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LAND AT MELTON ROAD, EDWALTON

GREEN INFRASTRUCTURE BIODIVERSITY MANAGEMENT PLAN

December 2008

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1.0 INTRODUCTION

1.1 The Melton Road site in total exceeds 100 hectares, and consists primarily of intensively farmed arable land with limited wildlife habitat potential, situated adjacent to the urban edge of Edwalton and West Bridgford. It is defined to the south by the A52 together with the Wheatcroft Garden Centre and associated Business Park.

1.2 Features of biodiversity interest include Sharphill Wood, a Site of Importance for Nature Conservation (SINC) and proposed Local Nature Reserve (LNR), as well as hedgerows, hedgerow trees and associated areas of species poor semi – improved grassland around the site of the former Lodge Farm, now rebuilt as a large domestic dwelling. Protected and BAP species including badger, great crested newt and bats, together with Yellow Hammer and Skylark are found on and around the site.

1.3 The importance of Sharphill Wood has been recognised from the outset and as part of the emerging Masterplan for Melton Road 35 ha Community Park is to be created in order to protect Sharphill Wood and its setting. In addition, other features of value such as the Lodge Farm hedgerows and hedgerow trees are to be retained and protected as the basis of a network of green corridors to be utilised for public access and sustainable drainage. In total over 50% of the application site is allocated for “Green Infrastructure”, (GI) a figure which exceeds the latest Government expectations for sustainable design as set out in the latest Eco – town guidelines.

1.4 Green Infrastructure was helpfully recently summarised at the Buckinghamshire Green Infrastructure Conference (April 2008) as follows :-

What is Green Infrastructure?

Green Infrastructure is a planned network of multifunctional greenspaces and interconnecting links designed, developed and managed to meet the environmental, social and economic needs of communities. It is set within and contributes to a high quality natural and built environment and is required to enhance the quality of life for both present and future residents and visitors.

1.5 This encapsulates the objectives for GI established by agencies such as Natural England, Sport England and CABI.

1.6 CABE's "**Actions for Housing Growth**" (2007) places particular emphasis on the concept of Green Infrastructure as an integral element within sustainable development. In the Introduction it states :-

"CABE and its partners in producing this document, Natural England, English Heritage, the Environment Agency and the Academy for Sustainable Communities, share a vision of what makes a good place":-

- **Places that respect and enhance the area's context, reinforcing or creating a positive identity.**
- **Landscapes that are multi functional and provide opportunities for food, water and energy production and healthy living.**
- **Neighbourhoods where it is convenient and safe to walk or cycle to the shops, the primary school, and the doctor's surgery and where, if travelling further afield, getting on a bus or tram, rather than in the car, is a first choice not a last resort.**
- **Places that are well managed and looked after.**

1.7 Addressing the need for a strategic spatial vision, the document recommends that development should :-

"seek to reconnect Green Infrastructure (the network of open space, woodlands, wildlife habitats, parks and other natural areas) and integrate it into strategic planning".

1.8 Under the guiding principles for sustainable development, it suggests that :-

"The Green Infrastructure alongside a development, when well designed, can provide a range of social, economic and environmental benefits including for example children's play areas, attractive walking and cycle routes, flood storage areas, biodiversity, air quality improvement, shelter from the wind, and space to grow food and wood for fuel"

1.9 **Action 6** from the same document focuses on the detailed requirements for Green Infrastructure. It recommends a large scale vision promoting multi – functional open space to support recreation, biodiverse wildlife habitats, cultural

heritage, energy production, water and waste treatment, sustainable transport, education, food production, flood alleviation and sustainable drainage.

1.10 This overall approach is also supported by “**Active Design**” published by Sport England in 2006. It states :-

“Good masterplanning promotes the creation of new open space networks based on existing landscape features and characteristics such as planting, landform and water features. The provision of attractive and well integrated sports and leisure facilities should be a significant and important part of this landscape framework and development layout. It places sports and physical activity high on the design agenda and can also raise the profile of sports and recreation activities through design excellence”.

1.11 Walking and cycling together with easy access to public transport are recognised as being crucially important in creating sustainable neighbourhoods which do not rely on the private car.

1.12 In their October 2007 Policy Position Statement, Natural England reinforced their support for the Green Infrastructure concept, identifying the ten key attributes as follows :-

- **Embedded wildlife with rich and varied habitats in urban areas;**
- **Recreational space to boost physical and mental wellbeing;**
- **Education resources;**
- **Climate change compensation, moderating urban ‘heat islands’;**
- **Sustainable urban drainage;**
- **Multi - functional integration;**
- **Physical and functional connectivity;**
- **Co – ordinated Management;**
- **Shaped by local distinctiveness and character;**
- **Responsive to existing biodiversity resources.**

2.0 MELTON ROAD

- 2.1 This Green Infrastructure Biodiversity Management Plan (BMP) has been prepared on behalf of David Wilson Homes and Brian Wells in order to secure the optimum long term biodiversity benefits. It is intended that a Steering Group comprising appropriate conservation bodies and existing new residents (such as Friends of Sharphill Wood) be consulted about the BMP and given the opportunity to implement specific elements of work. The bulk of the work will be carried out by a dedicated management company in liaison with Rushcliffe Borough Council. The management company will be modelled on the exemplar Milton Keynes Parks Trust, an independent single – purpose organisation sustainably funded to deliver and maintain high quality Green Infrastructure.
- 2.2 The GI Framework Habitat Creation Proposals (Figure 1) demonstrates the interaction of these components. Creative conservation techniques will be used throughout the GI to maximise the potential for habitat creation. Detailed discussions have taken place with the Nottinghamshire Wildlife Trust and GI Framework Habitat Creation Proposals agreed in principle.
- 2.3 Specific habitat opportunities for bat, badger, great crested newt and birds such as yellow hammer will be provided. Existing features of value such as hedgerows and mature trees are to be retained and enhanced, and as the basis of the GI framework.
- 2.4 A similar creative approach will be pursued throughout the built development. Green roofs and building integrated habitats such as bird boxes and bat tubes will be incorporated on appropriate buildings such as South Nott's College, the employment development and the Primary School / Local Centre buildings. Wildlife gardening techniques will be promoted across the residential component of the scheme, with initial garden planting utilising native species of trees, climbing plants and shrubs. The Wildlife Trusts Guides to "Wildlife Gardening" and "Attracting Wildlife to your Garden" will be distributed to every dwelling, and the Steering Group will target this approach in their consultation and education work.
- 2.5 A careful balance will need to be reached regarding the competing requirements of wildlife and the public who will utilise the GI framework for recreational purposes. To that end, specific zones within the Community Park and GI will be

designed to discourage public access in order to protect, for example, ground nesting birds and badger setts from disturbance. Ongoing public information and education will be an important element of this approach, provided by way of an inter – active web site and public liaison via the primary school. The overall objective is to make the entire Melton Road development wildlife friendly for great crested newts, badgers, bats and wildlife in general.

FACTORS INFLUENCING MANAGEMENT PROPOSALS

Great Crested Newts

2.6 The site is currently predominantly sub – optimal for Great Crested Newts (GCN). The ponds west of Melton Road are dry, and no newts were found in this area. There are no ponds on the area to the east of Melton Road which is proposed for development, but there are ponds within existing domestic gardens immediately to the north and ponds to the east of the site in the Edwalton Golf Course. Furthermore two GCN's were found foraging along the eastern boundary adjacent the disused railway.

