Smithurst Meadows LNR
Giltbrook, Nottinghamshire

Ecology Report and Management Plan 2015 - 2020

A report to:

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1. INTRODUCTION

1.1 This report has been prepared by EMEC Ecology for Broxtowe Borough Council. It provides the details of an extended Phase-1 habitat survey and a five-year management plan for Smithurst Meadows Local Nature Reserve (LNR) in Giltbrook, Nottinghamshire.

1.2 Smithurst Meadows LNR is centred on grid reference SK 477 454; the location of the site is shown on Figure 1 in Appendix 1. For the purpose of the Management Plan, the site has been split into five compartments (A – E). The total size of the area included within the Management Plan covers approximately 7 hectares (ha).

1.3 The compartments covered in the Management Plan have various owners although the majority of the area is under the ownership of Broxtowe Borough Council. The extent of ownership of the Council, and of the LNR designation, is shown on Figure 4 in Appendix 1. The plan is an extract from the cabinet report that approved the designation.

1.4 The northern section of Compartment B and the area of rough grassland immediately to the north of the site (adjoining Compartment B) is proposed for residential development and an associated SuDS scheme (balancing lagoon).

1.5 Compartment C also has planning permission for development (not including the northern section which is under Council ownership), including a storm retention lagoon.

1.6 The Management Plan covers a five-year period, after which it should be reviewed and updated. A previous Management Plan (2010 – 2014) was compiled by Nottinghamshire Wildlife Trust (Nottinghamshire Wildlife Trust 2010).

2. SITE INFORMATION

2.1 Smithurst Meadows LNR is listed by Natural England as *'an 'urban fringe' site with interesting grassland and scrub areas and wetland species associated with the Daisy Farm Brook. The site is characterised by amenity grassland with planted rows of hybrid poplars, small woodland areas dominated by sycamore and ash with the occasional Scots pine. The middle woodland storey and scrub areas are predominately single-aged hawthorn and elder'*.

2.2 The site is located between the A610, a housing estate and a nearby industrial / retail park. Historically, the site has been both in agricultural use and part of a colliery. The 1946 OS Map shows the area being part of Newthorpe Common Farm with compartments D and E forming part of Lodge Colliery (locally known as Billy Halls Pit), with pit baths, pit canteen, slurry pond and rubbish dump being located with this area. Halls Lane was once called Pit Lane reinforcing the industrial connection with the site being on the edge of LNER Pinxton Branch railway line which followed the line of the A610. Much of the site has been disturbed over the years with anecdotal reports of large quantities of clay material being dumped on the site during the development of Daisy Farm Estate off Newthorpe Common (Nottinghamshire Wildlife Trust 2010).

2.3 The geology underlying the area is carboniferous shale (middle coal measures) with bands of sandstone. The shale deposits run along the Erewash River Valley (Nottinghamshire Wildlife Trust 2010).

2.4 The site has heavy clay soils. The soil in compartment D is poorly draining and may not be the original soil. This was possibly a capping layer from when the area was an open cast mine. Deep sewers also run through compartment D which is thought to have been compacted further by heavy plant machinery when the nearby houses were built (Nottinghamshire Wildlife Trust 2010).

3. METHODOLOGY

3.1 Ecological Walk-over Survey

An ecological walk-over survey of the site was conducted and notes were made on the Phase-1 habitat types present (JNCC 2010) and their suitability for protected species. Target notes were used to record any habitats or features of particular interest and any sightings, signs or evidence of protected or notable faunal species or any potential habitat for such species, as detailed below:

- The suitability of habitats for badgers (*Meles meles*) was recorded and any evidence of badgers including setts, dung pits, badger paths, hairs, bedding, footprints and scratching trees was noted.
- Trees with features suitable for roosting bats were noted, such as hollows, cracks and cavities within trunks and branches (e.g. old woodpecker holes), crevices behind loose bark and ivy growth.
- The suitability of habitats was assessed for amphibians (including great crested newt *Triturus cristatus*) and reptiles.
- The suitability of habitats was assessed for nesting birds.

EMEC Ecology visited the site to carry out the above walk-over survey on 5th May 2015.

