# ECOLOGICAL IMPACT ASSESSMENT

# BUILDING ONE, SCIENCE MUSEUM GROUP AT WROUGHTON, WILTSHIRE

carried out by

CLARKSON & WOODS
ECOLOGICAL CONSULTANTS

commissioned by

**SCIENCE MUSEUM GROUP**

**OCTOBER 2017**

# ECOLOGICAL IMPACT ASSESSMENT

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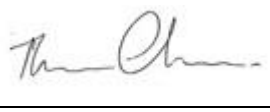
| |  | |  | |

# EXECUTIVE SUMMARY

- Clarkson and Woods Ltd. was commissioned by Science Museum Group to carry out an ecological survey of land at SMG Wroughton, near Wroughton, Wiltshire

- The objectives of this report are to set out the results of the survey, identify any potential constraints associated with the development proposals and provide recommendations or further surveys and. Mitigation to avoid or reduce impacts on species or habitats.

- An Extended Phase 1 Habitat Survey was carried out on the 31st January and 1st February 2017 by two experienced ecologists.

- The survey area predominantly comprised expanses of managed grassland between hardstanding runways. A block of young plantation woodland was present beyond the northern site boundary. The land in the surrounding area comprised further grassland, runways, blocks of woodland and large hangar buildings with a number of auxiliary buildings. The land to the south of the site has been developed into a large scale solar array.

- Clouts Wood SSSI is located approximately 100m North West of the development footprint. The relatively large distance from the site and the scale of the development means that impacts on the SSSI are unlikely to occur. However, it is recommended that the risk of temporary detrimental impacts arising from construction-related activities are minimised through the implementation of precautionary protective measures to be set out within a Construction Environmental Management Plan (CEMP) and adopted on site.

- Although the grassland habitat within the wider survey area is considered to be of Local importance, the habitat within the development footprint is of relatively low intrinsic value for biodiveristy and in in view of the extent of this habitat within the surrounding landscape its loss is not considered to be

significant. However, the grassland provides suitable habitat for ground nesting birds of conservation concern, particularly skylarks.

- The footprint of development (and an area immediately surrounding that) may result in the loss of several ground nesting bird territories. In isolation this would be considered a minor impact. However in view of possible impacts upon ground nesting birds resulting from the solar development to the south could mean potential for significant cumulative impacts. In particular, part of the application area identified as potentially being used for drainage purposes, was identified within the solar application as an area that would be managed specifically for ground nesting birds.

- No surveys have been undertaken of the application area and these are therefore recommended to ascertain the importance of the footprint (and its surroundings) of the facility for ground nesting birds. These surveys will inform requirements for remedial mitigation such as the further enhancement of other grassland areas within the SMG Wroughton facility.

- Badger foraging signs were close to the survey area, and several badgers setts are known to be present elsewhere within the site. Precautionary measures to prevent harming this species are recommended, including a pre-construction survey of the development and good site practice measures to be set out within a CEMP.

- Suggestions for ecological enhancements are also given in line with current planning policy

# 1 INTRODUCTION

1.1.1 Clarkson and Woods Ltd. was commissioned by Science Museum Group (SMG) to carry out an ecological survey of land at Science Museum Group at Wroughton (SMGW), near Swindon, Wiltshire.

1.1.2 An extended Phase 1 Habitat survey was carried out 31st January and 1st February 2017 by Henry Sturgess and Phil Bowater, both experienced ecologists, who are graduate members of the Chartered Institute of Ecology and Environmental Management. At the time of survey, the weather conditions were generally overcast and relatively mild, with a moderate wind and occasional rain showers.

1.1.3 Unless the client indicates to the contrary, information on the presence of species will be passed to the county biological records centre in order to augment their records for the area.

## 1.2 Report Aims

1.2.1 The aims of this report are:

- To identify and describe all potentially significant ecological effects associated with the proposed development
- To set out the mitigation measures required to ensure compliance with nature conservation legislation and to address any potentially significant ecological effects
- To identify appropriate enhancement measures

1.2.2 This report has been prepared to accompany a pre-application request and will be updated prior to a formal planning application submission.

## 1.3 Site Description Summary

1.3.1 The site is located approximately 1.4km south of the village of Wroughton, which itself lies south of Swindon, Wiltshire. The site predominantly comprised expanses of managed grassland between hardstanding runways.

1.3.2 The area within the application site boundary is approximately 19.9 hectares (ha) in size, and the approximate centre of the site was at OS Grid Ref. SU 137 789. The location of the site is shown in Figure 1 and an aerial image is shown in Figure 2. The aerial image was taken prior to the construction of the solar array to the south of the site, which was completed in 2016.

1.3.3 Beyond the site, the wider area comprised further grassland, runways, blocks of woodland and large hangar buildings with a number of auxiliary buildings. To the south of the site the land has been developed into a solar array.

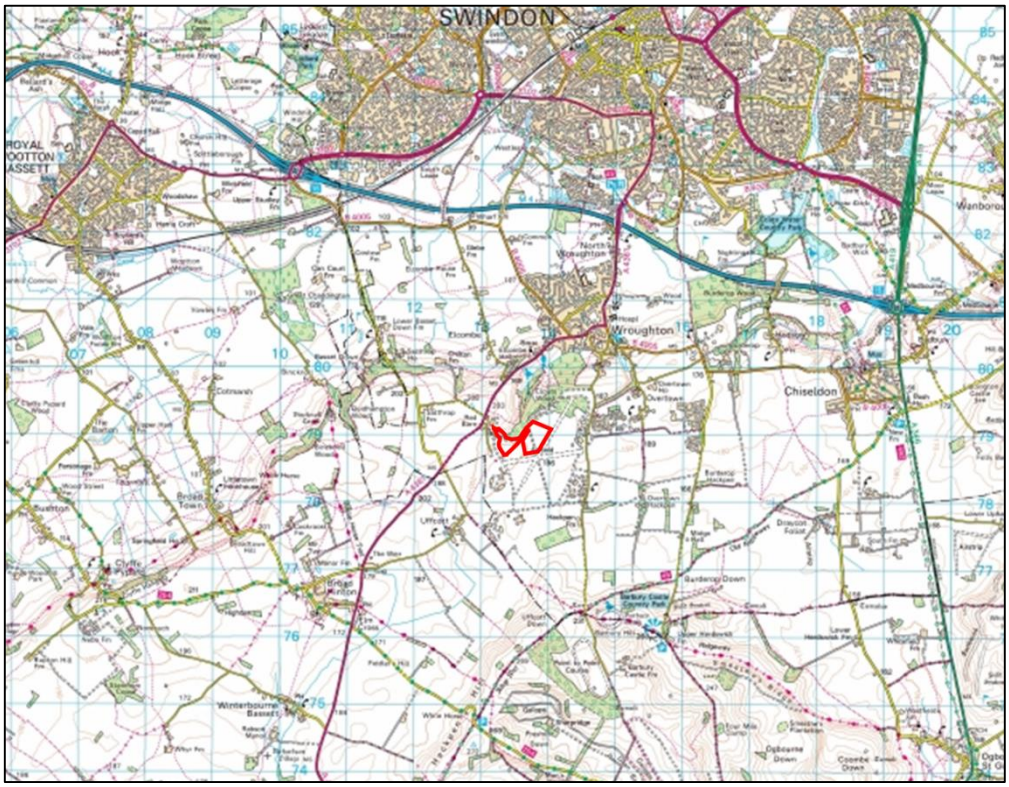



**Figure 1: Ordnance Survey Map Showing Location of Site (OS Licence 100050456)**


**Figure 2: Aerial photograph of Site boundary (©2017 Google)**

## 1.4 Development Proposals

1.4.1 The proposed development comprises the construction of a new purpose-built SMG collections management facility. The proposed site layout is shown in Figure 3.

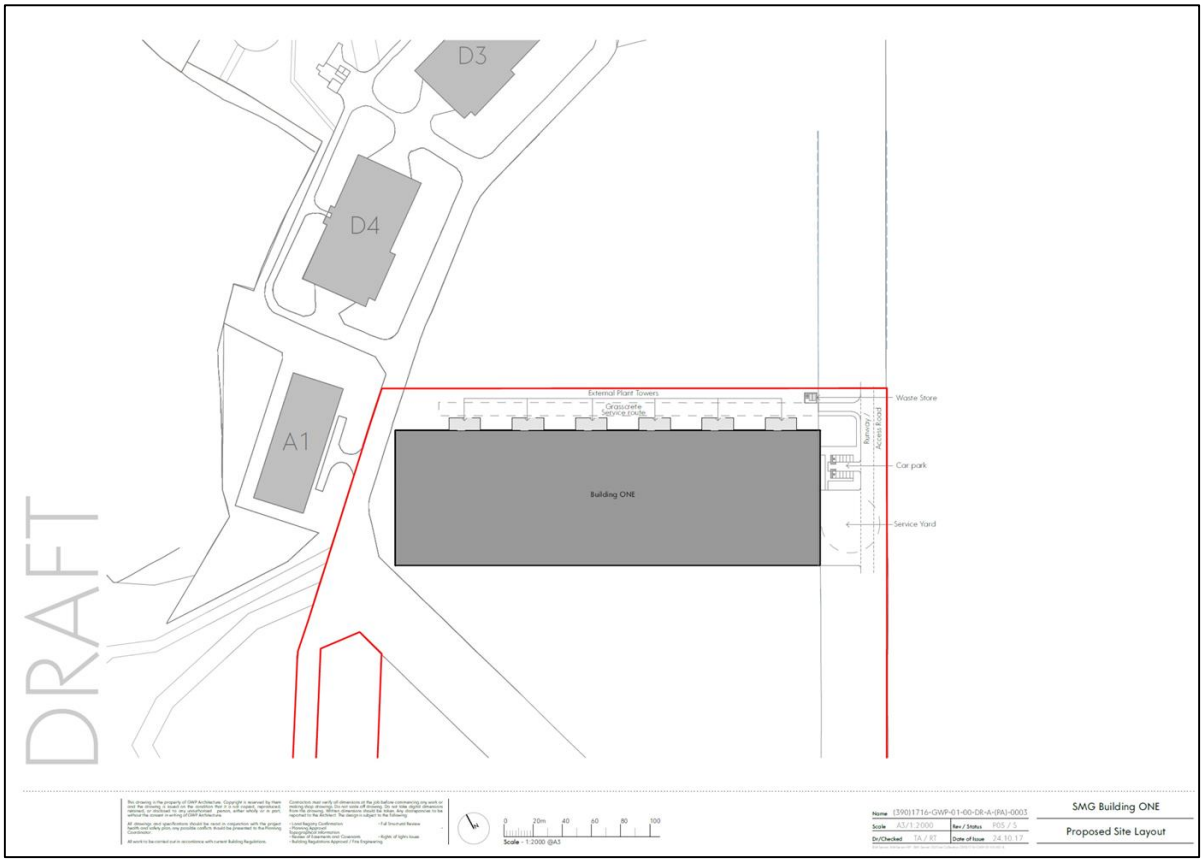



**Figure 3: Proposed Site Layout ((390) 1716-GWP-01-00-DR-A-(PA)-0003, prepared by GWP Architecture, October 2017**

# 2 SURVEY AND ASSESSMENT METHODOLOGY

## 2.1 Data Search

2.1.1 Statutory designated sites within proximity of the Site were identified using the Natural England/DEFRA web-based MAGIC database (www.MAGIC.gov.uk).