2.7 A full mitigation strategy is set out at Appendix 8J of the ES. In summary this proposes enhancing and creating new habitats for GCN's including ponds, hibernacula hedgerows, species rich grassland and broadleaved native woodland and scrub. All balancing facilities are to be enhanced for the benefit of GCN's.

2.8 A dedicated GCN area is proposed along the southern and eastern boundary of the development area to the east of Melton Road (Figure 2). Public access to this reserve area will be restricted.

Bats

2.9 Transect surveys identified bats foraging along the northern and eastern boundary, along the disused railway and in the vicinity of Sharphill Wood. No bat roosts were found in any of the buildings to be lost or in any of the mature trees.

2.10 As part of the GI proposals the existing hedgerow network is to be retained and enhanced with additional tree and shrub planting. All lighting will be designed in accordance with the Institute of Lighting Engineers guidance to minimise light spill and consequential pollution. Careful planting and management of hedgerows, trees and woodland areas together with a sensitive lighting plan will maintain and enhance bat commuting routes and foraging opportunities.

2.11 A full mitigation strategy is included in the ES at Appendix 8I.

Badger

2.12 Badger are present in the vicinity of the Melton Road application site, although only one outlier and two subsidiary setts are actually present on site. There are no badger sets east of Melton Road.

2.13 Foraging habitats are currently predominantly poor, consisting largely of intensively farmed arable land, although the species poor semi – improved grassland comprising the former Lodge Farm is of value. One badger clan living in domestic gardens on Edwalton Lodge Close are actively fed by residents. Sharphill Wood, Spinney Hill track (Old Coach Road) and Wilford Hill Cemetery provide other areas of better quality foraging).

2.14 The GI framework will maintain access corridors across the development area for badger following existing and proposed greenway routes along hedgerows. The 35 ha Community Park will convert large areas currently farmed intensively for arable purposes into species rich permanent grassland. The creation of this grassland will compensate for loss of foraging in the species poor semi-improved grassland.

2.15 In overall terms, whilst much of the Lodge Farm grassland is lost, there will be a significant increase in total grassland areas available for badger foraging. A community orchard is also proposed to provide an additional food source. Following discussions with the Nottinghamshire Wildlife Trust, it was agreed to provide three artificial badger setts in the northern sectors of the site. These will compensate for the potential loss of outlier setts and allow expansion of the clans throughout their natural range. The full mitigation strategy can be found at ES Appendix 8H.

Sharphill Wood SINC

2.16 Sharphill Wood is owned by Rushcliffe Borough Council. Historically, in the absence of a structured management plan, it has suffered from a degree of neglect and casual abuse. A management plan has now been introduced, administered by the Wildlife Trust and the Friends of Sharphill Wood (Appendix 1). As a component of the BMP it is proposed that funds are made available to the Friends and NWT to implement management and interpretation works within Sharphill Wood. It is also proposed to fence the existing woodland boundary to

control public access, and to plant a substantial woodland / woodland edge buffer zone extending the future woodland area beyond its current limits.

2.17 It is anticipated that Sharphill Wood may be designated as a Local Nature Reserve during the course of 2009, subject to approval from RBC.

Birds

2.18 The majority of breeding and wintering birds are associated with Sharphill Wood and the hedgerows around the perimeter of the site, all of which are to be retained. Significant new areas of broadleaved woodlands, woodland edge planting, hedgerows and species rich grassland are to be created. A substantial area of domestic gardens will also result from the development, with attendant beneficial habitat potential for birds.

2.19 As part of this BMP a more detailed and refined Implementation plan has been prepared for the habitat enhancements within the Community Park (Figure 1). This will be subject to regular review in response to feedback from the Steering Group.

Ecological Influences

2.20 Below is a list of species (SAP) and UK BAP habitats (HAP) **present** on and immediately adjacent to the site. Species protected by statute under the Wildlife and Countryside Act 1981 (*as amended*), the Protection of Badgers Act 1992 or the Conservation (Natural Habitats & c.) Regulations 1994 (*as amended*).

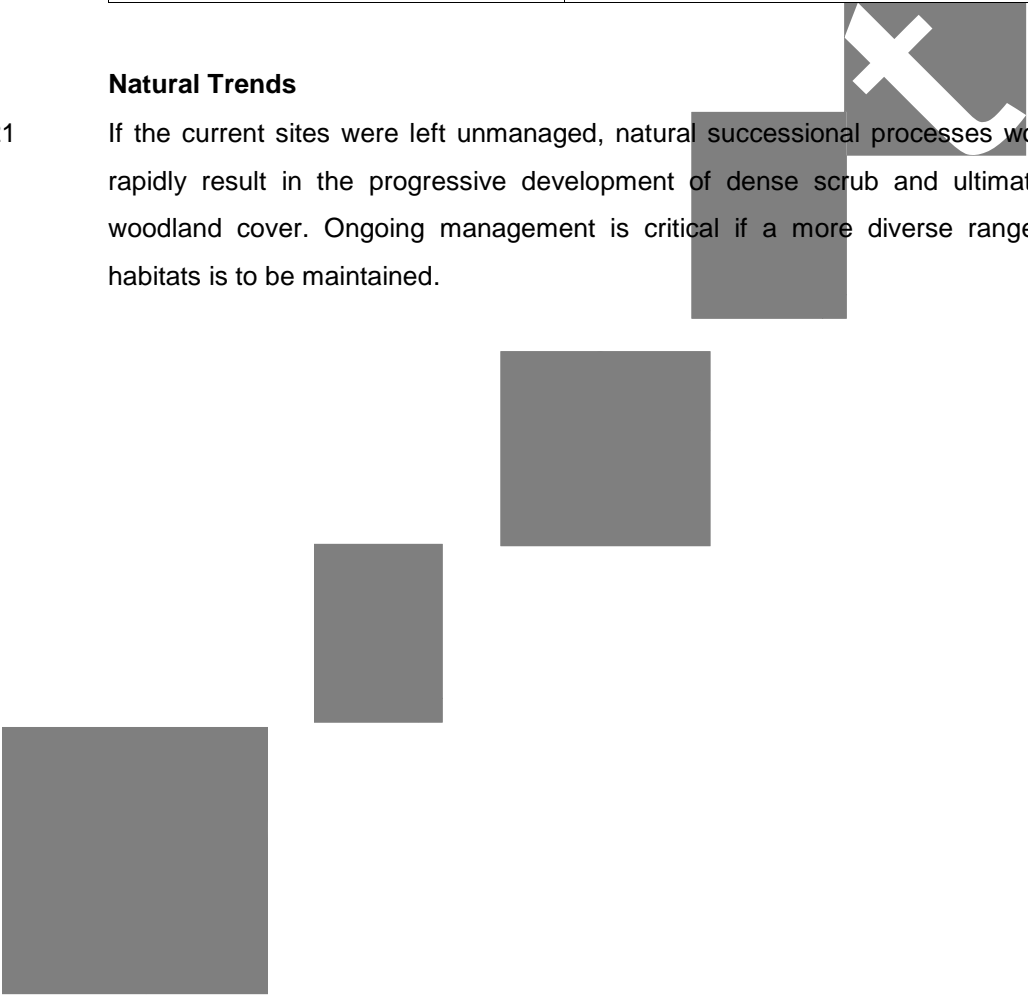
UK HAP	Local HAP
<ul style="list-style-type: none"> • Arable field margins • Hedgerows • Lowland mixed deciduous woodland • Ponds 	<ul style="list-style-type: none"> • Arable and horticulture • Improved grassland • Hedgerows
UK SAP	Local SAP
<ul style="list-style-type: none"> • Great crested newt • Noctule • Long eared bat species • Myotis bat species • Bullfinch 	<ul style="list-style-type: none"> • Pipistrelle bat • Myotis spp. • Noctule • Long eared bat