3.2 Ecological Evaluation Criteria

Ecological evaluation was undertaken using a combination of evaluation criteria for both habitats and species although the general framework follows that provided by the Institute of Ecology and Environmental Management (IEEM 2006). Key categories are as follows:

- International value (internationally designated sites or sites supporting populations of internationally important species);
- National value (nationally designated sites (e.g. SSSI) or sites supporting viable populations of nationally important species);
- Regional value (sites exceeding county-level designations but not meeting SSSI criteria or supporting viable populations of species on the regional Biodiversity Action Plan, BAP);
- County value (county sites (e.g. Local Wildlife Site) and other sites which meet the published ecological selection criteria for county designation, a viable area of habitat identified on the county BAP);
- District value (sites/features that are scarce within the District and appreciably enrich the District's habitat resource);
- Parish value (areas of habitat considered to appreciably enrich the habitat resource within the context of a parish or neighbourhood);
- Sub-parish value (common, low grade habitats).

Additional criteria employed were from the following:

- Schedules and Annexes of UK and European wildlife legislation (e.g. Wildlife and Countryside Act (1981) (as amended) and The Conservation of Habitats and Species Regulations 2010 (as amended);
- International conventions on wildlife (e.g. Bern Convention, Bonn convention);
- Habitats and Species of Principal Biological Importance listed on Section 41 of the Natural Environment and Rural Communities Act (2006);
- UK Biodiversity Action Plan (UK BAP 2007);
- County Biodiversity Action Plan (Nottinghamshire BAG 1998);
- Taxa-specific conservation lists (e.g. RSPB Lists of species of conservation concern, RSPB 2009).

4. ECOLOGICAL BASELINE

4.1 Compartment A: Extended Phase-1 Habitat Survey

4.1.1 *Habitat Types*

The following Phase-1 habitat types were recorded (on and immediately adjacent to the site):

- Amenity grassland
- Introduced shrub
- Running water
- Scattered broadleaved tree
- Scattered scrub

Habitat and target notes descriptions are provided below. Nomenclature follows that of Stace (1997). In the text species are referred to using their English names, Appendix 2 provides a list of species including their scientific names.

4.1.2 *Habitat Descriptions*

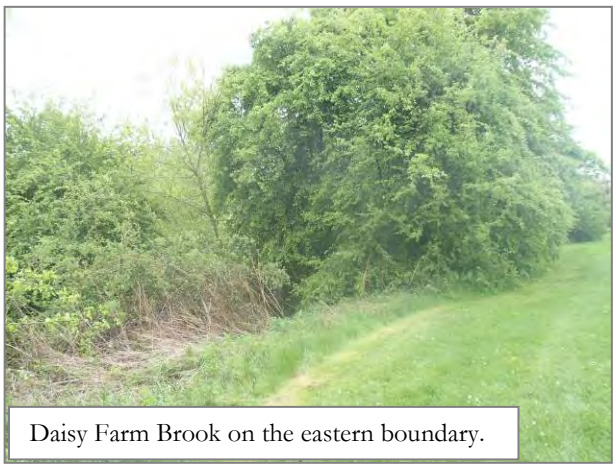
a) *General*

Compartment A covered an area of approximately 1.8ha. It comprised of amenity grassland with numerous planted trees, including an avenue of white willow. Daisy Farm Brook marked the eastern boundary. Residential properties bordered to the north and south and the northern end of Smithurst Road marked the western boundary.

Amenity grassland covered the majority of Compartment A.

Avenue of white willow trees.

Amenity grassland and scattered trees in the south-east section of the compartment



Daisy Farm Brook on the eastern boundary.

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b) *Amenity grassland*

The majority of Compartment A comprised of regularly managed amenity grassland. The majority of the grassland was closely mown and comprised a number of common grassland species typical of this habitat type, such as perennial rye-grass, annual meadow-grass, white clover, dandelion, creeping buttercup and common daisy. Other species, recorded less frequently included cock's-foot, Yorkshire-fog, common cat's-ear, greater plantain, ribwort plantain and broadleaved dock.

c) *Introduced shrub*

An introduced shrub border occurred on the south-east boundary at the Smithurst Road entrance. Further introduced shrubs occurred on the northern boundary, bordering residential properties. Species recorded included mahonia, cotoneaster, skimmia, cherry laurel and berberis.

d) *Running water*

Daisy Farm Brook ran along the eastern boundary of Compartment A. The brook was bordered by dense mature hawthorn, with occasional dog-rose and ash, which heavily shaded the water course. The banks were generally vegetated with species such as bramble, cow parsley, great willowherb, hogweed, garlic mustard, common nettle, broadleaved dock, cleavers and field forget-me-not. No aquatic or marginal vegetation was noted within the course of the brook in this section, other than very occasional pond sedge.

