

**FORMER PEWIT GOLF COURSE,
WEST END DRIVE, ILKESTON**

**Landscape and Ecology Management
Plan**



Client:

Erewash Borough Council

Report Reference:

RSE_4132_R3_V1_LEMP

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PROJECT

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Reference: RSE_4132_R3_V1_LEMP

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1 INTRODUCTION AND BACKGROUND

1.1 Purpose and Scope of this Report

- i RammSanderson Ecology Ltd was commissioned by Erewash Borough Council to produce a Landscape and Ecology Management Plan for the Site, in support of a “rewilding” project of the former Pewit Golf Course, with a view to the Site attaining Local Nature Reserve Status.

1.2 Background Information

- i RammSanderson Ecology Ltd was commissioned by Erewash Borough Council to carry out a Preliminary Ecological Appraisal of Pewit Golf Course, Ilkeston, Derbyshire in 2021 to inform the current ecological baseline of the site. Following recommendations within the Preliminary Ecological Appraisal Report (RSE_4132_01_V1) a suite of reptile surveys, bat activity surveys and a badger walkover were undertaken in 2022 to determine presence/likely absence of these species within the Site boundary and form a baseline for future monitoring successes. In addition, an updated Site walkover was undertaken in January 2023, which included a Biodiversity Impact Assessment conditions assessment of the existing onsite baseline habitats. RammSanderson were then commissioned to produce a Landscape and Ecology Management Plan, to inform a proposed Local Nature Reserve Strategy for the Site.
- ii This report provides ecological management recommendations to achieve the proposed habitat creation and enhancement measures, and to reach and maintain the habitat conditions proposed within the Biodiversity Impact Assessment, with a view to the Site attaining Local Nature Reserve Status.
- iii The Site is currently dominated by short-mown amenity grassland, bounded in places by intact species-poor hedgerows, intact species-rich hedgerows, species-rich hedgerows with trees, species poor hedgerows with trees, and a defunct species-rich hedgerow. Broadleaved woodland, mixed woodland, tall ruderal vegetation, scattered scrub and introduced shrub habitats were also present within the site. Three buildings were present onsite surrounded by hardstanding and introduced non-native shrub.

1.3 Site Context and Location

- i The Site comprised the former Pewit Golf Course, located west of West End Drive, Ilkeston, Derbyshire, and was c.10.5ha. The residential and road network of Ilkeston lies east of the site boundary, with open countryside dominating the wider landscape to the west of the site boundary; including Manor Floods LNR, Pewit Carr LNR and Straws Bridge LNR, waterbodies, blocks of deciduous woodland and a series of hedgerows and tree lines. The city of Derby also lies approximately 11km south-west of the site boundary.



Title: Site Context Plan		
Project: Pewit Golf Course, Proposed LNR Strategy		
Client: Erewash Borough Council		
Date: 08/03/2023	Fig:	Author: LG
A4 Scale: 1:3000	ID: RSE_4132b_STC_0323_V2R1	
EPSG:27700 OSGB36 / British National Grid		

1.4 Management Objectives and Targets

- i Assessments of protected species, local policies and ecological constraints on the site have been undertaken and are discussed in detail within the Preliminary Ecological Appraisal report (RSE_4132_01_V1), which should be read in conjunction with this report. A brief summary is provided in Section 1.5 below.
- ii In compiling the management plan for this site, the following relevant articles of legislation are considered with regard to maximise the local and national benefits in accordance with their targets;
 - The National Planning Policy Framework (2021)
 - ODPM Circular 06/2005 (retained as Technical Guidance on NPPF 2021)
 - The Conservation of Habitats & Species (Amendment) (EU Exit) Regulations 2019 (as amended);
 - The Wildlife and Countryside Act 1981 (as amended);
 - EC Council Directive on the Conservation of Wild Birds 79/409/EEC;
 - National Parks and Access to the Countryside Act 1949;
 - The Protection of Badgers Act 1992;
 - The Countryside and Rights of Way Act 2000;
 - The Hedgerow Regulations 1997;
 - The Natural Environment and Rural Communities (NERC) Act 2006;
 - UK Biodiversity Action Plan (UKBAP) 1995;
 - Local Biodiversity Action Plan for Lowland Derbyshire
- iii The Site falls within the Erewash Valley area, encompassed within the Lowland Derbyshire Biodiversity Action Plan 2011-2020. Although we are now beyond this period, an updated action plan has yet to be released, and within the action plan local planners, local authorities, ecological consultants and conservation authorities are encouraged to continue to promote, recognise and endorse the principles detailed within the BAP.
- iv Key targets for the creation of Priority Habitat (NERC Act, 2006) within the Erewash Valley area have been detailed within the Lowland Derbyshire BAP. The habitats proposed within the LEMP contribute towards meeting the following targets:
 - Creation of 15 ponds between 2011-2020
 - Creation of 20ha of lowland meadow
 - Creation of 50ha of lowland mixed deciduous woodland.
- v Several key targets for Priority species (NERC Act, 2006) have also been detailed which include:
 - Dingy Skipper: Range expansion of 1km between 2011-2020 through targeted pond creation
 - Great crested newt: Range expansion of 1km through appropriate habitat enhancement
- vi The Lowland Derbyshire BAP identifies Priority species (NERC Act, 2006) which are known to be present within the Erewash Valley area since 2000 (78 species). This includes the below, which are considered within this management plan:
 - Amphibians: Great crested newt, common toad
 - Reptiles: Common lizard, grass snake, slow worm
 - Mammals: Brown long-eared bat, harvest mouse, hedgehog, noctule, soprano pipistrelle,
 - Invertebrates: dingy skipper, small heath
 - Birds species, including house sparrow and starling

1.5 Site Baseline and Management Objectives

- i During the Preliminary Ecological Appraisal, the existing habitats were identified onsite:

- Broadleaved Semi-natural Woodland
 - Broadleaved Plantation Woodland
 - Mixed Plantation Woodland
 - Scattered Scrub
 - Poor Semi-improved Grassland
 - Bracken
 - Tall Ruderal Vegetation
 - Amenity Grassland
 - Introduced Shrub
 - Native hedgerow
- ii The overall objective is to enhance retained habitats and to create and manage habitats for their conservation value, within the site. The long-term management objectives are as follows:
- Maintain and enhance the existing nature conservation value of retained features, including trees, woodlands and hedgerows;
 - Manage retained and newly created habitats appropriately (including ponds, woodlands, trees, neutral grassland, orchards and open mosaic habitat);
 - Monitor key habitats and species and;
 - Comply with legal objectives

1.5.2 Designated Sites

- i Twelve statutorily designated Sites were identified within 5km of the Site, with forty-six non-statutorily designated sites also identified within 2km of the Site within a desk-based assessment¹. Manor Floods LNR, Pewit Car LNR and Straws Bridge LNR were identified adjacent to the Site to the north, north-west and west respectively. One objective of the proposed habitat creation and management detailed in this report is to increase the Sites connectivity to local designated Sites, and increase habitat provision within the local landscape.

1.5.3 Habitats

Semi-natural Broadleaved Woodland Management

- i Areas of semi-natural broadleaved woodland were present onsite along the western and southern boundaries of the Site. The western section of woodland comprised occasional ash (*Fraxinus excelsior*), hawthorn (*Crataegus monogyna*), alder (*Alnus glutinosa*), privet (*Ligustrum ovalifolium*), elder (*Sambucus nigra*), burdock (*Arctium* sp.), plum (*Prunus* sp.), hazel (*Corylus avellana*) and apple (*Malus* sp.). Ground flora within this habitat comprised species including ash saplings, snowberry (*Symphoricarpos albus*), cock's-foot grass (*Dactylis glomerata*), wood avens (*Geum urbanum*), common hogweed (*Heracleum sphondylium*), bramble (*Rubus fruticosus*) and ivy (*Hedera helix*). The woodland along the southern boundary of the Site comprised species such as occasional pedunculate oak (*Quercus robur*), ash, cherry (*Prunus avium*), holly (*Ilex aquifolium*), sycamore (*Acer pseudoplatanus*), hazel, field maple (*Acer campestre*), hawthorn and *Populus* species. Ground flora comprised of ivy, bramble, ash saplings, wood avens, holly and lords and ladies (*Arum maculatum*). Fallen deadwood was present on the ground in several locations.

¹ MAGIC resource was reviewed 28.08.2020

Plantation Woodland Management

- ii Areas of broadleaved and mixed plantation woodland were also present within the former golf course greenway.
- iii Within the broadleaved plantation woodlands, species comprised silver birch (*Betula pendula*), cherry, sweet chestnut (*Castanea sativa*), Norway maple (*Acer platanoides*), alder, sycamore, ash, rowan (*Sorbus aucuparia*), pedunculate oak (*Quercus robur*) and hazel. The woodland understorey comprised a continuation of the amenity grassland dominating the site.
- iv Within the mixed plantation woodlands onsite, species comprised oak (*Quercus* sp.), sycamore, *Pinus* sp., sweet chestnut, ash, elder, silver birch, field maple, yew (*Taxus baccata*), *Malus* sp., cherry, Norway maple, blackhaw (*Viburnum prunifolium*), hornbeam (*Carpinus betulus*), Scots pine (*Pinus sylvestris*), crack willow (*Salix fragilis*), lime (*Tilia* sp.), blackthorn, and hawthorn. The woodland understorey comprised a continuation of the amenity grassland dominating the site.

Objective 1: To retain, protect and enhance the existing woodlands, with an aim to improve their value as a habitat and connective feature.

Hedgerow Management

- i Eleven hedgerows were present along the Site boundaries, several of which are defunct and lack appropriate management.

Objective 2: To retain, protect and enhance the existing hedgerows, with an aim to improve their value as a habitat and connective feature.

Poor Semi-improved Grassland

- i Poor semi-improved grassland was present within the hardstanding car park. Species included dandelion (*Taraxacum officinale* agg.), ribwort plantain (*Plantago lanceolata*), perennial ryegrass (*Lolium perenne*), dove's-foot cranesbill (*Geranium molle*), spear thistle (*Cirsium vulgare*), rough meadow grass (*Poa trivialis*), clover (*Trifolium* sp.), creeping buttercup (*Ranunculus repens*), Yorkshire-fog (*Holcus lanatus*), ragwort (*Senecio jacobaea*) and cat's ear (*Hypochaeris radicata*). Ladies bedstraw (*Galium verum*), indicative of calcareous grassland, was also identified within this area.

Objective 3: To enhance the existing poor semi-improved grassland to increase its floristic diversity and value to foraging fauna.

Bracken

- i An area of *Pteridium aquilinum* was noted east-south-east within the site.

Objective 4: To retain onsite and manage to prevent encroachment into adjacent habitats

Tall Ruderal Vegetation

- i Tall ruderal vegetation was present along the site boundaries as hedgerow understory habitat. A small patch of tall ruderal was also present south-west within the site. Species comprised occasional common hogweed, cleavers (*Galium aparine*), wood avens, nettle (*Urtica dioica*), yarrow (*Achillea millefolium*), broadleaved dock (*Rumex obtusifolius*), herb Robert (*Geranium robertianum*) and black knapweed (*Centaurea nigra*).

Objective 5: To retain and enhance within proposals

Introduced Shrub

- i An area of introduced shrub was present north of B1 comprising ornamental species including box leaved honeysuckle (*Lonicera nitida*). *Cotoneaster* sp. was identified east of B1.

Objective 6: To remove Schedule 9 invasive species from within the Site to provide Site enhancement and reduce competition for native flora

Amenity Grassland

- i The majority of the site was dominated by managed short-mown amenity grassland, comprising the former golf course. This was dominated by Yorkshire-fog, with abundant perennial ryegrass (*Lolium perenne*), rough meadow-grass and cock's-foot grass. Occasional creeping buttercup (*Ranunculus repens*), dandelion (*Taraxacum officinale* agg.), yarrow, broadleaf plantain (*Plantago major*) and ragwort were also identified. Meadow foxtail (*Alopecurus pratensis*) and black knapweed were also rarely encountered.

Objective 7: To enhance the existing grassland onsite to increase its species diversity and value to a range of fauna including invertebrate species, herpetofauna, small mammals, foraging bird and bat species.

Buildings

- i Three buildings were present within the site boundary, comprising of brick and render.