2.1.2 The Wiltshire and Swindon Biological Records Centre (WSBRC) was consulted for records of protected and notable species within 2km of the Site. The records centre was also asked to provide details of locally designated sites within 2km of the site.

2.1.3 Clarkson & Woods' in-house records were checked for ecological data occurring within 2km of the site boundary. This included information gathered during a suite of surveys Clarkson & Woods undertook between 2013 and 2015 to inform the solar farm development to the south of the site.

2.1.4 Ordnance Survey maps (1:25,000) and aerial images of the Site were examined online (bing.com/maps and maps.google.co.uk).

2.1.5 The Swindon Borough Local Plan 2026 – Swindon: Planning for our future" was consulted for details of planning policies relevant to designated sites, protected species and habitats, and general ecological and environmental protection.

## 2.2 Field Survey

***Personnel***

2.2.1 The ecological survey was undertaken by Henry Sturgess and Phil Bowater. Henry has 4 years; experience and a BSc in relevant subjects. Phil has over 3.5 years' experience and a BSc and MSc in relevant subjects. Both Henry and Phil are graduate members of the Chartered Institute of Ecology and Environmental Management and have been assessed under the Clarkson and Woods QA processes as competent to complete the survey.

***Habitats***

2.2.2 A habitat survey was carried out based on standard field methodology set out in the *Handbook for Phase 1 Habitat Survey* (2003 edition)[1].

2.2.3 Botanical names follow Stace (1997)[2] for higher plants and Edwards (1999)[3] for bryophytes.

2.2.4 Habitats are mapped following the codes and conventions described within the Phase 1 Habitat Survey Handbook.

## 2.3 Protected and Notable Species

2.3.1 Details of the legislative protection afforded to those protected species which have been identified as occurring or potentially occurring on the site are detailed in Appendix A.

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[1] Nature Conservancy Council. (1990 - 2003 edition). *Handbook for Phase 1 Habitat Survey – A Technique for Environmental Audit*, Joint Nature Conservation Committee
[2] Stace, C. (1997). *New Flora of the British Isles Second Edition*. Cambridge University Press
[3] Edwards, S.R. (1999). *English Names for British Bryophytes*. BBS, Cardiff

***Badgers***

2.3.2 A search was made for badger setts, and sett entrances were checked for signs of use by badgers or other mammals. Setts were classified into the following categories; Main, Subsidiary, Annexe or Outlying.

2.3.3 Sett entrances are counted and mapped to record tunnel direction and their relative level of usage.

2.3.4 Field signs such as 'snuffle holes' (holes dug by badgers when searching for invertebrates), pathways through vegetation, 'latrines' (small pits in which badgers deposit their faeces) and 'day nests' (nests of bedding material made by badgers for sleeping above ground) were also mapped.

***Bats***

2.3.5 The assessment of the suitability of the site for foraging and roosting bats was based on current guidance set out by the Bat Conservation Trust[4].

2.3.6 *Habitat:* the habitats within the site were appraised for their suitability for use by foraging and commuting bats. In particular, the connectivity of the habitats on site to those lying beyond was taken into account. Vegetated linear features are typically important for many species to navigate around the landscape, while the presence of woodland, scrub, gardens, grassland and wetland features increases a site's foraging resource value to bats. The potential for noise or lighting disturbance which may affect commuting links was also recorded.

***Dormice***

2.3.7 Any hedgerows, scrub and woodlands were assessed during the walkover for their suitability to support dormice *Muscardinus avellanarius*. Particular consideration was paid to the abundance of food sources within them, density for nesting and overnight shelter and the strength of connectivity to other suitable habitats leading off site. In addition, any direct sightings, nests or feeding signs during the site visit were also recorded. Where hazel *Corylus avellana* was recorded on site, a search for gnawed hazelnuts was conducted.

***Amphibians***

2.3.8 All waterbodies within 500m of the Site were identified using Ordnance Survey maps and aerial imagery.

2.3.9 Where suitable water bodies were identified on accessible land a Habitat Suitability Index (HSI) score was calculated for each one following the methodology described by Oldham et al[5]. HSI scores give a relative indication of the likelihood that a water body would support breeding great

[4] Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London. ISBN-13 978-1-872745-96-1.
[5] Oldham. R.S., Keeble L., 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.

crested newts. Factors which increase these scores include the presence of other ponds nearby, water quality, pond size, absence of fish/waterfowl, vegetation cover and shading.

2.3.10 Terrestrial habitats were also assessed for their suitability for foraging and sheltering amphibians. Amphibians require habitats such as grassland, scrub, woodland and hedgerows for dispersal and hibernation. Further hibernation features include buried rubble and logs, or mammal burrows.

***Reptiles***

2.3.11 Features on site were assessed for their potential to provide suitable habitats for use by reptile species. These include rough, tussocky grassland, scrub, disturbed land or refugia such as wood piles, rubble or compost heaps. Where present, suitable existing refugia were inspected for sheltering reptiles, and the ground was scanned whilst walking to look for basking species.

***Birds***

2.3.12 Any buildings and vegetation were surveyed for signs of use by nesting birds and any birds seen or heard during the survey were noted. The site's potential to support bird species of particular conservation concern (i.e. Schedule 1, NERC S41 and Red List species) was assessed, taking into consideration the bird species assemblage observed during the survey, the habitats present on and around the site, the context of the site in the wider landscape and the results of the desk study.

***Invasive Species***

2.3.13 Invasive species, such as Japanese knotweed *Fallopia japonica* and Himalayan Balsam *Impatiens glandulifera* were searched for and recorded.

***Other Notable Species and Species of Conservation Concern***

2.3.14 Field signs indicating the presence of other species of conservation concern, such as hares *Lepus europaeus,* harvest mice *Micromys minutus* and hedgehogs *Erinaceus europaeus* (Species of Principal Importance under the NERC Act (2006)) were recorded. Habitats were also assessed for their potential to support such species.

## 2.4 Quality Assurance

2.4.1 All ecologists employed by Clarkson and Woods are members of the Chartered Institute of Ecology and Environmental Management (CIEEM) and follow the Institute's Code of Professional Conduct[6] when undertaking ecological work.

2.4.2 The competence of all field surveyors has been assessed by Clarkson and Woods with respect to the CIEEM Competencies for Species Survey (CSS)[7].

[6] CIEEM (2013). *Code of Professional Conduct*. www.cieem.net/professional-conduct.
[7] CIEEM (2013). *Competencies for Species Survey (CSS)*. www.cieem.net/competencies-for-species-survey-css-

2.4.3 This report has been prepared in accordance with the relevant British Standard: *BS42020: 2013 – Biodiversity: Code of Practice for Planning and Development*[8].

## 2.5 Ecological Evaluation

2.5.1 The evaluation of ecological importance builds upon the criteria provided within the CIEEM guidelines for Ecological Impact Assessment (2016)[9] and the Criteria for Nature Conservation Evaluation described by Ratcliffe (1977)[10]. These criteria are described further in Appendix B. With due consideration to the evaluation criteria ecological receptor importance is then classified on a scale between 'International' and 'Site' importance with an additional Negligible category included for those features which are of no intrinsic ecological value. Where further information is required to determine the true importance of a species or habitat present the importance of the receptor is marked as 'unknown'.

[8] The British Standards Institution (2013*). BS42020: 2013 – Biodiversity: Code of Practice for Planning and Development*. BSI Standards Ltd.
[9] *CIEEM (2016) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd edition.* Chartered Institute of Ecology and Environmental Management. www.cieem.net
[10] Ratcliffe, D.A. (1977). *A Nature Conservation Review*, Cambridge University Press

# 3 SURVEY LIMITATIONS

## 3.1 Desk Study

3.1.1 The data presented within the report should not be seen as exhaustive. Data obtained from within the search area is highly unlikely to constitute a complete record of habitats and species present within the search area. It is therefore possible that protected species may occur within the vicinity of the proposed development site that have not been identified within the desk study.

3.1.2 The data presented within the desk study section of this report constitutes a summary of the data obtained from the local records centre. Should additional detail be required on any of the records described within this report Clarkson and Woods Ltd. should be contacted.

## 3.2 Badgers

3.2.1 Areas with dense ground cover (hedges, scrub, woodland etc. were examined closely. If impenetrable vegetation prevented entry then the perimeter was examined in order to detect badger paths suggesting a hidden sett within the area. It cannot be guaranteed that all the entrances have been located, especially if a small sett is currently inactive or used seasonally and concealed in an area of thick scrub. Badgers may dig new holes and create new setts in a very short space of time.

## 3.3 General

3.3.1 Although the survey was conducted in **January**, which is outside the optimal time for a Phase 1 habitat survey (April to October inclusive), it was possible to adequately classify and assess the nature conservation value of the habitats involved. Although particular groups of species such as flowering herbs and spring ephemerals may have been under-recorded or missed, considering the habitats recorded on the site, noteworthy species were unlikely to have been missed. An extensive species list was not collected but species characteristic of the recorded habitats were recorded.

3.3.2 This survey offers only a single 'snapshot' of the site and takes no account of seasonal differences, or of any species which might choose to take up residence subsequently. At the same time a lack of signs of any particular species does not confirm its absence, merely that there was no indication of its presence during this survey.

3.3.3 If no action or development of this land takes place within twelve months of the date of this report, then the findings of this survey should be reviewed and may need to be updated. After three years the findings will be out of date and the full survey should be repeated.

# 4 RESULTS

## 4.1 Data Search – Designated Sites

***International Designations within 5km of the Site***

4.1.1 No Internationally designated sites were identified within 5km of the application site.

***National Designations within 2km of the Site***

4.1.2 Clouts Wood Site Special Scientific Interest (SSSI) is located approximately 80m beyond the north east of the survey area. It is owned partly by the Science Museum Group and partly by a neighbouring landowner. This 11.78ha site is designated due to its diverse, predominately ancient woodland. Species predominantly comprised ash Fraxinus excelsior and field maple Acer campestre with mature oak Quercus robur standards, formerly coppiced Wych elm Ulmus glabra, cherry Prunus sp., aspen Populus sp, lime Tilia sp. and areas of English elm Ulmus minor var. vulgaris on the valley floors. There was also a hazel Corylus avellana understory with some areas managed through coppicing. Several species of nationally restricted distribution were found amongst the ground flora and a diverse faunal community of woodland birds and invertebrates is present.

***Local Designations within 1km of the Site***

4.1.3 Markham Banks West LWS is located approximately 25m north of the site, and west of Clouts Wood SSSI. This comprises unimproved calcareous grassland on a steep east-facing chalk bank, with a smaller area west-facing. The site also includes flatter damp mesotrophic grassland and scrub woodland and an area of wetland around a spring.