A small drainage ditch containing shallow running water occurred along the northern boundary of Compartment A. This was culverted in the north-east corner and emptied into Daisy Farm Brook.

e) *Scattered broadleaved tree*

Numerous broadleaved trees had been planted throughout Compartment A. Species included white willow, alder, silver birch, ash and occasional apple trees.

f) *Scattered scrub*

Scrub bordered Daisy Farm Brook, as detailed above. Further scattered hawthorn and elder occurred at the western end of Compartment C, close to Smithurst Road.

4.2 Compartment B: Extended Phase-1 Habitat Survey

4.2.1 *Habitat Types*

The following Phase-1 habitat types were recorded (on and immediately adjacent to the site):

- Amenity grassland
- Running water
- Open water
- Plantation broadleaved woodland
- Scattered broadleaved tree
- Scattered scrub
- Species-poor hedgerow
- Tall ruderal

4.2.2 *Habitat Descriptions*

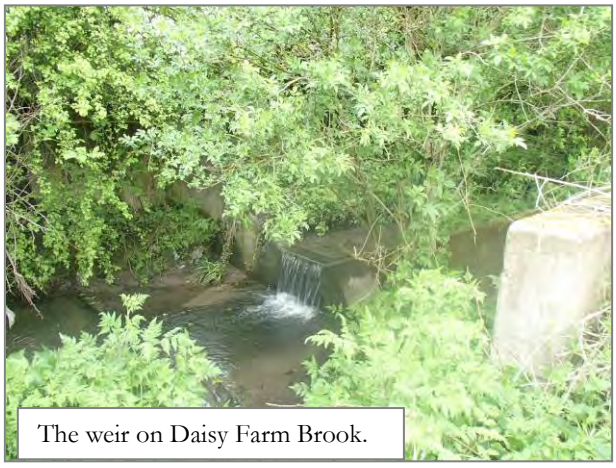
a) *General*

Compartment B covered approximately 1.2ha. It comprised of amenity grassland with two small areas of immature plantation woodland surrounded by species-poor hedgerows. A small pond also occurred in the south of the compartment. Daisy Farm Brook marked the western boundary and Smithurst Road occurred on the southern boundary. Residential properties bordered to the east and an area of rough grassland (proposed for residential development) occurred to the north.

Amenity grassland covered the majority of Compartment B.

The small pond in the south of Compartment B.

One of the immature plantations, surrounded by species-poor hedgerows.



The weir on Daisy Farm Brook.

b) *Amenity grassland*
The main habitat type within Compartment B was amenity grassland. The grassland was very well-managed and shortly mown. The habitat comprised of common grassland species, very similar to that described in Compartment A.

c) *Running water*
Daisy Farm Brook marked the western boundary of Compartment B. The brook was up to 4m wide and was bounded on both banks by heavy scrub, most frequently hawthorn and occasionally goat willow, dog-rose and ash. The substrate comprised generally of gravel with some larger rocks and a small weir was present. The brook flowed from a culvert at the northern of Compartment B.

d) *Open water*
A small shallow pond occurred in the south of Compartment B. The pond was surrounded by several mature crack willow trees, longer sward grassland and tall ruderal vegetation. The water was estimated to be up to 30cm deep and the substrate was generally silty. Dead wood was present within the pond. No aquatic plant species were noted, although wetland species including soft rush, meadow sweet and lesser celandine were noted around the margins.