Objective 8: To retain onsite and increase their value to protected and notable fauna through bat box and bird nest box provision

1.5.4 Species

Badgers

- i During the 2021 preliminary ecological appraisal, no badger (*Meles meles*) setts were recorded on site. A single badger dung pit was, however, identified within the broadleaved woodland located along the southern site boundary. Additionally, records of badgers were returned within 2km of the site boundary during the desk study. Therefore, it was considered that badgers were likely accessing the Site for foraging and commuting purposes.
- ii Badgers are a highly mobile species, and the woodland on site presents optimal habitat for badgers to establish setts. Therefore, there is potential that badgers may utilise the broadleaved woodland on site for sett building in the future.
- iii Due to the time elapsed since the preliminary survey visit, and the mobile nature of this species, an additional badger survey was undertaken on 28/09/2022. A single mammal hole (Figure 2) was identified within the semi-natural woodland along the western Site boundary. The entrance hole was indicative of badger due to the size and 'D' shape, although the entrance was filled with debris and soil, and likely not frequently utilised. Should works be required within 30m of this hole, a period of monitoring should be undertaken to determine level of use and inform future mitigation and habitat management.
- iv No other field signs indicative of badger in the form of latrines, hairs or prints were identified, although several mammal paths were noted within the semi-natural woodlands onsite. However, the dense scrub understorey within these habitats limited access and therefore the potential for concealed sett cannot be ruled out. It is worth noting, however, that the Site is frequently utilised by the public and dog walkers.

Figure 2: Potential Badger Set



Objective 9: To retain and maintain a minimum of a 30m buffer from the potential badger sett (where not possible a period of monitoring will be required)

Objective 10: To enhance the existing onsite habitats to increase the value of the Site for foraging, commuting and refuge seeking badger.

Other Priority Fauna

- i Given the suitability of the site for badgers, the habitats on site were also considered suitable for hedgehogs (*Erinaceus europaeus*). Records were also identified for this species and they are considered likely present on site.
- ii The woodland, tall ruderal vegetation, scrub and hedgerows also offer opportunities for refuge seeking and commuting common toad, and local records have been previously identified within a desk based assessment.

Objective 11: To enhance the existing onsite habitats to increase the value of the Site for foraging, commuting and refuge seeking hedgehog.

Objective 12: To increase the value of the Site for common toad through pond creation, grassland enhancement, woodland enhancement and hedgerow enhancement, as well as through hibernacula creation.

Great Crested Newt

- i No ponds were located on site, however there were eight ponds (P1-8) located within 500m of the site boundary (6).
- ii P1, P2 and P4 were located c.30m, c.40m and c.90m west of the site boundary, respectively, and constitute Straws Bridge LNR. These ponds have previously been assessed as suboptimal habitat for great crested newts due to a lack of emergent/submerged vegetation and the presence of fish (Penny Anderson Associates Ltd. 2014). However, records of great crested newt were returned within 2km of the site boundary; the closest of which was located 0.4km south-west of the site boundary, within P4.
- iii P3 was located c.50m north-west of the site boundary and was situated within Pewit Carr LNR.
- iv P6 was located c.230m west of the site boundary, adjacent to the western boundary of Straws Bridge LNR.

- v Whilst the Nutbrook Canal (WC1) lies between these ponds and Pewit Golf Course, this is not considered as a barrier to dispersal as a disused railway line lies north of Straws Bridge LNR spans Nutbrook Canal, creating terrestrial connectivity between P1-4, P6 and the development site.
- vi P5 was identified as Pewit Fish Pond Grade 3 non-statutorily designated site, and P8 appeared to be a private residential garden pond. As such, these ponds are likely to be stocked with fish and therefore suboptimal for breeding great crested newt, due to increased predation.
- vii The majority of habitats on site were considered to be sub-optimal for terrestrial phase great crested newts, comprising predominantly of managed and frequently disturbed amenity grassland. The peripheral vegetation on site, including broadleaved and mixed woodland, hedgerows, scattered trees, tall ruderal vegetation, and longer sward amenity grassland does provide opportunities for foraging, refuge seeking and commuting great crested newts. As such, given the presence of ponds and records of great crested newts within 500m of the site boundary and the ecological connectivity of the site, it is considered likely that terrestrial phase great crested newts may utilise the suitable habitats on site (such as the woodland, hedgerows and areas of longer sward grassland).
- viii It is recommended that eDNA surveys are conducted on the ponds within 250m of the Site to inform future mitigation required for the proposed habitat management and creation works.

Objective 13: To increase the value of the Site for great crested newt through pond creation, grassland enhancement, woodland enhancement and hedgerow enhancement, as well as through hibernacula creation.

Objective 14: To increase connectivity to local waterbodies through habitat enhancement

Reptiles

- i Thirty-six records of reptiles, including adder (*Vipera berus*), common lizard (*Zootoca vivipara*), grass snake (*Natrix natrix*) and slow worm (*Anguis fragilis*), were returned within 2km of the site boundary during the desk study. During the preliminary ecological, the majority of the terrestrial habitats on site were considered to be suboptimal for foraging, refuge seeking and commuting reptiles, mainly comprising heavily managed and frequently disturbed short-mown amenity grassland fairways. The pockets of woodland, hedgerows, and patches of longer sward grassland provided opportunities for foraging, refuge and commuting for reptiles. The site also exhibits extensive terrestrial connectivity into the wider landscape, and so presents opportunities for transient reptiles to traverse the site.
- ii A suite of reptile surveys was undertaken in 2022, during which no reptiles were identified and therefore they are considered likely absent from the Site, or of such a low population density that they are unlikely to constitute a core population.

Objective 15: To increase the value of the Site for reptile species through pond creation, grassland enhancement, woodland enhancement and hedgerow enhancement, as well as through hibernacula creation.

Terrestrial Invertebrates

- i The majority of habitats on site were of limited value to terrestrial invertebrates, mainly consisting of managed amenity grassland. In addition, the habitats on site were of limited botanical species diversity, and therefore limiting the suitability of the site for a range of invertebrates. The patches of woodland and tall ruderal vegetation on site does, however, provide suitable habitat for a range of terrestrial invertebrates, with the areas of grassland with a longer sward also providing pockets of suitable habitat. In addition, where the edges of the woodland meet the grassland on site, this creates an 'ecotone' habitat. Ecotones are created where

the transition of habitats (i.e. from grassland to woodland) creates a mosaic of niches, providing suitable habitat for a wide range of terrestrial invertebrates.

- ii During the desk study, three species of Lepidoptera (butterflies and moths) listed as species of Principal Importance under the NERC Act 2006 were returned within 2km of the site boundary. These included dingy skipper (*Erynnis tages*), small heath (*Coenonympha pamphilus*) and cinnabar (*Tyria jacobaeae*), each of which are discussed in the relevant headings below.

Dingy skipper

- iii Fourteen records of dingy skipper were recorded within 2km of the site boundary. The closest of which was recorded 0.4km north-west of the site boundary, within Pewit Carr LNR, and so exhibited connectivity to the site. Adult dingy skippers can often be found within woodland edge habitat (Brock, 2019). The larval host plants for this species, however, includes bird's-foot trefoil (*Lotus corniculatus*), greater bird's foot trefoil (*Lotus uliginosus*) and horseshoe vetch (*Hippocrepis comosa*) (Collins, 2009). None of these plant species were identified on site and so, the site is extremely unlikely to support a significant population of dingy skipper. As such, whilst woodland edge habitats are present on site, dingy skipper is considered likely absent from site due to the absence of the larval host plant species.

Small heath

- iv Five records of small heath were also returned within 2km of the site boundary, the closest of which was located 1.8km north-west of the site boundary. The larval host plants for this species includes sheep's fescue (*Festuca ovina*), red fescue (*Festuca rubra*), annual meadow grass (*Poa annua*), sweet vernal grass (*Anthoxanthum odoratum*), crested dogstail (*Cynosurus cristatus*), cock's foot (*Dactylis glomerata*) and mat-grass (*Nardus stricta*) (Collins, 2009). Cock's foot was frequently observed within the amenity grassland on site. This habitat was, however, short in sward from previous heavy management, and small heath larvae prefer tall, lush grasses (Brock, 2019). This therefore limits the availability of this plant species for small heath larvae and, therefore, is unlikely to support a significant population of small heath butterfly. As such, whilst a larval host plant for this species is present on site, small heath is considered likely absent from site.

Cinnabar

- v Three records of cinnabar moth were returned during the desk study, located 2km north-west of the site. The larval host plant for cinnabar is ragwort (*Senecio jacobaea*) (Waring, *et al.* 2017), which was occasionally observed within the amenity grassland fairways, frequent within tall ruderal vegetation, and frequent within patches of poor semi-improved grassland on site. As discussed for the small heath butterfly, as the areas of amenity grassland are short in sward, this limits the availability of this plant species for cinnabar larvae and, therefore, this habitat is unlikely to support a significant population of cinnabar moth. However, areas of amenity grassland on site left as 'rough' were of a longer sward height (c.25cm) and so, whilst this habitat is limited in area across the site, this habitat presents opportunities to support cinnabar larvae. As such, whilst the site is considered unlikely to support significant populations of cinnabar, this species is considered likely present within the patches of poor semi-improved grassland on site.

Objective 16: To increase the value of the Site for invertebrate species through pond creation, grassland enhancement, woodland and hedgerow enhancement and creation of open mosaic habitat.

Nesting Birds

- i The hedgerows, scattered trees and broadleaved woodland located onsite are suitable habitat for a range of bird nesting sites, and local records of Birds of Conservation Concern (BoCC) and Schedule 1 species were returned within 2km of the Site boundary, with song thrush (*Turdus philomelos*) records identified onsite. Whilst pockets of woodland, scattered trees and hedgerows were present on site, these are limited in extent

and unlikely to support significant populations of BoCC or Schedule 1 species onsite. As such, bird assemblages onsite are considered likely to comprise predominantly common and widespread species.

- ii The objective is to prevent damage/disturbance to nesting birds onsite during enhancement works, and therefore any vegetation clearance should avoid nesting bird season (March-September inclusive). A second objective is to enhance the site for nesting birds through habitat creation and enhancement.

Objective 17: To increase the value of the Site for nesting bird species through woodland creation and enhancement, hedgerow enhancement, pond creation and the installation of bird nest boxes.

Objective 18: To increase the value of the Site for foraging bird species, through pond creation, grassland enhancement, woodland and hedgerow enhancement and creation of open mosaic habitat.

Riparian Mammals

- i No suitable habitats for water vole (*Arvicola amphibius*) and otter (*Lutra lutra*) were identified on site. Nutbrook Canal and the wet ditch, located along the northern site boundary, do, however, present suitable habitat for these riparian mammals within the immediate vicinity of the development site. Straws Bridge LNR, adjacent to the western site boundary, is also known to support water voles. In addition, records of water vole were identified adjacent to the western site boundary, within Nutbrook Canal, with records of otter also returned 1.2km north-west of the site boundary, also within Nutbrook Canal. As such, whilst no suitable habitats for riparian mammals were present on site, it is considered extremely likely for riparian mammals to be present within the waterbodies immediately adjacent to site and within the wider landscape.

Objective 19: To enhance the Site for foraging, commuting and refuge seeking and to increase terrestrial connectivity within the wider landscape.

Bats

Trees

- i Patches of broadleaved woodland, mixed woodland and scattered trees were present throughout the site. Full Ground Level Tree Assessments (GLTAs) were, however, beyond the remit of the survey visits, and so no trees were assessed for their potential to support roosting bats. As such, there is potential for the woodland and scattered trees on site to support bat roosts.
- ii The objective is to prevent impacts to potential roosts should these be present within the trees onsite, and to enhance the commuting and foraging habitat locally and within the Site, as well as increasing roost provision.

Foraging Habitat

- iii The hedgerows and woodland present on site provided potential foraging and commuting habitat, as well as providing connectivity to the wider landscape. In addition, Nutbrook Canal and the wet ditch, located adjacent to the western and northern boundaries, respectively, also provided suitable foraging habitat within the wider landscape. The Site also exhibits extensive connectivity to the wider landscape.
- iv During the desk study, forty-one bat records were identified within 2km of the site boundary, the closest of which was a Daubenton's (*Myotis daubentonii*) bat located 0.5km south-west of the site, within Straw Bridge LNR. This record also exhibited connectivity to the site via waterbodies (including lakes and Nutbrook Canal) as well as through the blocks of deciduous woodland and open grassland. As such, it is considered likely for foraging and commuting bats to utilise the habitats, such as the broadleaved woodland, on and immediately adjacent to the site.

Buildings

- v Three buildings (B1-B3) were located within the eastern extent of the site. A Bat Building Assessment (BBA) for roosting bats was beyond the remit of this initial survey and so the buildings were not fully assessed for their potential to support roosting bats. However, potential access points for bats, including missing and lifted roof tiles, lifted roofing felt and airbricks were identified. As such, there is a potential for bat roosts to be present within these buildings.

Objective 20: To increase the value of the Site for foraging and commuting bat species through woodland creation and enhancement, hedgerow enhancement, pond creation and grassland enhancement

Objective 21: To increase opportunities for roosting bats within the Site through woodland creation and enhancement, and through installation of bat boxes.

1.5.5 Non-native Species Treatment

- i Japanese knotweed (*Fallopia japonica*) was recorded along the north-eastern site boundary. This is a Schedule 9 (Wildlife and Countryside Act, 1981 as amended), under which it is an offence to cause it to spread in the wild.
- vi It is recommended that a specialist Japanese knotweed contractor is appointed to ensure safe eradication of the infestation onsite. The removal of dead stands should be disposed of as contaminated waste. Monitoring of Japanese knotweed should continue on- and off-site (within the wider ownership) due to the high potential of this species to spread to the site.
- vii *Cotoneaster* sp. was also recorded on the Site adjacent to B2 and B3. Several species of *Cotoneaster* are recorded on Schedule 9 of the Wildlife and Countryside Act (1981) (as amended). It is therefore recommended that these plants are removed and burnt/mulched onsite.

