecula</i>	21	13
Redstart	<i>Phoenicurus phoenicurus</i>	1	0
Blackbird	<i>Turdus merula</i>	10	12
Song thrush	<i>Turdus philomelos</i>	7	6
Mistle thrush	<i>Turdus viscivorus</i>	0	1

which may have both a territorial and display function, is also undertaken, but is audible over shorter distances (the bird is often visible when wing clapping).

English Name	Scientific Name	Pairs on site	Pairs in Survey Area but off site
Blackcap	<i>Sylvia atricapilla</i>	9	7
Garden warbler	<i>Sylvia borin</i>	3	2
Whitethroat	<i>Sylvia communis</i>	1	0
Chiffchaff	<i>Phylloscopus collybita</i>	14	6
Willow warbler	<i>Phylloscopus trochilus</i>	20	2
Goldcrest	<i>Regulus regulus</i>	12	9
Long-tailed tit	<i>Aegithalos caudatus</i>	4	3
Blue tit	<i>Cyanistes caeruleus</i>	5	4
Great tit	<i>Parus major</i>	7	3
Coal tit	<i>Parus ater</i>	3	6
Nuthatch	<i>Sitta europaea</i>	0	2
Jay	<i>Garrulus glandarius</i>	0	2
Jackdaw	<i>Corvus monedula</i>	0	1
Carrion crow	<i>Corvus corone</i>	1	1
House sparrow	<i>Passer domesticus</i>	0	1
Chaffinch	<i>Fringilla coelebs</i>	6	1
Greenfinch	<i>Carduelis chloris</i>	4	3
Goldfinch	<i>Carduelis carduelis</i>	2	4
Linnet	<i>Carduelis cannabina</i>	1	0
Bullfinch	<i>Pyrrhula pyrrhula</i>	2	0
Reed bunting	<i>Emberiza schoeniclus</i>	1	0

The commonest species on site were ubiquitous species with wide ranging habitat preferences such as wren and robin. The mosaic of woodland and scrub on site resulted in species favouring these habitats, including willow and garden warblers also being well represented, while some species more characteristic of the Forest of Dean than much of Gloucestershire including Mandarin duck, redstart, tree pipit and grey wagtail also occurred. Urban and mature woodland habitats beyond the site boundary resulted in species such as nuthatch and jay and house sparrow and greenfinch respectively being recorded. Areas of coniferous plantation on and adjacent to site had a predictable bird community featuring relatively large numbers of goldcrest and coal tit.

In addition to those species for which there was sufficient evidence of breeding, 5 species; cuckoo (*Cuculus canorus*), siskin (*Carduelis spinus*), treecreeper (*Certhia familiaris*), woodcock (*Scolopax rusticola*) and sparrowhawk (*Accipiter nisus*); were recorded in suitable breeding habitat and are likely to have bred within or in close proximity to the survey area, though the location of the territory could not be accurately defined. Species using the site or

overflying it which were not breeding on site were raven (*Corvus corax*), great crested grebe (*Podiceps cristatus*), greylag goose (*Anser anser*), heron (*Ardea cinerea*), Canada goose (*Branta canadensis*), snipe (*Gallinago gallinago*) and crossbill (*Loxia curvirostra*).

The groups of crossbill recorded are likely to consist of a post-breeding flock containing adults and juveniles. These species breeds fairly early in the year, starting in January or February and can be fledged by late March or mid-April (Harrison & Castell, 2002). This species roams widely depending on food availability (Brown & Grice, 2005).

Table 3.2 Conservation Status of Birds Recorded within the Survey Area

Species	Schedule 1 of Wildlife and Countryside Act	Annex 1 of EC Birds Directive	BoCC Rating ³	UK BAP Priority Species ⁴	Local BAP Priority Species
Bullfinch			Red	√	√
Crossbill	√		Green		
Cuckoo			Amber	√	
Duncock			Amber	√	
Goldcrest			Amber		
Grey wagtail			Amber		
House martin			Amber		
House sparrow			Red	√	
Linnet			Red	√	√
Mistle thrush			Amber		

³ The background to the establishment of a ‘traffic light system’ of conservation concern for UK birds is discussed in Gregory *et al* (2002). ‘Red-listed’ species include those that are globally threatened, have suffered an historical population decline (between 1800 and 1995) or which have experienced rapid declines in their UK breeding population or contractions in their UK range of more than 50% over the past twenty-five years. Amber listed species have suffered moderate (25-49%) declines in their UK breeding population or range over the past 25 years, have an unfavourable conservation status in Europe (and are therefore of European concern), breed in very low numbers (five year mean of 1-300 pairs), breed at 10 or fewer UK sites, or occur in relatively high numbers in the UK (exceeding 20% of the European breeding, migratory or non-breeding populations). Other species have ‘green’ status, as they do not fulfil these criteria. This implies that the population of a species is either stable or increasing or that too little is known about the population to allow the species to be included on the red or amber list

⁴ The new Priority Species list was published in 2007. It contains 1149 species that have been listed as priorities for conservation action under the UK Biodiversity Action Plan (UK BAP). General principles underlying the criteria used to select species and habitats were: international importance, high perceived risk or rapid decline in population size, distribution or extent, and habitats that were important for key species. The UK BAP list of priority species and habitats is therefore an important reference source and will be the focus for conservation action across the UK over the next decade. It has been used to draw up the species and habitats of principal importance in England under S41 of the NERC Act 2006. It replaces the list published by Defra in 2002 under Section 74 of the Countryside and Rights of Way (CRoW) Act 2000. The NERC Act covers all species of the UK BAP list which occur in England, with the addition of hen harrier (*Circus cyaneus*).

Species	Schedule 1 of Wildlife and Countryside Act	Annex 1 of EC Birds Directive	BoCC Rating ³	UK BAP Priority Species ⁴	Local BAP Priority Species
Nightjar		√	Red	√	√
Redstart			Amber		
Reed bunting			Red	√	√
Snipe			Amber		
Song thrush			Red	√	√
Swallow			Amber		
Tree pipit			Amber	√	
Willow warbler			Amber		
Woodcock			Amber		

A total of six Red-listed species, all of which are also UK BAP Priority Species, held territory within the survey area, (bullfinch, house sparrow, linnets, nightjar, reed bunting and song thrush). These species are also listed under Section 41 of the Natural Environment and Rural Communities Act 2006, and one of these (nightjar) is also an Annex I of the Birds Directive species⁵. All of these Red-listed species, aside from nightjar, are thought to be breeding within the survey area, although house sparrow was only recorded on the outskirts of Cinderford and is unlikely to be affected by development. Crossbill was the only Schedule 1 species recorded on site.

Twelve amber listed species were also recorded on site. Of these, the cuckoo and dunnock are also UK BAP Priority Species and Section 41 species.

The most notable species at county level were redstart, tree pipit, grey wagtail and cuckoo: a singing male redstart was recorded using the northwest spur of the site; four territories of tree pipit were recorded in open habitats / scrubby areas; at least one, possibly two, territories of grey wagtail were recorded on site, with one male singing to the west of the brickworks and a pair to the southeast of the large lake during the third survey visit and; a cuckoo was heard calling and seen overflying the site during the second breeding bird survey visit.