<ul style="list-style-type: none"> • House Sparrow • Linnet • Reedbunting • Skylark • Songthrush • Starling • Yellowhammer • Yellow wagtail 	
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Natural Trends

2.21

If the current sites were left unmanaged, natural successional processes would rapidly result in the progressive development of dense scrub and ultimately, woodland cover. Ongoing management is critical if a more diverse range of habitats is to be maintained.



3.0 OBJECTIVES

Ideal Long-term Ecological Management Objectives

3.1 The main objectives for the site are based on the requirement to maintain and enhance the nature conservation value of the retained habitats, whilst contributing to objectives of Nottinghamshire Biodiversity Action Plan.

3.2 Created and enhanced habitat will provide improved features for wildlife within the area and act to buffer any potential impacts on the Sharphill Wood SINC. Sympathetic management will aim to encourage the natural colonisation of the buffer areas by species from within the SINC/surrounding habitats and contribute to the expansion of ecologically valuable habitat in the long-term.

Objective 1:

3.3 Maintain and enhance the existing nature conservation value of retained features including broad-leaved woodland, hedgerows, water bodies, associated habitats and species.

Objective 2:

3.4 Create new habitats to compensate for loss of and impacts to existing habitats, enhance biodiversity of the local area and maximise value through appropriate management ensuring significant green links are maintained and created.

Objective 3:

3.5 Balance recreational use of the site with wildlife interests within and adjacent to the site, particularly in relation to the potential impacts on the Sharphill Wood SINC and appropriate management of the designated buffer areas.

4.0 HABITATS TO BE RETAINED, PROTECTED AND ENHANCED

Objective 1

Maintain and enhance the existing nature conservation value of retained features including broad-leaved woodland, mesotrophic grassland, waterbodies, associated habitats and species.

- 4.1 Where feasible habitats have been retained and will be enhanced through management.

Sharphill Wood SINC

- 4.2 Sharphill Wood is to be retained and enhanced for the benefit of local wildlife and the local people. A native woodland tree belt with a woodland understorey mix is to be planted around the woodland to act as a buffer between the woodland and proposed development and also to increase the biodiversity of habitats within the Community Park. The 2008 – 2012 Management Plan prepared by the Friends of Sharphill Wood include thinning of mature sycamore *Acer pseudoplatanus* and sycamore saplings, coppicing areas of wych elm *Ulmus glabra*, elder *Sambucus nigra* and hawthorn *Crataegus monogyna*, laying and gapping up of perimeter hedgerows, defining footpaths and bridleways and the installation of information boards throughout the woodland. Surveys will also be carried out to monitor the woodland and obtain baseline data on invertebrates, mammals, flora and birds. A timber post and rail fence will be used to define the existing woodland edge and to prevent casual trespass.

- 4.3 Following discussions with the Friends of Sharphill Wood agreement will be sought to provide further enhancements within the curtilage of Sharphill Wood. Such mitigation will include creating crevices suitable to be used as bat roost sites in dead trees located in areas away from footpaths.

Hedgerows and Trees

- 4.4 The vast majority of hedgerows and trees are to be retained across the site. During construction all retained hedgerows will be protected by high visibility fencing erected approximately 2m from the outside edge of the hedgerow. All trees will be protected by fencing erected according to their calculated root protection area (RPA) (see Arboricultural Report and Tree Schedule – Appendix D of Environmental Statement, FPCR 2008). An ecological clerk of works will be

required to visit the site on a regular basis to check that protective fencing is in place and that no works are encroaching into these areas.

4.5 Hedgerows are to be gapped up using locally native woody species including field maple *Acer campestre*, hazel *Corylus avellana*, hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa* and dog rose *Rosa canina*. Where possible a percentage of hedgerows will be laid. Others will be managed in rotation, cutting only one side annually to ensure that there is a continuous supply of fruit during the winter months for species such as redwing, song thrush and starling.

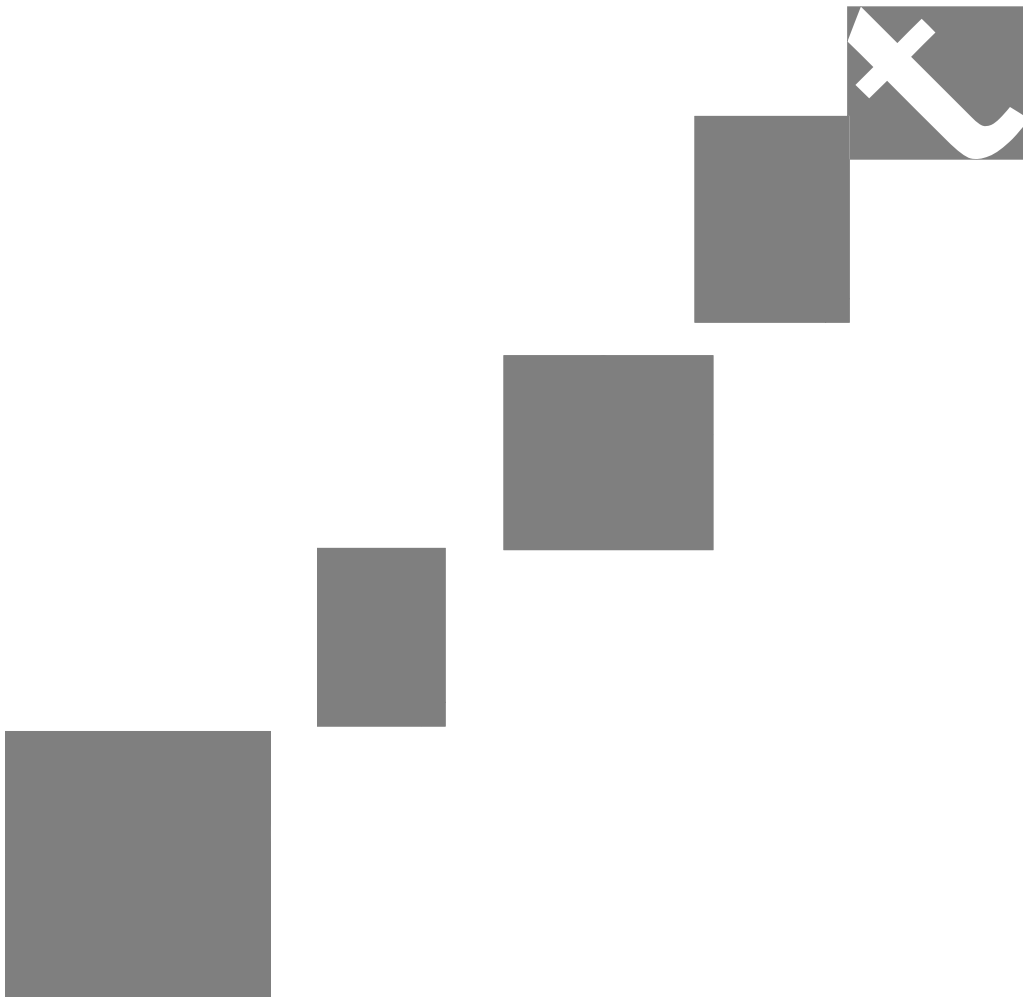
4.6 Trees and scrub are to be retained where possible to maintain connectivity and increase the diversity of the site by providing potential roosting sites and habitat niches for fauna such as bats and birds. Mature trees within the broad-leaved woodland will be left unmanaged unless otherwise dictated for reasons of public safety. If some limb removal or complete removal is required then the cut limbs will be stacked as dead wood piles, adjacent to hedgerows or woodland edges, except for any elm *Ulmus sp*, which will be removed from the site to discourage development of Dutch elm disease.