Objective 22: To ensure the prevention of further spread onsite and within the wider environment, and to implement a suitable remediation strategy.

Table 1: Summary of Objectives and their Ecological Receptors

Objective	Ecological Receptor
Objective 1: To retain, protect and enhance the existing woodland, with an aim to improve their value as a habitat and connective feature	Broadleaved semi-natural and plantation woodland Mixed plantation woodland
Objective 2: To retain, protect and enhance the existing hedgerows, with an aim to improve their value as a habitat and connective feature.	Hedgerows
Objective 3: To enhance the existing poor semi-improved grassland to increase its floristic diversity and value to foraging fauna.	Poor semi-improved grassland
Objective 4: To retain onsite and manage to prevent encroachment into adjacent habitats	Bracken
Objective 5: To retain and enhance within proposals	Tall Ruderal Vegetation
Objective 6: To remove Schedule 9 invasive species from within the Site to provide Site enhancement and reduce competition for native flora	Introduced Shrub
Objective 7: To enhance the existing grassland onsite to increase its species diversity and value to a range of fauna	Amenity Grassland

Objective	Ecological Receptor
including invertebrate species, herpetofauna, small mammals, foraging bird and bat species.	
Objective 8: To retain onsite and increase their value to protected and notable fauna through bat box and bird nest box provision	Buildings
Objective 9: To retain and maintain a minimum of a 30m buffer from the potential badger sett (where not possible a period of monitoring will be required)	Potential Badger Sett
Objective 10: To enhance the existing onsite habitats to increase the value of the Site for foraging, commuting and refuge seeking badger	Hedgerows Woodlands Grassland Scrub
Objective 11: To enhance the existing onsite habitats to increase the value of the Site for foraging, commuting and refuge seeking hedgehog.	Hedgerows Woodlands Grassland Scrub
Objective 12: To increase the value of the Site for common toad through pond creation, grassland enhancement, woodland enhancement and hedgerow enhancement, as well as through hibernacula creation.	Hedgerows Woodlands Grassland Scrub
Objective 13: To increase the value of the Site for great crested newt through pond creation, grassland enhancement, woodland enhancement and hedgerow enhancement, as well as through hibernacula creation.	Hedgerows Woodlands Grassland Scrub
Objective 14: To increase connectivity to local waterbodies through habitat enhancement	W Hedgerows Woodlands Grassland Scrub
Objective 15: To increase the value of the Site for reptile species through pond creation, grassland enhancement, woodland enhancement and hedgerow enhancement, as well as through hibernacula creation.	Hedgerows Woodlands Grassland Scrub
Objective 16: To increase the value of the Site for invertebrate species through pond creation, grassland enhancement, woodland and hedgerow enhancement and creation of open mosaic habitat.	Hedgerows Woodlands Grassland Scrub
Objective 17: To increase the value of the Site for nesting bird species through woodland creation and enhancement,	Hedgerows Woodlands

Objective	Ecological Receptor
hedgerow enhancement, pond creation and the installation of bird nest boxes.	Scattered trees Scrub
Objective 18: To increase the value of the Site for foraging bird species, through pond creation, grassland enhancement, woodland and hedgerow enhancement and creation of open mosaic habitat.	Hedgerows Woodlands Grassland Scrub
Objective 19: To enhance the Site for foraging, commuting and refuge seeking and to increase terrestrial connectivity within the wider landscape.	Hedgerows Woodlands Grassland Scrub
Objective 20: To increase the value of the Site for foraging and commuting bat species through woodland creation and enhancement, hedgerow enhancement, pond creation and grassland enhancement	Hedgerows Woodlands Grassland Scrub
Objective 21: To increase opportunities for roosting bats within the Site through woodland creation and enhancement, and through installation of bat boxes.	Woodlands Buildings Scattered trees
Objective 22: To ensure the prevention of further spread onsite and within the wider environment, and to implement a suitable remediation strategy.	Japanese knotweed

1.6 Biodiversity Impact Assessment (BIA)

- i Biodiversity Impact Assessment of proposals was carried out in accordance with guidelines published by DEFRA² and via the DEFRA Metric Calculation Tool 3.1. The existing value of individual habitats on site is initially calculated by accurately mapping the proposed development site from information collected during a Biodiversity Scoping Assessment/Phase 1 Habitat Survey and by dividing the land into individual habitat parcels; This part of the work is informed by JNCC Phase 1 habitat¹ and UK habitats³ classification systems. The distinctiveness, condition, connectivity and strategic significance of these parcels is then assessed and together with the area of each habitat, a value is assigned. A summary of how habitat distinctiveness, condition assessment, connectivity and strategic significance is determined is detailed within best practice literature.

Calculation

- ii Once the habitat types have been input into the Biodiversity Impact Assessment calculator, along with their area, distinctiveness, condition, connectivity and strategic significance, an overall score in biodiversity units is calculated.

Compensation

- iii Once the biodiversity value of existing on-site habitats has been quantified, the value of indicatively proposed habitats to achieve a net gain as part of proposals must be calculated. This is calculated using the methodology applied above, taking into account the area/length of indicatively proposed habitats, their distinctiveness, condition, connectivity and strategic significance once this is established. A further two parameters are also taken into consideration at this stage. These are the time it will take to reach this target condition and the difficulty of creating/restoring each habitat type proposed. By using these parameters, the calculation takes into account that the time it takes for a habitat to establish may result in a loss of biodiversity for a period of time and also the risk of failure associated with any habitat creation/restoration.

Results

- iv On completion of the Defra Biodiversity Metric 3.1 (RSE_4132b_BIA_V1), the onsite baseline score was 37.05 units, with habitat enhancements resulting in a post intervention score of 76.49 units, an **increase of 39.44 units (106.46%)**. The associated baseline and proposed visualisation plans can be found within Appendices 3 and 4.
- v To maximise the ecological benefits of these habitats, native species are recommended as detailed within the relevant sections below.
- vi Therefore, the management objective in this regard is to successfully create and manage the proposed habitats through the implementation of various management techniques over a 10-year period as a minimum. This will secure a successful net gain for the proposals. To achieve the proposed habitat conditions, various criteria need to be met, which are detailed within the associated Defra Biodiversity Metric (RSE_4132b_BIA_V1). Should the management criteria detailed within this report be adhered to, the

² Crosher I et al., 2019. The Biodiversity Metric 3.1: auditing and accounting for biodiversity value. User guide (April, 2022), Natural England.

³ UK Habitat Classification Working Group, 2018. UK Habitat Classification – Habitat Definitions V1.0 at <http://ecountability.co.uk/ukhabworkinggroup-ukhab>

condition criteria will be met. Yearly monitoring is recommended in order to adjust the proposed management prescriptions to achieve and maintain the proposed conditions. Management prescriptions are given for the entirety of the site.

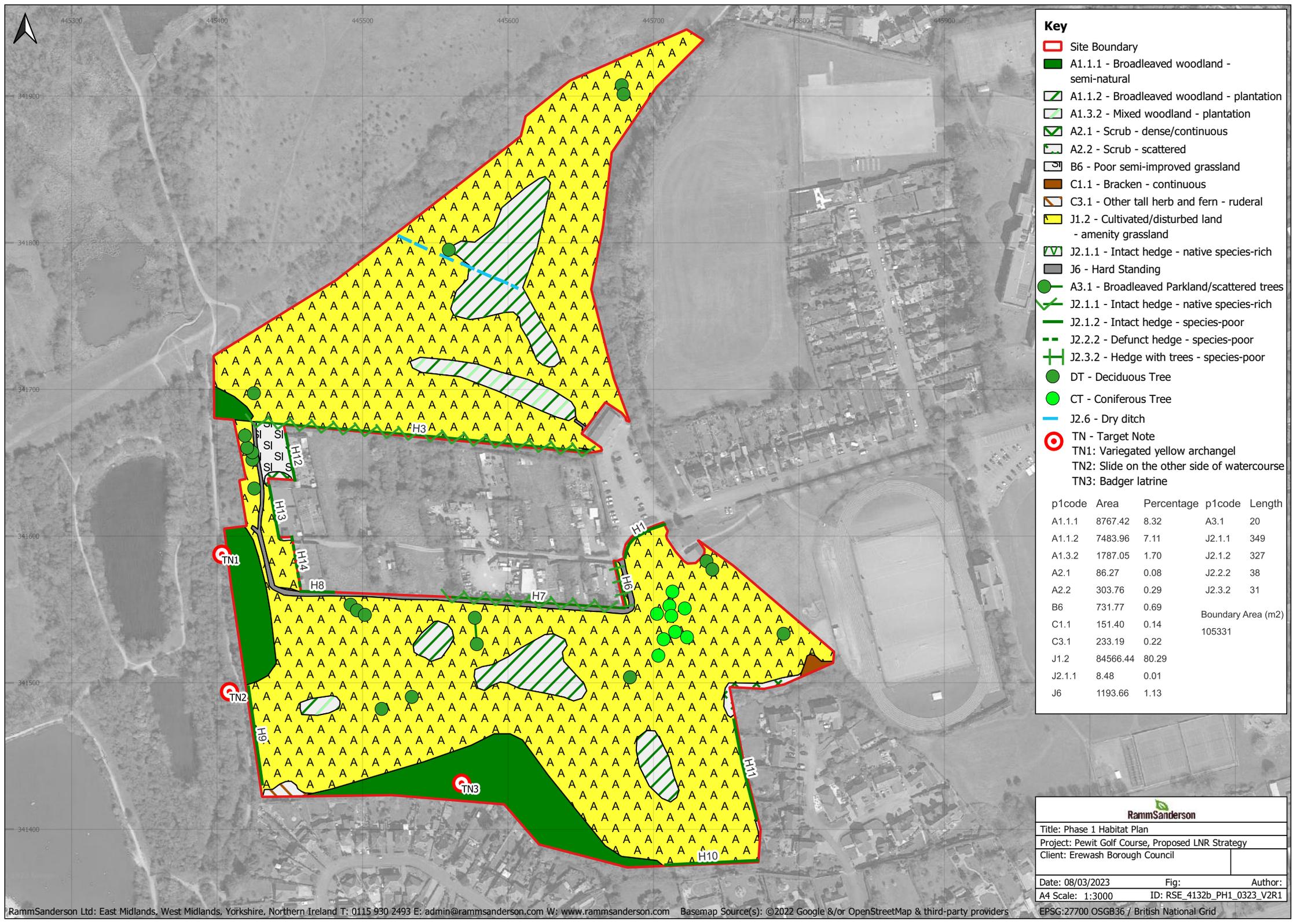
Figure 3: BIA Metric 3.1 Net Gain Score

<p style="text-align: center;">Total net unit change (including all on-site & off-site habitat retention, creation & enhancement)</p>	<i>Habitat units</i>	39.44
	<i>Hedgerow units</i>	0.00
	<i>River units</i>	0.00
<p style="text-align: center;">Total on-site net % change plus off-site surplus (including all on site & off site habitat retention, creation & enhancement)</p>	<i>Habitat units</i>	106.46%
	<i>Hedgerow units</i>	0.00%
	<i>River units</i>	0.00%

1.7 Habitat Creation and Biodiversity Management Objectives

- i In addition to existing onsite habitats, newly created habitats are proposed to increase biodiversity and habitat provision to protected and priority fauna, including:
 - New woodland planting; and
 - Neutral Grassland
 - Open Mosaic Habitat
 - Orchard
 - Pond Creation
 - Tussocky Grassland

- ii To maximise the ecological benefits of these habitats, appropriate management and enhancements are recommended as detailed within the relevant sections below.