3.2 Nightjar Surveys

Nightjar was recorded during the July survey (Refer to **Figure 2** for approximate location of sighting). A bird was heard calling in flight over an area of thicket stage spruce plantation adjacent to the western site boundary. This type of habitat is often used by nightjar for foraging (Cleere & Nurney, 1998). Young or recently felled plantation habitats are not present on site.

⁵ The implication of a species being listed under Section 41 of the NERC Act is that it puts an obligation on local planning authorities to consider any effects upon it in detail when determining planning applications. Listing of a species on Annex 1 of the EU Birds Directive obliges nation states to define and designate areas of importance for ensuring its conservation.

The grassland with scattered trees on site in the north east and southern spurs of the site is more suitable, though no birds were recorded in these areas. The remaining habitats present (mature plantation and developed areas) are not thought to offer suitable foraging or breeding opportunities. The bird detected may have been foraging within this area, but there is no evidence to suggest it bred there.

A ‘roding’⁶ woodcock was recorded during the first nightjar survey visit displaying over the central and southern areas of the site. It is therefore likely that the site formed part of the territory of a male bird.

4. Conclusions

A single Schedule 1 species (crossbill) and a single Annex I species (nightjar) were recorded during the surveys, but neither were recorded using the site (crossbill flew over, while nightjar was recorded in flight over adjacent forestry). In addition, a total of six Red-listed species (all of which are also UK BAP Priority and Section 41 species) and twelve Amber listed species were recorded on site (two of which are also UK BAP Priority and Section 41 species).

The bird community recorded reflects the mixture of woodland and more open habitats present within the survey area. Several species typical of pine woodland were recorded, including coal tit and goldcrest, as were species typical of deciduous and mixed woodland such as treecreeper and nuthatch. Five breeding species that are considered uncommon⁷ at county level were present on site: tree pipit, woodcock, cuckoo, grey wagtail and redstart. Three of these were considered to have definitely bred within the site boundary, whereas the site was considered to form part of the territory of an individual of the other two species. Most of these species are common and the numbers recorded on site are not thought to reach the threshold of county importance^{8,9}. The water bodies support small numbers of breeding waterfowl including mandarin duck, an introduced species.

⁶ The aerial display of the woodcock, characterised by low level patrolling flights around its territory and a range of high and low pitched ‘grunts’ and ‘squeaks’ is referred to as roding. The male is polygamous, and uses this display flight to locate females within his territory.

⁷ An uncommon breeding species for Gloucestershire is defined by GOCC as having an estimated breeding population of between 10 and 99 pairs.

⁸ When considering bird populations, importance is taken as meaning that a site supports at least 1% of the population under consideration, i.e. regional, national and international. There is no fundamental biological reason to take 1% of a population as the threshold for establishing the international importance of a site. However, this percentage is widely considered to be of value in giving an appropriate level of protection to populations, and has gained acceptance on this basis throughout the world. The criterion was, for example, adopted by parties involved in the Ramsar Convention. Thereafter, the 1% level of national species totals has been taken as the basis of assessment in various countries, including Britain.

⁹ There is no Gloucestershire bird atlas, although summary information on the status of some common bird is given in the annual county bird reports, and this provides an indication of status from which a reasoned judgement of likely importance can be derived. Population sizes derived from this source must be treated with extreme caution, however, as they are based on record submissions rather than the result of atlas work, and as such are unlikely to be wholly representative. Woodcock in particular, being nocturnal and crepuscular, is unlikely to be adequately surveyed for. Further contextual information is provided in detailed accounts of bird in Gwent (Venables *et al.*, 2008) and at national level (Brown & Grice, 2005).

The habitats on site are perhaps more typical of the Forest of Dean, which largely falls within Gwent, rather than of Gloucestershire. In Gloucestershire, species which are relatively common in Gwent, such as grey wagtail and redstart, have a restricted range and are, therefore, uncommon. As a result, on the basis of available information, it is likely that the site is of county importance for a number of breeding passerines, though these are nationally common, and possibly also for woodcock (for which very little baseline data appears to exist). Adjacent areas of plantation may form part of the foraging territory of a nightjar, but there was no evidence of use of the site by this species.

5. References

Baker, H., Stroud D. A., Aebischer, N. J., Cranswick, P. A., Gregory, R.D., McSorley, C. A., Noble D. G. & Rehfisch, M. M. (2006) Population estimates of birds in Great Britain and the United Kingdom. *British Birds* **99**: 25–44.

Brown, A. & Grice, P. (2005). *Birds in England*. T & A.D. Poyser, London.

Cleere N. & Nurney, D. (1998). *Nightjars. A Guide to Nightjars and Related Nightbirds*. Pica Press, Sussex.

Gilbert, G., Gibbons, D .W., & Evans, J. (1998). *Bird Monitoring Methods a manual of techniques for key UK species*. Royal Society for the Protection of Birds, Sandy, Bedfordshire.

Gloucestershire Ornithological Coordinating Committee. (2007a) Gloucestershire Bird Report 2005.

Gloucestershire Ornithological Coordinating Committee. (2007b) Gloucestershire Bird Report 2006.

Gregory, R.D., Wilkinson, N. I., Noble, D. G., Robinson, J. A., Brown, A. F., Hughes, J., Procter, D., Gibbons, D. W. & Galbraith, C. A. (2002). The population status of birds in the United Kingdom, Channel Islands and Isle of Man: an analysis of conservation concern 2002-2007. *British Birds* **95**: 410-448.

Venables, W. A., Baker, A. D., Clarke, R. M., Jones, C., Lewis, J. M. S., Tyler, S. J., Walker, I. R. & Williams, R. A. (2008). *The Birds of Gwent*. Christopher Helm, London.