e) *Plantation broadleaved woodland*
Two areas of broadleaved trees had recently been planted in this compartment. These small immature plantations were bordered by species-poor hedgerows (described below). A variety of tree species were recorded including field maple, silver birch, cherry species, hazel, hawthorn and hornbeam. The ground flora (likely to have derived from a seed mix) comprised red campion, cow parsley, garlic mustard, common nettle, cleavers, hedge woundwort, greater stitchwort, great willowherb, rosebay willowherb, common knapweed, meadow sweet and occasional hedge bedstraw.

f) *Scattered broadleaved tree*
No mature trees were present within Compartment B although a number of immature trees had been planted within the amenity grassland. Occasional semi-mature ash occurred along Daisy Farm Brook.

g) *Scattered scrub*
Scrub bordered Daisy Farm Brook as described above and several scattered hawthorn had been planted in the south of the compartment.

h) *Species-poor hedgerow*
The hedgerows bordering the plantations comprised of a number of species including hawthorn, dogwood, field maple, hazel and dog-rose.

i) *Tall ruderal*
Tall ruderal and wet grassland species were present around the pond, particularly on the eastern margins, including great willowherb, common nettle, cleavers, meadow sweet, white clover, hogweed, broadleaved dock, lesser celandine, meadow fox-tail and garlic mustard.

4.3 Compartment C: Extended Phase-1 Habitat Survey

4.3.1 *Habitat Types*

The following Phase-1 habitat types were recorded (on and immediately adjacent to the site):

- Amenity grassland
- Dense scrub
- Open water
- Poor semi-improved grassland
- Running water
- Scattered broadleaved tree
- Scattered scrub
- Tall ruderal

4.3.2 *Habitat Descriptions*

a) *General*

Compartment C covered approximately 1.6ha (the majority of this compartment is in private ownership). It comprised of a small amenity grassland area and a playground in the north (owned by Broxtowe Borough Council), with rough grassland, tall ruderal vegetation and scattered scrub forming a mosaic of habitats, further south (in other ownership). A small shallow area of standing water occurred within the rough grassland. The south of Compartment C, where it bordered the A610 comprised mainly of dense scrub with scattered broadleaved trees and tall ruderal vegetation. Daisy Farm Brook bordered the compartment to the west. Although all habitats within Compartment C are described below, only the upper section, in Council Ownership, is included within the Management Plan.

Playground and amenity grassland in the north of Compartment C, within Council ownership.

Tall ruderal, rough grassland and scattered scrub surrounding the area of standing water.

Footpath through the dense scrub in the south, alongside the A610.

b) *Amenity grassland*
A small area of closely mown amenity grassland and a children's playground occurred in the north of Compartment C.

c) *Dense scrub*
A relatively large area of dense scrub occurred in the south of the compartment, where it ran alongside the A610. The scrub in this area was dominated by hawthorn and bramble although goat willow, rowan and elder were also recorded regularly. A number of immature and semi-mature broadleaved trees were also present in this area and the dense scrub habitat was well on its way to developing into woodland.

d) *Open water*
A small shallow area of standing water was present within a wet area of the rough grassland. This was surrounded by goat willow saplings. Yellow iris, common reedmace and duckweed were present within the water and marginal plant species included meadow sweet, hard rush, tufted hair-grass and great willowherb.

e) *Poor semi-improved grassland*
Rough grassland occurred in the western and central sections of Compartment C. Frequently recorded species in this habitat included cock's-foot, Yorkshire-fog, false oat-grass, cow parsley, hogweed, creeping buttercup and great willowherb with localised hard rush and red fescue. The grassland comprised a high proportion of tall ruderal vegetation and scrub along with wetter areas, which formed an interesting habitat mosaic.

A small area of grassland also occurred within the dense scrub/tall ruderal habitat in the south-east of the site which comprised similar species; although red fescue, bush vetch and occasional great burnet were also recorded.

f) *Running water*
Daisy Farm Brook marked the western boundary of Compartment C. In the north of the compartment, the brook was relatively open with steep, overhanging banks. Towards the centre and south of the compartment, it was shaded by dense hawthorn. The brook flowed into a concrete culvert at the south of the site, which during very wet periods overflows into an adjoining ditch which, in turn, flows along the southern boundary (photographs overleaf).

a) Concrete culvert channelling Daisy Farm Brook beneath the A610.
b) Overflow ditch which runs along the southern boundary.