Ponds

4.7 The ponds in the northern part of the site will also be enhanced, being deepened to 1.5m with shallow marshy shelves created at the periphery. Gradients will vary from 15° – 35° with small embayments. This will create differing conditions of light and temperature and thus maximise diversification in the flora and associated fauna. Water depth will range from 5cm to 150cm, ensuring that in Winter an area of unfrozen water is retained whilst in summer warm shallows for the developing larvae of aquatic invertebrates and amphibians are created. Once confirmed that the ponds are retaining water native species aquatic and marginal vegetation will be introduced.

4.8 Natural colonisation of the margins will be augmented by additional planting of appropriate species of local provenance (within 20km or so of the pond). Species will be chosen to create a diverse and complex structure, with low-growing grasses such as floating sweet-grass *Glyceria fluitans*, wetland herbs and rushes including purple loosestrife *Lythrum salicaria* and soft-rush *Juncus effusus* planted around the edges and tall emergent e.g. greater pond sedge *Carex riparia* and floating-leaved plants such as white water-lily *Nymphaea alba* within the deeper areas of water. The pond can be made more visually attractive

through the planting of selected species including marsh marigold *Caltha palustris*, water dock *Rumex hydrolapathum* and common water plantain *Alisma plantago aquatica*.



5.0 HABITATS TO BE CREATED

Objective 2:

Create new habitats to compensate for loss of and impacts to existing habitats, enhance biodiversity of the local area and maximise value through appropriate management ensuring significant green links are maintained and created.

Green Infrastructure (GI) Corridors

5.1 A number of green corridors are to be created within and around the development. In those which do not require paved cycle routes, hardwearing grass species which are to be mown regularly are to be used. These species will include ;

<i>Agrostis capillaris</i>	Common bent	10%
<i>Festuca rubra</i>	Red fescue	50%
<i>Lolium perenne</i>	Perennial rye-grass	20%
<i>Poa pratensis</i>	Smooth meadow-grass	20%

Native Species Rich Grassland

5.2 The majority of the existing arable fields will be converted into species rich neutral grassland. Due to the existing nutrient content of these fields, top soil will need to be removed to a depth of 300mm where possible. Remaining subsoils, will be left in situ due to their chemical suitability for the creation of species rich communities and to ensure that sufficient soils persist to ensure successful establishment. The bulk of the grassland will be sown with a species rich seed mix (MG5) reflecting species present in the area. Where feasible green hay will be used, sourced from local similar grassland sites. Where this is not possible, a suitable mix of local provenance should be sourced from a reputable wildflower supplier, using either an appropriate off-the-shelf mix or a specifically designed mix for this site. Species used will include plants that are attractive to invertebrates within the local area.

Wildflowers

<i>Achillea millefolium</i>	Yarrow	1.5%
<i>Agrimonia eupatorium</i>	Agrimony	1%
<i>Centaurea nigra</i>	Black knapweed	1.5%
<i>Filipendula ulmaria</i>	Meadowsweet	1.5%
<i>Galium verum</i>	Lady's bedstraw	1.5%

<i>Leontodon hispidus</i>	Rough hawkbit	1%
<i>Leucanthemum vulgare</i>	Ox-eye daisy	1.5%
<i>Lotus corniculatus</i>	Common bird's-foot trefoil	0.5%
<i>Plantago lanceolata</i>	Ribwort plantain	2%
<i>Prunella vulgaris</i>	Self heal	1.5%
<i>Ranunculus acris</i>	Meadow buttercup	1.5%
<i>Ranunculus bulbosus</i>	Bulbous buttercup	1.5%
<i>Rhinanthus minor</i>	Yellow rattle	1%
<i>Sanguisorba minor</i>	salad burnet	0.5%

Grasses

<i>Anthoxanthum odoratum</i>	Sweet vernal grass	2%
<i>Agrostis capillaris</i>	Common bent	14%
<i>Cynosurus cristatus</i>	Crested dog's tail	24%
<i>Festuca rubra</i>	Red fescue	36%
<i>Trisetum flavescens</i>	Yellow oat-grass	6%

5.3 Additional species such as cowslip *Primula veris*, pignut *Conopodium majus*, common cat's-ear *Hypochoeris radicata*, field scabious *Knautia arvensis*, tufted vetch *Vicia cracca* and quaking grass *Briza media* can also be sown to increase the diversity of the sward.

Summer Grassland/Wildflower Meadow

5.4 A summer meadow is to be sown in association with the community orchard. These areas will be deep ploughed in order to reduce the nutrients which have been applied during agricultural processes. The wild flower species should be sown with a nurse crop of grass (For species see below) in a 20%:80% mixture. Wildflower species should include;

<i>Agrostemma githago</i>	Corncockle
<i>Anthemis arvensis</i>	Corn Camomile
<i>Centaurea cyanus</i>	Cornflower
<i>Centaurea nigra</i>	Black knapweed
<i>Chrysanthemum segetum</i>	Corn marigold
<i>Digitalis purpurea</i>	Foxglove
<i>Knautia arvensis</i>	Field scabious
<i>Hypericum perforatum</i>	Perforate St John's wort
<i>Leucanthemum vulgare</i>	Ox-eye daisy

<i>Lotus corniculatus</i>	Common bird's-foot trefoil
<i>Papaver rhoeas</i>	Corn poppy
<i>Plantago lanceolata</i>	Ribwort plantain
<i>Silene alba</i>	White campion
<i>Vicia sativa</i>	Common vetch

The nurse crop of grass species should include;

<i>Festuca rubra</i>	Red fescue
<i>Lolium perenne</i>	Perennial rye grass
<i>Festuca longifolia</i>	Hard fescue
<i>Cynosurus cristatus</i>	Crested dog's-tail
<i>Agrostis capillaris</i>	Common bent