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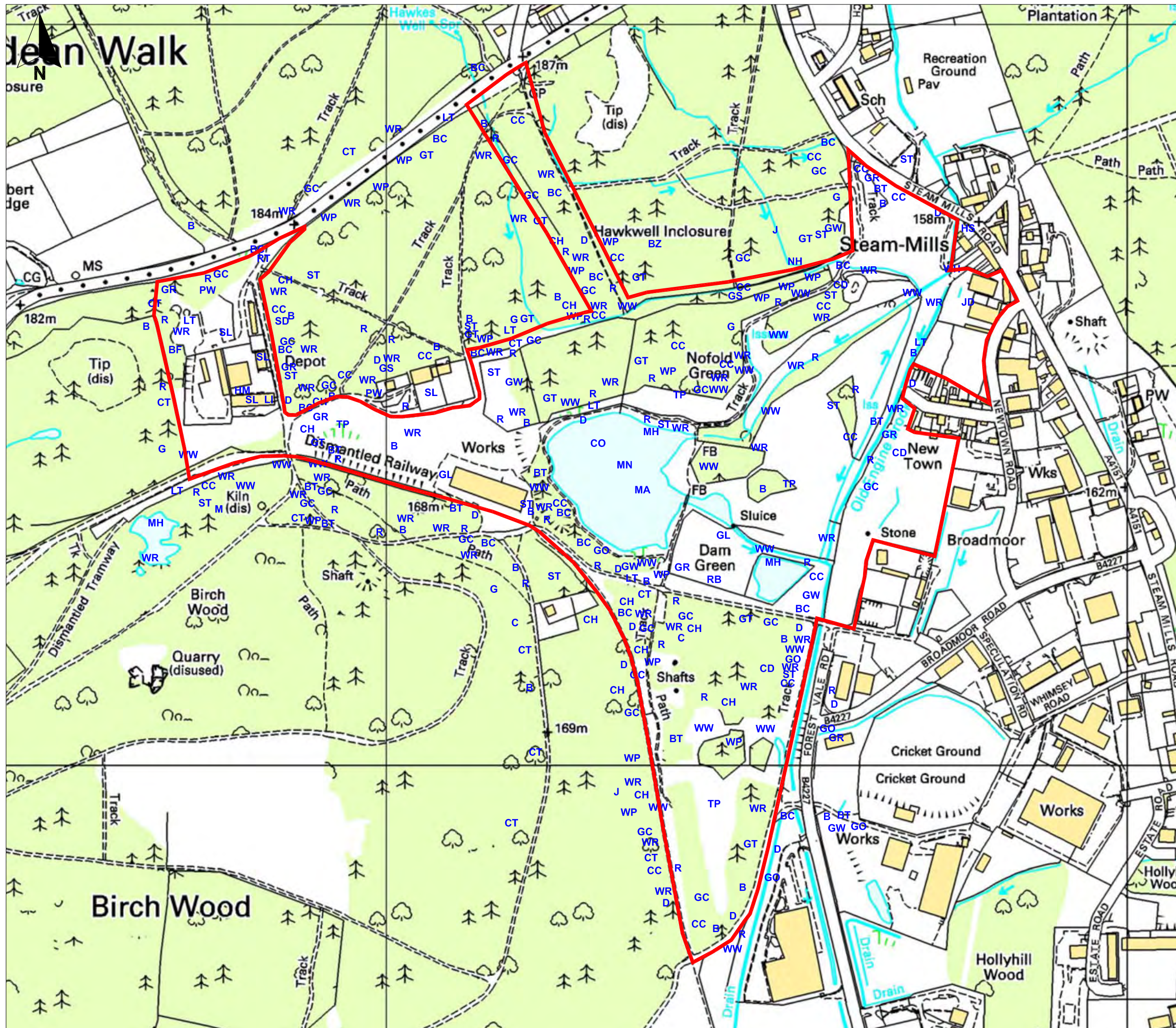
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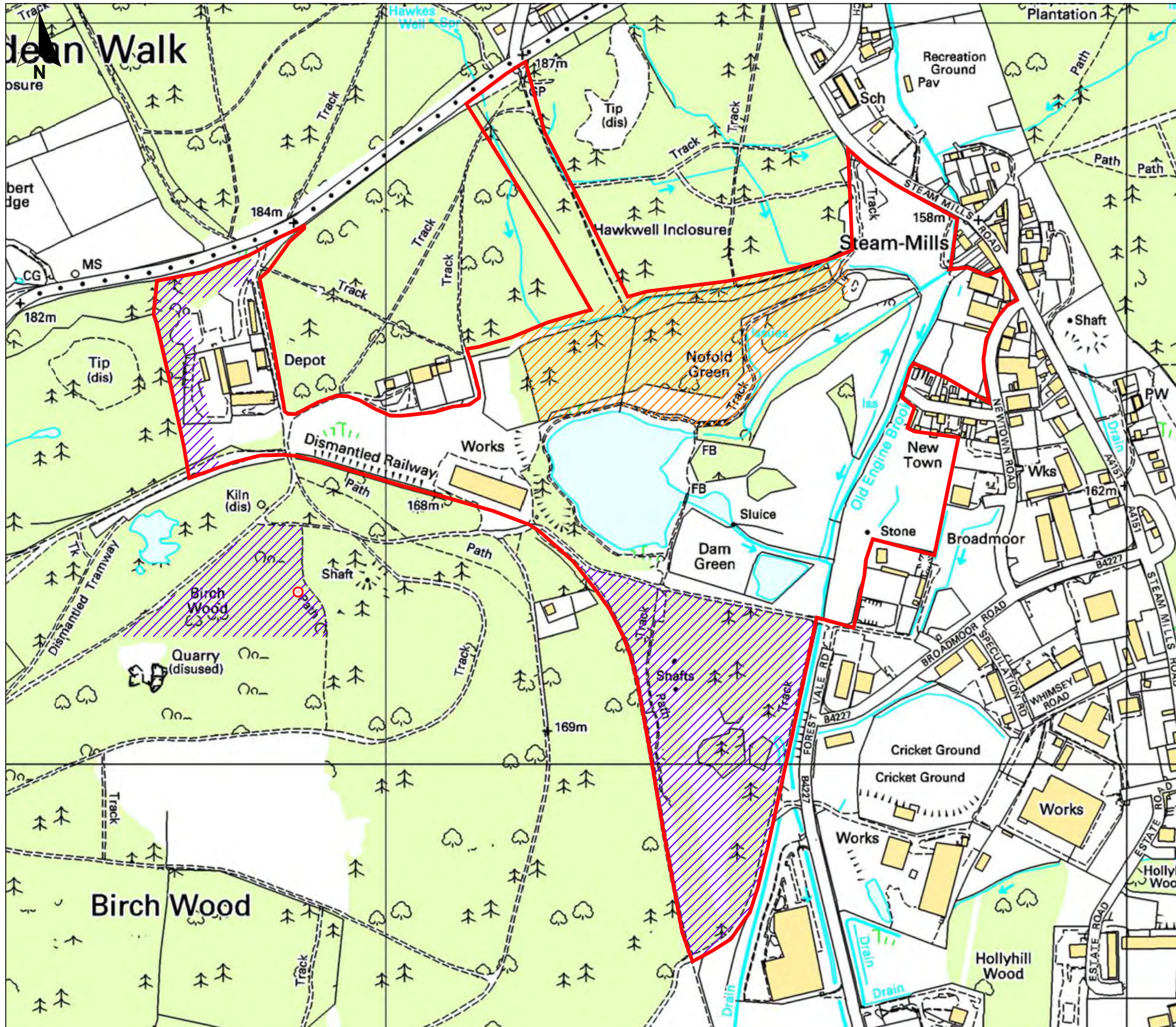
- Key**
- Site boundary
 - B Blackbird
 - BC Blackcap
 - BF Bullfinch
 - BT Blue tit
 - BZ Buzzard
 - C Carrion crow
 - CC Chiffchaff
 - CD Collard dove
 - CH Caffinch
 - CO Coot
 - D Dunnock
 - G Green woodpecker
 - GC Goldcrest
 - GL Grey wagtail
 - GO Goldfinch
 - GR Greenfinch
 - GS Great spotted woodpecker
 - GT Great tit
 - GW Garden warbler
 - HM House martin
 - HS House sparrow
 - J Jay
 - JD Jackdaw
 - LI Linnet
 - LT Long-tailed tit
 - M Mistle thrush
 - MA Mallard
 - MH Moor hen
 - MN Mandarin
 - NH Nuthatch
 - PW Pied wagtail
 - R Robbin
 - RB Reed bunting
 - RT Redstart
 - SD Stock dove
 - SL Swallow
 - ST Song thrush
 - TP Tree pipit
 - WH Whitethroat
 - WP Wood pigeon
 - WR Wren
 - WW Willow warbler