g) *Scattered broadleaved tree*
A number of semi-mature broadleaved trees occurred within the dense scrub area at the south of Compartment C. These included silver birch, sycamore, goat willow, crack willow and occasional apple trees.

h) *Scattered scrub*
Scattered scrub occurred within the grassland and tall ruderal habitats as well as along Daisy Farm Brook. The most frequently recorded species was hawthorn although elder, goat willow, bramble and honeysuckle were also present.

i) *Tall ruderal*
A large amount of tall ruderal vegetation occurred in the central section of the compartment. This comprised a high proportion of common nettle and great willow herb with creeping thistle, meadow sweet, white dead-nettle and cleavers.

4.4 Compartment D: Extended Phase-1 Habitat Survey

4.4.1 *Habitat Types*

The following Phase-1 habitat types were recorded (on and immediately adjacent to the site):

- Amenity grassland
- Plantation broadleaved woodland
- Poor semi-improved grassland
- Running water
- Scattered broadleaved tree
- Species-poor hedgerow

4.4.2 *Habitat Descriptions*

a) *General*

Compartment D covered an area of approximately 1.6ha. It comprised of four distinct areas including amenity grassland (with numerous planted trees), Daisy Farm Brook (on the eastern boundary), plantation broadleaved woodland and a small area of semi-improved grassland to the west.

Amenity grassland with planted trees

Semi-improved grassland at the west of Compartment B

Plantation woodland

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b) *Amenity grassland*
The main habitat type within Compartment C was shortly mown amenity grassland with numerous scattered trees.

c) *Plantation broadleaved woodland*
The plantation woodland within this area was relatively dense with a generally closed canopy, a well-developed understorey and an interesting ground flora. It comprised of generally semi-mature sycamore with occasional beech and hornbeam and an understorey of hawthorn and elder. The ground flora comprised a variety of species including lesser celandine, wood forget-me-not, cow parsley, hogweed, herb Robert, wood avens, lords and ladies, garlic mustard and very occasional bluebell. Past coppicing of hazel was apparent and some dead wood piles had been created.

d) *Poor semi-improved grassland*
A small gated field in the west of the compartment B comprised of semi-improved grassland. No access was available to this area to carry out a full survey although the grassland appeared to comprise of common grassland species with tall ruderal vegetation around the margins.

e) *Running water*
Daisy Farm Brook marked the eastern boundary of the compartment. The brook in this section was up to 1.5m wide with steep banks. It was shaded by hawthorn north of the footbridge and further to the south, the banks were dominated by garlic mustard. The water was rather cloudy and the substrate comprised of silt with occasional large stones. No aquatic or marginal plant species were recorded. A footbridge over the brook provided pedestrian access between Compartments C and D.

f) *Scattered broadleaved tree*
A number of trees had been planted within the amenity grassland. These included a number of native and non-native species including horse chestnut, field maple, alder, hornbeam, rowan, ash, holm oak and non-native poplars.

g) *Species-poor hedgerow*
A short length (approximately 8m) of species-poor hedgerow occurred along the boundary of the residential properties in the north-west of the compartment. Species included box, hawthorn, hazel, blackthorn and yew.

4.5 Compartment E: Extended Phase-1 Habitat Survey

4.5.1 *Habitat Types*

The following Phase-1 habitat type was recorded:

- Plantation broadleaved woodland

4.5.2 *Habitat Descriptions*

a) *General*

Compartment E is not within the ownership or control of Broxtowe Borough Council; although it is included within the Management Plan, the objectives are therefore reliant on the cooperation of the landowner.

The area covered approximately 1ha and consisted entirely of plantation woodland which comprised generally of immature 'leggy' trees and was relatively dense in most areas. Tree species included sycamore, alder, ash and occasional Scot's pine with an understorey of hawthorn, elder, rowan and bramble. The ground flora lacked species indicative of well-established woodland, although wood avens, hogweed and cleavers were recorded and creeping cinquefoil was frequent in more open areas, especially along the footpath on the southern boundary.

Compartment E comprised entirely of plantation broadleaved woodland.

