Cotmoor Solar Farm
on behalf of JBM Solar Projects 6 Ltd

Appendix 4: Biodiversity Management Plan

avian ecology

Document Control	
Project Name:	Cotmoor Solar Farm, Nottinghamshire
Project Number:	JBMSo-592-1248
Report Title	Biodiversity Management Plan

Issue	Date	Notes	Prepared	Reviewed
V1	01/06/2020	Draft	B Walker *MSc GradCIEEM*	U Maginn *MSc MCIEEM*
V2	09/07/2020	Final	B Walker *MSc GradCIEEM*	U Maginn *MSc MCIEEM*

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1 INTRODUCTION

1.1.1 This Biodiversity Management Plan (BMP) sets out habitat protection and enhancement measures for a proposed solar farm, battery stations and associated infrastructure located on land at Cotmoor Solar Farm, Halloughton, Nottinghamshire henceforth referred to as 'the Site'. This document also details ecological management practices to be adopted with the aim of developing and maintaining wildlife habitats to provide a net gain for local biodiversity.

1.1.2 Habitat enhancement measures and ongoing management practices are proposed in line with guidance produced by BRE guidance *Biodiversity Guidance for Solar Developments* (BRE, 2014[1]) that will enhance and safeguard key habitats for the benefit of wildlife, and enhance the ecological value of land currently under agricultural use.

1.1.3 BRE guidance *Biodiversity Guidance for Solar Developments* (BRE, 2014) states that; '*with appropriate land management, solar farms have the potential to support wildlife and contribute to national biodiversity targets. Indeed, solar farms may have several additional advantages in that they are secure sites with little disturbance from humans and machinery once construction is complete. Recent research suggests biodiversity gains on solar farms can be significant*'.

1.1.4 Therefore, the site-specific approach provided within this report provides recommendations for long-term management of the land throughout the lifetime of the solar farm to conserve and improve landscape habitat connectivity with the wider landscape for wildlife through protecting and enhancing potentially important wildlife corridors and habitats. This will contribute to the establishment of coherent ecological networks, supporting the targets of the National Planning Policy Framework (NPPF2, 2018).

[1] BRE (2014). *Biodiversity Guidance for Solar Developments*. Eds G E Parker and L Greene.

2 ECOLOGICAL BASELINE – PRE-DEVELOPMENT

2.1.1 This Biodiversity Management Plan should be read in conjunction with *Site Layout and Planting Proposals*. Detailed descriptions of habitats and species can be found in the *Ecological Assessment Report* (Avian Ecology Limited, 2020[2]). The Site is located to the north west of the village of Halloughton and west of the town Newark-on-Trent. It is located within an agricultural landscape with occasional farm dwellings.

2.1.2 Habitats within the Site include arable, improved grassland, poor semi-improved grassland, watercourses, scrub, hedgerows and scattered trees.

2.1.3 In the wider context the Site is surrounded by agricultural land interspersed with broadleaved woodland and the B6386, Oxton Road is situated to the north of the Site.

2.1.4 The Site is not located within any statutory designated site for nature conservation. One statutory designated site; Newhall Reservoir Meadow Site of Special Scientific Interest (SSSI) is located approximately 1.7km north west of the Site. One Local Wildlife Site (LWS) is situated within the Site boundary; Westhorpe Dumble LWS which is 'a wooded stream'. Another three LWS are situated adjacent to the Site including; Halloughton Wood LWS situated to the south west and is listed as an old woodland site. Cotmoor Lane LWS is located to the south west which is broad wooded trackside verges and Westhorpe Dumble Head Drain LWS is adjacent to the west and is designated for its association of uncommon grass species on the banks of a drain.

3 ECOLOGICAL MITIGATION MEASURES

3.1 Designated Sites and Habitats

3.1.1 No designated sites will be affected by the development. A buffer will be installed and maintained around Westhorpe Dumble LWS. This and adjacent habitats and the species associated with LWS will be protected by perimeter security fencing which will be erected first to prevent the encroachment of construction works beyond the proposed working areas.

3.1.2 Standard measures to ensure runoff control and pollution prevention will be implemented; these measures will safeguard both on and off-site LWS and associated habitats and species as well as watercourses and boundary habitats.

3.1.3 The majority of hedgerows will be retained on Site and protected in-line with BS 5837:2012 *Trees in relation to design, demolition and construction*.

3.1.4 There will be clear delineation of working areas and access routes for vehicles entering the Site and instructions on these will be given to all site construction staff, delivery drivers and subcontractors.

3.1.5 During the operation of the solar farm over time, dirt and dust can accumulate on the glass surface of the module, reducing its power output. Periodic cleaning of PV modules where required will be undertaken with a soft brush and using soft, clean water which is considered to have no potential to adversely affect habitats or species.

[2] Avian Ecology Ltd (2020) *Cotmoor Solar Farm: Ecological Assessment Report.* A report prepared on behalf of JBM Solar Projects 6 Ltd.

3.2 Birds

3.2.1 Site clearance works should be undertaken outside of the breeding bird season in so far as reasonably practical. The breeding bird season is generally considered to be 01st March to 31st August inclusive. Where this cannot be avoided, a suitably experienced ecologist will be appointed to undertake a pre-site clearance survey to identify the presence of any wild bird nests being built or in use (including those of ground nesting birds such as skylarks *Alauda arvensis*). Only once the appointed ecologist is satisfied that an offence under Part 1 of the Wildlife and Countryside Act 1981 (as amended) will not occur, may works proceed.

3.2.2 If a nesting species is identified, suitable work exclusion zone will be established around nest site where required, in line with best practice guidance and in consultation with the advising ecologist.

3.2.3 During operation, disturbance will be minimal and limited to intermittent maintenance activities. However, it is recommended that the cleaning of panels is undertaken outside of the breeding bird season in so far as reasonably practical to minimise disturbance to nesting birds.

3.3 Bats

3.3.1 Protection of mature/semi-mature trees on Site or along access routes and adjacent land will safeguard potential roost sites and maintain foraging and commuting opportunities.