0 m 300 m
 Scale 1:5000 @ A3

Cinderford Ecological Baseline Report

Figure 1
Indicative Territory Centres

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Key

- Site boundary
- Low potential
- Medium potential
- Nightjar (approximate location)

0 m 300 m
 Scale 1:5000 @ A3

Cinderford Ecological Baseline Report

Figure 2
Habitats Targeted by the Nightjar Survey and Location of Sighting

December 2008
 20998-W02.dwg marsa01



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Appendix H

Summary of bat activity survey results

24 Pages **June Survey**

RED ROUTE

Survey Point 1

Gemma Lee, Cinderford, 18/06/08 DUSK

Real Time	Transect Point	Sp.	No. Passes
21.38	1	LHS	1
21.40	1	LHS	1
21.43	1	LHS	3 bats
21.48	1	LHS	
22.24	2	45 pip	1
22.40	3	45 pip	5
22.57	4	45 pip	2

RED ROUTE**Survey Point 2****Dyfrig Hubble, Cinderford 18/06/08 DUSK**

Real Time	Transect Point	Sp.	No. Passes
21.31	1	pip	
21.35	1	pip	
21.39	1	pip	
21.44	1	pip	
21.54	1	LHS	
23.20	1	pip	

PURPLE ROUTE**Survey Point 3****Clare Cheeseman, Cinderford 18/06/08 DUSK**

Real Time	Transect Point	Sp.	No. Passes
21.54	A	45 pip	3
22.03	A	45 pip	1
22.27	A	45 pip	1
22.50	4	45 pip	1

PURPLE ROUTE

Survey Point 4

Sarah Boyd, Cinderford 18/06/08 DUSK

Real Time	Transect Point	Sp.	No. Passes
21.50	B	45 pip	1

July Survey

RED ROUTE Survey Point 1

Gemma Lee, Cinderford, 29/07/08 DUSK

Real Time	Transect Point	Sp.	No. Passes
21.04	1	LHS	1
21.10	1	LHS	1
21.13	1	45 pip	1
21.14	1	LHS	1
21.17	1	LHS	1
21.18		LHS	1
21.27	1	BAT	
21.29	1	45 pip	2
21.31	1	LHS	1
21.41	1	45 pip	6
21.43	1	45 pip	3
21.47	1 to 2	45 pip	
21.50		45 pip	2
21.53	1 to 2	45 pip	1

RED ROUTE Survey Point 1

Gemma Lee, Cinderford, 29/07/08 DUSK

Real Time	Transect Point	Sp.	No. Passes
22.02	1 to 2	55 pip	1
22.04	1 to 2	45 pip	2
22.11	2 to 3	45 pip	4
22.21	2 to 3	45 pip	1
22.22	2 to 3	45 pip	3
22.25	4	45 pip	1
22.27	4 to 3 (about 1/3 way up)	45 pip	1
22.27	4 to 3	Noc	1
22.28	4 to 3	45 pip	3
22.31	3	Sero	1
22.34	3 to 2	45 pip	1
22.37	3 to 2	55 pip	1
22.43	2 to 1	55 pip	1
22.43	2 to 1	45 pip	1
23.05	2 to 3	45 pip	2

RED ROUTE Survey Point 1

Gemma Lee, Cinderford, 29/07/08 DUSK

Real Time	Transect Point	Sp.	No. Passes
23.15	3 to 4	45 pip	1
23.18	at end of transect	45 pip	1
21.31	3 to 2	45 pip	3

RED ROUTE Survey point
2 NOTE – recordings were lost

Lynn Whitfield, Cinderford 29/07/08 DUSK

Real Time	Transect Point	Surveyors Notes	Sp.
21.03	A	pip flew over south from building; uncertain where emerged from	pip
21.08	A	as above	pip
21.10	A	pip flew over surveyor	pip
21.13	A	pip pass (bat not seen)	pip
21.19	A	faint noctule pass heard - not seen	noc
21.31	A	pip pass not seen	pip
21.35	A	pip pass not seen	pip
21.40	A	bat seen briefly over building (not audible)	bat
21.46	A	bat pass	bat
21.52	A	pip pass not seen	pip
22.01	1	pip activity (few passes)	pip
22.02	2	pip activity (few passes)	pip
22.06	3	3 pip passes	pip
22.24	5	pip pass	pip

RED ROUTE Survey point
2 NOTE – recordings were lost

Lynn Whitfield, Cinderford 29/07/08 DUSK

Real Time	Transect Point	Surveyors Notes	Sp.
22.26	6	pip pass	pip
22.27	5	3 pip passes	pip
22.32	7	Myotis pass?	myotis?
22.32	7	serotine pass	Sero
22.35	4	serotine pass	Sero
22.37	8	faint bat pass	bat
22.4	9	pip pass	pip
22.42	9	2 pip passes	pip
22.45	10	pip pass	pip
22.47	11	pip pass	pip
22.48	12	pip pass	pip
23.01	9	pip pass and foraging	pip
23.06	9	pip pass	pip
23.13	7	faint bat pass	bat
23.16	13	pip pass	pip

RED ROUTE Survey point
2 NOTE – recordings were lost

Lynn Whitfield, Cinderford 29/07/08 DUSK

Real Time	Transect Point	Surveyors Notes	Sp.
23.2	5	2 pip passes	pip
23.33	10	2 pip passes	pip
23.36	11	pip pass	pip
23.38	13	pip pass	pip
23.41	A	LHS pass	LHS
23.5		bat pass and social calls	Bat
23.53		bat pass	Bat
23.57		45 pip pass	45 pip

PURPLE ROUTE Survey point 3

Caroline Chipperfield, Cinderford 29/07/08 DUSK

Real Time	Transect Point	Sp.	No. Passes
21.25	3 to 2	45 pip	2
21.31	fishing car park	45 pip	1
21.38	4	45 pip	Continuous
21.42	4	55 pip	2
21.42	4	45 pip	2
21.44	next to lake	55 pip	4
21.45	next to lake	45 pip	4
21.47	Next to wood	55 pip	1
21.49	Next to wood	45 pip	1
21.49	Next to wood	Myotis	1
21.51	5	45 pip	2
21.53	5	55 pip	
21.53	5	45 and 55 pip	
21.55	5	45 and 55 pip	Continuous
21.57	5	Myotis followed by 45 pip	3

PURPLE ROUTE Survey point 3

Caroline Chipperfield, Cinderford 29/07/08 DUSK

Real Time	Transect Point	Sp.	No. Passes
21.57	5	Myotis	3
21.58	5	45 pip	1
22.01	5	45 and 55 pip	Many for 3mins
22.05	5	Myotis	2
22.05	5	45 and 55 pip	many
22.06	6	45 and 55 pip	Continuous to 560
22.16	6	45 pip	2
22.18	6	45 pip	2
22.49	2 to 3	45 pip	1
22.54	2 to 3	45 pip	1
22.56	3	45 pip	1
22.57	3	45 pip	1
23.06	2	45 pip	1
23.08	near 4	45 pip	1
23.11	4 to 5	45 pip	1