Key

- Site Boundary
- A1.1.1 - Broadleaved woodland - semi-natural
- A1.1.2 - Broadleaved woodland - plantation
- A1.3.2 - Mixed woodland - plantation
- A2.1 - Scrub - dense/continuous
- A2.2 - Scrub - scattered
- B6 - Poor semi-improved grassland
- C1.1 - Bracken - continuous
- C3.1 - Other tall herb and fern - ruderal
- J1.2 - Cultivated/disturbed land - amenity grassland
- J2.1.1 - Intact hedge - native species-rich
- J6 - Hard Standing
- A3.1 - Broadleaved Parkland/scattered trees
- ✓ J2.1.1 - Intact hedge - native species-rich
- J2.1.2 - Intact hedge - species-poor
- - - J2.2.2 - Defunct hedge - species-poor
- + J2.3.2 - Hedge with trees - species-poor
- DT - Deciduous Tree
- CT - Coniferous Tree
- J2.6 - Dry ditch
- ⊙ TN - Target Note
- ⊙ TN1: Variegated yellow archangel
- ⊙ TN2: Slide on the other side of watercourse
- ⊙ TN3: Badger latrine

p1code	Area	Percentage	p1code	Length
A1.1.1	8767.42	8.32	A3.1	20
A1.1.2	7483.96	7.11	J2.1.1	349
A1.3.2	1787.05	1.70	J2.1.2	327
A2.1	86.27	0.08	J2.2.2	38
A2.2	303.76	0.29	J2.3.2	31
B6	731.77	0.69		
C1.1	151.40	0.14		
C3.1	233.19	0.22		
J1.2	84566.44	80.29		
J2.1.1	8.48	0.01		
J6	1193.66	1.13		
			Boundary Area (m2)	105331

RammSanderson

Title: Phase 1 Habitat Plan

Project: Pewit Golf Course, Proposed LNR Strategy

Client: Erewash Borough Council

Date: 08/03/2023	Fig:	Author:
A4 Scale: 1:3000	ID: RSE_4132b_PH1_0323_V2R1	

1.8 Comparison to Policy

i In reviewing the local policy objectives against the proposed LNR strategy the table below identifies where it is considered that the proposals meet these targets and under what criteria.

Table 2: Targets and Objectives Criteria, Compared to Policy

Targets	Objective Criteria	Rationale
Woodlands	Lowland Derbyshire BAP	<p>Substantial new native tree planting is proposed across the Site. Proposals comprise the proposed planting of 0.2ha of broadleaved woodland, and 0.6ha of mixed woodland. Additionally, 0.8ha of existing woodland is to be enhanced.</p> <p>Trees will be retained and protected from construction works.</p> <p>The BAP has targeted woodland as priority habitat. Through incorporation of the extant woodlands within the management plan in order to seek an improved woodland habitat this is considered that the site can contribute towards the LDBAP.</p> <p>A secondary objective that has been identified within the Lowland Derbyshire BAP is to increase connectivity of semi-natural habitats to create larger habitat complexes.</p>
Enhanced Grassland	Lowland Derbyshire BAP	The LDBAP has targeted neutral grassland as a priority habitat. Enhancement of 6ha of modified grassland to neutral grassland is being established on site. If maintained appropriately, this will provide a valuable ecological resource locally in accordance with LDBAP targets.
Ponds	Lowland Derbyshire BAP	<p>Maintenance, restoration and expansion of wetlands including ponds was identified as a primary objective within the Erewash Valley area within the Lowland Derbyshire BAP. A target of the creation of 15 ponds between 2011-2020 was set within the Erewash Valley area.</p> <p>Proposals include the creation of seven ponds onsite.</p>
Biodiversity Net Gain	Env Act 2021	The Environmental Act 2021 has targeted biodiversity net gain as a priority.
Great Crested Newts	NPPF 2021, Wildlife & Countryside Act (1981, as amended), The Conservation of Habitats & Species (Amendment) (EU Exit) Regulations 2019 (as amended)	The creation of seven permanent waterbodies within the area managed for biodiversity.
Nesting Birds	NPPF 2021, EC Council Directive on the Conservation of Wild Birds 79/409/EEC	The inclusion bird boxes on site will enhance site biodiversity by allowing species to become resident of the site and not transitory, providing biodiversity gain. Removal of vegetation outside of nesting season minimises the chance that birds and their eggs will be injured or damaged during construction.
Roosting Bats	NPPF 2021, The Conservation of Habitats & Species (Amendment) (EU Exit) Regulations 2019 (as amended)	The inclusion bat boxes on site will enhance site biodiversity by providing roosting opportunities onsite. Retention of onsite trees in case of presence of bat roosts

Targets	Objective Criteria	Rationale
Non-native species control	Wildlife & Countryside Act (1981, as amended)	Relating to Japanese knotweed and Cotoneaster. It is an offence, to spread or cause the spread of these species. Their control on Site should be viewed as a positive result of the scheme.
Badger Sett Protection	Protection of Badgers Act (1992)	It is an offence to intentionally or recklessly damage or destroy a badger sett or obstruct access to it; or to disturb a badger when it is occupying a sett. Protection of the setts and efforts to avoid disturbance should be seen to meet the policy criteria.
Invertebrates	Lowland Derbyshire BAP / NERC Act 2006	Invertebrate boxes will be added to the proposed trees on site. This will provide additional refuge opportunities in accordance with LDBAP and NERC targets. LDBAP target to expand the range of dingy skipper by 1km through targeted pond creation. Proposals include the creation of 0.5ha of open mosaic habitat which of value to dingy skipper, the creation of seven waterbodies, and the sowing of wildflower seed mixtures (including around proposed waterbodies), which include bird's-foot trefoil and greater bird's-foot trefoil, the larval food source for dingy skipper.
Herpetofauna	Lowland Derbyshire BAP / NERC Act 2006	Hibernacula will be established on site for herpetofauna. This will provide additional refuge opportunities in accordance with LDBAP and NERC targets.

1.9 Management Responsibility

- i The responsibility for implementing this management plan will be the site contractor (nominated by Erewash Borough Council) and any associated sub-contractors/management team during the construction time. A copy of this document should be kept on site and referred to where necessary.
- ii See Section 2.1.6 paragraph vii in regard to Japanese knotweed treatment.

1.10 Ecological Clerk of Works (EcoW)

- i An Ecological Clerk of Works (EcoW) will oversee works that are considered to have an impact on any of the sites ecological receptors in accordance with the Ecological Clerk of Works code of practice, and will remain on call for the duration of works. This will include location and erection of bat and bird boxes, nesting bird checks (where vegetation is removed inside the breeding bird season).

2 MANAGEMENT PRESCRIPTIONS

- i With a view to the Site attaining Local Nature Reserve Status, the following habitat creation, management prescriptions and enhancement measures are recommended. In order to ensure a gain is achieved in line with that proposed within the BIA metric, frequent monitoring should be undertaken by a suitably experienced surveyor, to assess the habitat conditions against those proposed within the BIA.

2.2 Native Woodland Enhancement

- i It is recommended that the existing onsite woodlands are managed to increase their botanical diversity and value to protected and priority fauna. Furthermore, the planting of additional native woodland to provide connectivity between the existing onsite woodlands will increase connectivity within the Site as well as the wider landscape, that, once established, has the potential to support a range of protected and notable species, including nesting birds, foraging and commuting bat species, foraging, commuting and refuge seeking small and aquatic mammals, herpetofauna and invertebrates.

2.2.2 Woodland Creation – Broadleaved Semi-Natural

- ii Wherever possible, local tree stock standards will be used to establish the woodland.
- i A minimum of five species should be implemented, of native species only, including a diverse shrub layer to create distinct vertical layers throughout the woodland. Species such as holly, alder, willows, hornbeam, dogwood, birch, elder, oak and hawthorn could be utilised.
- ii Trees will be planted in groups at irregular spacing intervals between rows. This is typically preferred if a more natural appearance is desired or if wildlife and conservation are prime objectives. This variable spacing also allows space for natural regeneration to supplement the planted trees. This will improve Criteria 4 (native species). Tree planting should be undertaken in year 2 after suitable locations have been identified with the following management prescriptions for areas of new planting
- Removal and replacement of any dead saplings within the first 5 years post planting
 - Removal of the protective sheaths once the trees have established;
 - Seek to retain leaf litter beneath trees, to allow it to decompose naturally. If removal is required for aesthetic reasons, composting on site should be encouraged to provide further habitat areas; and
 - New planting may require watering in times of drought and replacement where new stock has failed to take.
- iii No evidence of grazing livestock or significant numbers of deer were identified onsite, however this should be monitored to ensure that new seedlings can establish without grazing pressures. If a deer population is identified following monitoring, then fencing of woodland areas may be required.

2.2.3 Existing Woodland

Coppicing and pollarding

- i Coppicing/pollarding is considered an appropriate management technique for the semi-natural broadleaved woodland onsite, due to requirement of opening the canopy, improving vertical and age structure within the woodland, and a number of the species present are suitable for coppicing. Within the woodlands, species such as hazel, oak and alder should be rotationally coppiced/pollarded. To allow for natural regeneration and improved structural/age diversity, ¼ of suitable plants should be coppiced in Year 1, with a further quarter coppiced in year 5, a further quarter in year 7 and the final quarter in year 10. Each coppice area should then be coppiced every 7-10 years, however this will be determined based on monitoring of the woodland

- conditions. The management will improve Criteria 1 (Age distribution), Criteria 6 (Open Space), Criteria 7 (Woodland regeneration), Criteria 10 (Vertical structure).
- ii Brash piles should be created from offcuts within the woodland, creating valuable dead wood and refugia for faunal species.
 - iii Where any diseased and dead trees are identified (such as ash dieback) these should be removed by an appropriately skilled contractor, however other standing dead wood should be left in situ where appropriate to provide a valuable habitat for invertebrates. This will improve criteria 8 (Tree health).

2.2.1 Ground flora enhancement

- i While some natural regeneration and improvement of the ground flora will occur following coppicing and removal of bramble, it may also be necessary to undertake more proactive measures as ground flora restoration is a long-term process and colonisation rates are slow. Extensive coverage of ivy and bramble should be removed over winter; however some patches should be retained to provide shelter. This will improve Criteria 6 (Open space) as well as Criteria 9 (Ground flora).
- ii It is recommended that a shade tolerant woodland understorey mixture such as Woodland Mixture EW1 (Emorsgate) is sown within the existing and proposed newly created woodlands. This comprises a mixture that will bloom in spring and early summer (Table 3).
- iii All unwanted vegetation should be removed from the area to be sown with the seed mixture, although care should be taken not to damage the root system of the existing trees, and disturbance should be minimised to only that required to expose fresh soil.
- iv The wildflower mixture should be surface sown and not incorporated or covered.
- v Existing established woodlands that have been under-sown will require little management, although will benefit from coppicing and tree management to increase light filtration.
- vi The newly planted woodlands will have higher light levels during establishment, and therefore grasses will be more prominent. Therefore, a mid-summer annual cut should be undertaken to manage the growth of weeds such as nettles, as well as bramble. As it will take around 10-15 years for the canopy to close and for light levels to drop, the ground flora should be managed as a grassland. After this period when light levels drop, wildflowers will become more prominent, and a supplementary wildflower seed mix, such as EW1F, could be sown. Bramble and ivy removal should be undertaken annually for the first 5 years (Wildseed, 2022).

Table 3: EW1 Woodland Mixture Species Mix (Ground flora)

Species Name	Common Name	Mix Composition
<i>Alliaria petiolata</i>	Garlic Mustard	1%
<i>Anthriscus sylvestris</i>	Cow Parsley	0.5%
<i>Carex divulsa</i> spp. <i>divulsa</i>	Grey Sedge	2%
<i>Carex pendula</i>	Pendulous Sedge	0.10%
<i>Chaerophyllum temulum</i>	Rough Chervil	4%
<i>Digitalis purpurea</i>	Foxglove	1%
<i>Filipendula ulmaria</i>	Meadowsweet	1.1%
<i>Galium album</i>	Hedge Bedstraw	0.5%
<i>Geum urbanum</i>	Wood Avens	0.8%

<i>Hyacinthoides non-scripta</i>	Bluebell	1%
<i>Silene dioica</i>	Red Campion	5%
<i>Silene flos-cuculi</i>	Ragged Robin	1%
Wildflower Species		20%
<i>Agrostis capillaris</i>	Common Bent	1%
<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass	2%
<i>Brachypodium sylvaticum</i>	False Brome	1%
<i>Cynosurus cristatus</i>	Crested Dogstail	50%
<i>Deschampsia cespitosa</i>	Tufted hair-grass	2%
<i>Festuca rubra</i>	Red Fescue	20%
<i>Poa nemoralis</i>	Wood Meadow-grass	4%
Grass Species		80%

2.3 Hedgerows

- i Native hedgerow planting along the boundaries of the site consisting of hawthorn (*Crataegus monogyna*) and blackthorn (*Prunus spinosa*) is recommend, and will provide further foraging opportunities for bats, birds and hedgehogs along with nesting opportunities for some breeding bird species. Suggested additional species species include hazel (*Corylus avellana*), beech (*Fagus sylvatica*) and elder (*Sambucus nigra*) are recommended due to their value to wildlife.
- ii Early management of the hedgerow will be limited. This will also include replacement of dead saplings and removal of protective sheaths. After the first 5 years, management could potentially include laying, gapping up and cutting. However, this will be better advised at the 5-year stage when the success of the planting can be reviewed. Management of the hedgerow will be minimal, with traditional management practices such as hand trimming and coppicing undertaken where possible. There will be no hedgerow management over the period March to August inclusive, to safeguard nesting birds. Initially, to encourage dense and bushy growth, the newly planted hedge should be pruned during winter for the first couple of years.
- iii The planting of the understorey is also recommended to be planted with both sun and shade-tolerant species mix, such as the 'N9 Hedgerow Mix', beneath existing onsite hedgerows. This mix is 80% grasses and 20% wildflowers (Table 4).
- iv Prior to sowing, the seed bed should be cleared of weed using repeated cultivation, although care should be taken to avoid damage to hedgerow and tree roots. The optimum sowing time is autumn and spring, and the seeds should be surface sown and not incorporated into the soil, but they should be firmed in by treading or rolling to provide good seed/soil contact.
- v During the first year the wildflowers can be slow to establish and annual weeds may be abundant. As these weeds provide value to invertebrates they should be left in-situ until August, and they can then be removed and composted. The young wildflowers can then be kept short through mowing through to the end of March the following year. It is recommended that once established, zoned management is undertaken to provide a diverse habitat structure, with the mixture closest to the hedgerow left uncut in most years, and those furthest

away mown more frequently and managed as grassland. It is recommended that management and removal of any scrub is done on a rotational basis to maintain undisturbed refugia for wildlife.