3.3.2 In order to protect foraging / commuting bats, lighting required during construction and/or operation of the solar farm will be used in a sensitive manner and directed away from field boundary habitats, including habitats bordering the Site. Lighting for the solar farm will be restricted to ancillary buildings and required only for occasional maintenance and inspection visits. The site itself will not be lit. Building lighting will employ suitable low level lighting to minimise the potential for light spill (further information is provided in BCT guidance (2018) *Bats and Lighting in the UK: Bats and the Built Environment Series*[3]).

3.4 Badger

3.4.1 Badgers are discussed separately in the Confidential Badger Appendix.

3.5 Amphibians

3.5.1 Land within the Site is dominated by arable and pasture fields, which are intensively managed and considered to be unsuitable habitat to support and maintain viable amphibian populations. However, habitats such as field margins, hedgerows and woodlands, which will largely be retained and protected, may provide suitable terrestrial habitat for amphibian species.

3.5.2 Three ponds are in close proximity to the Site and an additional fifteen ponds are located within 250m (**Figure 5**). EDNA surveys found P12 and P13 to be positive for great crested newts and P14 and P15 to be negative. No ponds are affected by the works.

3.5.3 With records of great crested newts in the local area confirmed by these eDNA survey results, measures to ensure protection of individual animals and maintenance of the favourable conservation status of the species have been included as part of the proposed development, including maintaining a suitable protection buffer around ponds supporting great crested newts during the construction phase and protecting hedgerow, woodland and field edge habitats most

[3] Bat Conservation Trust. (2018). *Bats and Lighting in the UK: Bats and the Built Environment Series.*

likely to be used by this species. Standard measures to ensure runoff control and pollution prevention will be implemented; these measures will safeguard ponds, watercourses and boundary habitats.

3.5.4 Measures to ensure the favourable conservation status of the species during the proposed development must reflect legislation and guidance application at the time and the construction phase will be undertaken following Reasonable Avoidance Measures (RAMS) under the supervision of a project ecologist to provide advice on the implementation of RAMs (refer to **Appendix 2**). Such measures will include the establishment of exclusion/protection zones along hedgerows and woodland edges during construction, timing of certain works, tool box talks to site staff on ecological responsibilities and precautionary measures to adopt in relation to protected species, and vegetation management ahead of some earth stripping locations to make working areas unattractive to amphibians. Should RAMs be considered insufficient, certain works may require to be undertaken under a Low Impact Class Licence (LICL) or full European Protected Species Mitigation (EPSM) licence from Natural England, either of which would be supported by a detailed Method Statement.

3.5.5 Total land take for solar farm developments is typically low (less than 5% footprint on the ground) and construction works are low impact; requiring limited disturbance for a temporary period of time. Overall, the proposed habitat retention and enhancements will provide a habitat net-gain for amphibians by providing enhanced terrestrial habitat for foraging/hibernation purposes.

3.6 Reptiles

3.6.1 Land within the Site is dominated by arable fields, which are intensively managed and considered to be unsuitable habitat to support and maintain viable reptile populations. However, habitats such as watercourses, grassland, field margins, hedgerows and woodlands may provide suitable habitat for reptile species if present including grass snake *Natrix helvetica*. These habitats will be largely protected.

3.6.2 The creation of species diverse grassland beneath and surrounding the solar panels as well as hedgerow and tree planting will provide the species with additional suitable habitats Overall, the proposed habitat retention and enhancements will provide a habitat net-gain for reptiles by providing enhanced terrestrial habitat for foraging/hibernation purposes.

3.6.3 It is considered unlikely that reptiles are present within the Site but should a small extent of hedgerow/woodland removal or vegetation greater than 15cm be required, (such as that proposed for the access track to the south east of the Site) it is considered the implementation of a series of Reasonable Avoidance Measures (RAMs) will be sufficient to avoid any risk of adverse effects on individual reptiles if present. Outline RAMs for reptiles are presented in **Appendix 3.**

3.7 Hazel Dormouse & Hedgehog

3.7.1 The majority of habitats on Site are considered to be unsuitable for hazel dormice *Muscardinus avellanarius* and Western European hedgehogs *Erinaceus europaeus* (arable and pastoral land), but habitats including hedgerows and woodland do have limited potential for both species.

3.7.2 Hedgerows and woodlands are to be retained and protected during works, with additional planting proposed to strengthen the network and add new connectivity, thereby securing potential dormouse and hedgehog habitat. Any works requiring the removal/cutting back of short sections of hedgerow (up to 5m sections) or young tree removal (access track through planted young woodland area) will follow Reasonable Avoidance Measures (RAMs) to avoid any risk of adverse effects on both species if present. Should proposals be amended, requiring a greater length of hedgerow removal than currently planned, further survey for dormice and suitable protection measures (including

works under a dormouse licence) may be required. Outline RAMs for hazel dormouse and hedgehog are presented in **Appendix 3.**

4 ECOLOGICAL ENHANCEMENT MEASURES

4.1 Habitat Enhancement

4.1.1 Management practices are proposed that will enhance the Site for the benefit of local wildlife. The design and long-term management of the land seeks to maintain and improve functionality through protecting and enhancing potentially important wildlife corridors i.e. through new hedgerow creation, infill planting to strengthen existing hedgerows within and around the Site and the creation of a tree belt. The creation of extensive grassland habitat on fields containing solar panels which were formerly arable and pastoral grassland, provides increased habitat for invertebrates and foraging, shelter and breeding opportunities for other wildlife.

4.1.2 New hedgerow creation and infill planting (over 1,200m of new planting in total), bordered by arable field margins and grassland oversown with a suitable mix, will provide suitable edge habitat favoured by foraging bird species.

4.1.3 Tree belt, swale and grassland creation will include field margins and species rich seed mixes to provide favourable habitat for a range of species, including invertebrates, which in turn increase foraging resources for birds and small mammals.