PURPLE ROUTE Survey point 3

Caroline Chipperfield, Cinderford 29/07/08 DUSK

Real Time	Transect Point	Sp.	No. Passes
23.13	4 to 5	45 pip	several
21.15	around lake	45 and 55 pip, Myotis	almost constant
21.2	5	Myotis	several
23.24	5	Bat	
23.25	5	55 pip	several
23.29	5	45 and 55 pip	2
23.3	6	45 and 55 pip	constant to 320
23.36	6	45 pip	2

August Survey

RED ROUTE**Survey Point 1****Gemma Lee, Cinderford, 28/08/08 DUSK**

Real Time	Transect Point	Sp.	No. Passes
20.06	A	45 pip	
20.18	A	Noc and LHS	
20.21	A	LHS	
20.26	A	LHS	
20.32	A	45 pip	
20.33	A	LHS	
20.35	A	LHS and 45 pip	
20.54	1 to 2	Noc	
20.58	1 to 2	45 pip	
20.59	1 to 2	55 pip	
21.04	2	pip	
21.08	2 to 3	55 pip	
21.12	2 to 3	45 pip	
21.13	3	45 pip	

RED ROUTE**Survey Point 1****Gemma Lee, Cinderford, 28/08/08 DUSK**

Real Time	Transect Point	Sp.	No. Passes
21.18	3 to 4	45 pip	
21.18	3 to 4	45 and 55 pip	
21.25	3 to 4	45 pip	constant
21.32	4 to 3	45 pip	
21.34	4 to 3	45 pip	
21.37	3	pip	
21.42	3 to 2	45 pip	
21.45	3 to 2	45 pip	
21.46	3 to 2	45 pip	
21.48	2 to 1 via road	45 pip	
21.55	2 to 1 via road	45 pip	
21.56	2 to 1 via road	45 pip	
22.05	1 to 2	pip	
22.08	1 to 2	pip	
22.12	1 to 2	45 pip	

RED ROUTE**Survey Point 1****Gemma Lee, Cinderford, 28/08/08 DUSK**

Real Time	Transect Point	Sp.	No. Passes
22.17	2	45 pip	
22.19	2 to 3	Noc	
22.20	2 to 3	45 pip	
22.28	3 to 4	45 pip	
22.32	4	pip	
22.35	4	45 pip	
22.44	3	45 pip	
22.46	3	45 pip	
22.50	3 to 2	Myotis	
22.55	2 to 1 via road	LHS	
22.59	2 to 1 via road	45 pip	
23.01	2 to 1 via road	55 pip	

RED ROUTE Survey point 2

Tom Ormesher, Cinderford 28/08/08 DUSK

Real Time	Transect Point	Sp.	No. Passes
20.22	B	LHS	
20.25	B	LHS	
20.25	B	45 pip	
20.27	B	LHS	14 individuals over 10mins
20.35	B	pip	
20.38	B	45 pip	
20.49	1 to 2	45 pip and Noc	
20.50	1 to 2	45 pip	
20.54	1 to 2	45 pip	
21.03	2 to 3	45 pip	
21.05	2 to 3	45 and 55 pip	
21.13	2 to 3	45 pip	
21.14	2 to 3	55 pip	
21.19	2 to 3	Myotis	
21.21	3 to 4	pip	
21.24	3 to 4	45 pip	

RED ROUTE Survey point 2

Tom Ormesher, Cinderford 28/08/08 DUSK

Real Time	Transect Point	Sp.	No. Passes
21.26	3 to 4	55 pip	
21.3	3 to 4	45 pip	
21.38	3	Myotis	
21.45	3 to 2	45 pip	
21.48	3 to 2	45 pip	
22	1	45 pip	
22.1	1 to 2	pip	
22.14	1 to 2	pip	
22.15	1 to 2	pip	
22.2	2	Noc	
22.22	2 to 3	45 pip	
22.25	2 to 3	55 pip	
22.3	3 to 4	55 pip	
22.32	3 to 4	45 pip	
22.37	3 to 4	45 pip	
22.42	3 to 4	pip	

RED ROUTE Survey point 2

Tom Ormesher, Cinderford 28/08/08 DUSK

Real Time	Transect Point	Sp.	No. Passes
22.45	3 to 4	55 pip	

PURPLE ROUTE Survey point 3

Gemma Lee, Cinderford 27/08/08 DUSK

Real Time	Transect Point	Sp.	No. Passes
20.22	1	45 pip	
20.24		45 pip	
20.26		45 pip	
20.28		45 pip	
21.06	3	pip	
21.16	2-3	bat	
21.17	2-4	45 pip	
21.47	6-7	45 pip	

PURPLE ROUTE Survey point 4

Caroline Chipperfield, Cinderford 27/08/08 DUSK

Real Time	Transect Point	Sp.	No. Passes
20.28	1a	45 pip	1
20.38	1b	45 pip	1
20.48	1b	45 pip	3
20.50	bridge	45 pip	1
20.53	stream	45 pip	1
21.03	3	45 pip	2
21.08	3 to 2	45 pip	1
21.12	3 to 2	45 pip	1
21.17	2	Bat	1
21.23	4 to 5	45 pip	1
21.24	lake	55 pip	1
21.25	lake	45 pip	1
21.26	lake	45 and 55 pip	3
21.27	lake	45 and 55 pip	many
21.31	near 5	45 pip	3

PURPLE ROUTE Survey point 4

Caroline Chipperfield, Cinderford 27/08/08 DUSK

Real Time	Transect Point	Sp.	No. Passes
21.33	5	55 pip	2
21.35	Lake	45 and 55 pip	almost constant
21.39	Lake	Myotis	1
21.43	6a (cars)	45 and 55 pip	almost constant
21.46	6	55 pip	2
21.47	6	45 and 55 pip	several
21.49	6	Noc	1
21.53	1a	55 pip	1
21.56	1a to 1b	Myotis	1
21.59	1b	45 pip	1
22.03	near 1b	55 pip	1
22.04	on bridge	Myotis	1
22.05	1b	45 pip	1
22.08	bare ground	45 pip	1
22.08	bare ground	45 pip	1

PURPLE ROUTE Survey point 4

Caroline Chipperfield, Cinderford 27/08/08 DUSK

Real Time	Transect Point	Sp.	No. Passes
22.10	near 2	45 pip	2
22.12	2	45 pip	1
22.18	3	45 pip	2
22.20	3	45 pip	1
22.21	3	45 pip	1
22.22	3	45 pip	1
22.25	3	45 pip	1
22.27	3 to 2	Sero	1
22.28	2	55 pip	1
22.29	2 to 4	55 pip	1
22.34	4		1
22.37	4 on bridge	Bat	1
22.36	Lake	45 and 55 pip, Myotis	almost constant
22.39	along woodland edge	45 and 55 pip	almost constant