Table 4: N9 Hedgerow Meadow Mixture Species Mix

Species Name	Common Name	Mix Composition
<i>Achillea millefolium</i>	Yarrow	0.1%
<i>Alliaria petiolata</i>	Garlic Mustard	1%
<i>Anthriscus sylvestris</i>	Cow Parsley	0.5%
<i>Carex divulsa ssp divulsa</i>	Grey Sedge	1.5%
<i>Centaurea nigra</i>	Common Knapweed	2%
<i>Chaerophyllum temulum</i>	Rough Chervil	3%
<i>Cruciata laevipes</i>	Crosswort	2%
<i>Dipsacus fullonum</i>	Wild Teasel	0.2%
<i>Galium album</i>	Hedge Bedstraw	0.5%
<i>Geranium pyrenaicum</i>	Hedgerow Cranesbill	1.0%
<i>Geranium pratense</i>	Meadow Cranesbill	0.1%
<i>Geum urbanum</i>	Wood Avens	0.3%
<i>Knautia arvensis</i>	Field Scabious	0.2%
<i>Leucanthemum vulgare</i>	Moon Daisy	1%
<i>Malva moschata</i>	Musk Mallow	1%
<i>Plantago lanceolata</i>	Ribwort Plantain	2%
<i>Silene dioica</i>	Red Champion	3%
<i>Silene flos-cuculi</i>	Ragged Robin	0.5%
<i>Torilis japonica</i>	Upright Hedge-Parsley	0.1%
Wildflower Species		100%
<i>Agrostis capillaris</i>	Common Bent	1%
<i>Anthoxanthum odoratum (N)</i>	Sweet Vernal Grass	2%
<i>Brachypodium sylvaticum</i>	False Brome	1%
<i>Cynosurus cristatus</i>	Crested Dogstail	50%
<i>Deschampsia cespitosa (N)</i>	Tufted Hairgrass	2%
<i>Festuca rubra</i>	Red Fescue	20%
<i>Poa nemoralis</i>	Wood Meadow-grass	4%

Grass Species

100%

2.4 Grassland Enhancement

2.4.1 Neutral Grassland Enhancement and Management

- i The existing grassland is an area of modified grassland that could be enhanced through the addition of further wildflower species with local provenance, particularly those that are utilised by local lepidoptera species. Enhancing these grassland areas by creating wildflower meadows will also provide a broad variety of food sources for a diverse range of invertebrates, including pollinators, in turn providing an ample food source for insectivores, such as bats and hedgehogs.
- ii The existing grassland is an area of amenity grassland (modified grassland), will require a regime of nutrient stripping in advance of any further enhancement measures. It is envisaged that 5 years of nutrient removal will be required, and this should be assessed with regular monitoring to inform the next stage of management.
- iii An early summer hat cut should be taken in April/May with all arisings removed from the site. Ensure that the year's vegetation growth is removed and that litter cover at the base of the sward is no more than 10% so that the following year's wildflower growth is not impeded. Further cuts over the course of the summer could be undertaken (all arisings removed) followed by a final cut in late August. Alternatively, low density cattle or sheep grazing could be implemented from the initial early hay cut, until October. However, stocking densities should be low enough to avoid excessive nutrient inputs and no supplementary feeding should be undertaken. During years 1-5 the site should be seeded with yellow rattle, during winter, in an aim to reduce the grass abundance and allow for natural colonisation of herb species.
- iv Following this, in Year 6, the grassland should be scarified/harrowed to approximately 50% bare ground to partial soil disturbance to allow for reseeding with an appropriate, diverse grassland mixture.
- v It is recommended that within the proposed areas of neutral grassland, Long Season Meadow Mix (available from Naturescape) is sown to allow for a long growing season, producing an aesthetically pleasing meadow of flowers, thus negating the requirement for an extensive mowing regime (Table 5). Seeds should be sowed during autumn or spring, and if there is a dry period, the soil being sowed should be watered.
- vi Within the areas of proposed marshy grassland surrounding the new ponds, N7 Wetland Meadow Mixture should be sown (Table 8).
- vii Mowing during or shortly after periods of wet weather should be avoided as this can damage the sward. However, areas of bare ground from disturbance/poaching are a component of habitat regeneration and where this drops below 5% some artificial ground disturbance should be undertaken to meet criteria 5.
- i Patches of scrub within the grassland adds to the structural diversity of the habitat, however encroachment should be monitored to ensure that it stays below 20% of coverage in order to meet criteria 3. Removal of woody scrub with hand tools should be undertaken where required.
- ii In the first year of establishment with the new seed mix, the grassland should be cut regularly throughout the winter until April to ensure maximum plant diversity by helping to maintain a balance between faster growing grasses and wildflowers which are slower to develop. The grass should be cut to a height of 30-50mm and all arisings must be removed from the grassland to reduce and maintain low nutrient levels in order to inhibit the growth of coarse, aggressive grasses and increase diversity.
- iii Mowing during or shortly after periods of wet weather should be avoided as this can damage the sward. However, areas of bare ground from disturbance/poaching are a component of habitat regeneration and where this drops below 5% some artificial ground disturbance should be undertaken to meet criteria 5.

- iv In the second year, from sowing, the grassland can be left uncut to flower for the majority of the year. A first cut should be undertaken in September – October after flowering plants have had an opportunity to set seed. The grass should be mown in varying heights using a mowing regime resulting in at least 20% of the sward at less than 7cm and at least 20% of the sward at more than 7cm (Criteria 2). A cut at this time of year will reduce potential impacts on ground nesting birds, amphibians and reptiles which may be utilising the site.
- v All arisings should be left in situ for between 1 and 7 days to allow for seed dispersal, before being removed.
- vi Once established, the grassland will only require mowing in September (with the arisings being left for 48hrs prior to removal to allow the seeds to disperse for the following year). Any cutting should be removed from the ground, so that a low level of fertility is maintained, and any unwanted weeds such as nettles or thistles should be removed during the first year of management.
- vii Large areas of nettle and dock should be treated with herbicide if required, however natural management is preferred. Undesirable species cover should be kept at less than 5% to meet criteria 7. Cover of bracken will be maintained at less than 20% of sward coverage, to meet criteria 6.
- viii Monitoring of the meadow habitats should be undertaken and the cutting regime adapted accordingly, allowing for the varying swards. An earlier cut may be required due to the fertility of the grassland however due to the potential for ground nesting birds this should not be undertaken until September.
- ix In the following years the meadow will become more diverse as slower establishing species establish and growth is less vigorous as nutrients become fixed in the root systems. The character and composition of the meadow will continue to change over time and a stable community will develop.
- x Undesirable weeds should be managed regularly by spot hand weeding or cutting. For more pernicious areas, spot treatment with a broad-spectrum herbicide or mechanical/manual removal may be required, particularly on a high frequency (monthly within the plant growing season) within the first two years of the management plan whilst the grassland establishes. Use of herbicides should be minimised wherever possible.

Table 5: N5 Long Season Meadow Mixture

Species Name	Common Name	Mix Composition
<i>Achillea millefolium</i>	Yarrow	3%
<i>Centaurea nigra</i>	Common Knapweed	5%
<i>Centaurea scabiosa</i>	Greater Knapweed	3%
<i>Daucus carota</i>	Wild Carrot	5%
<i>Echium vulgare</i>	Viper's Bugloss	2%
<i>Galium verum</i>	Lady's Bedstraw	6%
<i>Geranium pratense</i>	Meadow Cranesbill	2%
<i>Hypochaeris radicata</i>	Common Catsear	2%
<i>Knautia arvensis</i>	Field Scabious	3.5%
<i>Lathyrus pratensis</i>	Meadow Vetchling	2%
<i>Leontodon hispidus</i>	Rough Hawkbit	2%
<i>Leucanthemum vulgare</i>	Oxeye Daisy	5%

Species Name	Common Name	Mix Composition
<i>Linaria vulgaris</i>	Common Toadflax	1%
<i>Lotus corniculatus</i>	Birdsfoot Trefoil	4%
<i>Malva moschata</i>	Musk Mallow	3%
<i>Plantago media</i>	Hoary Plantain	2.5%
<i>Primula veris</i>	Cowslip	3%
<i>Prunella vulgaris</i>	Self Heal	7%
<i>Ranunculus acris</i>	Meadow Buttercup	5%
<i>Ranunculus bulbosus</i>	Bulbous Buttercup	5%
<i>Rhinanthus minor</i>	Yellow Rattle	6%
<i>Rumex acetosa</i>	Common Sorrel	5%
<i>Scabiosa columbaria</i>	Small Scabious	3%
<i>Silene dioica</i>	Red Campion	4%
<i>Stachys officinalis</i>	Betony	3%
<i>Succisa pratensis</i>	Devilsbit Scabious	2%
<i>Trifolium pratensis</i>	Wild Red Clover	2.5%
<i>Verbascum nigrum</i>	Dark Mullein	1.5%
<i>Vicia cracca</i>	Tufted Vetch	2%
29 Wildflower Species		100%
<i>Agrostis capillaris</i>	Common Bent	3%
<i>Anthoxanthum odoratum</i> (N)	Sweet Vernal Grass	3%
<i>Briza media</i> (N)	Quaking Grass	2%
<i>Cynosurus cristatus</i>	Crested Dogstail	22%
<i>Festuca trachyphylla</i>	Hard Fescue	22%
<i>Festuca rubra</i> ssp. <i>Commutata</i>	Chewing's Fescue	22%
<i>Festuca rubra</i> ssp. <i>Litoralis</i>	Slender Creeping Red Fescue	13%
<i>Hordeum secalinum</i> (N)	Meadow Barley	1%
<i>Poa pratensis</i>	Smooth Stalked Meadow Grass	14%
<i>Trisetum flavescens</i>	Yellow Oatgrass	2%
10 Grass Species		100%

2.5 Open Mosaic Habitat Creation

- i Open mosaic habitat is proposed to be created within the Site, to be of value to a range of species, in particular invertebrate species such as dingy skipper. A mosaic of habitats will be required to create OMH onsite, and an amalgamation of bare ground, scrub, shallow pools and rough grassland habitats is recommended, and their development closely monitored.
- ii The proposed area should be cleared of vegetation, and the loose spreading of a slag substrate. The loose spreading of a slag substrate will help maintain low nutrient levels, required to maintain typical OMH plant communities.
- iii Re-profiling of the Site can be done through scrape digging. This management prescription should aim to maintain bare ground cover of at least 15% across the created OMH area. Scraping should be done annually on a rotational basis, to maintain successional stages across the Site, from bare ground to densely vegetated areas. This will, therefore, maintain heterogeneity across the Site and help maintain a high level of biodiversity.
- iv Scraping should be done annually on a rotational basis, to maintain successional stages across the site, from bare ground to densely vegetated areas, aiding towards satisfying Criteria 4a.
- v Any waste material produced by scraping can be used to create 'bee banks' on site. These spoil mounds can provide significant variation in topography of the OMH areas, providing a variety of microhabitats for a diverse range of invertebrate species, including solitary bees and wasps. Any created spoil mounds should face south-east/south/south-west to provide extra warmth for nesting invertebrates.
- vi To support dingy skipper species onsite, some of the banks should be comprised of high pH aggregate, partially compacted by machinery. This should be sparsely sown with a mix of Naturescape N4F Flowering Butterfly and Bees Flowers Only, supplemented with additional bird's-foot trefoil (*Lotus corniculatus*), of which this species is reliant on.
- vii Patches of scrub should also be created within this area. Areas of scrub and young trees are beneficial in providing a greater habitat diversity on site; however, scrub should be maintained to be between 1–15% of the total area, through periodic disturbance and clearance. Scrub habitats should also not be allowed to dominate one area of the Site and should be scattered across the entirety of the recreated OMH areas instead, again providing greater habitat heterogeneity across these areas. This should be closely monitored and the requirement for clearance prescribed as and when these areas are close to the specified percentages of the total OMH area (10-15%). Where arisings occur from this scrub clearance, these can be used to create herpetofauna hibernacula.
- viii Where the area of OMH naturally regenerates, the species composition and habitat structure should be closely monitored. Early successional communities are a key component of OMH and should not be allowed to be outcompeted by undesirable species, such as nettles or thistle, or competitive grass species.
- ix Areas of rough grassland should be created within this area, but kept at approximately 10% of the total OMH area and scattered throughout this area. The ground should be prepared in late summer by cutting and harrowing to produce 50% bare ground. It is recommended that Emorsgate EM10 Tussock Mixture is sown within these areas in Autumn. Once established, this seed mixture will form tussocky grassland, interspersed within wildflowers that can tolerate competition from the tussocky forming grass species. In the first year of establishment, the cut should be undertaken in winter to reduce and maintain low nutrient levels, in order to inhibit the growth of coarse, aggressive grasses and increase diversity. In the second year following grassland establishment, the cut should again be undertaken in winter, with all arisings left in-situ for 1-7 days to allow for seed dispersal, before being removed. The cutting regime of the site should be adapted accordingly following close monitoring of the grassland communities onsite. Where areas of rough grassland and weed

species start to dominate the early successional communities, or dominate over 10% of the total OMH area, these areas should be targeted as areas for scraping to produce bare ground as described. Additionally, species such as thistles and nettles can be hand pulled where appropriated.