4.1.5 The *Site Layout and Planting Proposals Plan* sets out the landscape planting and maintenance specifications.

4.1.6 All planting stock supplied shall be healthy and viable and comply with BS 3936: Parts 1 to 10 as relevant, and BS 4043, the National Plant Specification, published by the Horticultural Trades Association (HTA) as appropriate. Supplying nurseries will be registered under the HTA Nursery Certification Scheme. All plants will be packed and transported in accordance with the Code and Practice for Plant Handling as produced by CPSE.

4.1.7 All seeding shall be carried out in accordance with BS 4428:1989 Code of Practice for general landscape operations (excluding hard surfaces), or the most up to date and current British Standard and in accordance with seed suppliers technical advice.

4.1.8 It is advised that herbicides are not used on Site; however, if herbicides are required, the herbicide handbook (English Nature, 2003[4]) provides guidance on appropriate herbicide use in relation to nature conservation works.

4.1.9 Planting will not be carried out when the ground is waterlogged, frost bound or during periods of cold drying winds.

4.1.10 All bare-root planting stock will be kept covered until actually planted in order to minimise water-loss and prevent the roots from drying out. Bare root stock shall be planted while dormant (November-April) or alternatively cell or container grown stock shall be used.

[4] English Nature (2003) *The Herbicide Handbook: Guidance on the use of herbicides on nature conservation sites*. Natural England, Peterborough.

Hedgerow and Tree Planting

4.1.11 New and infill hedgerow planting (approximately 1,000m in total) will be carried out as part of the development which will include strengthening the existing species poor hedgerows, and planting up gappy sections of hedgerow with native species. In addition 0.43ha of trees will be planted to create a 15m wide tree belt to the south of the Site. This will provide more species diverse and well-structured hedgerows and a tree belt, of value for wildlife around the Site and linking to existing woodland areas around the Site. Planting will be in accordance with the *Site Layout and Planting Proposals Plan.*

4.1.12 Hedgerow and tree species have been selected to be appropriate to local conditions, with a general hedgerow species as summarised below:

Hedgerow Planting
Field maple *Acer Campestre*
Hawthorn *Crataegus monogyna*
Hazel *Corylus avellana*
Dog rose *Rosa canina*
Holly *Ilex aquifolium*
Blackthorn *Prunus spinosa*

Tree Planting
Field maple
Hawthorn
Spindle *Euonymus europaeus*

Ground Preparation

4.1.13 Where necessary existing weeds will be manually removed or treated with a suitable herbicide as specified within the herbicide handbook (English Nature, 2003) or hand-weeding.

4.1.14 Any extraneous matter such as plastic, large pieces of wood and metal will be removed from site to a registered waste disposal facility.

Planting

4.1.15 Hedgerows will be notch planted in a double staggered row at 5 plants per linear metre or infilled as per planting schedule.

4.1.16 The exact timing of the proposed hedgerow planting will be dependent on the ground conditions but bare-root planting should ideally take place between the months of December-February inclusive. It is expected that ground conditions and climate will allow for earlier planting (i.e. before January),

and this will allow the plants more time to establish a network of feeder roots before the onset of spring. Planting should avoid freezing and water logged conditions.

4.1.17 Planting slots shall be made using a planting spade. Plant notches should be L- shaped, using spades of a design suitable for this purpose. The planting notches must be vertical and deep enough for the roots to hang freely, with the transplant being planted so that the root collar is exactly level with the ground surface. The notch must then be closed and the soil will be well firmed round the roots in line with the guidelines as set out in BS 4428 (1989).

4.1.18 If ground conditions are dry during the time of planting (unlikely during December-February) then all individual plants should be well watered following planting.

Grassland Creation

4.1.19 The BRE guidance state that, as panels are raised above the ground on posts, over 95% of a site used for solar farm development is still accessible for plant growth and complementary agricultural activities, such as conservation grazing (BRE, 2014). The RSPB briefing note on Solar Energy also states that biodiversity gains are possible where intensively cultivated arable or grassland is converted to extensive grassland and/or wildflower meadows between and/or beneath solar panels and in field margins (RSPB, 2014[5]). A significant benefit to wildlife will be therefore achieved through creation of more species and structurally diverse grassland within the Site, favourable to invertebrates, birds, mammals, amphibians, and reptiles.

4.1.20 The main body of the Site is currently arable and pasture fields. Land beneath and around the solar panels will be converted to more species-rich grassland through grass seeding where the ground has been disturbed during construction and through an on-going management regime.

4.1.21 Re-seeding of impacted fields, will be sown with Cotswold seeds *Solar Park Long Term Grazing mix* (or similar) and the field margins planted with the seed mix Emorsgate EM2 *Standard General Purpose Meadow Mix* or similar as described in the *Site Layout and Planting Proposals Plan*.

4.1.22 The difficulties of successfully establishing wildflower meadows on previously intensively managed agricultural grassland or arable land is acknowledged, and it is considered that a highly species-rich flowering meadow mix is unlikely to establish in the short-term at this Site as a result. The mix that has been selected is however considered to be robust, with a range of species able to successfully establish under a range of soil conditions to develop a reasonably diverse grassland meadow. A longer-term approach to the establishment of this grassland meadow habitat has been adopted, seeking through suitable management practices and the avoidance of fertilizers to establish an increasingly species and structurally varied grassland across the Site, which will naturally diversify over time.

<u>Establishment</u>

4.1.23 The areas to be sown will be lightly scarified to a depth of approximately 5mm with low-impact machinery/equipment, designed to avoid impacting the sub-soil and buried services or cables associated with the solar array.

4.1.24 The seed bed will be prepared by removing weeds using repeated surface cultivation or a suitable non-residual herbicide.

[5] RSPB (2014) *Solar Energy: RSPB Policy Briefing, December 2014*. RSPB: Sandy.

4.1.25 Areas will be sown in accordance with the suppliers instructions, ideally during early spring following the completion of development and underground cabling (although seeding is possible at other times of year). Seed will be sown by machine or where this is not possible, seed will be broadcast by hand.