PURPLE ROUTE Survey point 4

Caroline Chipperfield, Cinderford 27/08/08 DUSK

Real Time	Transect Point	Sp.	No. Passes
22.42	5	45 and 55 pip	almost constant
22.44	5	55 pip, myotis	almost constant

September Survey

RED ROUTE Survey Point 1

Caroline Mellor, Cinderford, 17/09/08 DAWN

Real Time	Transect Point	Sp.	No. Passes
06.08	4	Noc	1

RED ROUTE Survey point 2

Donna Warren, Cinderford 17/09/08 DAWN

Real Time	Transect Point	Sp.	No. Passes
NO BATS RECORDED			

PURPLE ROUTE

Survey point 3

Gemma Lee, Cinderford 17/09/08 DAWN

Real Time	Transect Point	Sp.	No. Passes
04.56	by bridge	Myotis	2 (or 2 bats)
04.58	stream	Myotis	1
06.00	woodland along nw edge of steam mills	45 pip	2
06.07	along woodland edge	45 pip	2
06.14	3	45 and 55 pip	many
06.34	6	55 pip	4

PURPLE ROUTE Survey point 4

Nick Masters, Cinderford 17/09/08 DAWN

Real Time	Transect Point	Sp.	No. Passes
05.00	2	Myotis	2

Appendix I

Invertebrate survey results

24 Pages

TERRESTRIAL INVERTEBRATES RECORDED FROM CINDERFORD: SEPT 2007

SUBSITE	Lake	Brickwork Ponds	Zone 1 South	Zone 1 North	Zone 2 South	Zone 2 North	Zone 3 (Road)	Northern United
GRID REFERENCE (SO)	64371528	64461530	64711561	64711561	64541540	64331560	64231576	63851547
GPS WAYPOINT (SEE MAP)	242, 245-248	250 & 251	No waypoint	244	253-255	243	243 to 256	241
Arion ater				+				+
Deroceros reticulatum			+					+
Arianta arbustorum	+	+	+		+	+		
Candidula intersepta	+							
Cepaea hortensis				+				
Cepaea nemoralis	+		+					
Cochlicopa lubrica					+			
Discus rotundatus			+					
Oxyloma pfeifferi	+	+			+			
Araneus diadematus	+	+		+	+	+		+
Araneus quadratus	+		+	+	+	+		
Misumena varia						+		
Tibellus oblongus				+				
Eriophyes goniothorax typicus				+	+	+	+	+

SUBSITE	Lake	Brickwork Ponds	Zone 1 South	Zone 1 North	Zone 2 South	Zone 2 North	Zone 3 (Road)	Northern United
GRID REFERENCE (SO)	64371528	64461530	64711561	64711561	64541540	64331560	64231576	63851547
GPS WAYPOINT (SEE MAP)	242, 245-248	250 & 251	No waypoint	244	253-255	243	243 to 256	241
Dicranopalpus ramosus	+						+	
Leiobunum blackwallii							+	
Oligolophus meadii		+		+			+	
Phalangium opilio							+	
Armadillium vulgare			+					
Oniscus asellus							+	+
Porcellio scaber	+		+				+	+
Tachypodoiulus niger	+			+			+	
Forficula auricularia								+
Ectobius sp (nymph)	+							
Tetrix subulata		+						
Leuctra fusca	+							
Nemurella picteti	+							
Enallagma cyathigerum	+							
Lestes sponsa					+			
Aeshna cyanea		+			+			

SUBSITE	Lake	Brickwork Ponds	Zone 1 South	Zone 1 North	Zone 2 South	Zone 2 North	Zone 3 (Road)	Northern United
GRID REFERENCE (SO)	64371528	64461530	64711561	64711561	64541540	64331560	64231576	63851547
GPS WAYPOINT (SEE MAP)	242, 245-248	250 & 251	No waypoint	244	253-255	243	243 to 256	241
Aeshna mixta					+			
Sympetrum sanguineum	+				+			
Sympetrum striolatum				+	+			
Agapetus fuscipes					+			
Anabolia nervosa	+	+						
Glyptotaelius pellucidus	+							
Limnephilus auricula		+						
Mystacides longicornis	+							
Tinodes waeneri	+							
Aphrophora alni	+					+		
Neophilaenus lineatus	+					+		
Philaenus spumarius	+		+	+			+	+
Aelia acuminata	+		+	+				+
Anthocoris nemorum	+							+
Chilacis typhae	+							
Coreus marginatus	+			+				

SUBSITE	Lake	Brickwork Ponds	Zone 1 South	Zone 1 North	Zone 2 South	Zone 2 North	Zone 3 (Road)	Northern United
GRID REFERENCE (SO)	64371528	64461530	64711561	64711561	64541540	64331560	64231576	63851547
GPS WAYPOINT (SEE MAP)	242, 245-248	250 & 251	No waypoint	244	253-255	243	243 to 256	241
Cymus melanocephalus	+			+		+		
Elasmostethus interstinctus				+				
Himacerus apterus							+	
Kleidocerys resedae		+		+				
Lamproplax picea					+			
Neottiglossa pusilla				+				
Notostira elongata		+	+	+			+	+
Palomena prasina	+							
Pantilius tunicatus	+		+		+			
Podops inuncta	+							
Rhyparochromus pini	+							
Stenodema calcaratum			+	+	+	+	+	+
Stenodema holsatum							+	
Stenodema laevigatum	+					+		+
Tingis ampliata				+				
Troilus luridus		+						

SUBSITE	Lake	Brickwork Ponds	Zone 1 South	Zone 1 North	Zone 2 South	Zone 2 North	Zone 3 (Road)	Northern United
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GPS WAYPOINT (SEE MAP)	242, 245-248	250 & 251	No waypoint	244	253-255	243	243 to 256	241
Staphylinus olens	+							
Necrophilus vespilloides	+							
Adalia 2-punctata					+			
Anisosticta 19-punctata	+	+			+			
Coccinella 7-punctata		+			+	+		
Halyzia 16-guttata								+
Subcoccinella 24-punctata				+				
Oulema melanopa s.l.	+							
Vanessa atalanta								+
Acrolepia autumnitella	+							
Zygaena sp (pupal case)			+					
Tipula lateralis	+	+						
Tipula oleracea		+						
Tipula pagana	+	+	+	+	+	+	+	+
Tipula paludosa		+	+			+		
Dicranomyia modesta	+	+						

SUBSITE	Lake	Brickwork Ponds	Zone 1 South	Zone 1 North	Zone 2 South	Zone 2 North	Zone 3 (Road)	Northern United
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GPS WAYPOINT (SEE MAP)	242, 245-248	250 & 251	No waypoint	244	253-255	243	243 to 256	241
Dicranomyia morio	+							
Erioptera trivialis			+					
Euphylidorea lineola		+						
Limonia macrostigma	+							
Limonia nubeculosa	+						+	+
Molophilus griseus	+							
Molophilus obscurus	+			+	+	+		
Molophilus ochraceus	+							
Neolimnophila adjuncta	+							
Rhypholophus varia	+			+				+
Paradelphomyia senilis	+				+	+		
Phylidorea ferruginea		+						
Pilaria decolor	+							
Rhipidia duplicata							+	
Tricyphona immaculata	+	+			+	+		+
Ula crassicauda	+							