Wet grassland

5.5

The areas of grassland associated with the balancing ponds will experience occasional inundation. Specific areas within each balancing pond will be over deepened and lined in order to maintain permanent wetland areas. These areas will be seeded with a wet grassland seed mix to provide mesotrophic conditions. Species included in this mix are:

<i>Achillea millefolium</i>	Yarrow	0.5%
<i>Centaurea nigra</i>	Black knapweed	2%
<i>Filipendula ulmaria</i>	Meadowsweet	2.5%
<i>Galium verum</i>	Lady's bedstraw	1%
<i>Leucanthemum vulgare</i>	Ox-eye daisy	1.5%
<i>Lotus pedunculatus</i>	Greater bird's-foot trefoil	1%
<i>Lychnis flos-cuculi</i>	Ragged robin	1%
<i>Plantago lanceolata</i>	Ribwort plantain	1%
<i>Primula veris</i>	Cowslip	1%
<i>Prunella vulgaris</i>	Selfheal	1%
<i>Ranunculus acris</i>	Meadow buttercup	2.5%
<i>Rhinanthus minor</i>	Yellow rattle	1%
<i>Rumex acetosa</i>	Common sorrel	1%
<i>Silaum silaus</i>	Pepper saxifrage	1%
<i>Stachys officinalis</i>	Betony	1%
<i>Succisa pratensis</i>	Devil's-bit scabious	1%

Grasses

<i>Agrostis capillaris</i>	Common bent	8%
<i>Alopecurus pratensis</i>	Meadow foxtail	4%
<i>Anthoxanthum odoratum</i>	Sweet vernal grass	2%
<i>Briza media</i>	Quaking grass	1%
<i>Cynosurus cristatus</i>	Crested dog's-tail	40%
<i>Deschampsia cespitosa</i>	Tufted hair-grass	1%
<i>Festuca rubra</i>	Red fescue	24%

- 5.6 All seed mixes will be sown during the spring or summer, after which they will be subject to varied cutting regimes. The first cut will take place once the grass has reached a height of 100mm, then mow 2-3 times in the first year. Pernicious weeds will be spot-treated with herbicide as necessary. Once grassland has established selected areas will be subjected to different cutting regimes on a rotational basis. This will include: a twice annual cut in early spring and summer and a once annual cut during the early spring or late summer. This will ensure that a continuous supply of nectar and seeds for local fauna across the site and help maintain floristic diversity. The different sward lengths will provide habitat diversity of interest to a range of local fauna including invertebrates, butterflies and small mammals. Selected areas including public paths will be cut on a more regular basis (three to four times a year). All arisings will be left in-situ for 48 hours following cutting, to allow appropriate time for seeds to fall and any invertebrates to move back into the sward. Following this arisings will be removed to prevent soil enrichment. Arisings can be used to create compost piles in suitable locations, which will provide hibernacula and breeding habitat suitable for reptiles and amphibians. Marginal areas adjacent to woodland edges, and ponds should be cut once on alternate years and allowed to develop ruderal species for further species and habitat diversity. Scrub encroachment should be monitored on a regular basis and removed as necessary.

Pond creation

- 5.7 Five ponds are to be created, one in the west and four within the GCN reserve area. These will be of varying size, depth and shape, but will each have surface area of approximately 150m² with scalloped edges and shallow marshy shelves at the periphery.
- 5.8 There will also be variation in the substrate used to line the pond. Some areas will be lined with topsoil and planted, whilst others will be lined with a different,

nutrient poor form of substrate from the site. This will mean that the ponds will be colonised at different rates, providing a more varied mosaic of available habitats, thereby improving the potential species diversity of the area.

5.9 The areas of the newt ponds to be planted will be located in the marginal areas and open water and will include:

<i>Callitriche stagnalis</i>	Common water starwort
<i>Caltha palustris</i>	Marsh-marigold
<i>Juncus effusus</i>	Soft rush
<i>Lythrum salicaria</i>	Purple loostrife
<i>Mentha aquatica</i>	Water mint
<i>Myosotis palustris</i>	Water forget-me-not
<i>Nymphaea alba</i>	White water lily
<i>Ranunculus aquatilis</i>	Water Crowfoot
<i>Veronica beccabunga</i>	Brooklime



5.10 Periodic dredging will need to take place in order to ensure this variation in habitats continues over time, the frequency of which will depend on the information gathered during monitoring. Marginal vegetation should be monitored to ensure that it does not engulf the open water. At least 50% of the water will be managed as open and free from marginal vegetation. If clearance is required only one-third or less of marginal areas should be cleared annually on a rotational basis during autumn. Arisings should be left next to the open water for at least 48 hours to allow invertebrates to return, then removed to a designated composting site.

5.11 A denser and taller area of vegetation will be planted around the peripheries of the ponds to provide additional habitats for invertebrates and terrestrial habitats for GCN. Species used in the marginal planting will include:

<i>Carex obtrubae</i>	False Fox Sedge
<i>Carex ovalifolium</i>	Oval Sedge
<i>Eleocharis palustris</i>	Common Spike Rush
<i>Epilobium hirsutum</i>	Greater Willowherb
<i>Iris pseudocorus</i>	Yellow Flag Iris
<i>Juncus effusus</i>	Soft Rush
<i>Juncus inflexus</i>	Hard Rush

<i>Lychnis flos-cuculi</i>	Ragged Robin
<i>Lycopus europaeus</i>	Gipsywort
<i>Lythrum salicaria</i>	Purple loosestrife
<i>Phalaris arundinacea</i>	Reed Canary Grass

Reedbed/Balancing Facilities

5.12 The seven balancing facilities within the eastern extent of the project will largely comprise a reed bed of canary reed grass *Phalaris arundinacea* which will be planted in patches during the spring (March – May) at a density of 4 plants per m². Additional aquatic species should be planted adjacent to the reedbed to provide additional diversity within the reedbed habitat. Species should include;

<i>Alisma plantago-aquatica</i>	Water plantain
<i>Iris pseudacorus</i>	Yellow flag iris
<i>Mentha aquatica</i>	Water mint
<i>Veronica beccabunga</i>	Brooklime

5.13 One third of each reedbed should be cut on a 3-5 year rotation during the winter (November to March) to stimulate the production of new growth and reduce litter accumulation. Dry areas within the balancing facilities will be sown with a wild flower mix.

Swales

5.14 Grassed swales are to be created as part of the GI within the developed part of the project area. The swales will have a shallow gradient (approx 2%), and gentle curves wherever possible. The vegetation in the channel itself is to be maintained at approximately 100mm – 150mm, with taller vegetation at the top of the bank sides.

Channel species are to include;

<i>Agrostis stolonifera</i>	Creeping bent	10%
<i>Festuca rubra</i>	Red fescue	70%
<i>Poa pratensis</i>	Smooth-stalked meadow grass	20%

5.15 Bank side vegetation is to include;

<i>Arrhenatherum elatius</i>	False oat-grass
<i>Cirsium vulgare</i>	Spear thistle
<i>Dactylis glomerata</i>	Cock's-foot
<i>Epilobium hirsutum</i>	Great Willowherb
<i>Picris echioides</i>	Bristly ox-tongue

N.B. Spear thistle, bristly ox tongue and other ruderals will provide valuable habitat for invertebrates. These species should be left to colonise naturally.