4.1.4 The L3 and L4 Chalk Grassland Local Wildlife Site (LWS) is located, approximately 190m south of the site. This is a mixture of calcareous and neutral species rich grassland with areas of mesotrophic grassland.

4.1.5 Wroughton East LWS is located approximately 330m north of the site and is designated for its calcareous grassland habitat.

4.1.6 Markham Banks East LWS is located approximately 400m north of the site. This is cited as a small chalk coombe containing unimproved species rich calcareous and mesotrophic grassland.

4.1.7 Chilcot Wood LWS is located approximately 500m north west of the site and is a small area of deciduous woodland composed mainly of beech standards.

4.1.8 Coombe Bottom LWS is located approximately 800m north east of the survey area, beyond Priors Hill road. This comprises a narrow valley containing calcareous and mesotrophic grassland with scrubby woodland

4.1.9 The site is within the North Wessex Downs Area of Outstanding Natural Beauty. It lies within the Downs Plain and Scarp Landscape Character type which comprises the low lying chalk plain and a northern scarp with The Ridgeway running along the top. The Downs Plain is made up of

large arable fields, whilst the scarp encompasses broadleaved woodland, pasture and chalk grassland.

## 4.2 Data Search – Protected and Notable Species

**Data obtained from Wiltshire and Swindon Biological Records Centre**

4.2.1 A total of 119 records of badger were identified by the local record centre within 2km of the site and since 2000.

4.2.2 There are records of common pipistrelle *Pipistrellus pipistrellus* and brown long-eared bat *Plecotus auritus* roosts from 1985 and 1986 from approximately 1.9km north of the site. A serotine *Eptesicus serotinus* roost was identified in 1990 2km north of the site.

4.2.3 Several bat roosts were identified in nearby buildings during surveys undertaken by Chalkhill Environmental Consultants in 2003 and 2005. These are summarised in Table 1:

**Table 1: Findings of Bat Surveys undertaken in 2003/2005**

| Building | Search survey results 2003 and 2005 | Emergence survey results July 2005 | Species and roost type |
|---|---|---|---|
| Engineering Building | 2003: no signs<br>2005: pipistrelle roost in south wall | c.30 common pipistrelle bats seen to emerge from roost in south wall | Common pipistrelle – suspected maternity roost |
| Stores Building | 2003: no signs<br>2005: one brown long-eared bat & c.100 droppings in attic; two pipistrelle bats roosting in external door lintel | Two common pipistrelle bats seen to emerge from door lintel | Brown long-eared bat– suspected male summer roost<br>Common pipistrelle – suspected male summer roost |
| Western gatehouse – attic | 2003: several dozen bat droppings<br>2005: several 100 bat droppings | No bats seen to emerge | Brown long-eared bat– roost type unknown |
| Swindon Model Aeroplane Club – attic | 2003: several droppings<br>2005: 100 + droppings | One suspected pipistrelle bat emerged from roof structure | Brown long-eared bat– roost type unknown<br>Suspected pipistrelle bat – roost type unknown |
| St. John Ambulance Station – attic | 2003: several dozen droppings<br>2005: not surveyed | Not surveyed | Brown long-eared bat– roost type unknown |
| House nearest Hangar L4 – attic | 2003: several droppings<br>2005: not surveyed | No bats seen to emerge | Suspected brown long-eared bat – roost type unknown |

| Building | Search survey results 2003 and 2005 | Emergence survey results July 2005 | Species and roost type |
|---|---|---|---|
| Decontamination building – attic | 2003: several droppings<br>2005: not surveyed – unsafe | Not surveyed | Suspected brown long-eared bat – roost type unknown |
| MG Office – attic | 2003: c.12 droppings 2005: as 2003 | No bats seen to emerge | Unidentified |
| Two houses by Hangar D3 – attic | 2003: several droppings<br>2005: as 2003 | No bats seen to emerge | Unidentified |

4.2.4 There are records of slow worm *Anguis fragilis* from Clouts Wood to the north of the site from a survey carried out in 2008. A record of grass snake *Natrix natrix* also exists from 1985 within the same area.

4.2.5 There are records of invertebrate Species of Principal Importance (NERC Act) since 2000. Records from L3 and L4 Chalk Grassland LWS to the south west of the site include small heath butterfly *Coenonympha pamphilus*. Records from Clouts Wood SSSI to the north of the site include species such as Southern yellow splinter fly *Lipsothrix nervosa* and cinnabar moth *Tyria jacobaeae*.

***MAGIC search for EPS Licences***

4.2.6 Two European Protected Species (EPS)Licenses have been granted within 2km of the site as revealed by the MAGIC website:

- EPSM2013-5437 -Located close to the site and granted in April 2013 to allow damage and destruction of a resting place of common pipistrelle *Pipistrellus pipistrellus* and soprano pipistrelle *Pipistrellus pygmaeus*
- 2014-1149-EPS-MIT-1 - Located approximately 1.8km north east of the site. Granted in October 2014 to allow the destruction of a resting place of common pipistrelle.

**Clarkson and Woods In-house records**

4.2.7 The following records are based on surveys carried out in 2013 for the proposed development at land to the south of the site into a solar farm.

4.2.8 Badgers – a number of active badger setts along with several field signs were recorded in the south west corner of the solar array during 2013 and an updated survey in 2015.

4.2.9 Bats – unspecified bat droppings were recorded within a small elder at the far south eastern boundary of the solar array, (approximately 750m away) indicating the presence of a roost.

4.2.10 Birds – The following bird species shown in Table 2 were recorded at the within the solar array land during surveys undertaken in 2013, and are listed under the UK Biodiversity Action Plan[11], Species of Principal Importance (SPI)[12] or BTO Birds of Conservation Concern red/amber lists[13]:

**Table 2: Bird species recorded in the solar array land during 2013**

| Species | Latin | Designation |
|---|---|---|
| Bullfinch | *Pyrrhula pyrrhula* | BTO Amber list, UKBAP Priority Species, SPI |
| Corn bunting | *Emberiza calandra* | BTO Red list, UKBAP Priority Species, SPI |
| Dunlin | *Calidris alpina* | BTO Red list |
| Fieldfare | *Turdus pilaris* | BTO Red list |
| Hen harrier | *Circus cyaneus* | BTO Red list, UKBAP Priority Species, SPI |
| Herring Gull | *Larus argentatus* | BTO Red list, UKBAP Priority Species, SPI |
| House sparrow | *Passer domesticus* | BTO Red list, UKBAP Priority Species, SPI |
| Kestrel | *Falco tinnunculus* | BTO Amber list |
| Lapwing | *Vanellus vanellus* | BTO Red list, UKBAP Priority Species, SPI |
| Lesser Black-backed Gull | *Larus fuscus* | BTO Amber list |
| Linnet | *Carduelis cannabina* | BTO Red list, UKBAP Priority Species, SPI |
| Meadow pipit | *Anthus pratensis* | BTO Amber list |
| Redshank | *Tringa totanus* | BTO Amber list |
| Redstart | *Phoenicurus phoenicurus* | BTO Amber list |
| Skylark | *Alauda arvensis* | BTO Red list, UKBAP Priority Species, SPI |
| Snipe | *Gallinago gallinago* | BTO Amber list |
| Song Thrush | *Turdus philomelos* | BTO Red list, UKBAP Priority Species, SPI |
| Starling | *Sturnus vulgaris* | BTO Red list, UKBAP Priority Species, SPI |
| Yellowhammer | *Emberiza citrinella* | BTO Red list, UKBAP Priority Species, SPI |

4.2.11 Amphibians – great crested newt *Triturus cristatus* surveys were undertaken in April and May 2013 at a garden pond located in the south west of the site close to hangar L3. No great crested newts were recorded during any of the surveys but smooth newts *Lissotriton vulgaris* and toads *Bufo bufo* were present in the pond.

[11] Species identified as being most threatened and requiring conservation under the UK Biodiversity Action Plan. UK BAP Species are not legally protected, however local governments are obliged to have due regard to the presence and conservation status of these species through the planning process and mitigation/enhancements for them may be recommended.

[12] Species of Principal Importance (SPI) are listed in Schedule 41 of the Natural Environment and Rural Communities (NERC) Act as requiring action under the UK Biodiversity Action Plan

[13] Red list species are those that are globally threatened, whose population or range has declined rapidly in recent years (i.e. >50% in 25 years), or which have declined historically and not recovered. Amber list species are those whose population or range has declined moderately in recent years (>25% but <50% in 25 years) declined historically but recovered recently, rare breeders (fewer than 300 pairs), internationally important populations in the UK, localised populations and those with an unfavourable conservation status in Europe.

4.2.12 Other notable species - brown hare *Lepus europaeus* was recorded throughout the site during 2013. A peak count of 8 individuals was recorded during a breeding bird survey conducted on 29/04/2013.

## 4.3 Planning Policy

4.3.1 The following policy within the Swindon Borough Local Plan (2026) is relevant to onsite ecology:

*Policy EN1: Green Infrastructure Network*

> *a. In accordance with the Swindon Borough Green Infrastructure Strategy, development shall protect and enhance green infrastructure and assets as identified …. This includes the requirement that development must provide for the protection and integration of visually or ecologically important existing trees, hedges and woodlands. Development that would result in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees found outside ancient woodland will only be permitted where the need for, and benefits of, the development in that location clearly outweigh the loss.*
>
> *b. Development shall provide and design green infrastructure to integrate with existing green corridors identified on the Policies Map, to maximise its connections and functions and ensure the sustainable maintenance and management of it.*

*Policy EN4: Biodiversity and Geodiversity*

> *a. Development will avoid direct and indirect negative impacts upon biodiversity and geodiversity sites as identified on the Policies Map. This will be achieved through sensitive site location and layout, and by maintaining sufficient buffers and ecological connectivity with the wider environment. Damage or disturbance to local sites will generally be unacceptable, other than in exceptional circumstances where it has been demonstrated that such impacts are: unavoidable and reduced as far as possible or are outweighed by other planning considerations in the public interest, and where appropriate compensation measures can be secured*
>
> *b. All development, where appropriate, shall protect and enhance biodiversity and provide net local biodiversity gain. Where this is demonstrably not achievable, mitigation and compensation measures will be agreed.*

## 4.4 Data Search – Local Conservation Priorities

4.4.1 The following habitats have targeted action plans within the Wiltshire Biodiversity Action Plan (2008), and are considered relevant to the site.

***Habitats***

- *Woodland*
- *Farmland Habitats*

4.4.2 260 species are listed as priorities within this BAP, but do not have specific action plans. Species particularly relevant to the site include skylark and brown hare.

4.4.3 These habitats and species, including those listed within the Wiltshire BAP but which currently have no specific action plan, have been identified as local conservation priorities and therefore will be given appropriate additional weight within the site ecological evaluation.