5. EVALUATION

5.1 Habitats

The evaluation of the habitats within the site is based on the guidelines from CIEEM (IEEM 2006). As indicated the individual habitats within the site are considered to be of moderate 'Parish' value to low 'Sub-Parish' value.

As indicated, Smithurst Meadows LNR currently comprises of habitats of moderate ('District') to low ('Sub-Parish') value. No rare or notable habitats are present on site, although 'ponds' are listed on both Section 41 of the NERC Act 2006 and on the National BAP (UK BAP 2007) and 'rivers and streams' are listed as a broad habitat type on the National BAP.

Table 5.1: Summary of Ecological Evaluation of the Habitats on the Site

Habitat	Reason for Valuation
District Value	
Dense scrub	The dense scrub in the south of Compartment C (alongside the A610) comprises a number of semi-mature trees as well as small open grassy areas and tall ruderal vegetation. The habitat provides a high number of berry-producing scrub species which provide an abundance of food for over-wintering birds. It provides good cover and shelter for amphibians and small mammals and potential sett-building habitat for badger. The more mature trees in the area may provide bat roost opportunities and the scrub offers good foraging habitat for bats, particularly as it provides a linear habitat along the road embankment. It is a relatively uncommon habitat type within the area and the linear nature provides a connection to farmland further afield.
Plantation broadleaved woodland *(Compartments D and E)*	The plantation woodlands provide an important and scarce resource in a landscape which comprises of residential and industrial areas, with arable and grazing land further afield. A few small plantations occur to the south of the A610 although the habitat remains under-represented in the area. The woodlands provide habitat for a range of plants, birds and potentially badgers and other mammals. They also provide potential bat roost opportunities and the woodland edges provide excellent foraging and flightlines for bats.
Parish Value	
Plantation broadleaved woodland *(Compartment B)*	The two small woodlands in Compartment B are currently very immature comprising trees of only 2-3 years old. However, they have the potential to provide good nesting and foraging habitat for birds, in future years, as well as providing shelter for small mammals and common amphibians.
Ponds	The ponds, in Compartments B and C, currently hold only shallow water. The pond in Compartment C is of slightly higher ecological value, supporting native aquatic and marginal plant species and having the advantage of a relatively undisturbed location. Both are likely to provide some habitat for common amphibians and their value would increase following simple enhancement (see Section 6.2.5).
Poor semi-improved grassland / tall ruderal /	This mosaic of habitats provides good structural diversity potentially offering an important resource for fauna, including

Habitat	Reason for Valuation
scrub mosaic *(Compartment C)*	birds, small mammals, amphibians, reptiles and invertebrates. It provides shelter in the longer sward and good foraging opportunities.
Running water *(Daisy Farm Brook)*	Daisy Farm Brook, along with the bordering scrub on both banks, provides an ecological corridor along which plants and animals can disperse. It provides potential habitat for water vole (*Arvicola amphibius*) and white-clawed crayfish (*Austropotamobius pallipes*) as well as a dispersal route for grass snake (*Natrix natrix*). However, no evidence of water vole or white-clawed crayfish was found during a survey carried out in July 2015 (EMEC Ecology 2015).
Scattered broadleaved tree	The numerous broadleaved trees provide bird nesting habitat as well as possible potential for bat roosting.
Sub-Parish Value	
Amenity grassland	The amenity areas support a number of common grassland species but offered little potential for faunal species due to the regular maintenance.

5.2 Protected/notable Species[1]

5.2.1 *Floral Species*

None of the species recorded during the survey are specifically protected by the Wildlife and Countryside Act (WCA) 1981 (as amended) or considered rare nationally or locally (e.g. Preston *et al.* 2002). Also, none are listed as Priority Species on the national BAP (UK BAP 2007) or County BAP (Nottinghamshire BAG 1998).