Swale Creation

4.1.26 Although the creation of a swale is primarily to accommodate runoff within the Site, this feature will also be of ecological benefit, creating habitat for a range of species. A swale will be created along various boundaries of the Site.

4.1.27 It will be designed to be shallow with a 1 in 20 slope and total storage of 3.5m³/m. The banks will be planted in line with the grassland creation.

4.1.28 The swale will be constructed to provide a range of micro-topography to encourage a diversity of plant species. A variety of drainage features, including an bunded storage and attenuation basin, is proposed on the Site. The swales will have a base width of 0.5m, a depth of 0.5m and 1 in 1 side slopes.

4.2 Wildlife Enhancement

Birds

4.2.1 Additional bird nesting provision will be made through the inclusion of 8 bird boxes erected on semi-mature/mature trees located within the site. Precise locations will be subject to confirmation during the installation depending on tree condition at that time, but indicative locations can be found in **Figure 1.**

4.2.2 An additional 4 bird boxes will be incorporated within an area for biodiversity to the west of the Site.

4.2.3 Bird boxes should ideally be installed in the autumn (September to November) following the cessation of construction works, by the appointed contractor under advice of the suitably competent ecologist.

4.2.4 Boxes should be erected at an appropriate height of between 1 to 5 metres. Boxes should be angled so that they face away from the prevailing wind or in a semi sheltered environment. Positioning within or close to hedgerows will increase chances of occupation. Bird boxes will be suitable for a variety of farmland bird species.

4.2.5 Suitable specifications for bird boxes are provided in **Appendix 1**.

Bats

4.2.6 Additional bat roost provision will be made through the inclusion of a minimum of 8 bat roost boxes on trees. Bat boxes will also be incorporated within the area for biodiversity to the west of the Site, with 4 boxes installed within the woodland habitat.

4.2.7 Boxes will be erected in suitable habitats, at an appropriate height (ideally above 4m in height) and with clear flight paths to utilise the Site boundary features. Precise locations will be subject to confirmation during the installation depending on tree condition at that time.

4.2.8 Suitable specifications for roosting boxes are provided in **Appendix 1.**

5 HABITAT MANAGEMENT

5.1.1 Habitat management will be reviewed and undertaken periodically throughout the lifetime of the solar farm (see Section 7). Management will be the responsibility of the current or any subsequent owner of the solar farm. All works associated with the implementation of the BMP will be undertaken by experienced contractors. The costs of any such works will be borne by the owner or any subsequent owner of the solar farm. Monitoring and reporting will be undertaken by a suitably qualified ecologist and the costs associated with monitoring reporting and any rectification works will be borne by the owner or any subsequent owner.

5.2 Hedgerow and Tree Management

5.2.1 During the establishment period (the first five years), all dead, dying or diseased stock will be replaced with stock of similar size and species by the appointed contractor at his own cost. If the failure of the plant is due to disease and the disease is considered likely to re-occur then an alternative native species of local provenance may be used as a replacement. The exact timing of the planting of replacement hedgerow and trees is dependent on the ground conditions; however, planting should ideally take place between the months of December and February inclusive, this will allow the plants more time to establish a network of feeder roots before the onset of spring.

5.2.2 The planting areas will be kept weed-free during the establishment period, using approved hand-weeding or if necessary herbicide treatment (applications in April, June and August). The herbicide handbook (English Nature, 2003) provides guidance on appropriate herbicide use in relation to nature conservation works. Where used, herbicides will be sprayed in appropriate weather conditions, to avoid affecting adjacent grassland areas.

5.2.3 During the establishment period, the planted hedgerows and trees should be inspected during periods of warm weather and drought. If it is considered that the ground conditions are too dry, the planted areas will be watered on a regular basis until weather conditions are considered suitable for watering to cease.

5.2.4 During establishment, hedgerows will be trimmed outside each growing season; hedgerows will be cut back by half the growth of that year with pruning aiming to encourage the development of healthy well-shaped specimens. New hedgerows will be trimmed using powered hand-held machinery (not flail cutters) for the first 3 years until established.

5.2.5 Once established, all hedgerows will be cut on a 2-3 year flexible basis as necessary to avoid shading of the panels and protect the perimeter fencing from encroachment. Ideally not all hedgerows will be cut in the same year for the benefit of wildlife and to allow plants to flower and set seed/fruit. Established hedgerows will be cut between late September and February using a tractor mounted flail or other method as appropriate.

5.2.6 No cutting or trimming is to be undertaken during the breeding bird season (1st March to 31st August inclusive).

5.2.7 If of a sufficient amount, cuttings can be collected and used to create habitat piles / wildlife refuges in habitats adjacent to the site.

5.2.8 After the establishment period planting guards (where used) will be removed and all hedgerows will be maintained at a height of approximately 2-4m or higher as appropriate for the operation of the Site.

5.2.9 Existing and newly planted trees within hedgerows will be left to grow naturally and not cut apart from pruning if necessary to maintain the health of the tree, safety or to protect panels from damage. These will be clearly marked to ensure that they are not cut back during hedgerow trimming/maintenance works.

5.3 Grassland Management

5.3.1 The grassland vegetation within the Site will be managed to provide a varied habitat structure providing nesting opportunities for birds and nectar, pollen and shelter for invertebrates, amphibians, reptiles and small mammals. Taller grassland vegetation will be encouraged to develop at the base of hedgerows, at field margins to provide foraging and shelter opportunities for wildlife.

Initial Management

5.3.2 Grassland management will be carried out in accordance with the seed supplier's technical advice during the establishment phase Most of the sown meadow species are perennial and will be slow to germinate and grow and will not usually flower in the first growing season. There will often be a vigorous initial growth and a flush of annual weeds during the first season. This should be managed across all of the seeded areas by topping and mowing throughout the first year at regular intervals. Regular cutting to establish the grassland will take place during Year 1 after seeding and possibly also in Year 2 if growth is particularly vigorous on the ex-arable land. In the unlikely event that the grassland / meadow planting fails and the area of bare ground is greater than 20%, these areas will be re-seeded.