## 4.5 Survey Results

4.5.1 The results of the ecological survey are included in map form on Figure 5. Habitats are mapped following the codes and conventions described within the Phase 1 Habitat Survey Handbook.

## 4.6 Habitats

***Improved Grassland***

4.6.1 Part of the survey area, including much of the development footprint comprised species-poor agriculturally improved grassland. These areas were dominated by perennial ryegrass with some cock's foot also noted.

***Semi-improved Grassland***

4.6.2 This was the most frequently encountered habitat within the survey area and immediately surrounding land and was present in large parcels of land between runways. The development footprint partially consisted of this habitat as well as improved grassland

4.6.3 In general, this habitat was slightly calcareous in character and contained a relatively high diversity of grasses with some forb species, although this was spread across a large area and signs of agricultural improvement were apparent. The habitat was managed through sheep grazing. Species commonly encountered within this habitat across the survey area included red fescue *Festuca rubra*, perennial ryegrass *Lolium perenne*, sweet vernal grass *Anthoxanthum odoratum*, red clover *Trifolium pratense*, cock's foot *Dactylis glomerata*, common bird's-foot trefoil *Lotus corniculatus* and creeping buttercup *Ranunculus repens*.

4.6.4 Other species that were occasionally encountered in some parts but were absent elsewhere included tufted hair-grass *deschampsia cespitosa*, common mouse ear *Cerastium fontanum,* dove's-foot cranesbill *Geranium molle*, common knapweed *Centaurea nigra*, creeping bent *Agrostis stolonifera*, hairy violet *Viola hirta*, meadow foxtail *Alopecurus pratensis* false oat grass *Arrhenatherum elatius*, ribwort plantain *Plantago lanceolata*, greater plantain *Platago major* and common couch *Elymus repens*. Species occasionally encountered within the sward included ragwort *Jacobaea vulgaris*, dandelion *Taraxacum* agg. Nettle Urtica *dioica*, spear thistle *Cirsium vulgare*, teasel *Dipsacus fullonum*, hedge bedstraw *Galium mollugo*, yarrow *Achillea millefolium* crested dog's-tail *Cynosurus cristatus*, field speedwell *Veronica persica*, daisy *Bellis perennis* and self-heal *Prunella vulgaris*.

4.6.5 Generally the semi-improved grassland within the site was not uniform in diversity with patches of moderate diversity and an abundance of flowering species as well as areas of relatively low diversity. The footprint of the proposed building was not noted to be one of the areas supporting a particularly high diversity of species.

***Poor Semi-improved grassland***

4.6.6 Areas of managed grassland surrounding buildings to the north of the site were managed as per the rest of the semi-improved grassland and contained similar species within the sward. However

these areas were noted to be less florally diverse and as such were considered to represent poor semi-improved grassland. This habitat was present immediately north of the site.

***Plantation Woodland***

4.6.7 A block of new plantation woodland was present adjacent to the northern site boundary. The woodland in this area was approximately 12 years old and comprised native broadleaved species including oak *Quercus robur*, silver birch *Betula pendula*, field maple *Acer campestre*, guelder rose *Viburnum opulus*, bird cherry *Prunus padus*, alder *Alnus glutinosus*, lime *Tilia x europaea*, holly *Ilex aquifolium* and hazel *Corylus avellana*.

4.6.8 At ground level, this habitat contained coarse, tussocky grassland at the base of planted trees. These areas contain a small diversity of rank grasses (dominated by cock's foot) which was not regularly managed, with a resulting layer of thatch present.

***Hardstanding***

4.6.9 Concrete and tarmac hardstanding was present at the site in the form of wide runways and service/parking areas around buildings.

## 4.7 Protected Species and Species of Conservation Concern

***Badgers***

4.7.1 No badger setts were recorded within the survey area. A small number of field signs in the form of badger foraging pits were found in the woodland beyond the northern site boundary. A number of badger setts are known to be present elsewhere within the wider area and it is likely that the grassland and woodland within the site contributes to the foraging grounds of local badger groups.

***Bats***

Roosting

4.7.2 No features or structures were noted within the site that could provide potential roost sites for bats

Foraging/commuting

4.7.3 The managed, open grassland habitats and hardstanding within the site do not represent optimal habitat for foraging/commuting bats. The young woodland habitat adjacent to the northern site boundary is more likely to be used by bats for foraging and navigating through the landscape in conjunction with the wider area.

***Dormice***

4.7.4 The broadleaved woodland within Clouts Wood SSSI to the north of the site provides suitable habitat for dormice, including the structural and species diversity of woodland flora required to sustain a population of this species if present.

4.7.5 Given the young age of the planted woodland adjacent to the north of the site, it is unlikely that this area would currently support dormice populations throughout the year. It is possible that

small numbers of dispersing dormice could use this area if a population is present in Clouts Wood, due to its strong connectivity to this area of woodland.

***Amphibians***

4.7.6 One pond is present within 500m of the site, which is a small garden pond at a residential property approximately 190m south west of the site. A great crested newt survey was undertaken in April/May 2015[14], which found no evidence of great crested newts within this pond. The survey found the pond to be used by small numbers of smooth newt *Lissotriton vulgaris*, common toad *Bufo bufo*, and goldfish.

4.7.7 No other ponds were identified within 500m of the survey area.

4.7.8 The young plantation woodland habitat adjacent to the site was considered suitable terrestrial habitat for amphibians such as common toad and common frog *Rana temporaria*. However, due to its relative isolation from aquatic habitats, it is unlikely that amphibians would be present in high numbers. The semi-improved/improved grassland areas are subject to regular management and disturbance and are unlikely to be of high value for amphibians during their terrestrial phase.

***Reptiles***

4.7.9 Suitable habitat for reptiles was restricted to the area of young plantation woodland habitat with coarse grassland understorey adjacent to the north of the site, which provided opportunities for basking, foraging and sheltering/hibernation required to sustain populations of reptiles. These habitats could potentially support a populations of widespread reptile species such as slow worm *Anguis fragilis*. However, this habitat has only recently been established (within the last 15-10 years), and it is possible that reptiles have not yet dispersed into these areas, particularly slow worms which have very small home ranges.

4.7.10 The large open areas of semi-improved grassland that dominate the site are likely to be less valuable for reptiles. These have been managed for arable/ley in the recent past, and have been subjected to regular disturbance and ground movement, which are likely to dissuade reptiles from inhabiting them and prevent populations establishing.

***Birds***

4.7.11 A number of farmland and woodland birds were either seen or heard during the survey. Bird activity was largely concentrated at woodland areas beyond the site boundary, although groups of birds of open farmland (namely skylark) were recorded within the large, open parcels of grassland in between the runways. Previous surveys of the area have confirmed the land immediately to the south is important to a number of notable species, in particular breeding skylark; corn bunting; linnet; yellow hammer; whitethroat; and meadow pipet. Wintering surveys also confirmed an abundance of winter thrushes and starlings within the site.

[14] Great Crested Newt Survey – Wroughton Airfield (May 2015) Clarkson and Woods

4.7.12 The woodland adjacent to the site represents suitable bird nesting habitat. Depending on the management of the open grassland areas at the site, they could also provide the necessary sward structure and open sightlines required by ground nesting birds of open farmland, such as skylark.

4.7.13 Species recorded on site during the survey are provided in Table 4:

**Table 4 Bird Species Recorded During the Field Survey**

| Species | Latin | Behaviour |
|---|---|---|
| Skylark | *Alauda arvensis* | Singing and displaying over open grassland |
| Pheasant | *Phasianus colchicus* | Foraging across grassland |
| Buzzard | *Buteo buteo* | Flying over the north of the site |
| Carrion crow | *Corvus corone* | Foraging close to large hangars |
| Chaffinch | *Fringilla coelebs* | Individuals frequently seen at woody vegetation and buildings across the site |
| Magpie | *Pica pica* | Small numbers seen at woodland edges |
| Song thrush | *Turdus philomelos* | Heard calling in Clouts Wood |
| Blue tit | *Cyanistes caeruleus* | Several individuals recorded within woodland areas |
| Great tit | *Parus major* | Several individuals recorded within woodland areas |
| Jay | *Garrulus glandarius* | Small numbers present within woodland areas |

***Invertebrates***

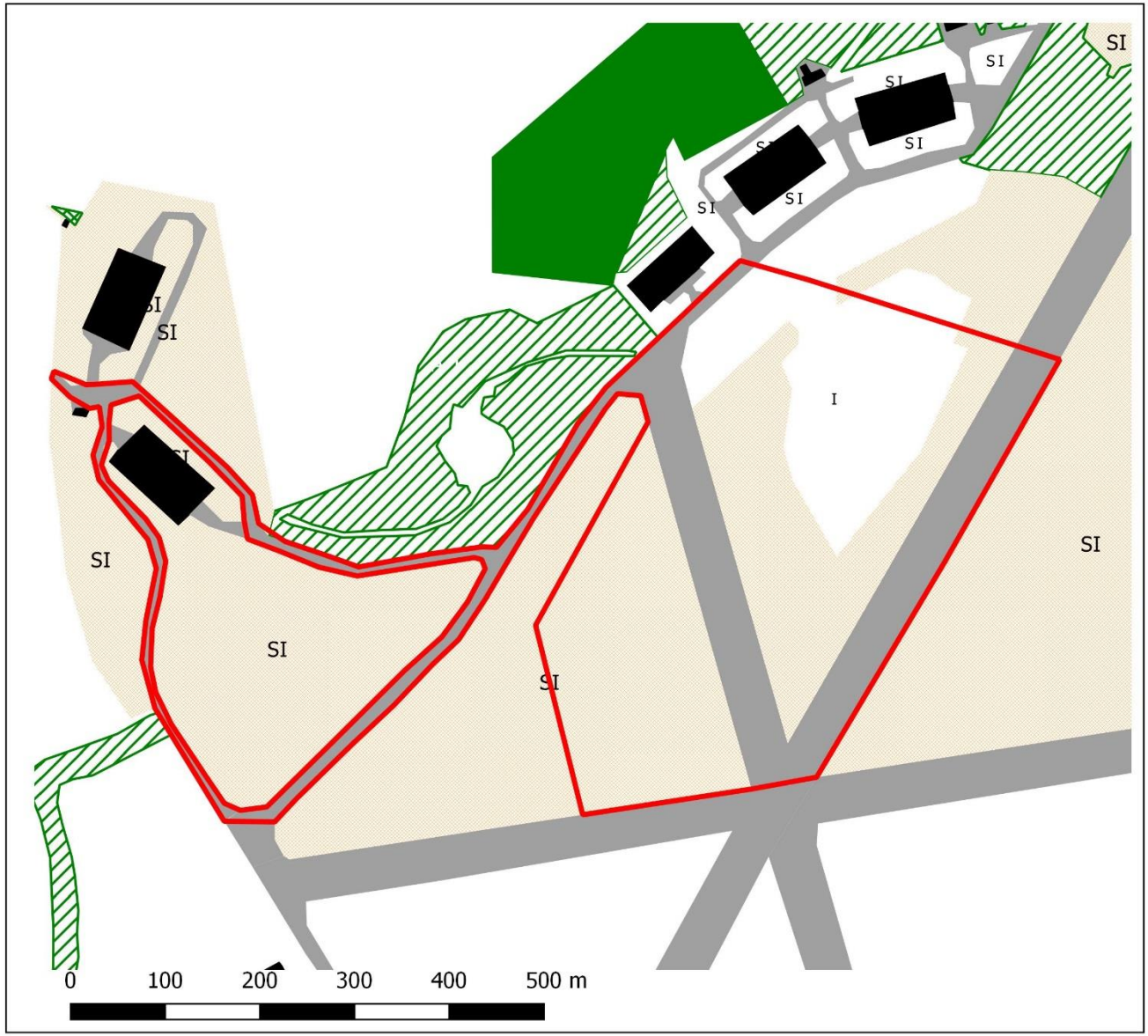
4.7.14 The habitats present at the site are likely to support a range of invertebrate species typical of farmland and woodland habitats. The grassland and woodland areas generally contained a low diversity of flowering species, although be of some value for assemblages of pollinating insects such as bees and members of the *Lepidoptera* order.