5.2.2 *Faunal Species*

a) *Amphibians*

The ponds in Compartments B and C may provide some breeding habitat for common amphibians such as common toad (*Bufo bufo*), common frog (*Rana temporaria*) and smooth newt (*Lissotriton vulgaris*) although it is considered likely that, in its current condition, the pond in Compartment B will dry out over the summer, limiting its value. Both ponds support some emergent or marginal vegetation which would be suitable for newt egg-laying, potentially including great crested newt. The prescriptions recommended in Section 6.2.5 will enhance the ponds for amphibians.

b) *Badger*

Although no badger setts were recorded within the habitats on site, the woodlands in Compartments D and E as well as the dense scrub habitat along the A610 in the south of Compartment C, all provided potential sett-building habitat. The rough grassland and tall ruderal vegetation in Compartment C also provided potential foraging habitat. It is likely that badgers are active in the area which may commute into the site from farmland further afield, along habitat corridors on the embankments of the A610.

c) *Bats*

Many of the more mature trees within the site, particularly in the south along the A610, are likely to provide features with the potential to support roosting bats. Furthermore, it is likely that some of the residential properties within the vicinity would support bat roosts.

[1] Protected species legislation is provided in Appendix 4.

The habitats within the site, particularly the linear features such as the avenue of white willow in Compartment A, the dense scrub along the A610 and Daisy Farm Brook with its bordering scrub, provide good foraging habitat and flightlines for bats.

Recommendations for enhancing the site for bats are provided in Section 6.2.4.

d) *Nesting Birds*

Habitats within Smithurst Meadows LNR, particularly the woodland, dense scrub and scattered trees, provide good potential for nesting as well as foraging birds, throughout the year. The site will be enhanced further by introducing nest boxes, as recommended in Section 6.2.4.

e) *Reptiles*

Potential habitat for reptiles, particularly grass snake, is provided within the grassland / tall ruderal/scrub habitat mosaic along with the wetter areas in Compartment C. Further potential is offered in the dense scrub area in the south of the compartment which comprises some small open grassy areas for basking. Daisy Farm Brook provides a potential commuting and dispersal route for grass snake.

f) *Water Vole & White-clawed Crayfish*

No evidence of water voles was found during a recent survey of the water course (EMEC Ecology 2015). The survey found that Daisy Farm Brook currently offers limited potential for the species due to insufficient food source, bankside cover and low water levels. Currently, dense shading by bankside hawthorn is considered to be limiting marginal vegetation growth and macrophytes (submerged pondweeds etc.) and consequently will be limiting water quality and invertebrate diversity. There is also likely to be significant leaf litter load in the autumn and winter. The recommendations for management of the hawthorn scrub alongside the brook are included in Section 6.3.2.

The brook comprised a gravelly substrate with many larger stones and some tree roots, which would provide potential refuges for crayfish (EMEC Ecology 2015). However, the water was generally very shallow and slow flowing with no riffles or faster flowing areas which would create well-oxygenated areas. Although two concrete weirs were present in the northern section, no water was currently flowing over them and the pools created on the downstream side of the weirs comprised generally of still water with a soft mud substrate, offering little in the way of refuge. The section of Daisy Farm Brook which flows through Smithurst Meadows was therefore considered to be currently sub-optimal for white-clawed crayfish.

6. MANAGEMENT OPERATIONS

6.1 Vision Statement

The vision for the site involves the enhancement of the habitats already present at Smithurst Meadows LNR, as well as the creation of additional habitats (i.e. wildflower meadows) to encourage wildlife, whilst maintaining open amenity areas for public recreation.

Wildflower meadow areas will bloom from early spring (through the planting of bulbs) until late summer (through the sowing of a long season native seed mix) and will provide habitat for an abundance of pollinating insects, birds and small mammals. Ponds will be enhanced to provide breeding habitat for amphibians as well as supporting native wetland plants and insects such as dragonflies and damselflies. Sensitive woodland management will enable the woodlands to continue to mature, comprising shaded areas as well as open glades. They will provide a haven for native woodland flora and a variety of trees and shrubs, supporting an abundance of fauna, including breeding birds in the spring and summer and feeding flocks of over-wintering birds through the cooler months.

There are currently proposals for housing to the north of Compartment B and this includes a balancing lagoon which would be located within the LNR. This proposal is subject to council approval; however, if the lagoon was sensitively designed and managed, it could create an interesting wetland feature for the site (see Section 6.3.5).

Although every effort should be made to implement the objectives within the management plan, this will be governed by certain constraining factors including resource availability. Not all areas described in the Ecological Baseline (Section 4) are included within the Management Plan as some sections are outside the ownership and control of Broxtowe Borough Council.