Scrub

5.16 Scrub planting is to be incorporated into a mosaic with broad leaved woodland and species rich grassland within the Community Park and within the GCN reserve. Scrub will also be used to provide shelter surrounding the artificial badger setts. Shrubs should be planted at 300mm centres and should be adequately protected from rabbits. Dead and diseased plants will be replaced in the first year. All planting should be left to develop untouched for the first five-year period. After this time woodland edge planting should be graded from grassland to woodland and a scalloped edge maintained by cutting and removal of individual shrubs where necessary. Species are to include:

<i>Corylus avellana</i>	Hazel
<i>Crataegus monogyna</i>	Hawthorn
<i>Lonicera periclymenum</i>	Honeysuckle
<i>Prunus spinosa</i>	Blackthorn
<i>Rosa canina</i>	Dog rose

Native Species Woodland Tree Belts

5.17 Native species woodland belts will be planted around Sharphill Wood to act as a buffer between the SINC and the proposed development. All new groups of trees should be adequately protected and fenced from rabbits using spiral tree guards. Weed growth around the immediate vicinity of each tree will be treated using a glyphosate based herbicide. All dead and dying specimens are to be replaced on a like for like basis for the first five years. Periodic scrub management should ensure that the woodland or scrub does not develop or encroach onto adjacent habitats. Woodland canopy species are to include;

<i>Betula pendula</i>	Silver birch
<i>Acer campestre</i>	Field maple
<i>Alnus glutinosa</i>	Alder
<i>Corylus avellana</i>	Hazel
<i>Crataegus monogyna</i>	Hawthorn
<i>Fraxinus excelsior</i>	Ash
<i>Quercus robur</i>	Pedunculate oak

5.18 The woodland belts are to be planted with a woodland understorey mix which is to include;

<i>Alliaria petiolata</i>	garlic mustard
<i>Allium ursinum</i>	ramsons
<i>Digitalis purpurea</i>	foxglove
<i>Hyacinthoides non-scripta</i>	bluebell
<i>Stachys sylvatica</i>	hedge woundwort
<i>Brachypodium sylvaticum</i>	false brome
<i>Deschampsia caespitosa</i>	tufted hair grass
<i>Festuca rubra</i>	red fescue

Community Orchard

5.19 A community orchard will be implemented within an area of species rich grassland in the north of the project area. The grassland understorey will comprise species described in 5.4 above. Traditional varieties of domestic fruit trees (including apple and plum) should be planted approximately 2.5m apart between October and February. All new groups of trees should be adequately protected and fenced from rabbits using spiral tree guards. Dead and diseased plants should be replaced within the first year. The bases of the trees should be kept weed free using spot treatment of a glyphosate based herbicide.


Hedgerows with Standard Trees

5.21 New and reinforced hedgerows will be introduced as part of the GI routes through the Project. Where hedgerows are provided standard trees will also be planted within the canopies. Species used in the hedgerow will comprise:

<i>Acer campestre</i>	Field maple	5%
<i>Crataegus monogyna</i>	Hawthorn	60%
<i>Ilex aquifolium</i>	Holly	5%

<i>Ligustrum vulgare</i>	Wild privet	5%
<i>Malus sylvestris</i>	Crab apple	5%
<i>Prunus spinosa</i>	Blackthorn	15%
<i>Viburnum opulus</i>	Guelder rose	5%

Standard trees to be planted within the hedgerows approximately every 20m are to include;

<i>Acer campestre</i>	Field maple	
<i>Fraxinus excelsior</i>	Ash	
<i>Ilex aquifolium</i>	Holly	
<i>Prunus avium</i>	Wild cherry	
<i>Quercus robur</i>	Oak	

5.22 Half of each hedge should be cut annually on a rotational basis ensuring that this is done during late winter when the majority of the fruit has been taken by local wildlife. Hedgerows should not be cut during heavy frost or during bird breeding season (March – August).

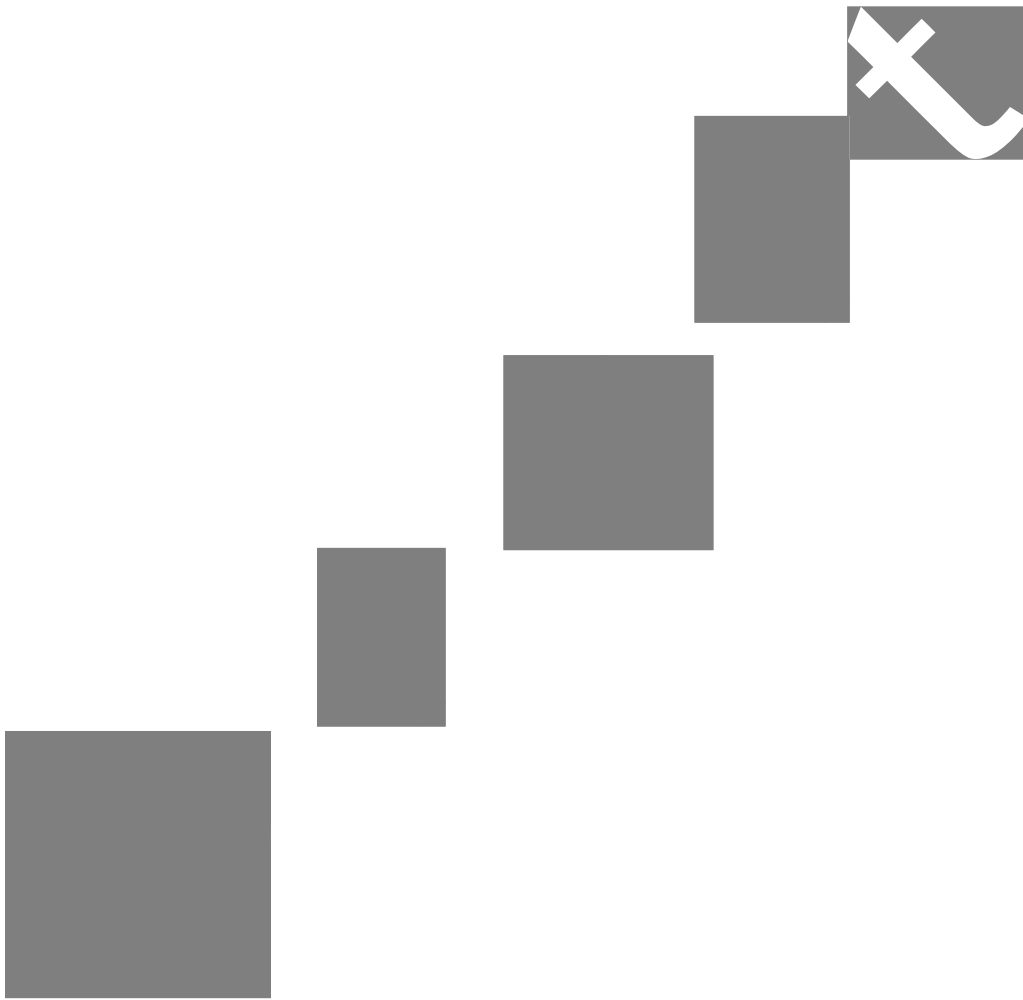
Hibernacula

5.23 It is proposed that hibernacula are created within the GCN receptor area. The hibernacula will be constructed out of rubble and organic material; small crevices will be created between material that will allow areas of refuge for amphibians, invertebrates and small mammals. These will be situated around the newly created ponds and balancing ponds. Hibernacula will vary in length depending on the location. However they will be approximately 2m in width with sloping sides no greater than 45°. Actual gradients and heights should be varied, to provide differing conditions.