- x Within several of the proposed seed mixtures, the larval food plants for small heath and dingy skipper are incorporated. In order to increase the value of the site and the open mosaic habitat for invertebrates, additional wildflower plugs could be incorporated. This could include bird's-foot-trefoil for dingy skipper.
- xi Shallow and seasonal pools should be created within this area. Unlike with the proposed pond creation, these pools should remain shallow, with a maximum depth of 50cm. The proposed pools should have gently sloping sides (gradient at least 12°C), with ledges in the shallows, to create areas of warmer water.

2.6 Orchard Creation

- i Traditional orchard species such as apple, pear and plum should be used, with a diverse mix of sub species to provide variety. Understorey grassland management should also be of low intensity and a sward height of between 5-30cm maintained, with a diverse seed mix implemented, as in adjacent grassland habitats and undesirable species such as docks, thistles, nettle etc being removed as required.

2.7 Tussocky Grassland Creation

- i It is recommended that the northern extent of the Site is subject to an infrequent mowing regime to establish rough grassland areas, particularly within the north of the Site (JNCC Code B2.1 in Appendix 1). The provision of rough grassland would provide a valuable foraging, commuting and refuge resource for terrestrial phase herpetofauna, including grass snake and great crested newts, as well as a variety of invertebrates and small mammals. It is recommended that Emorsgate EM10 Tussock Mixture is utilised within these areas (Table 6). This seed mixture, once established, would form tussocky grassland, interspersed with wildflowers that can tolerate competition from the more competitive tussock forming grass species within this mixture. Once established, this grassland would require little to no maintenance and would provide value for insects, small mammals, birds, amphibians and reptiles, providing nesting sites during the spring, a foraging resource during the summer and autumn, and a refugia within winter months.
- ii Prior to the sowing of a seed mixture, weeds should first be removed through repeated cultivation. A plough could then be utilised to bury the surface vegetation, before a rake or harrow is used to create a medium tilth, and a roll to produce a firm surface. The seed mixture should be sown in autumn or spring, but can also be sown if there is sufficient warmth and moisture at other times of year. The seed mixture should not be incorporated or buried although a roll should be used to create good contact.
- iii After sowing annual weeds will become apparent, which although may appear unsightly, will provide value to invertebrate species and should therefore be retained until late summer, before being removed and composted. The younger meadow can then be regularly mown through to the end of March the following year. Once established, the grassland can be cut on a rotational basis every 2-3 years, so an area is left undisturbed to maintain an area of refugia for wildlife (Wildseed, 2022a).

Table 6: EM10 Tussock Mixture

Species Name	Common Name	Mix Composition
<i>Achillea millefolium</i>	Yarrow	0.8%
<i>Agrimonia eupatoria</i>	Agrimony	0.6%

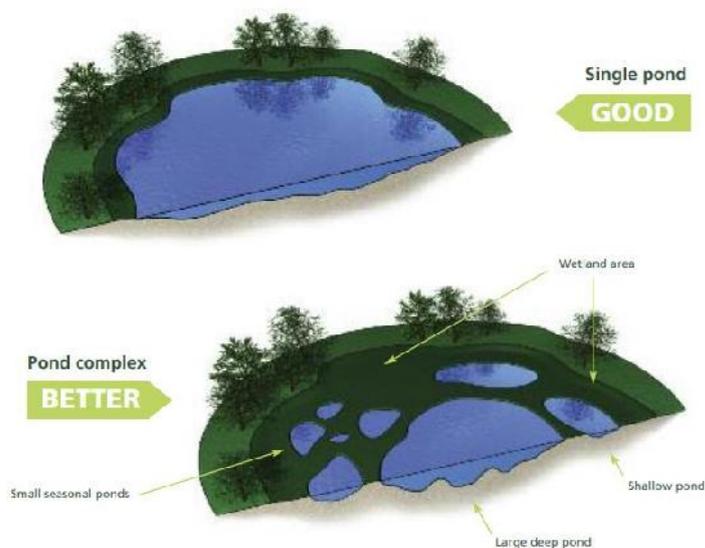
Species Name	Common Name	Mix Composition
<i>Arctium minus</i>	Lesser Burdock	0.1%
<i>Centaurea nigra</i>	Common Knapweed	1.6 %
<i>Centaurea scabiosa</i>	Greater Knapweed	1.6%
<i>Chaerophyllum temulum</i>	Rough Chervil	1.2%
<i>Cirsium eriophorum</i>	Wooly Thistle	0.1%
<i>Daucus carota</i>	Wild Carrot	0.6%
<i>Dipsacus fullonum</i>	Wild Teasel	1.6%
<i>Filipendula ulmaria</i>	Meadowsweet	0.4%
<i>Galium album</i>	Hedge Bedstraw	1.2%
<i>Knautia arvensis</i>	Field Scabious	0.8%
<i>Lathyrus pratensis</i>	Meadow Vetchling	0.4%
<i>Lotus corniculatus</i>	Birdsfoot Trefoil	0.4%
<i>Malva moschata</i>	Musk Mallow	1.6%
<i>Poterium sanguisorba</i>	Salad Burnet	1.6%
<i>Plantago lanceolata</i>	Ribwort Plantain	1.8%
<i>Ranunculus acris</i>	Meadow Buttercup	0.8%
<i>Rhinanthus minor</i>	Yellow Rattle	1.2%
<i>Silene dioica</i>	Red Campion	2%
<i>Vicia cracca</i>	Tufted Vetch	0.2%
Wildflower Species		20%
<i>Cynosurus cristatus</i>	Crested Dogtail	36%
<i>Schedonorus arundinaceus</i>	Tall Fescue (w)	16%
<i>Deschampsia cespitosa</i>	Tufted hair-grass	4%
<i>Dactylis glomerata</i>	Cocksfoot	8%
<i>Festuca rubra</i>	Red Fescue	8%
<i>Schedonorus pratensis</i>	Meadow Fescue	8%
Grass Species		80%

2.8 Pond Creation

- i Several ponds are proposed within the Site, and, if planted sympathetically, this could provide significant ecological enhancement to the Site. Areas of permanently wet water bodies and associated reedbeds can

- provide an important invertebrate habitat area increasing the foraging capacity of the Site for fauna (especially bats).
- ii Where pond basins are designed to hold some degree of permanent standing water, they could be planted with native marginal plug plant species and seeded with a grassland mix suitable for wet conditions such as Naturescape N8 Water's Edge Meadow Mixture. This comprises 24 Wildflower species and 9 grass species and provides the added benefits as described above within the grasslands planting. Areas of swale will be planted with native marginal plug plants and seeded with Naturescape N7 Wetland Meadow Mixture comprising 22 wildflower and 12 grass species. Once established, an annual regime will be implemented with the grassland cut to a height no lower than 100mm in September. Areas of pernicious weeds should be removed by hand with all arisings removed from the area to reduce nutrient build-up which would encourage the development of more vigorous plant species. Where basins are designed to hold permanent standing water, management will focus primarily on maximising the nature conservation interest of the pond. Aquatic and marginal vegetation should be checked annually and where necessary cleared to maintain areas of open water. Only 1/3 or less of marginal areas should be cleared annually on a rotational basis during autumn. Arisings removed from open water should be left next to the pond for at least 7 days before taking to a designated composting area or removed from site, to allow amphibians/invertebrates to return to the pond. Should desilting be required, this should be undertaken between November and January. The ponds should be monitored annually to assess signs of drying, colonisation of vegetation and any accumulation of sediment or debris. Inlets and outlets should be checked regularly for build-up of litter / sediment and cleared as required.
- iii To keep water healthy and low in turbidity, a mix of submerged aquatic oxygenators, floating aquatics, deep water aquatics and marginal plants should be utilised. This will help achieve Criteria 1. Recommended species to include:
- Hornwort (*Ceratophyllum*)
 - Frogbit (*Hydrocharis morsus - ranae*)
 - Brooklime (*Veronica beccabunga*)
 - Meadowsweet (*Filipendula ulmaria*)
 - Ragged robin (*Lychnis flos-cuculi*)
 - Soft rush (*Juncus effusus*)
 - Marsh cinquefoil (*Potentilla palustris*)
 - Yellow flag iris (*Iris pseudacorus*)
 - Water plantain (*Alisma plantago-aquatica*)
 - Greater spearwort (*Ranunculus lingua*)
 - Willow moss (*Frontinalis antipyretica*)
- iv The value of these ponds for wildlife can be maximised by utilising the following principles, recommended from the Freshwater Habitats Trust:
- Creating complexes of ponds rather than single waterbodies
 - Include both permanent and seasonal ponds
 - Almost all pond slopes are at least 12° in gradient
 - Create broad, undulating wetland areas around and between ponds
 - Create underwater bars and shoals to benefit aquatic plants.

Figure 5: Pond Complex Example



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2.8.1 Maintenance

i All ponds will be subject to management/maintenance measures. This will include:

- Aquatic vegetation management
- Clearance of shading tree or scrub cover around margins
- Desilting and clearance of leaf litter
- Checking of fish presence and removal through appropriate methods
- Checking pond condition and remedial action as required
- Checking for and removal of dumped rubbish

Table 7: N8 Water's Edge Meadow Mixture

Species Name	Common Name	Mix Composition
<i>Achillea ptarmica</i>	Sneezewort	3%
<i>Angelica sylvestris</i>	Wild Angelica	4%
<i>Caltha palustris</i>	Marsh Marigold	2%
<i>Carex pendula</i>	Pendulous Sedge	2%
<i>Centaurea nigra</i>	Common Knapweed	4%
<i>Eupatorium cannabinum</i>	Hemp Agrimony	2%
<i>Filipendula ulmaria</i>	Meadowsweet	11%
<i>Geum rivale</i>	Water Avens	4%
<i>Hypericum tetrapterum</i>	Square Stemmed St. Joh's Wort	1%
<i>Iris pseudacorus</i>	Yellow Flag Iris	21%

<i>Juncus effusus</i>	Soft Rush	1%
<i>Juncus inflexus</i>	Hard Rush	4%
<i>Lathyrus pratensis</i>	Meadow Vetchling	2%
<i>Lotus pedunculatus</i>	Greater Birdsfoot Trefoil	5%
<i>Lychnis floss-cuculi</i>	Ragged Robin	4%
<i>Lycopus europaeus</i>	Gypsywort	3%
<i>Lythrum salicaria</i>	Purple Loosestrife	7%
<i>Pulicaria dysenterica</i>	Common Fleabane	1%
<i>Ranunculus acris</i>	Meadow Buttercup	7%
<i>Sanguisorba officinalis</i>	Great Burnet	1%
<i>Scrophularia auriculata</i>	Water Figwort	2%
<i>Stachys palustris</i>	Marsh Woundwort	1%
<i>Succisa pratensis</i>	Devilsbit Scabious	4%
<i>Vicia cracca</i>	Tufted Vetch	4%
24 Wildflower Species		
<i>Agrostis capillaris</i>	Common Bent	4%
<i>Alopecurus pratensis</i>	Meadow Foxtail	4%
<i>Anthoxanthum odoratum (N)</i>	Sweet Vernal Grass	5%
<i>Cynosurus cristatus</i>	Crested Dogstail	14%
<i>Deschampsia cespitosa</i>	Tufted Hair-grass	5%
<i>Festuca trachyphylla</i>	Hard Fescue	17%
<i>Festuca rubra ssp. litoralis</i>	Slender Creeping Red Fescue	17%
<i>Festuca rubra ssp. rubra</i>	Strong Creeping Red Fescue	17%
<i>Poa pratensis</i>	Smooth Stalked Meadow Grass	14%
9 Grass Species		

Table 8: N7 Wetland Meadow Mixture

Species Name	Common Name	Mix Composition
<i>Achillea millefolium</i>	Yarrow	2.5%
<i>Centaurea nigra</i>	Common Knapweed	9%
<i>Filipendula ulmaria</i>	Meadowsweet	8%