SUBSITE	Lake	Brickwork Ponds	Zone 1 South	Zone 1 North	Zone 2 South	Zone 2 North	Zone 3 (Road)	Northern United
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GPS WAYPOINT (SEE MAP)	242, 245-248	250 & 251	No waypoint	244	253-255	243	243 to 256	241
<i>Ula sylvatica</i>							+	
<i>Trichocera annulata</i>							+	+
<i>Trichocera regelationis</i>							+	
<i>Sylvicola cincta</i>							+	
<i>Sylvicola punctata</i>								
<i>Filipendula gall</i>	+	+						
<i>Dasyneura urticae</i>	+						+	
<i>Dixa nubilipennis</i>					+			
<i>Dixella aestivalis</i>					+			
<i>Platypalpus ciliaris</i>							+	
<i>Platypalpus longicornis</i>						+		
<i>Bicellaria vana</i>	+		+	+	+	+		+
<i>Hybos culiciformis</i>	+		+	+		+		+
<i>Ocydromia glabricula</i>							+	+
<i>Trichinomyia flavipes</i>							+	
<i>Rhamphomyia erythrothalma</i>	+		+			+		+

SUBSITE	Lake	Brickwork Ponds	Zone 1 South	Zone 1 North	Zone 2 South	Zone 2 North	Zone 3 (Road)	Northern United
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GPS WAYPOINT (SEE MAP)	242, 245-248	250 & 251	No waypoint	244	253-255	243	243 to 256	241
Chelifera precatória							+	
Chelifera sp (female)		+						
Campsicnemus loripes				+				
Chrysotimus molliculus	+							
Chrysotus gramineus				+				
Dolichopus griseipennis	+							
Dolichopus plumipes	+	+						
Dolichopus trivialis		+						
Sympycnus desoutteri	+							
Syntormon denticulatus	+	+						
Syntormon pallipes	+	+				+		+
Thrypticus sp (female)						+		
Lonchoptera furcata	+	+		+	+	+	+	+
Lonchoptera lutea	+			+	+		+	
Agathomyia cinerea							+	+
Callomyia amoena				+				

SUBSITE	Lake	Brickwork Ponds	Zone 1 South	Zone 1 North	Zone 2 South	Zone 2 North	Zone 3 (Road)	Northern United
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GPS WAYPOINT (SEE MAP)	242, 245-248	250 & 251	No waypoint	244	253-255	243	243 to 256	241
Episyrphus balteatus	+							
Melanostoma mellinum	+	+	+	+	+	+		+
Melanostoma scalare	+							+
Platycheirus albimanus	+	+	+					
Platycheirus angustatus			+	+		+		+
Platycheirus clypeatus	+	+	+	+		+		
Platycheirus occultus			+					
Platycheirus scutatus s.l.	+							
Sphaerophoria scripta		+	+	+		+		+
Syrphus ribesii		+						
Tephritis leontodontis				+				
Urophora cardui	+		+					
Palloptera scutellata	+	+			+	+	+	
Psila humeralis				+				
Calliopum elisae					+			
Calliopum simillimum	+			+				

SUBSITE	Lake	Brickwork Ponds	Zone 1 South	Zone 1 North	Zone 2 South	Zone 2 North	Zone 3 (Road)	Northern United
GRID REFERENCE (SO)	64371528	64461530	64711561	64711561	64541540	64331560	64231576	63851547
GPS WAYPOINT (SEE MAP)	242, 245-248	250 & 251	No waypoint	244	253-255	243	243 to 256	241
Meiosimyza rorida	+						+	+
Meiosimyza subfasciata	+							+
Minettia fasciata			+	+		+		
Minettia longipennis	+							
Pseudolyca pallidiventris group (female)								+
Sapromyza sexpunctata	+						+	
Tricholauxania praeusta								+
Elgiva cucularia		+						
Hydromya dorsalis						+		
Pherbellia cinerella		+						
Pherbellia schoenherri		+			+			
Pherbellia ventralis		+						
Pherbina coryleti	+	+			+			
Psacadina verbekei		+						
Sepedon spegea	+	+			+			
Tetanocera ferruginea					+			

SUBSITE	Lake	Brickwork Ponds	Zone 1 South	Zone 1 North	Zone 2 South	Zone 2 North	Zone 3 (Road)	Northern United
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GPS WAYPOINT (SEE MAP)	242, 245-248	250 & 251	No waypoint	244	253-255	243	243 to 256	241
Tetanocera fuscinervis		+			+			
Tetanocera silvatica					+			
Trypetoptera punctulata					+			
Geomyza tripunctata		+						
Opomyza florum	+				+			+
Opomyza germinationis		+				+		
Sepsis cynipsea		+			+			
Sepsis fulgens				+	+			+
Sepsis orthocnemis		+		+	+			+
Asteia amoena							+	
Anthomyza gracilis			+	+		+		
Cerodontha denticornis	+	+		+				+
Liriomyza flaveola			+	+		+		
Liriomyza melampyga	+						+	
Phytomyza cirsii					+			
Phytomyza ilicis							+	

SUBSITE	Lake	Brickwork Ponds	Zone 1 South	Zone 1 North	Zone 2 South	Zone 2 North	Zone 3 (Road)	Northern United
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GPS WAYPOINT (SEE MAP)	242, 245-248	250 & 251	No waypoint	244	253-255	243	243 to 256	241
Phytomyza loniceræ							+	
Phytomyza tussilaginis	+	+			+			
Chlorops brevimana				+				+
Chlorops speciosa			+	+				+
Thaumatomyia notata	+				+	+		
Neuroctena anilis							+	
Suillia bicolor							+	
Suillia variegata							+	
Tephrochlamys rufiventris							+	
Campichoeta obscuripennis	+	+			+			
Campichoeta punctum								
Diastata fuscula	+						+	+
Drosophila andalusiaca					+			
Scaptomyza pallida	+	+	+	+		+	+	+
Limnellia quadrata				+				
Parydra coarctata	+	+			+			+

SUBSITE	Lake	Brickwork Ponds	Zone 1 South	Zone 1 North	Zone 2 South	Zone 2 North	Zone 3 (Road)	Northern United
GRID REFERENCE (SO)	64371528	64461530	64711561	64711561	64541540	64331560	64231576	63851547
GPS WAYPOINT (SEE MAP)	242, 245-248	250 & 251	No waypoint	244	253-255	243	243 to 256	241
Scatella stagnalis	+	+		+	+			+
Scatella tenuicornis	+	+		+	+			
Lotophila atra				+				
Cordilura albipes				+				
Scathophaga furcata	+	+				+	+	+
Scathophaga stercoraria			+	+				+
Morinia nana								+
Coenosia tigrina		+	+	+				
Schoenomyza litorella	+	+	+	+				+
Cistogaster globosa			+					
Siphona geniculata			+	+				
Diplazon tetragonus	+							
Diplolepis rosae	+							
Formica fusca	+			+	+			+
Lasius flavus			+	+	+			+
Lasius niger	+	+	+	+	+			