5.3.3 Problem perennial weeds will be controlled by hand pulling or if necessary careful targeted application of a non-residual herbicide by way of spot spraying with a knapsack (low pressure to avoid spray drift), or weed wiping (no herbicide application within the vicinity of dry ditches) herbicide application may be used in April, June and August. Alternatively, annual weeds can be managed by topping and mowing prior to setting seed which will encourage lateral development of the grasses. Any topping undertaken between April and July should be no lower than 200mm to prevent harm to any ground nesting birds.

5.3.4 Any cut material will be either removed from the site or heaped in designated areas within the site in order to prevent nutrient build-up within the soil. Heaped material will provide suitable habitat for reptiles and invertebrates.

5.3.5 Specific attention should be paid to the potential presence of the following injurious (harmful) weeds: common ragwort (*Senecio jacobaea*), spear thistle (*Cirsium vulgare*), creeping thistle (*Cirsium arvense*) curled dock (*Rumex crispus*) and broad-leaved dock (*Rumex obtusifolius*); which are all listed within the Weeds Act 1959. These species should be removed from the grassland areas prior to enhancement works commencing[6 & 7].

[6] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/525269/pb9840-cop-ragwort-rev.pdf

[7] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69296/pb7190-harmful-weed-control.pdf

Long-term Management

5.3.6 Following establishment of a suitable sward, the grassland habitats will be managed through either grazing and/or mechanical cuts to develop nectar and pollen rich meadow grassland with a varied structure. Both management approaches are detailed below for ease of reference.

Option A: Cutting Regime

5.3.7 Following establishment, one or possibly two cuts will be taken per year comprising an early cut in February (if necessary) to manage regrowth around panels, and a second later in the season between August and September (each cut reducing sward height to approximately 150mm). No cutting will take place throughout the summer to allow the seeds of the later flowering species to fall prior to the cut, unless there is excessive height or tall weeds around panels which require period control. There may be circumstances when an additional summer cut is required to prevent vegetation obscuring panels, in such cases cuts should reduce sward height to no lower than 200mm to avoid impacts on nesting birds.

5.3.8 Cutting should adopt a systematic method (i.e. working outwards towards the boundary features); this will allow fauna such as invertebrates, amphibians, birds and small mammals to temporarily and safely vacate the area.

5.3.9 The management will take a flexible approach and the exact dates will be dependent upon weather conditions. A phased (rotational) cutting regime is recommended (i.e. ideally the entire area should not be cut at the same time) in order to allow for more structured grassland.

5.3.10 Cuttings will remain on-site for three to five days following the cut to allow seeds to disperse, and then be removed in order to remove nutrients and promote the development of a species-rich sward and placed on habitat piles located on the periphery of the site.

5.3.11 The perimeter of the Site along hedgerow bases can be cut less frequently once established, with a single main cut (reducing sward height to approximately 150mm) late in the season, between August and September, subject to weather conditions. The late cut will allow the seeds of the later flowering species to fall prior to the cut. An optional earlier cut can be made in March, if necessary, to manage re-growth.

Option B: Grazing Regime

5.3.12 Once established the grassland within the perimeter fence can be managed by sheep grazing as an alternative to mechanical cutting. Grazing should follow a low-intensity grazing regime as follows.

5.3.13 The grassland would be subject to light intermittent grazing by sheep between late August / September and November where conditions allow. Moderate trampling will expose ground for colonisation by annuals the next spring; however, heavy trampling can lead to ground poaching and infestations by weed species that will be detrimental to the Site. During the spring and summer (March to August), sheep will be removed or stocking density reduced to allow summer flowering plants to set seed, and grazing will be removed in the winter period in order to prevent the compaction of wet earth.

5.3.14 Ideally, it is best to aim for a stocking rate just sufficient to maintain a varied structure, rather than the maximum that the grassland can support. Grazing density (Table 5.1) is based on medium sized sheep (e.g. 60kg). It is important to constantly monitor the Site to ensure the grassland is not under or over grazed and stock density and duration altered accordingly. The stocking density should be reduced in wet periods or in conditions when poaching would lead to a break-up of the sward and colonisation by aggressive weed species.

Table 5.1: A guide to stocking levels for lowland grassland (number of sheep per hectare). Adapted from the Lowland Grassland Management Handbook produced by Natural England.

Number of grazing weeks per year	Neutral Grassland (sheep per ha)
16	12.5
20	10
24	8
36	5.5
52	4

5.3.15 The following indicators will be used to review and amend stocking densities:

- An increase in the amount of uneaten grass, the accumulation of litter, an increase in vigorous rank and unpalatable grasses, and a reduction in low growing herbs indicates stocking density is too low (increase density).
- A reduction in density of plants, excessive poaching, weed invasion and the development of bare patches indicates stocking density is too high (reduce density).

5.4 Swale Creation

5.4.1 The swales will be monitored and if considered appropriate they may be planted with suitable aquatic species of local provenance, although natural re-vegetation is the preferred option.

5.4.2 Swales require minimal intervention once constructed, however, some selective clearance of scrub vegetation every few years may be required to maintain function, which will also maintain value for amphibians.

5.5 Habitat Piles

5.5.1 Any wood and grass removed during habitat management or other work operations should be kept in habitat piles, placed along the edge of hedgerows, in order to provide valuable invertebrate habitat and shelter for other species including small mammals/amphibians/reptiles. These should be placed in the same locations each year.

6 ECOLOGICAL MONITORING

6.1.1 The development of the biodiversity interest of the Site will be monitored over time by a suitably experienced ecologist. A walkover survey will be undertaken on years 1, 3 and 5 and 10. This will involve an inspection of the hedgerows, trees, grassland and any other ecological features to ensure that they are being managed in a manner suitable for the enhancement of wildlife interest. Bird and bat boxes will also be checked. The results of these monitoring surveys will be used to inform future changes in management and the need or otherwise to replace missing bat/bird boxes. The management plan will be amended if necessary based on the monitoring recommendations (including amending the cutting regime if necessary).