Species Name	Common Name	Mix Composition
<i>Lathyrus pratensis</i>	Meadow Vetchling	3%
<i>Leucanthemum vulgare</i>	Oxeye Daisy	7%
<i>Lotus corniculatus</i>	Birdsfoot Trefoil	4%
<i>Lotus pedunculatus</i>	Greater Birdsfoot Trefoil	4%
<i>Lychnis flos-cuculi</i>	Ragged Robin	2%
<i>Ononis repens</i>	Common Restharrow	2%
<i>Plantago lanceolata</i>	Ribwort Plantain	4%
<i>Primula veris</i>	Cowslip	3%
<i>Prunella vulgaris</i>	Self Heal	8%
<i>Ranunculus acris</i>	Meadow Buttercup	9%
<i>Rhinanthus minor</i>	Yellow Rattle	10%
<i>Rumex acetosa</i>	Common sorrel	8%
<i>Sanguisorba officinalis</i>	Great Burnet	2%
<i>Serratula tinctoria</i>	Sawwort	1%
<i>Stachys officinalis</i>	Betony	2.5%
<i>Succisa pratensis</i>	Devilsbit Scabious	3.5%
<i>Tragopogon Pratensis</i>	Goatsbeard	2%
<i>Trifolium pratensis</i>	Wild Red Clover	3%
<i>Vicia cracca</i>	Tufted Vetch	3%
<i>Rhinanthus minor</i>	Yellow Rattle	1.2%
<i>Silene dioica</i>	Red Champion	2%
<i>Vicia cracca</i>	Tufted Vetch	0.2%
Wildflower Species		
<i>Agrostis capillaris</i>	Common Bent	2.5%
<i>Alopecurus pratensis</i>	Meadow Foxtail	3%
<i>Anthoxanthum odoratum (N)</i>	Sweet Vernal Grass	2.5%
<i>Cynosurus cristatus</i>	Crested Dogstail	16.5%
<i>Deschampsia cespitosa</i>	Tufted Hair-grass	2%
<i>Festuca trachyphylla</i>	Hard Fescue	16.5%
<i>Festuca rubra ssp. Commutata</i>	Chewing's Fescue	16%

Species Name	Common Name	Mix Composition
<i>Festuca rubra ssp. litoralis</i>	Slender Creeping Red Fescue	29%
<i>Hordeum secalinum</i>	Meadow Barley	1%
<i>Poa pratensis</i>	Smooth Stalked Meadow Grass	7.5%
<i>Trisetum pratensis</i>	Yellow Oatgrass	2%
Grass Species		

2.8.2 Scrub

- i Where areas of scrub is proposed to be planted, this should utilise a mixture of native species such as hazel (*Corylus avellana*), blackthorn (*Prunus spinosa*), hawthorn (*Crataegus monogyna*), willow (*Salix* sp.), elder (*Sambucus nigra*), dogwood (*Cornus sanguinea*), and buckthorn (*Rhamnus frangula*). These areas of scrub should also be managed sensitively for wildlife, with sections cleared on a rotational basis to produce clearings within this habitat, which will meet Criteria 2. In addition, areas of scrub should be planted around the new ponds to provide suitable refugia for any herpetofauna (amphibians and reptiles) that may utilise these habitats. The provision of this scrub would also provide suitable habitat for a variety of nesting bird species, as well as suitable habitat for sett establishment by badgers.
- ii Management techniques such as flailing and mowing should be implemented to maintain grass edges, rides and glades between stands of scrub. This will maintain Criteria 4 and 5.
- iii Undesirable weeds should be managed regularly by spot hand weeding or cutting. For more pernicious areas, spot treatment with a broad-spectrum herbicide or mechanical/manual removal may be required, particularly on a high frequency (monthly within the plant growing season) within the first two years of the management plan whilst the scrub establishes. Use of herbicides should be minimised wherever possible.
- iv Once the scrub has reached a mature status (15+ years), the use of coppicing should be adopted on a rotational basis. This will allow the rejuvenation of stands and to generate dense scrub cover for biodiversity.
- v Other areas of the scrub habitats should be subject to 'thinning', involving the cutting selected bushes to ground level; can be used to diversify age and structure of the mixed scrub, as well as creating open conditions for flora and fauna opportunities.

2.9 Nesting Birds

2.9.1 Vegetation Removal

- i The trees, woodland and scrub on site offered suitable habitat for nesting birds. Although no habitat removal is proposed, management of existing onsite habitats, such as the woodland, is recommended including the removal of scrub and thinning of trees. Any vegetation clearance / tree pruning works should be completed outside of the bird nesting season (which is considered to be March to September inclusive). If this is not possible the area should first be checked by a suitably qualified ecologist for any in-use nests. If any in-use nests are found, these should be protected from works via a no-work exclusion buffer (size dependent on species but typically around 5m) demarcated using hazard tape until they are no longer in-use and chicks have fledged (usually around 2-4 weeks).

2.9.2 Nesting provision

- i The proposed woodland, scattered tree and scrub planting along will provide opportunities for nesting and foraging bird species. Additionally, fourteen bird nest boxes are proposed across the Site. It is recommended that a variety of boxes are sited onsite to suit a range of species. Additional general purpose bird nest boxes could also be sited on the retained buildings.
- ii Starling are a BoCCRed listed species and are a priority species within the NERC Act (2006). Additionally, within the desk based assessment, five records of starling were recorded within 2km of the Site. It is recommended that four Schwegler 3S Starling Nest box are sited within the woodland. They should be placed at least 2m from ground level and in close proximity to other starling boxes due to their preference to nest in groups.
- iii House sparrow are a BoCC listed species, and are listed on the NERC Act (2006). Additionally, four records of house sparrow were identified within the desk-based assessment within 2km of the Site. Five house sparrow nest boxes could also be incorporated within proposals, which should be sited 2-4m above ground.
- iv Five general purpose nest boxes, such as the Schwegler 1B nest box, are also recommended as they suite variety of species, and can be fixed with a variety of entrance hole sizes to appeal to different species. A 32mm entrance hole is suitable for species including great tit, blue tit, marsh tit, nuthatch, and house sparrow. The 26mm sized hole will deter larger species and suit species including blue tit, marsh tit, coal tit and wren.
- v It is also recommended that a kestrel tower is installed within the Site. A box, such as the kestrel open nest box, can be places on a post at least 5m above ground. It is recommended that this is placed north within the Site within an area of tussocky grassland, in order to provide a good view point and foraging habitat.

Figure 6: Bird Nest Boxes



House Sparrow Box
(www.nhbs.com)



Kestrel Open Nest Box



Schwegler 1B nest box

2.10 Bats

2.10.1 Foraging and commuting habitat

- i A ground level tree assessment has not been conducted for the Site, and therefore the potential for trees with bat roost potential cannot be ruled out. Therefore, prior to the removal of any trees for woodland management should be subject to an assessment prior to removal.
- ii The existing broadleaved and plantation woodlands onsite provide value to foraging and commuting bats. Parcels of plantation woodland are isolated within the Site and therefore additional woodland plantation has been recommended to increase connectivity between the woodland parcels, and therefore within the Site and the wider environment.
- iii The neutral grassland, ponds and open mosaic habitat proposed within the Site will also provide value to invertebrate species, and therefore foraging bat species.

2.10.2 Installation of bat boxes

- i Recommendations for the Site also include the addition of five tree mounted bat boxes and a bat tower.
- ii Tree mounted bat boxes could comprised Schwegler 1FF bat boxes, or similar. in total. Suitable trees and siting of boxes will be conducted by an ecologist. The tree mounted boxes shall face south (for additional warmth), and be positioned at least 4 metres from the ground, with the entrances being free of overhanging branches. It is also recommended that bird nest boxes be placed 1.5m below each bat box, to ensure that the birds have somewhere to nest and do not inhabit the bat boxes. The bat box dimensions are 430mm high X 270mm wide X 140mm deep and the material is 'Schwegler Woodcrete', a blend of wood, concrete and clay. The boxes are designed to mimic natural roost sites and to provide a stable environment.
- iii A wildlife tower, such as that pictured below, could also be sited within the Site, which will provide opportunities for nesting and hibernating bats, invertebrates and birds, such as barn owl, kestrel and house sparrow.

Figure 7. Bat Boxes



Schwegler 1FF Bat Box

Figure 8: Wildlife Tower



(Barn Owl Trust, undated)

2.11 Lighting

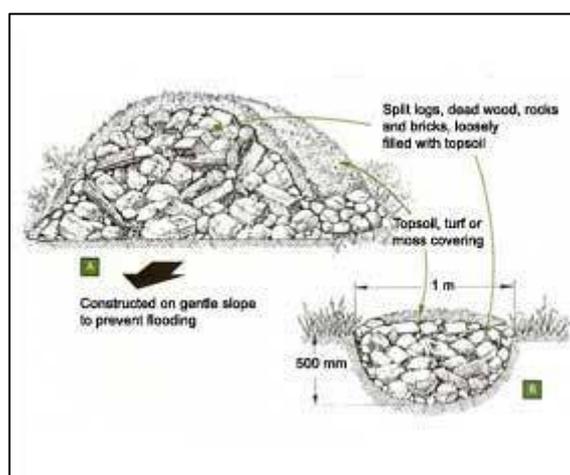
- i Care should be taken to prevent long term impacts to foraging bats by the implementation of a bat friendly lighting scheme. Artificial lighting can affect the way that bats use habitats in a number of ways, depending on the species and proximity to a roost. Direct bright lighting of a roost can cause bats to delay emergence from a roost and could even cause them to desert the roost (BCT and ILE, 2018). The prey items for British bats are flying insects, and many flying insects are attracted to certain types of artificial light sources, especially those that emit light with an ultraviolet component (BCT and ILE, 2018; Rydell, 2006). Some species of bat recorded within the Site are known to be attracted to insects gathered around light sources (such as pipistrelle and noctule), whereas others actively avoid lit areas (such as Myotis species and long-eared bats) (BCT and ILE, 2018; Rydell, 2006). Lighting within the Site could therefore be expected to affect the ways that the bats in the area are able to use the Site. It is also possible that artificial lighting within the Site could attract insects to the lit areas from outside the Site, acting as a sink for insect activity and

- potentially resulting in the adjacent areas supporting lower numbers of insects and therefore a reduced availability of food for bats within these areas.
- ii Lighting will be carefully designed adjacent to existing (and potentially new) foraging areas. Where artificial lighting cannot be avoided the lighting scheme will be designed with reference to the Bat Conservation Trust and Institute of Lighting Professionals Guidance 5,6,7 and will be designed to reduce light spill and be downwardly directional. Of primary significance however, lighting must be avoided at all measures around and near to new / retained roosting features for bats which are detailed below. All new lighting will meet the current environmental standards of good practice in order to reduce potential light pollution and will use the lowest intensity for its purpose. This will minimise light spill onto foraging routes and minimise potential disturbance to dark corridors.
- iii Therefore, associated site lighting proposals must consider the following:
- Avoid lighting where possible;
 - Install lamps and the lowest permissible density;
 - Install lamps with the shortest permissible column height;
 - Lamps should be fitted with light spill accessories directing light to the road and avoiding upward spill and spill onto any newly planted trees/ hedgerows/woodlands;
 - Use of low intensity bulbs to minimise light intensity and impacts to bats; and
 - The use of timers and dimmers to avoid lighting areas of the site all night is recommended.

2.12 Herpetofauna Hibernacula and Refugia

- i Herpetofauna (reptile and amphibian) hibernacula are also to be created, utilising any debris created from excavation. This will provide important places for herpetofauna to rest during the day, or during cold/dry weather. Hibernacula should be 2m² and 1m in height. This should then be capped with topsoil and a turf covering. Log piles can also easily create areas of refuge for commuting and refuge seeking herpetofauna. A newly created hibernacula and refugia is to be sited north within the Site, within the proposed tussocky grassland habitat, adjacent to the pond. Additional refugia should be created with any Site arising due to ongoing habitat management and enhancement works, and these should be placed near to newly created wildlife ponds, within the tussocky grassland north within the Site, and/or within retained areas of broadleaved woodland and constructed on a gentle slope to prevent flooding.

Figure 9: Herpetofauna Hibernacula



2.13 Invertebrates

- i The majority of the Site is considered of limited value for invertebrates, due to the frequent management of the amenity grassland that dominates the Site.
- ii Neutral grassland, tussocky grassland, orchard, open mosaic habitat, woodland and pond creation recommended onsite will increase the value of the Site for foraging and breeding invertebrate species. In addition, an insect house, such as the Minibeast HQ, is recommended to be site within an area of open mosaic habitat. The insect house is suitable for species such as solitary bees, spiders, woodlice, ladybirds and lacewings. A mammal house is also situated at the base of the insect house, which provides refugia for small mammals including shrews and field mice, as well as amphibians (NHBS, undated). This will provide a foraging resource for bird species, such as kestrel and barn owl.