***Other Protected Species, Species of Conservation Concern and Invasive Species***

4.7.15 Several brown hares were recorded during the survey, within the large areas of open semi-improved grassland between runways.

4.7.16 The woodland edge habitats adjacent to the site are likely to support hedgehogs year round. Opportunities for nesting, foraging and sheltering were all present at this habitat to the north of the site.

4.7.17 Both hedgehog and brown hares are listed as Species of Principal Importance




Key

- Red line boundary
- Building
- Hardstanding
- I Improved grassland
- SI Semi-improved Grassland
- SI Poor Semi-improved Grassland
- Broadleaved Plantation Woodland
- Broadleaved Plantation Woodland

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| | |
|---|---|
| Project<br>**Building ONE, SMG Wroughton, Wiltshire** | |
| Title<br>**Extended Phase 1 Habitat Map** | |
| Project Number<br>**5824** | Figure Number<br>**Figure 4** |
| Scale<br>**See scalebar** | Date<br>**23/10/17** |

# 5 ECOLOGICAL EVALUATION

5.1.1 This section provides an analysis of the value of ecological receptors (the designated sites, habitats and protected species) identified as actually or potentially occurring within or in proximity of the site. The valuation of the receptor reflects its legal protection, rarity and conservation status as well as its relative abundance on site and whether it is identified as a local or national conservation priority. Where appropriate the social and economic importance of ecological receptors has also been considered.

**Table 5: Ecological Evaluation**

| Ecological Receptor | Description/Comments | Ecological Importance |
|---|---|---|
| **Designated Sites** | | |
| Clouts Wood SSSI | Ancient woodland, situated approximately 80m north of the site. Diverse woodland habitat. | **National** Importance |
| Markham Banks West LWS | Unimproved calcareous, species-rich grassland. Located approximately 25m north of the site. | **County** Importance |
| L3 and L4 Chalk Grassland LWS | Comprises a parcel of land approximately 190m south west of the site. Supports a diverse range of calcareous grassland species. | **County** Importance |
| Wroughton East LWS | Species-rich calcareous grassland, 330m north of the site. | **County** Importance |
| Markham Banks East LWS | Located approximately 400m north of the site. Comprises species-rich calcareous and neutral grassland. | **County** Importance |
| Chilcot Wood LWS | Broadleaved woodland habitat, 500m north west of the site. | **County** Importance |
| Coombe Bottom LWS | Calcerous and neutral grassland habitat with scrubby woodland, 80mm north east of the site at the closet point. | **County** Importance |
| **Habitats** | | |
| Semi-improved grassland | Generally large, open parcels of managed grassland, with moderate floristic diversity. In view of the large, open nature of the habitat its importance is elevated. | **Local** importance |

| Ecological Receptor | Description/Comments | Ecological Importance |
|---|---|---|
| Poor semi-improved grassland | Generally heavily managed and of lower floristic diversity than grassland elsewhere. Adjacent to the north of the site. | **Site** Importance |
| Improved grassland | Present in certain areas of the large grassland parcels, these areas were well managed and dominated by one or two grass species. | **Site** Importance |
| Plantation woodland | Relatively recent planted woodland containing native species of benefit to wildlife. Importance expected to increase with time. | **Local** Importance |
| Hardstanding | Concrete and tarmac tracks and service areas around the site. | **Negligible** importance |
| **Species** | | |
| Badgers | Small number of signs of activity present at woodland adjacent to the north of the survey area. Several setts known to be present elsewhere in the wider landscape. Site provides opportunities for foraging. | **Site** Importance |
| Bats | No potential for roost sites within the site. Suitable foraging / commuting habitat restricted to woodland at site boundaries. Development area of very limited value. | Likely to be **Site** Importance in view of sub-optimal nature of habitat |
| Dormice | Potential for established population at Clouts Wood. Potential for young woodland adjacent to the site to be used opportunistically by dispersing individuals. Development area unsuitable | Negligible but surrounding woodland likely to be District Importance if present. |
| Amphibians | Habitats within the survey area, particularly the adjacent woodland, likely to be used by small numbers of widespread amphibians. Open grassland provides some limited opportunities but lacks shelter. | **Site** Importance |
| Reptiles | Suitable habitat restricted to young woodland in the north of the site. Open grassland provides some limited opportunities but lacks shelter. | **Site** Importance |

| Ecological Receptor | Description/Comments | Ecological Importance |
|---|---|---|
| Birds | The survey area was found to support a moderate assemblage of farmland and woodland birds over winter including several of conservation concern. Suitable habitat for ground nesting birds is present within the site. | Likely to be **Local** Importance for birds. Further surveys may be necessary to confirm this. |
| Invertebrates | Young woodland and grassland likely to support typical farmland assemblages. Site is fairly homogeneous and lacking in diversity of structure limiting importance to invertebrates. | Likely to be of **Site** Importance |
| Brown hare | Several individuals recorded on site using large grassland areas between runways. | **Local** Importance |
| Hedgehogs | Not recorded at the site, although suitable habitat present at woodland and edge habitats adjacent to the north of the site. Site unlikely to be of importance due to lack of sheltering opportunities. | **Negligible** Importance. |

# 6 ASSESSMENT AND RECOMMENDATIONS FOR MITIGATION AND ENHANCEMENT

## 6.1 Introduction

6.1.1 This section considers the effects of the proposed development upon the ecological receptors identified in Section 5. Avoidance, mitigation and compensatory measures are then described to ensure adverse effects associated with the construction and operation of the proposed development can be eliminated or reduced as far as possible. Recommendations are also provided for any further work that might be required as well as suggestions for ecological enhancement measures that would be appropriate within the development in line with the National Planning Policy Framework.

## 6.2 Details of Proposed Development

6.2.1 This assessment has been based upon the Proposed Site Layout ((390) 1716-GWP-01-00-DR-A-(PA)-0003, prepared by GWP Architecture, October 2017 (see Figure 3).

6.2.2 The proposed development comprises the construction of a collections management facility. The building will mainly be used to house collections belonging to the SMG, although ancillary stores, workshops and welfare rooms will be provided within the building. The new facility will cover an area of 2.6ha, with some additional areas around the building expected to be given to grasscrete service routes. The existing hardstanding runway will be used for main access, car parking and service yards. A small waste store will also be created in the north west of the site adjacent to the runway.

6.2.3 The parcel of grassland beyond the runway to the south west of the proposed building has been identified as a potential site for drainage features. It is currently unknown what, if any, drainage requirements will be necessary. Although significant ecological impacts are unlikely to arise as a result of the creation of new drainage features, this assessment will need to be reviewed once requirements for drainage have been established.

6.2.4 Following construction, the operation of the facility will generate an inherent level of background disturbance given the likely increase in visitors and human activity in and around the building. It is anticipated that on average 35 vehicles per day would arrive at the operational site. Overall, this is not expected to be significantly greater than typical activities which currently occur at the nearby hangar buildings and elsewhere within wider area.

## 6.3 Designated Sites

6.3.1 Clouts Wood SSSI lies 80m to the north of the site. The development footprint is expected to be around 100m away from the edge of the SSSI, which is considered to be of sufficient distance that no direct impacts would be anticipated on the SSSI as a result of the development. Similarly, Markham Banks West is situated approximately 25m to the northern of the site at the closest point, although the distance between this and the development footprint is approximately 220m.

6.3.2 There is a risk of the development having indirect detrimental impacts on the ecological integrity of the SSSI, for instance through disturbance to wildlife at the edge of the woodland due to increased noise, dust, vibrations and personnel/machinery activity during the construction phase. However, the significant distance between the construction footprint and the SSSI, as well as the presence of existing, in-use hangar buildings and access road between the two sites and the development site, means that any such impact is likely to be minor at most. Potentially impacting work is most likely to occur during the construction phase of the hangar, although it is anticipated that this can be managed to reduce impacts through the implementation of a Construction Environmental Management Plan (CEMP). This should be prepared to set out precautionary measures to be adopted to prevent damage/detrimental impacts on nearby sensitive ecological habitats and species therein. Typically the preparation of a CEMP will be a conditional requirement of the planning permission.

6.3.3 Due to the distance of the facility from the other identified designated sites and scale of the development, no direct or indirect impacts any of the other designated sites are anticipated.

### 6.4 Habitats

6.4.1 Under the current proposals, the development is expected to result in the loss of approximately 2.6ha of managed, semi-improved or improved grassland. The semi-improved grassland habitat was considered to be of 'Local' nature conservation importance in its own right, however there is generally a large extent of this habitat within the wider area and as such the loss of this relatively small proportion of grassland (approximately 4% of the total area of semi-improved grassland within the wider SMG Wroughton site) is unlikely to be significant.

6.4.2 Any necessary requirement for drainage features within the land in the south west of the site may result in further losses of grassland although again, in view of the large expanse of semi-improved grassland this loss is unlikely to be significant. The drainage works, if required, may also present opportunity to deliver some enhanced ecological habitats. This will need to be reviewed once drainage requirements have been established.

6.4.3 It is considered unlikely that the remaining habitats identified within the survey area will be directly impacts by the proposed works.

6.4.4 Indirect impacts upon habitats, particularly resulting during construction of the building should be managed through a CEMP as described within 6.3.2.

### 6.5 Protected Species and Species of Conservation Concern

***Badgers***

6.5.1 No badger setts were identified within the survey area, although several setts are known to be present elsewhere within the wider area including a badger sett within open grassland to the east of the site. The grassland within the development footprint is likely to be used by badgers for foraging, in conjunction with the habitats elsewhere in the surrounding landscape. The construction of the facility will be highly unlikely to have a long-term adverse impact upon the

available foraging habitat for badgers, given the relatively small area of habitat likely to be lost in the context of the wider landscape.