6.1.2 Following the outcomes of each monitoring survey it will be the duty of “the Owner” of the site to amend the BMP to inform future changes in management including amending the grazing and cutting regime, if needed.

6.1.3 Monitoring procedures are outlined in **Table 6.1** (adapted from BRE guidance):

Table 6.1: Monitoring procedures and key indicators.

Biodiversity feature	Monitoring procedure	Key indicators
Hedgerows & tree belt	Walk full length of planted hedgerows and tree belt	Browse damage, dead whips, weeds, gaps, dead or damaged hedgerow/tree plants.
Field margins and species diverse grassland	Walkover of planted areas	Increase in the amount of uneaten grass/accumulation of litter/vigorous rank and unpalatable grasses – indicates need to increase stock densities. Reduction in density of plants or plant species present (count and check against original seed mix species list) - Indicates need to reduce stock densities or amend cutting regime. Excessive poaching, weed invasion or unwanted perennial weeds (docks, thistles) may need control by occasional spot treatment with an herbicide or other specific remediation. Occasional bare patches at the edges of the grassland are acceptable as they provide diversity within the grassland habitat for invertebrates and birds.
Swale	Walk full length of the swale	Increase in the amount of scrub species, dominance of terrestrial species and lack of establishment of aquatic species. Requires scrub clearance of deepening of swale to restore runoff management function.
Bird and bat boxes	Inspect each box	Visually check boxes are intact, secured. Note if need to replace.

7 INDICATIVE MANAGEMENT SCHEDULE

7.1.1 The following management programme shows possible months in which activities will commence within the first planting period after construction:

Initial Habitat Enhancement Year 1

Management Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year 1												
Grassland creation (*recommended)			✓*	✓*	✓	✓	✓	✓	✓			
Hedgerow and tree planting	✓	✓										✓*
Installation of bird nest and bat roost boxes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

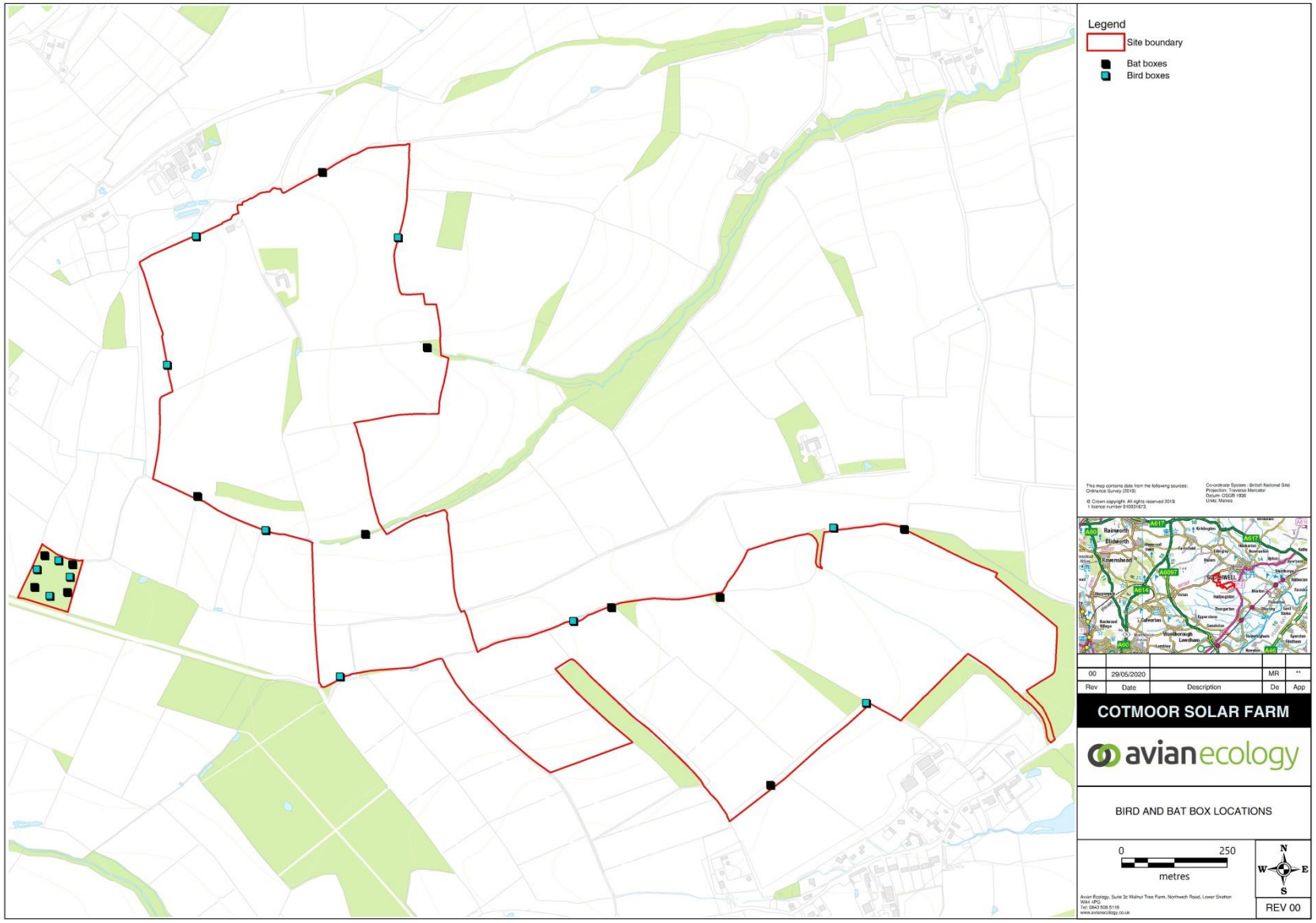
Habitat Management Year 2

Management Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year 2												
Initial management of grassland / meadows areas (targeted herbicide treatment of perennial weeds or cutting/topping where necessary)				✓		✓		✓				
Herbicide treatment or hand-weeding of hedgerow/tree planting bed				✓		✓		✓				
Trimming of new hedgerows to encourage bushy side growth	✓	✓							✓	✓	✓	✓
Swale management; scrub removal & litter picking	✓	✓							✓	✓	✓	✓
Swale management; aquatic planting if natural colonisation not established		✓	✓									