SUBSITE	Lake	Brickwork Ponds	Zone 1 South	Zone 1 North	Zone 2 South	Zone 2 North	Zone 3 (Road)	Northern United
GRID REFERENCE (SO)	64371528	64461530	64711561	64711561	64541540	64331560	64231576	63851547
GPS WAYPOINT (SEE MAP)	242, 245-248	250 & 251	No waypoint	244	253-255	243	243 to 256	241
Myrmica ruginodis					+		+	
Pontania sp	+							
Vespula vulgaris		+						
Bombus pascuorum	+							+

AQUATIC INVERTEBRATES RECORDED FROM CINDERFORD: SEPT 2007

SUBSITE	Lake A	Lake B	Lake C	Lake D	2	3	5	6	7	8	9
GRID REFERENCE (SO)	64281532	64221541	64371546	64391533	64421537	64451527	64511522	64531516	64531506	64511504	64501497
GPS WAYPOINT (SEE MAP)	245	246	247	248	249	250	251	252	253	254	255
Dugesia lugubris		7		4	1		1				
Polycelis tenuis				1							

SUBSITE	Lake A	Lake B	Lake C	Lake D	2	3	5	6	7	8	9
GRID REFERENCE (SO)	64281532	64221541	64371546	64391533	64421537	64451527	64511522	64531516	64531506	64511504	64501497
GPS WAYPOINT (SEE MAP)	245	246	247	248	249	250	251	252	253	254	255
Planariidae indet.		1		1							
Oligochaeta indet.			1		2	10					
Stylaria lacustris			3		4	7					
Erpobdella octoculata			2	1							
Piscicola geometra				1							
Theromyzon tessulatum			1	1	1						
Acroloxus lacustris									1		
Anisus vortex			2	14							
Bithynia tentaculata		1	4	2	1						
Gyraulus albus	2		4	4	3				1		
Gyraulus laevis	2		3								
Hippeutis complanata		1									
Lymnaea stagnalis					1						
Oxyloma pfeifferi									2	3	
Physa sp (including acuta)	2	2	6		2	4					
Physa fontinalis				1		2	9				
Planorbis carinatus		1	5	3							

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GPS WAYPOINT (SEE MAP)	245	246	247	248	249	250	251	252	253	254	255
Planorbis planorbis			2								
Planorbis sp (juvenile)					1						
Radix balthica	1	1		2				2		10	2
Pisidium sp			1				1				
Asellus aquaticus	1	20	20	25		1	9	20			
Crangonyx pseudogracilis	40	20	30	25	20		30	20	20	9	1
Gammarus pulex			9				1				
Daphnia sp	40	20	40	30	30	14					
Eurycerus lamellatus	30	40	5	20	40	40					
Scapholeberis mucronata					1	1					
Sida crystallina	10	3	9	4	3	1					
Simocephalus vetulus	1	2	1	1		4					
Ostracoda							1				
Hydrachnellae	40	10	25	4	20	4	20	15	50	10	20
Caenis horaria				1							
Cloeon dipterum	1		1	2	9		1				3
Sialis lutaria	1										

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Coenagrion sp	4	3	13	13	23	6	4		2	1	6
Enallagma cyathigerum							1				
Ischnura elegans							1				
Pyrrhosoma nymphula	1			1	1		2	3	7	8	8
Coenagrionidae indet.							2	20	80	20	50
Aeshna cyanea									1		
Aeshna juncea									2		
Anax imperator	1							1			20
Libellula quadrimaculata						1			5	1	6
Aesnidae (small instar)					1						
Agraylea sexmaculata					5		1				
Agrypnia varia					1				1	2	3
Holocentropus picicornis							1			1	2
Limnophilus ?flavicornis		1	1	1							
Mystacides longicornis	4		2	4							
Oxyethira sp (larval case)				1							
Tinodes waeneri					1						

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GPS WAYPOINT (SEE MAP)	245	246	247	248	249	250	251	252	253	254	255
<i>Triaenodes bicolor</i>	1		1				1			1	
<i>Gerris lacustris</i>			2	1	1				1		
<i>Gerris sp</i>		1		1	5			1			
<i>Hesperocorixa linnai</i>									24	7	50
<i>Hesperocorixa sahlbergi</i>							1		1		
<i>Hydrometra stagnorum</i>	2			10	5		2				
<i>Ilyocoris cimicoides</i>			1					1			
<i>Micronecta scholtzi</i>	1		6		9						
<i>Microvelia reticulata</i>							1		3	3	
<i>Nepa cinerea</i>			1								
<i>Notonecta glauca</i>	1		2		1		1		1	1	1
<i>Notonecta obliqua</i>									2		
<i>Plea leachii</i>	1						7	1	40	20	2
<i>Ranatra linearis</i>						1					
<i>Sigara dorsalis</i>			1			1					
<i>Gyrinus substriatus</i>		1								1	
<i>Haliphus fluviatilis</i>	3		1								

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Haliphus immaculatus							9				
Haliphus ruficollis							5	2			
Haliphus ruficollis group (females)			1				18	1		2	
Noterus clavicornis	1	1		3			8	3			2
Agabus sturmii								5			
Dytiscus marginalis								1			
Graptodytes pictus							1				
Hydroglyphus pusillus							1		2	1	
Hydroporus angustatus								2			
Hydroporus incognitus							1	1			
Hydroporus memnonius								1			
Hydroporus planus							2				
Hygrotus inaequalis							4	1			
Hygrotus versicolor	1						1				
Hyphydrus ovatus							25	1			
Ilybius ater									1		
Laccophilus hyalinatus	4				1						

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Laccophilus minutus							2				
Rhantus suturalis								1			
Dytiscinae (larvae)			1	1			1	2			
Anacaena limbata											1
Anacaena lutescens							3	1	5	2	
Enochrus melanocephalus	1	2									
Enochrus ochropterus								1		1	
Enochrus testaceus					1			1			
Helochares lividus											1
Laccobius minutus					1						
Helophorus brevipalpis								1			
Helophorus flavipes									1		
Hydraena gracilis						1					
Limoniidae (larvae)		3	3	1							1
Chaoborus crystallinus (larvae)										1	
Ceratopogonidae (larvae)			2		1						
Acricotopus lucens (pupal skin)					2						

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Chironomidae (all larvae)	15	10				20		4			
Chironominae (larvae)		3	7	3	4	2					
Orthoclaadiinae (larvae)	3	1			1						
Tanypodinae (larvae)		1	2		1			2			
Tanytarsini (larvae)											1
Anopheles atroparvus/messae					1						
Dixella aestivalis (larvae)							2				
Dixella serotina (larvae)	3	1	4								
Dixidae (larvae)				2	2		4	1			
Sciomyzidae (larvae)	1							1			

TERRESTRIAL INVERTEBRATES RECORDED IN POND NET SAMPLES

Ischnura elegans (adult)	1
Agraylea sexmaculata (adult)	3
Anabolia nervosa (adult)	1 1
Tinodes waeneri (adult)	1

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Anisosticta 19-punctata							1				