6.5.2 In view of the presence of a badger sett within the open grassland it is recommended that a pre-commencement badger survey of the site for new badger setts is carried out prior to site clearance / construction work. Badgers can excavate new setts in a short space of time, and there is an abundance of badger activity within the site and as such the risks of new setts being dug is high. Such surveys should ideally be carried out approximately one month prior to commencement of the development.

6.5.3 During construction, any excavations over 1m in depth should be covered overnight to prevent badgers from becoming trapped. Alternatively, a scaffold plank or similar, or profiled side should be used to create a ramp, and left in the excavation overnight to provide any animal a means of escape. These measures should be included as part of a CEMP prepared for the site.

***Bats***

6.5.4 The existing semi-improved grassland habitat to be lost to the development holds very little value for foraging bats. The woodland habitat is likely to be of higher value to foraging/commuting bats, although this habitat will be retained and its value to bats will not be reduced by the construction of the facility.

6.5.5 No specific further survey or mitigation for bats is considered necessary. However if incorrectly designed, the use of external lighting on facility could result in adverse impacts upon nocturnal wildlife, including bats.

6.5.6 The installation of external night time lighting within or around the development area could result in light pollution of more valuable foraging/commuting habitat or roost features within and adjacent to the site, to the detriment of any light sensitive bat species.

6.5.7 Significant amounts of artificial lighting are considered unlikely to be necessary during the construction period as this will be restricted to daylight hours.

6.5.8 It is recognised that some external lighting will be required to enable the safe use of the store during the operational period. The lighting should however be kept to a minimum and be low intensity where possible. Where practicable, the operational site should be fitted with directional cowls and/or motion-sensitive timer switches to reduce light pollution and glare for extended periods of night time lighting.

***Dormice***

6.5.9 The development proposals are unlikely to have significant impacts on dormice populations (if present at the site) as the area of habitat most likely to support dormice (namely the woodland habitats) are situated off-site and will be retained and protected. No impacts on this species are anticipated as a result of the development, and therefore no specific recommendations for further survey or mitigation is required.

***Amphibians & Reptiles***

6.5.10 The habitat of most value for amphibians and reptiles is the woodland situated beyond the northern site boundary, which will be retained and protected from impacts arising from the development.

6.5.11 Given the grassland within the development zone is subject to regular management and disturbance, amphibians and reptiles are unlikely to be present and therefore no impacts are anticipated to occur on these species groups. It is recommended that the grassland habitat within the construction footprint is regularly managed as per the existing regime up until the commencement of site clearance/construction works in order to prevent it becoming more attractive to amphibians/reptiles which could use surrounding habitats.

***Birds***

6.5.12 Habitat suitable for breeding bird (other than ground nesting) species, was restricted to the woodland at the north of the site, which is expected to be retained and protected and thus no significant impacts on these bird species are anticipated. Whilst some loss of foraging habitat might occur, in view of the large expanse of grassland within surrounding land it seems unlikely that the 2.5ha area would constitute a significant impact upon favourable conservation status.

6.5.13 The areas of open semi-improved grassland provided suitable nesting habitat for ground nesting birds of open farmland such as skylark and meadow pipit. Both of these species were confirmed to be breeding on the fields to the south of the site (now comprising the solar array) in 2013. Skylark was recorded within the site during the survey undertaken in January/February 2017 using the grassland for winter foraging. The 2.5ha area of the site, plus a suitable buffer zone around this might be anticipated to support a maximum of 3 partial nesting pairs, based upon experience in mapping skylark territories and reported mean territory sizes[15].

6.5.14 These species need to monitor surrounding habitat for potential predators, and build nests away from tall structures and trees to avoid predation. Ground nesting birds are likely to be dissuaded from nesting within areas of the fields where they are close to tall buildings and structures. As such, the construction of a tall building will result in the loss of suitable nesting habitat within the development footprint and the land immediately surrounding it.

6.5.15 Nevertheless the area of open grassland to be adversely affected by development will be relatively small in the context of the wider landscape given the abundance of this habitat elsewhere within the surrounding land. However, in view of the recent construction of the solar array the habitat available to ground nesting birds at the site and surrounding land may have declined considerably. As such development which further removes habitat for ground nesting birds will need to consider potential cumulative impacts.

[15] Poulsen, J.G et. al (1998). Comparative nesting and feeding ecology of skylarks *Alauda arvensis* on arable farmland in southern England with special reference to set-aside. *Journal of Applied Ecology*,**35,** 131-147.

6.5.16 The 2013 survey report[16] , as well as the Environmental Statement prepared for the solar array[17] identified other areas of the SMG Wroughton Site, including the fields identified to be used for drainage purposes, as areas to be retained and managed as suitable habitat for ground nesting birds in order to mitigate/compensate for the likely loss of nesting habitat within the solar array. It is understood that proposals within the area identified for drainage are currently in draft form but may involve underground storage tanks. It seems unlikely, if these are the proposals, that this use would have any long-term adverse impact upon the use of the area by ground nesting birds, provided that the habitat above the tanks was restored and management of the area to promote use of ground nesting birds resumed.

6.5.17 There is a general lack of scientific evidence of how ground nesting birds such as skylark use solar arrays. As such during the application for the solar array a precautionary principal was applied and it was assumed that ground nesting birds would cease to nest within the area. However there is emerging evidence which indicates that solar arrays provide valuable habitat for ground nesting birds, including skylarks. This species has been recorded using land within solar arrays for nesting and for foraging. This is largely based on incidental observations by Clarkson and Woods ecologists whilst undertaking monitoring of solar arrays on various sites around the country. At least 3 sites are known where skylark have been observed to be using nesting sites within arrays. In almost every site monitored (Clarkson and Woods have monitored in excess of 25 large scale solar arrays) skylark have been seen foraging within or perching on array panels. Other species, where were also assumed likely to be displaced by solar arrays such as *lapwing Vanellus vanellus* have also been recorded nesting between array strings. It therefore seems that the precautionary approach adopted within earlier assessments may be overly precautionary and the impacts of arrays upon ground nesting birds may not be as significant as proposed within the environmental statement for the solar array.

6.5.18 The Landscape and Biodiversity Management Plan prepared for the solar array[18] prescribed monitoring of the use of the solar array by wintering and breeding birds following the completion of construction. The results of these monitoring surveys may be particular helpful in understanding how the array is being used by ground nesting birds. These were not available at the time of writing. If it can be shown that these species are continuing to use the array for nesting then the likelihood of cumulative impacts would be minimal and impacts would only likely result on the small numbers of breeding pairs directly beneath the Building ONE footprint and surrounding habitat (circa 2-3 nesting pairs maximum). Conversely if monitoring surveys has not found evidence of continued nesting within the array then the Building ONE would further contribute to impact of habitat loss already experienced within the SMG Wroughton Site..

6.5.19 If monitoring data is not available from the solar array (or if monitoring data shows no evidence of nesting by ground nesting species such as skylark), further surveys might be appropriate to

[16] Wintering and Breeding Bird Survey –Wroughton Airfield (July 2013) Michael Woods Associates
[17] Chapter 11 – Ecology and Nature Conservation. Wroughton Airfield, Swindon (June 2013)
[18] Landscape and Biodiversity Management Plan – Science Museum at Wroughton (June 213) Michael Woods Associates

establish the use of the habitats within the site and surrounding land (including the solar array) by ground nesting birds of conservation concern to enable a full assessment of (both direct and cumulative) impacts for the proposals to be made. Surveys would entail a minimum of four visits undertaken between April and June, when breeding activity and territorial behaviour is most intense. The surveys would be used to establish bird use of the site for breeding and identify likely territories or groups of territories. The survey visits should ideally be spread evenly throughout the survey period. The need for such surveys should be reviewed with the LPA ecologist.

6.5.20 Alternatively, if delaying the application until this survey information is obtained is not feasible or desirable, consideration should be given to methods by which retained habitat within the site ownership could be further enhanced for ground nesting birds. This might be achieved through further diversification of the grassland within the retained grassland parcels. This would increase invertebrate diversity and therefore potentially increase the carrying capacity of the grassland. The management regime within the site ownership could also be reviewed as potentially there are further management measures that could be designed to improve the importance of retained, unaffected habitat for ground nesting species.

6.5.21 Alternatively compensation for the loss of habitat could be achieved through the improvement of other habitat elsewhere to increase opportunities for ground nesting birds.

6.5.22 Site clearance will need to consider the potential presence of ground nesting birds. Site clearance should be scheduled to take place outside of the key breeding season – March to August. Where this is not possible then pre-construction survey of the site will be required by an appropriately experienced ecologist to confirm if any nests are present. In the event nests are present clearance of this area (and a substantial area around it) will have to be delayed until chicks have fledged. Current construction programmes indicate a construction period starting in October and as such direct impacts upon nesting birds will be avoided.

6.5.23 In the absence of further survey information it would seem appropriate to adopt a precautionary principal and assume that nesting skylarks/meadow pipits are likely to have been displaced from the solar array, and that these species would be further impacted through loss of nesting habitat by the development of the facility. As such the proposals will result in significant cumulative adverse impacts upon on bird species of local and national conservation concern. The mitigation measures proposed may be sufficient to offset these impacts and in the absence of survey data a precautionary approach to the design of mitigation may be necessary. Again, this should be reviewed with the LPA ecologist.

***Other Protected Species and Species of Conservation Concern***

6.5.24 The loss of a relatively small (~2.6 ha) area of open semi-improved grassland, would not be expected to negatively impact brown hares if present within the area, given the abundance of suitable habitat elsewhere in the surrounding area, including within the solar array.

6.5.25 The habitat identified as being of most value to hedgehogs, namely the woodland habitat beyond the northern site boundary, will be retained and protected from development and no impacts on this species are anticipated to occur.

## 6.6 Ecological Enhancements

6.6.1 The National Planning Policy Framework[19] (NPPF), issued in March 2012, states that the planning system should contribute to "minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures". It also states that "opportunities to incorporate biodiversity in and around developments should be encouraged".

6.6.2 A number of long lasting bat and bird boxes will be installed onto suitably mature trees within the site ownership. Specific boxes for targeted species known to be present within the local area can be used. It is recommended that 10 boxes are provided.

6.6.3 5 Log piles and 2 partially buried hibernacula will be installed in marginal habitat within or close to the site. These would provide sheltering features for a range of wildlife, including invertebrates, reptiles, amphibians and small mammals.

## 6.7 Summary of Recommended Further Work

6.7.1 Below is a summary of the recommended further work which should be carried out within the relevant project timescales.

| Habitats/Species | Scope of work | Timescale |
|---|---|---|
| Clouts Wood SSSI | Impact avoidance measures to be detailed within a CEMP prepared for the site | CEMP to be prepared prior to and implemented during construction |
| Badgers | Preconstruction survey to check for new setts<br><br>Good site management practices to be included within CEMP | 1 month prior to site clearance and construction activities commencing<br><br>CEMP to be prepared prior to and implemented during construction |
| Birds | Further survey/monitoring required to enable assessment of cumulative impacts on ground nesting birds of conservation concern. Information to be used to determine appropriate mitigation/compensation if necessary. | Appropriate mitigation/compensation implemented prior to commencement |

[19] DCLG (2012). *National Planning Policy Framework*. www.communities.gov.uk

# 7 CONCLUSIONS

7.1.1 The proposed development will not result in adverse impacts upon the majority of ecological features identified as occurring or potentially occurring within and adjacent to the site.