5.24 Along the eastern boundary of the Project area, adjacent to the disused railway line a linear hibernacula hedgerow will be implemented and once formed the hibernacula will be planted with native species. The hedgerow bank will be approximately 1m high and will comprise 60cm of hardcore interspersed with organic matter such as small logs and branches, and 45cm of topsoil into which shrub species will be planted. Species planted will include;

<i>Corylus avellana</i>	Hazel	15%
<i>Crataegus monogyna</i>	Hawthorn	45%

<i>Euonymus europaeus</i>	Spindle	5%
<i>Ilex aquifolium</i>	Holly	5%
<i>Ligustrum vulgare</i>	Wild privet	10%
<i>Prunus spinosa</i>	Blackthorn	10%
<i>Rosa canina</i>	Dog rose	10%



6.0 OVERALL MANAGEMENT REGIME

Objective 2:

- 6.1 *Create new habitats to compensate for loss of and impacts to existing habitats, enhance biodiversity of the local area and maximise value through appropriate management ensuring significant green links are maintained and created.*

Rationale

- 6.2 The site supports an array of different species. These include protected species such as badger, bats and great crested newts, and the many different species present within Sharphill Wood SINC. Habitat creation has focussed on providing habitats that will meet the requirements of all of these species, as well as encourage colonisation by new ones through the provision of an assortment of newly created habitats, which also aim to enhance the biodiversity of the area. Habitats to be created will include reedbeds, open water, species rich grassland, an orchard, hedgerows and broadleaved mixed woodland. These habitats will aim to mirror the local SINC habitats and encourage their natural expansion.
- 6.3 Areas of open water and associated vegetation will provide habitats for amphibians and invertebrates increasing Nottinghamshire BAP target habitats such as reedbeds and standing open water. Open grassland associated with these areas will provide habitat for over-wintering birds enhancing the biodiversity of the area.
- 6.4 Hedgerows, woodland belts and scrub will be used to provide links across the wider site especially around the boundaries and provide potential foraging and nesting habitat.
- 6.5 Species rich grassland will provide areas for nesting and foraging animals, but provide areas to be colonised by ruderal species such as weld *Reseda luteola* and mugwort *Artemisia vulgaris* further increasing the diversity of habitats for invertebrates.
- 6.6 Areas of open water and associated vegetation will provide habitat for great crested newts and other amphibians and will be left largely unmanaged. The marginal vegetation however will be monitored to ensure that this does not exceed 50% of the open water. If clearance is required only one-third or less of marginal areas should be cleared annually on a rotational basis (in autumn

outside the main breeding period or the period of larval development), with the arisings left by the ponds edge for 48 hours to allow any trapped animals to escape. The arisings would then be cleared to the designated composting area. Any scrub planting surrounding the water bodies should be controlled to ensure over shading doesn't affect the vegetation within the pond or create considerable leaf fall.

6.7 The grassland within the reserve the site will be managed at low intensity with only 50% of the grassland cut at each time to create a variety and structure of grassland habitats that would be of most benefit to great crested newts. The grassland will be cut during spring and late summer to a height no less than 100 mm, with the arisings removed within 48 hours to a designated composting area. This would also act as suitable hibernacula and areas of habitat variation for invertebrates. The remainder of the grassland will be cut every other year. Grassland around the bottom of hedgerows will not be cut at all, similarly to help provide a more structured habitat. This varied cutting regime will provide a complex of short areas and longer grassland that will also be used by invertebrates.

6.8 Scrub will be managed within the grassland by annual clearance to ensure that grassland habitat does not become engulfed by scrub.

6.9 The permanent newt fencing surrounding the GCN reserve will be checked for damage and any damages should be repaired/replaced immediately (Table 1 provides a summary).

Table 1. Outline Prescriptions

<p><u>Green Infrastructure Pathways</u></p>	<p>Sow GI pathways with grassland detailed previously.</p>
<p><u>Species Rich Grassland/Summer Grassland/Wildflower Meadow/Wet Grassland areas</u></p>	<p>The first cut will take place once the grass has reached a height of 100mm, then maintain a short sward by mowing 3-4 times per year.</p>
	<p>Sow newly created grassland with grass mix detailed previously during spring or autumn.</p> <p>Mow once the seeded grassland reaches 100mm, then mow 2-3 times in the first year.</p> <p>For all established grassland mow selected</p>

<p><u>Swales</u></p> <p><u>Reedbed</u></p> <p><u>Marginal & Emergent Vegetation</u></p>	<p>areas twice annually during spring and late summer. Allow other species to naturally colonize or introduce through use of green hay. Leave longer unmown grass around hedgerows bases, adjacent to the waters edge of ponds and reedbeds. Mow selected areas once every other year.</p> <p>Remove arisings approximately 48 hours after mowing, these should be placed in a designated area within the site to provide habitat diversity.</p> <p>Create small areas of bareground through rotoation as discussed with the management steering group.</p> <p>Allow development of areas of ruderal vegetation; such areas will need to be controlled. Ruderals located in areas required as open grassland should be spot treated with a glyphosate based herbicide.</p> <p>N.B. Spear thistle, bristly ox tongue and other ruderals will provide valuable habitat for invertebrates, where feasible these species should be left to colonise.</p> <p>Mow channel vegetation to approximately 100mm – 150mm. Leave longer unmown grass along bank sides, and mow alternate banks each year during late summer.</p> <p>Plant reeds in patches during the spring (March –May) at a density of 4 plants per m².</p> <p>One third of each reedbed should be cut on a 3-5 year rotation during the winter (November to March) to stimulate the production of new growth and reduce litter accumulation.</p> <p>Ensure marginal vegetation does not engulf the open water, at least 50% of the water will be maintained as open water free from marginal vegetation. If clearance is required only one-third or less of marginal areas should be cleared annually on a rotational basis during autumn, arisings should be left next to the pond for at least 48 hours, before taking to the designated composting area, to allow amphibians and invertebrates to return to the pond.</p>
<p><u>Scrub</u></p>	<p>Planting will consist of hawthorn, blackthorn, hazel, holly and honeysuckle planted at 300mm centres.</p> <p>All new planting will be adequately protected and fenced from rabbits.</p> <p>Dead and diseased plants will be replaced in the first year.</p>