Ongoing Annual Management

Management Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year 3 onwards												
Grassland cutting		✓						✓	✓			
Sheep gazing	✓	✓							✓	✓	✓	✓
Herbicide treatment or hand-weeding of hedgerow/tree planting bed (establishment period up to first five years)				✓		✓		✓				
Periodic trimming of hedgerows as required	✓	✓							✓	✓	✓	✓
Swale management; scrub removal, litter picking & aquatic planting (where appropriate)	✓	✓							✓	✓	✓	✓

FIGURE 1: BAT AND BIRD BOX PROPOSED LOCATION



ANNEX 1: BAT AND BIRD BOX SPECIFICATIONS

Suitable Bat Roost Boxes		
Large Twin Crevice		Primarily for use by roosting bats but may also be used by small birds as a safe roost site. Two curved internal voids narrowing down to tight crevices at the top. Suitable for a range of bat species, mating roosts and spring and autumn roosts where the thermal mass is a benefit.
Bat chamber		Primarily for use by roosting bats including as an autumn mating roost, particularly for pipistrelles. Also likely be used by small birds as a safe roost site. 16mm hole for endoscope inspection in the base facilitating inspection, potentially avoiding working at height with the right equipment.
Siting	The bat boxes can be sited in trees and are best positioned at a height of between 3 to 6 metres. Bat boxes should ideally be sited in open sunny positions facing different directions to provide a variety of micro-habitats.	
Timing	Bat boxes can be installed at any time of year following the cessation of construction works.	
Other Notes	Note that once bats have inhabited a roost site they may only be disturbed by licensed bat workers.	
References	https://www.barkboxes.co.uk/product/large-twin-crevice/ https://www.barkboxes.co.uk/product/kent-type-twin-crevice/ https://www.barkboxes.co.uk/product/bat-chamber/	

Suitable Bird Boxes		
Great tit / tree sparrow nest box		Nest box and roost site with 28mm entrance suitable for great tit or tree sparrow. Likely to be used by roosting birds, and with potential for use by roosting bats.
Branch stub		Replicating a rotting branch stub with void. More likely to be used by nesting and roosting birds than roosting bats.
Open fronted nest box		For birds such as robin and pied wagtail. Open fronted but with a generous canopy to screen from aerial predators. Place in good cover not in the open.
Siting	The nest boxes should be sited in trees and are best positioned at a height of between 2 to 4 metres. Boxes should be angled so that they face away from the prevailing wind or in a semi sheltered environment. Positioning within or close to hedgerows will increase chances of occupation.	
Timing	Bird boxes will be erected outside of the breeding bird season, to eliminate the possibility of disturbing birds currently utilising the trees for nesting.	
Other Notes	Note that bird boxes should not be opened between the months of March to September to avoid disturbing nesting birds.	

Suitable Bird Boxes	
References	https://www.barkboxes.co.uk/product/great-tit-tree-sparrow/ https://www.barkboxes.co.uk/product/starling-box/ https://www.barkboxes.co.uk/product/branch-stub/ https://www.barkboxes.co.uk/product/open-fronted-nest-box/

ANNEX 2:

Outline Reasonable Avoidance Measures (RAMS) Method Statement; Amphibians

The following Method Statement outlines suitable measures to be implemented during construction works associated with the proposed solar development on Land at Cotmoor Solar Farm, Halloughton, Nottinghamshire (the Site), to avoid the potential for disturbance, injury or killing of individual great crested newt *Triturus cristatus*.

Measures to ensure the favourable conservation status of the species during the proposed development must reflect legislation and guidance application at the time and the construction phase will be undertaken following RAMS under the supervision of a Ecological Clerk of Works (ECoW) as required to provide advice. Should RAMs be considered insufficient, certain works may require to be undertaken under a Low Impact Class Licence (LICL) or full European Protected Species Mitigation (EPSM) licence from Natural England, either of which would be supported by a detailed Method Statement.

These RAMs relate to small scale removal of hedgerow and young plantation woodland habitat for access and should not be employed for larger scale or extensive scrub, woodland or hedgerow habitat removal. Minor or short term destructive or disturbance works (e.g. grid connection, cable laying, ground mountings, construction of substations) will also follow this Method Statement to ensure legal compliance and to ensure the objectives are achieved.

Method Statement Objectives

In order to facilitate the proposed works, a detailed working Reasonable Avoidance Measures (RAMs) Method Statement will be adopted to limit disturbance to avoid significant impacts on amphibian local populations potentially present.

Any development related activities on the Application Site, such as vegetation clearance or excavations in areas of suitable newt habitat may potentially affect amphibian species. As a result, safeguards must be implemented to protect these species and the Method Statement below outlines measures to be implemented to ensure these objectives are achieved. If these measures are followed then no impacts are likely to occur.

Method Statement

This Method Statement should be followed for the construction works and associated minor short term destructive habitat clearance works within the Application site in order to ensure legal compliance and to ensure the objectives are achieved.

The following measures will be adopted throughout the construction period of the proposed development:

- Site operatives will be informed by ‘tool box’ talk of the potential for protected species to occur on-site, what to look out for and what to do in the event that animal is found.

- If possible, the timing of the proposed vegetation removal works within the main body of the Site (arable and grassland should coincide with the majority of amphibians still being in hibernation (November to February inclusive). This will reduce the likely presence of individual animals within the Site as more favourable hibernation habitat (dense scrub and woodland) is located within the wider survey area outside of the Site boundaries.

- Vegetation clearance works should only commence after a careful visual inspection by a ECoW has determined that no animals are present. Vegetation should be reduced (by hand strimmer) to a height of c.150mm prior to ground works commencing to aid visual searches and encourage individuals to temporarily move away from the working areas.