7.1.2 Clouts Wood SSSI is located approximately 100m north of the development footprint at the closest point. Due to the distance from this SSSI and the scale of the development, impacts on this designated site are considered unlikely to occur although it would be appropriate to minimise the risk of temporary construction-related impacts through the adoption of precautionary measures outlined within a CEMP.

7.1.3 The Site is likely to be used by ground nesting birds. Whilst the loss of a small area is unlikely to result in significant impacts upon local populations there is potential for cumulative impacts when the effects of this habitat loss are combined with losses already experienced to the south of the Site, within the solar array. Further surveys may be helpful to establish whether the effects of the solar array upon ground nesting birds is significant and therefore whether potential for cumulative impacts will occur. Compensation for habitat loss can also be designed and implemented to reduce potential cumulative effects. Further consultation with the LPAs ecologists will be required to determine requirements for further survey and habitat compensation.

7.1.4 Notwithstanding the questions regarding impacts upon ground nesting birds it seems likely that a successful scheme can be devised that will ensure that biodiversity is protected and appropriate compensation designed where protection cannot be achieved. As such the proposed development can be considered in line with planning policies EN1 and EN4.

# APPENDIX A: WILDLIFE LEGISLATION & SPECIES INFORMATION

## BADGERS

Badgers and their setts are protected under the Protection of Badgers Act 1992 (as amended) against damage or destruction of a sett, or disturbance, death or injury to the badgers. The Act defines a sett as "any structure or place which displays signs indicating current use by a badger". The definition of current use is subject to considerable debate. Natural England have produced guidance on the definition of current use. (*Badgers and Development – A guide to best practice and development . Natural England 2011*). Given the ambiguity surrounding the definition in all circumstances we would recommend an assessment of current use is always undertaken by a qualified ecologist. Natural Resources Wales (NRW) have a slightly different definition of current use. Please see the NRW website for further information. Penalties for offences against badgers or their setts include fines of up to £5,000 and/or up to six months in prison.

Disturbance of badgers could be caused by any digging activity or scrub clearance within 30 metres of an occupied sett and therefore every case needs to be assessed individually. Felling of trees close to a badger sett may also cause disturbance in some situations. Some activities such as pile driving may cause disturbance at even greater distances, and should be discussed with Natural England or NRW.

Licences are issued by Natural England (or NRW in Wales) to allow the disturbance of badgers, and the destruction of their setts in certain circumstances, in relation to development. Full planning permission must be obtained before a licence application will be considered. Although licences can be applied for at any time of year, disturbance of badgers or exclusion of badgers from a sett can only take place between 1 July and 30 November, to avoid the breeding season when dependant young may be underground. This restriction may be relaxed in some cases where a sett is seasonal and badgers can be shown to be absent from a sett at that time of year.

This report contains information of a confidential nature relating to the location of badger setts. Public access to this data should be restricted to those who have a legitimate need to assess the information and to know the exact situation of the setts rather than simply that badgers are present.

## BATS

All 17 species of bat known to breed in England and Wales, and their roost sites, are protected under the Conservation of Habitats and Species Regulations 2010 (as amended), known as the 'Habitats Regulations'. This makes it an offence to deliberately kill or injure a bat, or to deliberately disturb a bat such that its ability to hibernate, breed or rear young, or such that the species' distribution, were significantly affected. It is also an offence to damage or destroy any breeding site or resting place. Intentional or reckless disturbance of bats in their resting places, and damage to or obstruction of resting places are also offences under the Wildlife and Countryside Act 1981 (as amended). Under UK law a bat roost is "any structure or place which any wild [bat]...uses for shelter or protection". As bats tend to reuse the same roosts, legal opinion is that the roost is protected whether or not the bats are present at the time. Penalties for offences against bats or their roosts include fines of up to £5,000 and/or up to six months in prison.

As a result, development works which are likely to involve the loss of or alteration to roost sites, or which could result in killing of or injury to bats, need to take place under licence. Works which could disturb bats may also be licensable, though this needs to be assessed on a case by case basis, as bats' sensitivity to disturbance varies depending on normal background levels, and the definition of disturbance offences under the Habitats Regulations is complex. In practice this means that works involving modification or loss of roosts (typically in buildings, trees or underground sites) or significant disturbance to bats in roosts are likely to be licensable.

Licences can be obtained from Natural England or the Welsh Government to permit works that would otherwise be illegal, provided it can be demonstrated that the proposed works are needed to protect public health or safety, or for other reasons of overriding public interest including social and economic reasons. It is also necessary to demonstrate that there is no satisfactory alternative to the proposed works, and that the conservation status of bats in the area will be maintained. Appropriate mitigation and post-construction monitoring are therefore a requirement of all licences.

## DORMICE

Dormice and their nests are protected in England and Wales under the Conservation of Habitats and Species Regulations 2010 (as amended), known as the 'Habitats Regulations'. This makes it an offence to deliberately kill or injure a dormouse, or to deliberately disturb a dormouse such that its ability to hibernate, breed or rear young, or such that the species' distribution, were significantly affected. It is also an offence to damage or destroy any breeding site or resting place. Intentional or reckless disturbance of dormice in their nests, and damage to or obstruction of nests

are also offences under the Wildlife and Countryside Act 1981 (as amended). Penalties for offences against dormice or their nests include fines of up to £5,000 and/or up to six months in prison.

As a result, development works which are likely to involve the loss of nest sites, or which could result in killing of or injury to dormice, need to take place under licence. Works which could disturb dormice may also be licensable, though this is rarely the case unless loss of dormouse habitat is also proposed, and should be assessed on a case by case basis. In practice this means that works involving any removal of habitat (typically woodland, hedgerows, and scrub) supporting dormice are likely to be licensable.

Licences can be obtained from Natural England or the Welsh Government to permit works that would otherwise be illegal, provided it can be demonstrated that the proposed works are needed to protect public health or safety, or for other reasons of overriding public interest including social and economic reasons. It is also necessary to demonstrate that there is no satisfactory alternative to the proposed works, and that the conservation status of dormice in the area will be maintained. Appropriate mitigation and post-construction monitoring are therefore a requirement of all licences.

## AMPHIBIANS

Great Britain supports seven native amphibian species. The four most widespread species; smooth and palmate newts, common frog, and common toad, receive partial protection under the Wildlife and Countryside Act 1981 (as amended) which prohibits sale, barter, exchange, transporting for sale and advertising to sell or to buy. The great crested newt, pool frog and natterjack toad are also fully protected in England and Wales under the Conservation of Habitats and Species Regulations 2010 (as amended). Penalties for offences against amphibian species include fines of up to £5,000 and/or up to six months in prison.

Four amphibian species (great crested newt, pool frog, common toad, natterjack toad) are listed as priority species under the UK Biodiversity Action Plan, and are therefore considered to be Species of Principal Importance in England and Wales (excluding the pool frog, which does not occur in Wales) under the Natural Environment and Rural Communities (NERC) Act 2006. All public bodies including local and regional authorities have a duty under this legislation to have regard for the conservation of biodiversity.

## REPTILES

All six native reptile species receive protection under the Wildlife and Countryside Act 1981 (as amended). The four more common species (common lizard *Zootoca vivipara*, slow-worm *Anguis fragilis*, adder *Vipera berus* and grass snake *Natrix natrix*) receive partial protection which makes it an offence to intentionally kill or injure a reptile. The two other reptile species (smooth snake *Coronella austriaca* and sand lizard *Lacerta agilis*), both of which are rare with very restricted UK ranges receive full protection under the Conservation of Habitats and Species Regulations 2010 (as amended). Penalties for offences against reptile species include fines of up to £5,000 and/or up to six months in prison.

Works such as site clearance or topsoil stripping which could result in killing or injury of reptiles could be considered result in an offence unless measures are taken to minimise the risk of this occurring. Any inadvertent impacts on common reptile species despite these mitigation measures being in place would be considered an 'incidental result of an otherwise lawful operation' which 'could not reasonably have been avoided' and therefore not an offence. Works which could affect smooth snakes or sand lizards, or their habitats, would need to take place under licence from Natural England or Natural Resources Wales. However sites supporting smooth snakes or sand lizards are very rarely affected by development proposals.

In practice, mitigation for impacts of development on common reptiles generally comprise one or more of the following techniques: displacement, in which reptiles are encouraged to move to suitable retained habitat by changing the management of areas affected by development; exclusion, where reptile-resistant fencing is provided between a development site and suitable retained habitat allowing reptiles to be trapped from the development footprint and released elsewhere on the site; and translocation, where animals are trapped from a development site and released on another suitable site nearby. Reptile mitigation proposals, particularly those involving translocation of animals, should be agreed in advance with the local planning authority.

## BIRDS

All British birds, their nests and eggs (with certain exceptions) are protected under the Wildlife & Countryside Act 1981 (as amended) which makes it an offence to: intentionally kill, injure or take a wild bird; intentionally take, damage or destroy nests which are in use or being built; intentionally take or destroy birds' eggs; or possess live or dead wild birds or eggs. A number of species receive additional protection through inclusion on Schedule 1 of the Wildlife and Countryside Act; for these it is also an offence to intentionally or recklessly disturb birds while nest building, or at a nest containing eggs or young, or to disturb the dependant young of such a bird. Penalties for offences against bird species include fines of up to £5,000 and/or up to six months in prison.

General licences for control of some bird species are issued by Natural England and Natural Resources Wales in order to prevent damage or disease, or to preserve public health or public safety, but it is not possible to obtain a licence for control of birds or removal of eggs/nests for development purposes. Consequently if nesting birds are present on a development site when works are programmed to start it is usually necessary to delay works, at least in the areas supporting nests, until any chicks have fledged and left the nest. It is usually possible, once chicks have hatched, for an experienced ecologist to predict approximately when they are likely to fledge, in order to inform programming of works on site.

## PLANNING POLICY IN RELATION TO BIODIVERSITY - ENGLAND

The National Planning Policy Framework (NPPF), issued in March 2012, has superseded Planning Policy Statement 9: Biodiversity and Geological Conservation (August 2005). Additional guidance can be found online at http://planningguidance.planningportal.gov.uk/blog/guidance/. Further guidance is also available within the Government Circular ODPM 06/2005 on Biodiversity and Geological conservation although it should be noted that this document is currently being updated by DEFRA. The NPPF simplifies and collates a number of previous planning documents and outlines the government's objective towards biodiversity.

The NPPF identifies ways in which the planning system should contribute to and enhance the natural and local environment (Paragraph 109), including:

- protecting and enhancing valued landscapes, geological conservation interests and soils;
- recognising the wider benefits of ecosystem services;
- minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures.