Figure 10: Insect House



2.14 Non-Native Species Control

- i Two stand of Japanese knotweed were noted adjacent to the Site, to the north-east (TN1 and TN2 within Figure 4). This is a Schedule 9 (Wildlife and Countryside Act, 1981 as amended), under which it is an offence to cause them to spread in the wild. Therefore a suitable remediation strategy should be agreed upon by a licenced contractor and implemented within proposed, including the implementation of a 7m exclusion zone which should be erected as soon as possible to prevent further spread via underground rhizomes, due to proposed management and habitat creation works.
- ii *Cotoneaster* sp. was identified onsite within the introduced shrub adjacent to B2 and B3. As several species of *Cotoneaster* are listed on Schedule 9, this plant should be removed and burnt/mulched onsite.

2.15 Timescales

- i Details of the timescales of the implementation of all proposed works are provided in Appendix 3.

2.16 Monitoring

- i The site should be subject to regular monitoring by a suitably qualified ecologist to review the habitats and ensure they are meeting the proposed conditions in the BIA metric. Management techniques should be adjusted if necessary to meet the conditions proposed. It is recommended that monitoring be undertaken once every two years for the first six years. Thereafter, monitoring should take place once every five years. During these visits, condition assessments should be undertaken in line with DEFRA metric requirements, including a full species list. Where required following monitoring, the habitat management strategy should be adjusted in order to achieve the required condition and meet the relevant criteria.

3 REFERENCES

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- Key**
- Site Boundary
 - A1.1.1 - Broadleaved woodland - semi-natural
 - A1.1.2 - Broadleaved woodland - plantation
 - A1.3.2 - Mixed woodland - plantation
 - A2.2 - Scrub - scattered
 - B2.1 - Neutral grassland - unimproved
 - B2.2 - Neutral grassland - semi-improved
 - B5 - Marsh/marshy grassland
 - B6 - Poor semi-improved grassland
 - C1.1 - Bracken - continuous
 - C3.1 - Other tall herb and fern - ruderal
 - F2.1 - Marginal and inundation - marginal vegetation
 - G1 - Standing water
 - J1.2 - Cultivated/disturbed land - amenity grassland
 - J6 - Hard Standing
 - Orchard / Fruit Trees
 - Open Mosaic Habitat
 - J2.1.1 - Intact hedge - native species-rich
 - J2.1.2 - Intact hedge - species-poor
 - J2.3.2 - Hedge with trees - species-poor
 - DT - Deciduous Tree
 - J2.6 - Dry ditch
 - J2.4 - Fence
 - Bird Box
 - Insect Hotel
 - Reptile Refugia
 - Integrated Bat and Bird Box
 - Bat Tower
 - Kestrel Tower

Title: Enhancement Plan		
Project: Pewit Golf Course		
Client: Erewash Borough Council		
Date: 23/01/2023	Fig:	Author: KHE/LG
A4 Scale: 1:3000	ID: RSE_4132_EP1_1122_V1R4	

Appendix 2: Management Timetable

Ecological Feature	Prescription	Timing	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Comments	
Woodland and Hedgerows	Planting of stock	Winter	X	x									<p>NB: Coppice and pollarding – A Felling licence is not required where less than 5m³ is felled in a quarter (of which 2m³ is solid wood).</p> <p>Typically coppice /pollarding are not operations where an exemption applies to works required to keep a tree in good health.</p> <p>An exception applies to felling trees that, when measured at a height of 1.3 metres from the ground:</p> <ol style="list-style-type: none"> 1) have a diameter over bark of 8cm or less; 2) if thinning (i.e. felling carried out in order to improve the growth of the remaining trees), have a diameter over bark of 10cm or less; or 3) if underwood or existing coppice (i.e. previously managed by cutting to promote multi-stemmed growth arising at or near ground level), individual stems have a diameter over bark of 15cm or less. 	
	Replacement of failed stock	September - February		x	x	x	x	X						
	Removal of guards	As required				x	x	x						
	Watering in times of drought	During periods of prolonged drought	x	x	x	x								
	On site vegetation removal	October - February	x	x										
	Copping/Pollarding of existing woodland (rotation, quarter of appropriate stands)	Winter	x					x		x		X (then every 7-10 years)		
	Removal of non-native species	Winter	x											
	Bramble/ ivy management	Winter	x	X	x	x	x							
	Seeding and planting of understorey	Spring or Autumn		X		x								
Newly planted woodland ground flora - Removal of unwanted weeds via an annual cut	Mid-summer		X	x	x	x	x	x						
Grassland Enhancement	Removal of nutrient rich grassland through bi-annual cuts	April/May and August	x	X	x	x	x		x		x			
	Prepare ground in late summer by cutting and harrowing to produce 50% bare ground	August	x					x						
	Sow yellow rattle	Autumn/Winter		x	x	x								
	Sow seed mix in Autumn	September-November						x						
	Mow grassland regularly during first year of seeding to height of 30-50mm	As required							x					
	Following the initial year of establishment, the hay cut should be taken in September-October. 20% should be less than 7cm, and 20% should be more than 7cm. Arisings should remain in situ for 1-7 days	Annually								x	x	x	x	
	Scrub and pernicious weeds such as thistle, docks and ragwort will be hand pulled or where this is inadequate, spot treated. Use of herbicides should be kept to a minimum.	As required		x	x	x	x							
Open Mosaic Habitat	Scrub Clearance	October - February		x										
	Rotational Scraping	October-February		X										

Ecological Feature	Prescription	Timing	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Comments
	Grassland mowing	November-February			X	X	X	X	X	X	X	X	
	Removal of pernicious weeds	As required		X	X	X	X						
Ponds	Creation of Ponds	Autumn/Winter	X	X		X							Not all ponds will be created in year 1. Ponds to be created in stages to manage budgetary constraints.
	Aquatic vegetation management and clearance of shading or scrub cover at margins	October-February	X		X		X		X		X		
	Desilting and clearance of leaf litter				X		X			X	X	X	
	Checking fish presence and removal through appropriate methods						X		X		X	X	
	Checking for and removal of rubbish		X	X	X	X	X	X	X	X	X	X	
Bat boxes	Installation on trees				X								Installed after major earthworks
	Check / repair / replace						X		X		X	X	
Bird boxes	Installation on trees				X								Installed after major earthworks
	Check / repair / replace						X		X		X	X	
Insect Houses	Installation				X								Installed after major earthworks
	Check / repair / replace						X		X		X	X	
Reptile Refugia	Installation		X					X					Additional refugia can be created from arisings from site management
Invasive Species Removal	Initial Removal		X										Target early spring and later summer treatment in year 1
	Checks	Spring		X	X	X	X						Check for regrowth in early spring and spot treat where necessary
Habitat Monitoring	Monitoring of habitat condition	Habitat depending, spring/summer	X		X		X		X		X		To be completed by appropriately qualified ecologist using DEFRA condition assessment tools.
Infrastructure	Creation of Footpath network	Year 1 as part of major earthworks	X										NB, throw lines must be subject to inspection in accordance with manufacturer and HSE guidance.
	Installation of benches, picnic tables, bins, signage, throw lines for ponds, interpretation board, welcome board as required	Year 1-3 as appropriate for installation (i.e throw lines to be installed as ponds progress	X	X	X								
	Inspection and repairs	Twice yearly site walkover to inspect for defects / damage plus spot recording on site.	X	X	X	X	X	X	X	X	X	X	



Key

- Site Boundary
- Bracken
- Bramble scrub
- Developed land; sealed surface
- Hawthorn scrub
- Mixed scrub
- Modified grassland
- Other woodland; broadleaved
- Other woodland; mixed
- Ruderal/Ephemeral
- Ditches
- Line of Trees (w1g6NE2)
- Native Hedgerow (h2NE5)
- Native Hedgerow with trees (h2NE4)
- Native Species Rich Hedgerow - Associated with bank or ditch (h2NE7)
- Existing Medium Tree
- Existing Small Tree

Title: BIA Baseline Habitat Plan		
Project: Pewit Golf Course, Proposed LNR Strategy		
Client: Erewash Borough Council		
Date: 08/03/2023	Fig:	Author: LG
A4 Scale: 1:3250	ID: RSE 4132b_BIAB_0223_V1R3	



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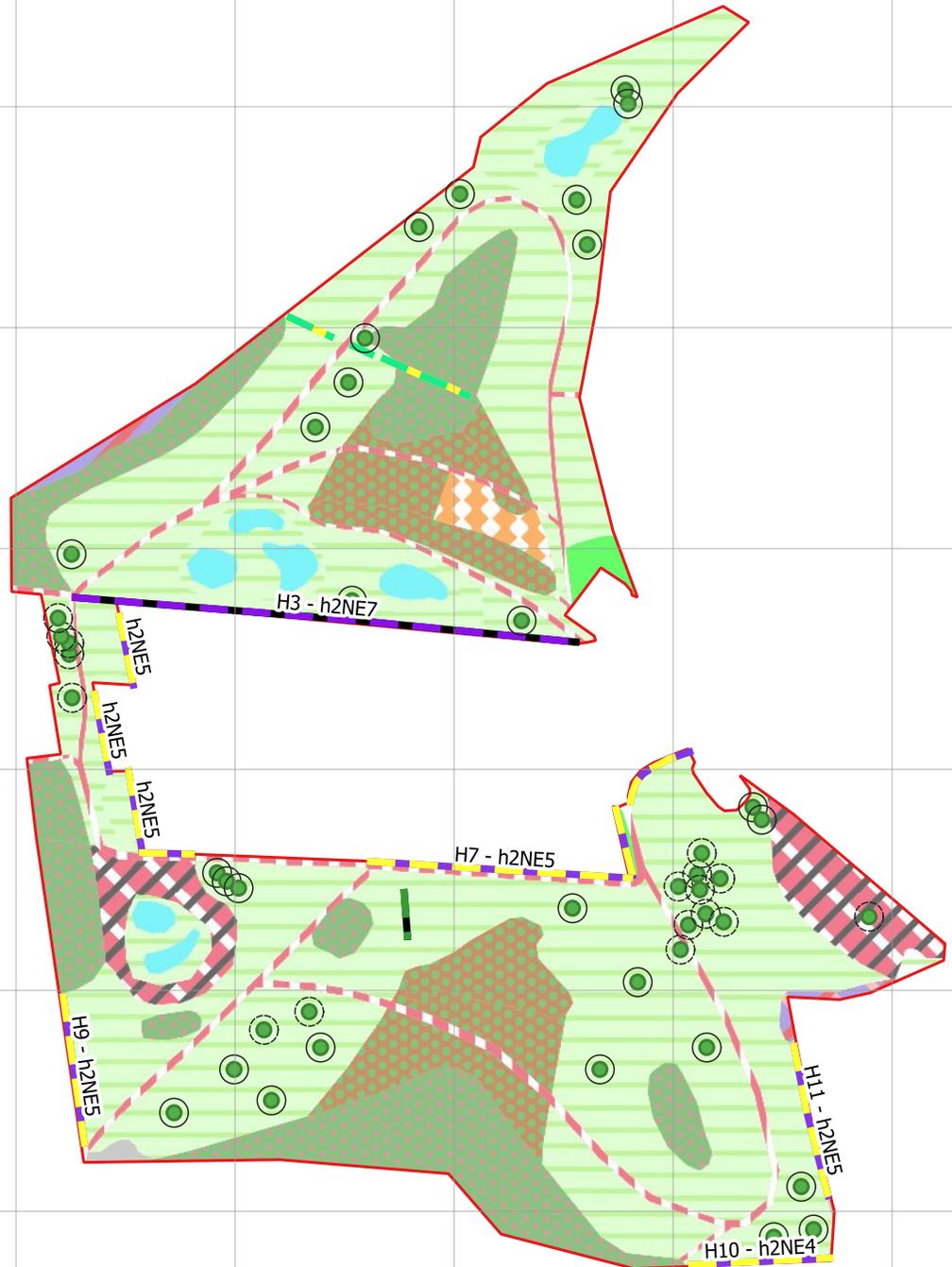
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Key

- Site Boundary
- Bracken
- Developed land; sealed surface
- Hawthorn scrub
- Mixed scrub
- Modified grassland
- Open Mosaic Habitats on Previously Developed Land
- Other neutral grassland
- Other woodland; broadleaved
- Other woodland; mixed
- Ponds (Non- Priority Habitat)
- Ruderal/Ephemeral
- Traditional orchards
- Ditches
- Line of Trees (w1g6NE2)
- Native Hedgerow (h2NE5)
- Native Hedgerow with trees (h2NE4)
- Native Species Rich Hedgerow - Associated with bank or ditch (h2NE7)
- Medium Tree
- Small Tree

Title: BIA Proposed Habitat Plan		
Project: Pewit Golf Course, Proposed LNR Strategy		
Client: Erewash Borough Council		
Date: 08/03/2023	Fig:	Author: LG
A4 Scale: 1:3250	ID: RSE_4132b_BIAP_0223_V1R3	