	<p>All planting should be left to develop untouched for the first five-year period. After this time woodland edge planting should be graded from grassland to woodland and a scalloped edge maintained by cutting and removal of individual shrubs where necessary.</p> <p>Scrub will be controlled by annual clearance to prevent encroachment into the grassland. Glyphosate based herbicide should be used on stumps to help prevent re-growth.</p> <p>Any tall vegetation and scrub should be controlled around the water bodies to prevent over shading and build up of leaf litter.</p>
<p><u>Native Species Woodland Belt</u></p>	<p>Tree planting using young specimens, less than 1m high, will be undertaken in November – March as in accordance with the species mix and densities outlined above.</p> <p>Weed growth around the immediate vicinity of the tree to be treated using a glyphosate based herbicide.</p>
	<p>All dead and dying specimens to be replaced on a like for like basis for the first five years. However, any plants failing to establish within the first two years will be replaced.</p> <p>Periodic scrub management should ensure that the woodland or scrub does not develop or encroach onto adjacent habitats. Where possible saplings should be hand pulled or if this is not possible cut to stump height and treated with a glyphosate based.</p>
<p><u>Community Orchard</u></p>	<p>Plant orchard at 2.5m centres across area. Trees should be planted between October and February and should consist of traditional domestic fruit tree species.</p> <p>All new groups of trees should be adequately protected and fenced from rabbits using spiral tree guards.</p> <p>Dead and diseased plants should be replaced within the first year.</p> <p>Base of trees should be kept weed free using spot treatment of a glyphosate based herbicide.</p>
<p><u>Hedgerows and Standard Trees</u></p>	<p>Hedgerows should be allowed to develop into tall thick hedges with gently angled sides. Trimming should begin after the first five-year management period (Between 5 and 10 years).</p> <p>Cut half of the hedgerows annually on a</p>

<p><u>Hibernacula</u></p>	<p>rotational basis ensuring that this is during late winter when the majority of the fruit has been taken by local wildlife. Hedgerows will not be cut during heavy frost or during bird breeding season (March – August).</p> <p>Standard trees should be planted along the hedgerows every 20m. These should be predominantly oak with occasional ash.</p> <p>Standard retained trees will be left unmanaged. If pruning is required any wood taken will be left in habitat piles next to hedgerows and within open grassland.</p> <p>The shrub planting on the hibernacula should be controlled when necessary to ensure the vegetation does not encroach into the grassland.</p> <p>Hibernacula hedgerow to be managed as hedgerows above.</p>
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7.0 BALANCE OF RECREATIONAL USE WITH WILDLIFE INTERESTS

Objective 3:

7.1 *Balance recreational use of the site with wildlife interests within and adjacent to the site, particularly in relation to the potential impacts on the adjacent SINC and appropriate management of the designated buffer areas.*

7.2 There is currently public access to much of the site, via designated and informal footpaths. These pathways will be maintained and enhanced to provide access from the development into the Community Park whilst reducing the potential for the build up of litter, desire lines and nutrient enrichment from dogs and horses in sensitive areas of the park. Further footpath routes will be created throughout the Community Park to reduce recreational pressure on Sharphill Wood.

7.3 As within Sharphill Wood SINC, information boards will be placed at appropriate locations within the site adjacent to the public rights of way. These will detail the importance of the site and instruct people on how to reduce their impact on the surrounding wildlife. Further boards will be placed within the site when coming to the SINC. These boards will be used to provide information about the site and the wildlife within it, thereby reinforcing conservation messages.

7.4 Potential nutrient enrichment from dogs will be mitigated for through clear signposting and the frequent provision of dog bins throughout the Community Park.

7.5 A small car park will be established primarily to provide ready access for disabled visitors to the Community Park. Controlled vehicular access for management purposes will be provided through this car park.

7.6 It is anticipated that a full time Community Park Ranger system will be a key element of the management regime, responding to the daily requirements of all the Green Infrastructure network. The Rangers will liaise on a regular basis with RBC and the Steering Group.

8.0 MONITORING AND WORK PROGRAMME

- 8.1 In order to ensure that the habitats created within the site reach and maintain their maximum value to nature conservation, all habitats should be monitored every two years.
- 8.2 Results of this monitoring should be used to inform changes to the BMP, particularly at the end of the initial five-year work programme. The prescriptions provided here should not be set in stone and will be altered if required. The management plan should run for a period of ten years, the five year work programme will be reviewed at the end of the five year period. An outline of the five year work programme is detailed below. Flexibility is essential and the Rangers will have the ability to adjust the regime in consultation with the Steering Group in order to respond promptly to changing circumstances.
- 8.3 Litter should be removed from the site as part of the general management and maintenance visits.

FIVE YEAR WORK PROGRAMME

Description of works	Years Active with Priority						
	1	2	3	4	5	Post 5 yrs	
Management of water bodies							
1. Monitor marginal vegetation extent and remove up to 1/3 rd if required.	-	1	-	1	-	1	
2. Control over-shading of shrub and tree species surrounding water bodies when appropriate.	-	-	-	-	-	-	
3. Maintain grassland within swale to approx 100 – 150 mm	1	1	1	1	1	1	
4. Cut 1/3 rd of reedbed to simulate production of new growth	-	-	-	1	-	1	
Grassland							
1. Sow grass seed and mow grassland in the first year once it grows to 100 mm during late summer/autumn.	1	-	-	-	-	-	
2. Mow grassland 2-3 times in first year	1	-	-	-	-	-	
3. Mow 50% of the grassland once every	-	1	-	1	-	1	

other year, leaving longer unmown grass around woodland and hedgerows etc.						
4. Mow GI pathways 3-4 times a year	1	1	1	1	1	1
5. Remove arisings within 48 hours to a designated composting area.	1	1	1	1	1	1
Swales						
1. Sow grass seed.	1	-	-	-	-	-
2. Mow grassland 2-3 times in first year	1	-	-	-	-	-
3. Mow grassland at 100 – 150 mm	1	1	1	1	1	1
Hedgerow						
1. Gap up existing hedgerows and plant new hedgerows with native woody species.	1	-	-	-	-	-
2. Replace dead or dying species on a like for like basis.	-	1	1	1	1	1
3. Cut every year, with a maximum of 50% of the hedgerow cut at the same time.	1	1	1	1	1	1
4. The hedgerow will be cut in autumn or winter to avoid the bird breeding season, but not during severe frost.	1	1	1	1	1	1
Scrub						
1. Control of scrub spreading into grassland by annual clearance. Treat stumps where necessary with glyphosate based herbicide to help prevent re-growth.	1	1	1	1	1	1
Mixed Broad-leaved Woodland/ Community Orchard						
1. Plant young tree species	1	-	-	-	-	-
2. Treat weed growth around immediate vicinity of tree	1	1	1	1	1	-
3. Replace dead or dying species on a like for like basis.	-	1	1	1	1	1
4. Manage woodland and scrub to reduce encroachment on adjacent habitats	-	-	-	-	-	1
Monitoring						
1. Monitor habitats every year and use results to inform future management, (i.e. if annual scrub clearance is not effective	1	1	1	1	1	1

in controlling encroachment etc).						
2. Monitor the water bodies annually to ensure the breeding GCN population is maintained.	1	1	1	1	1	1
3. Monitor water bodies for the presence of fish and remove when appropriate.	1	1	1	1	1	1
4. Monitor bat habitats to establish use for foraging and roosting	1	1				
5. Monitor badger foraging habitats and artificial setts to establish use.	1	1	1			

Appendix 1

**Sharphill Wood West Bridgford
Management Plan
(2008 – 2012)**

(Not Included Here Refer Appendix 3 Main Proof of Evidence)