- Trenches and excavations should include an escape route for animals that might enter the trench, especially if left open overnight. Ramps should be no greater than 45 degrees in angle and can include wooden planks or ramped earth. Ideally, any excavations open for a prolonged period should be covered.

- All excavations left open overnight or longer should be checked for animals prior to the continuation of works or infilling.

- Any excavated material stored overnight should be searched prior to being used as infill.

Should a great crested newt be found at any point during construction, works within suitable habitat and/or potentially disturbing works in close proximity to the great crested newt must cease immediately and the ECoW will advise on the appropriate actions, including applying for a licence, if required. Other amphibians found during the visual inspection will be placed within a designated receptor area comprising of terrestrial habitats which will not be impacted by the proposed works and has excellent connectivity with surrounding terrestrial habitats.

ANNEX 3:

Outline Reasonable Avoidance Measures (RAMS) Method Statement; Hazel Dormouse, Reptiles & Hedgehog

The following Method Statement outlines suitable measures to be implemented during construction works associated with the proposed solar development on Land at Cotmoor Solar Farm, Halloughton, Nottinghamshire (the Site), to avoid the disturbance, injury or killing of individual hazel dormice *Muscardinus avellanarius,* western hedgehog *Erinaceus europaeus,* reptiles including common lizard *Zootoca vivipara*, slow-worm *Anguis fragilis,* grass snake *Natrix helvetica* and adder *Vipera berus*. These RAMs relate to small scale removal of hedgerow and young plantation woodland habitat for access and should not be employed for larger scale or extensive scrub, woodland or hedgerow habitat removal. Minor or short term destructive or disturbance works (e.g. grid connection, cable laying, ground mountings, construction of substations) will also follow this Method Statement to ensure legal compliance and to ensure the objectives are achieved.

Hazel Dormouse

Summary of Method Statement

It is currently understood that a small area of vegetation removal is required within the proposed development comprising of a section of scrub, hedgerow and young plantation woodland to accommodate access tracks. Although hazel dormouse are not considered likely to be present, as a precautionary measure these RAMs will be used to guide works.

Any clearance of habitats potentially suitable for hazel dormouse will be carried out by hand using the 'persuasion' approach (Bright *et. al.*, 2006[15]) and under the direct supervision of a suitably licensed ecologist and/or accredited agent.

Search and Habitat Clearance

Prior to habitat clearance commencing in suitable hazel dormouse habitats (young trees in planted woodland area, hedgerows and associated habitats), a detailed inspection of all such vegetation to be removed/impacted will be undertaken by an ECoW in order to ensure no hazel dormice are present. Clearance of scrub/hedgerow sections up to 5m sections of hedgerow for example to facilitate access are not likely to affect dormice in any way but should be first checked by the project ecologist/ECoW. Lengths greater than that may require more detailed survey and advice should be sought from the project ecologist before removal.

Potential impacts of killing and injury during site clearance will be mitigated using the 'persuasion' approach (Bright *et al*, 2006[8]). This approach is normally adopted where:

- Less than 100m of hedgerow will be removed – as long as the remaining habitat is linked to a larger potential dormouse habitat.
- Less than a 50m wide strip of woodland will be removed – as long as the remaining habitat is linked to a larger dormouse habitat.

If works are proposed during the dormouse hibernation period between November – March, vegetation will be 'soft' felled in order to avoid impacts on potential dormouse hibernation habitat such as tree/hedge

[8] Bright, P.W, Morris, P.A. & Mitchell-Jones, A. (2006) *Dormouse Conservation Handbook: Second Edition*. English Nature, Peterborough.

'stools' and exposed roots (no ground clearance should take place in these habitats during this period). Felled tree sections may be logged into approximately 2m lengths and piled away from proposed works areas to provide wildlife habitat (including summer and winter nest/hibernation sites for dormice). As a precautionary measure, remaining stumps that may provide places of shelter should be removed the following April/May.

All clearance will be undertaken by an appointed contractor under the supervision of a suitably qualified/licenced ECoW, using hand tools or light machinery, and will be sensitive to the likelihood of disturbing dormice. Vegetation will be gradually reduced to stump level, with all cut brash stacked in habitat piles or chipped into piles at suitable locations around the site (outside of the proposed development works areas in retained woodland habitats), as directed by the ECoW to provide habitat for invertebrates, small mammals (including dormice), amphibians and reptiles.

Site operatives will be informed by a 'tool box', which will detail the potential for protected species to occur on-site, what to look out for and what to do in the event that animal is found.

If a hazel dormouse is found during site clearance or construction periods, works must stop immediately and contact should be made with a suitably qualified/licenced ECoW.

Reptiles & Hedgehogs

Summary of Method Statement

It is currently understood that a small area of higher value vegetation removal is required within the proposed development comprising of a section of scrub, hedgerow and young plantation woodland to accommodate access tracks. Although species such as reptiles and hedgehog are considered unlikely to be present, as a precautionary measure these RAMs will be used to guide works.

Vegetation clearance including grasslands greater than 15cm in height will be supervised by a suitably licensed ecologist and/or accredited agent.

Search and Habitat Clearance

Clearance works affecting hedgerows and scrub within the Site should only commence after a careful visual inspection undertaken by the ECoW has determined that no animals (including dormouse and hedgehog) are present. Vegetation should be reduced to a height of c.150mm prior to ground works commencing (ideally between April-October) to aid visual searches and encourage individuals to temporarily move away from the working areas.

Should any trenches and excavations be required, an escape route for animals that might enter the trench must be provided, especially if left open overnight. Ramps should be no greater than 45 degrees in angle. Ideally, any holes should be covered.

All excavations left open overnight or longer should be checked for animals prior to the continuation of works or infilling.

Any excavated material stored overnight should be checked for sheltering animals prior to being used as infill.

Site operatives will be informed by 'tool box' talk of the potential for protected or notable species to occur on-site, what to look out for and what to do in the event that animal is found.

If an reptile or hedgehog is found, work at this location must stop immediately to allow the animal to safely vacate the area and the ECoW informed.