It also emphasises the importance of conserving biodiversity and areas covered by landscape designations (Paragraph 115):

Great weight should be given to conserving landscape and scenic beauty in National Parks, the Broads and Areas of Outstanding Natural Beauty, which have the highest status of protection in relation to landscape and scenic beauty. The conservation of wildlife and cultural heritage are important considerations in all these areas, and should be given great weight in National Parks and the Broads.

When determining planning applications, the NPPF states that local planning authorities should aim to conserve and enhance biodiversity (Paragraph 118) by applying principles including:

- if significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;
- proposed development on land within or outside a Site of Special Scientific Interest likely to have an adverse effect on a Site of Special Scientific Interest (either individually or in combination with other developments) should not normally be permitted. Where an adverse effect on the site's notified special interest features is likely, an exception should only be made where the benefits of the development, at this site, clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of Sites of Special Scientific Interest;
- development proposals where the primary objective is to conserve or enhance biodiversity should be permitted;
- opportunities to incorporate biodiversity in and around developments should be encouraged;
- planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss; and
- the following wildlife sites should be given the same protection as European sites: potential Special Protection Areas and possible Special Areas of Conservation; listed or proposed Ramsar sites; and sites identified, or required, as compensatory measures for adverse effects on European sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.

The Natural Environment and Rural Communities Act (2006) states that a public authority must, "in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity; Conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat". DEFRA issued further guidance on implementation of this act in the document; Guidance for Local Authorities on Implementing the Biodiversity Duty (May 2007), which notes that "Conserving biodiversity includes restoring and enhancing species populations and habitats, as well as protecting them".

## ECOLOGICAL ENHANCEMENTS

The Natural Environment and Rural Communities Act (2006) states that a public authority must, "in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity; Conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat". DEFRA issued further guidance on implementation of this act in the document; Guidance for Local Authorities on Implementing the Biodiversity Duty (May 2007), which notes that "Conserving biodiversity includes restoring and enhancing species populations and habitats, as well as protecting them".

In England, the National Planning Policy Framework (NPPF), issued in March 2012, states that the planning system should contribute to "*minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures*". It also states that "*opportunities to incorporate biodiversity in and around developments should be encouraged*".

## UK BIODIVERSITY ACTION PLANS

The UK Biodiversity Action Plan (UK BAP) 2011 is a policy first published in 1994 to protect biodiversity and stems from the 1992 Rio Biodiversity Earth Summit. The policy is continuously revised to combine new and existing conservation initiatives to conserve and enhance species and habitats, promote public awareness and contribute to international conservation efforts. Each plan details the status, threats and unique conservation strategies for the species or habitat concerned, to encourage spread and promote population numbers.

Species or habitats identified as priorities under the UK Biodiversity Action Plan receive some status in the planning process through their identification as Species/Habitats of Principal Importance in England and Wales, under the Natural Environment and Rural Communities (NERC) Act 2006 (as amended).

Current planning guidance in England, the National Planning Policy Framework, does not specifically refer to Species or Habitats of Principal Importance, though it includes guidance for conservation of biodiversity in general. Supplementary guidance is available online at http://planningguidance.planningportal.gov.uk/blog/guidance/ and this guidance indicates that it is '*useful to consider*' the potential effects of a development on the habitats or species on the Natural Environment and Rural Communities Act 2006 section 41 list.

## APPENDIX B: ECOLOGICAL EVALUATION CRITERIA

It is important to appreciate that the level of protection given to a particular species or habitat through national or international legislation does not necessarily relate to the evaluated level of importance of that receptor to nature conservation. Whilst species may be widespread or common nationally, but of scarce occurrence in a particular county (for example, it might be at the limit of its geographical range), a species may also be considered to be rare nationally or internationally but be abundant within particular areas.

The Ratcliffe Criteria (Ratcliffe, 1977) provide a long established and widely accepted method of determining the nature conservation value of a particular site and have been used to aid the evaluation of the habitats associated with the Scheme. The attributes of the Ratcliffe Criteria are described below.

| Ratcliffe Criteria for Nature Conservation Evaluation | |
|---|---|
| **Criteria** | **Description** |
| Size | Large, continuous areas of habitat are considered to be of greater importance than small or fragmented areas. |
| Diversity | Species and habitat diversity, including variations in topography and wetness, increase the wildlife value. |
| Naturalness | This reflects man's intervention or management of the habitat. Most habitats of this survey are semi-natural. Naturalness indicates the amount of modification of the land by man. Generally a less modified area results in an increase in the nature conservation value. |
| Rarity | The scarceness of a habitat, and the presence of rare/uncommon species, relates to its importance and priority for nature conservation. Rarity is related to the frequency of occurrence at national or county level. |
| Fragility | Fragile habitats are those where changes due to man's intervention, environmental factors or natural succession can directly threaten it. Scrub invasion, agricultural improvement, fire and changes in hydrological regime are the most common threats. |
| Typicalness | This relates to the quality of the habitat in terms of how good an example it is of a recognised type. |
| Position in an ecological/geographical unit | The relationship of a site to adjacent areas of nature conservation value. It is important to recognise the important and characteristic formations, communities and species of a district. |
| Recorded history | The extent to which a site has been used for scientific study and research is a factor of some importance. |
| Potential wildlife value | The likely quality of the habitat for birds, mammals, reptiles, amphibians and invertebrates if it is managed for wildlife. If appropriate habitat management is undertaken, it is possible for an increase in the diversity and nature conservation value of an area. |
| Intrinsic appeal | The knowledge of the distribution and numbers of popular groups of species such as birds, is greater than for obscure groups. Similarly, colourful wild flowers and rare orchids arouse more enthusiasm than liverworts. It is pragmatic to give more weight to some groups than to others. |
| Criteria are based on Ratcliffe, D.A. (1977). A Nature Conservation Review, Cambridge University Press | |

Following the CIEEM Guidelines for Ecological Impact Assessment in the UK, when determining the biodiversity importance of natural features found on or in proximity to the site the following characteristics will be considered:

- Naturalness;
- animal or plant species, sub-species or varieties that are rare or uncommon, either internationally, nationally or more locally, including those that may be seasonally transient;
- ecosystems and their component parts, which provide the habitats required by important species, populations and/or assemblages;
- endemic species or locally distinct sub-populations of a species;
- habitat diversity;
- habitat connectivity and/or synergistic associations;
- habitats and species in decline;
- rich assemblages of plants and animals;
- large populations of species or concentrations of species considered uncommon or threatened in a wider context;
- plant communities (and their associated animals) that are considered to be typical of valued natural/semi-natural vegetation types, including examples of naturally species-poor communities; and
- species on the edge of their range, particularly where their distribution is changing as a result of global trends and climate change. The criteria described by Ratcliffe and CIEEM will then be used to ascribe importance to each feature according to its value in a geographic context. This is described in the table overleaf.

| Level of Importance | Ecological Features |
|---|---|
| International | A habitat or species cited as a reason for the designation or proposed designation of a World Heritage Site, Biosphere Reserve, Biogenetic Reserve, Ramsar Site, Special Protection Area (SPA) or Special Area of Conservation (SAC).<br>A large extent of habitat that is listed as a Priority Habitat Type in Annex 1 of the EC Habitats Directive in good condition with typical species diversity.<br>A large and viable population of a regularly occurring species that is rare within an international context. |
| National | A habitat or species cited as a reason for the designation or proposed designation of a National Nature Reserve (NNR), Marine Nature Reserve (MNR), National Park, Site of Special Scientific Interest (SSSI) or Area of Special Scientific Interest (ASSI).<br>Any area of habitat listed as a Priority Habitat Type in Annex 1 of the EC Habitats Directive that has potential to support typical species diversity.<br>A large extent of habitat listed as a Priority Habitat in the UK BAP in good condition that supports an abundance of typical species.<br>A large and viable population of a regularly occurring species that is scarce within an international context.<br>A very large and viable population of a regularly occurring species that is listed as a Priority Species in the UK BAP.<br>A large and viable population of a regularly occurring rare species that occurs in 15 or fewer 10km squares of the National Grid (e.g. a species that is listed in UK Red Data Books).<br>A bird species with a British breeding population of <1,000 pairs. |
| Regional | A large extent of habitat listed as a Priority Habitat in the UK BAP that supports typical species diversity and is in good condition.<br>A large and viable population of a regularly occurring species that is listed as a Priority Species in the UK BAP.<br>A large and viable population of a regularly occurring plant species that is known to occur in 16 to 100 10km squares of National Grid (Stewart, Preston and Pearman 1994).<br>A large and viable population of a regularly occurring insect species (Nationally Notable categories Na and Nb) that is known to occur in 16 to 100 10km squares of the National Grid [Ball, 1986].<br>A bird species with a British breeding population of 1,000 to 10,000 pairs. |
| County | A habitat or species cited as a reason for the designation or proposed designation of a Local Site (known locally as a County Wildlife Site (CWS), Site of Importance for Nature Conservation (SINC), Ecology Database Site (EDS) etc.), a Local Nature Reserve (LNR), a Nature Reserve (owned or managed by: The Wildlife Trusts, The Woodland Trust or equivalent body etc) or an Ancient Woodland.<br>A habitat listed as a Priority Habitat in the UK BAP which is large in extent and supports typical species diversity.<br>A medium and viable population of a regularly occurring species that is listed as a Priority Species in the UK BAP.<br>A viable population of a regularly occurring species listed in a County Red Data Book, County Flora or found in less than 10% of 1km squares of the National Grid within the count.<br>A small population of a plant species that is known to occur in 16 to 100 10km squares of National Grid.<br>A small population of an insect species (Nationally Notable categories Na and Nb) that is known to occur in 16 to 100 10km squares of the National Grid.<br>A bird species with a British breeding population of 10,000 to 100,000 pair |
| District | A habitat or species cited as a reason for the designation or proposed designation of a Local Site (known locally as a Local Wildlife Site (LWS), Site of Importance for Nature Conservation (SINC), Ecology Database Site (EDS) etc.), a Local Nature Reserve (LNR), a Nature Reserve (owned or managed by: The Wildlife Trusts, The Woodland Trust or equivalent body etc) or an Ancient Woodland.<br>A habitat listed as a Priority Habitat in the UK BAP which is small in extent, supports typical species diversity or is in an unfavourable condition.<br>A small and viable population of a species that is listed in the UK BAP or LBAP.<br>A bird species with a British breeding population of 100,000 to 500,000 pairs. |
| Local | A habitat or species cited as a reason for the designation or proposed designation of a site which is officially listed e.g. on a Parish Register.<br>A semi-natural habitat that is listed in the UK BAP or LBAP, which is either small in extent and/or is in an unfavourable condition.<br>A species which occurs occasionally that is listed in the UK BAP or LBAP.<br>A bird species with a British breeding population of >500,000 pairs. |
| Site | An artificial habitat or habitat that has readily established e.g. amenity grassland.<br>A species which is common and not listed on the UK BAP or LBAP e.g. Badger. |
| Negligible | A habitat or species common within the Application Site, offering little benefit to British wildlife and biodiversity. |

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