6.2 Management Objectives

Management objectives are listed below. The rationale for the objectives and management operations is given in Section 6.2 and a Plan of Works is given in Section 6.3.

1. **Woodlands:** Enhance the woodland areas to encourage the healthy growth of trees and create a mosaic of woodland habitats.

2. **Hedgerows**: Enhance the habitats bordering Daisy Farm Brook through trimming and laying of hawthorn.

3. **Grassland:** Create species-rich meadows within the amenity grassland areas and increase botanical diversity further through the planting of bulbs. Maintain the rough grassland/tall ruderal/ scrub mosaic and manage sensitively to increase its potential for wildlife.

4. **Supplementary habitat for faunal species:** Install bird nest boxes and bat roost boxes to increase the value of the site for faunal species.

5. **Ponds:** Enhance the existing pond by re-profiling and planting of native aquatic and marginal species. Potentially create further diverse wetland features. Manage sensitively for amphibians.

6. **Local community and visitors:** Ensure access points and paths are maintained. Ensure the site is secure from off-road motorcycles and the site free of litter and vandalism, where possible. Explore opportunities to provide interpretation.

7. **Monitoring:** Monitor the effects of management on flora and fauna.

6.3 Management Rationale

6.3.1 Objective 1: Woodlands

- Rationale

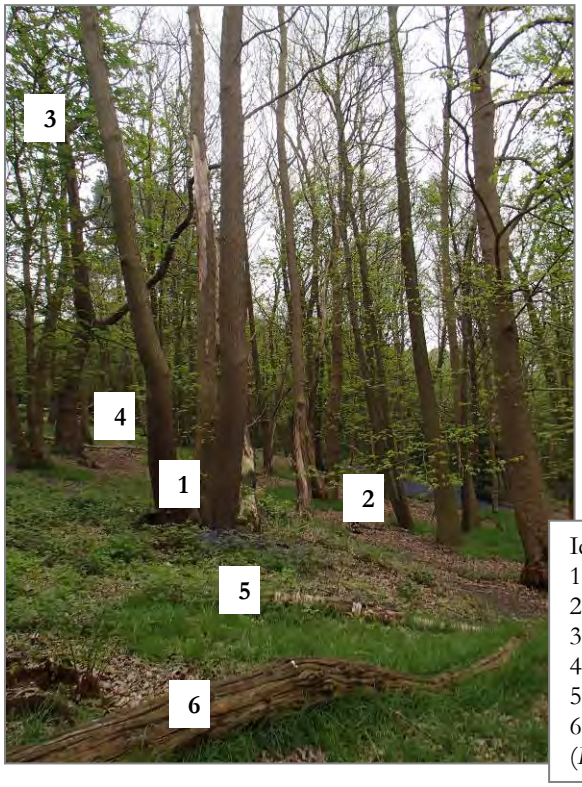
Enhance the woodland areas to encourage the healthy growth of trees and create a mosaic of woodland habitats.

Plantation Broadleaved Woodlands (Compartments D and E)

Compartment E is not within the ownership or control of Broxtowe Borough Council and although it is included within the Management Plan, the objectives are reliant on the cooperation of the landowner.

Plantation woodland occurs in Compartments D and E, which comprises a number of tree species (see Section 4.4 and 4.5). The trees within the woodlands are generally immature to semi-mature, although a few more mature specimens occur in Compartment D. Compartment E, in particular, is currently rather dense and requires thinning as a priority in order to encourage the broadening spread of tree crowns and preventing further 'leggy' and spindly growth form. Recommendations for thinning are given below.

The aim of woodland management should be to create a diversity of structures and different ages of trees. Generally, woodlands which are structurally diverse and support a wide range of micro-habitats tend to sustain more biodiversity. The woodlands, as they continue to mature, should support a variety of tree species of different ages, along with damp, closed canopy areas, sunny, sheltered glades, and a well-developed understorey of shrubs and saplings. Standing deadwood and deadwood habitat piles are also important components of a healthy woodland.



Ideal woodland structure:
1. Maturing trees;
2. Immature trees;
3. Woodland canopy;
4. Shrub layer;
5. Woodland ground flora (thriving in open, sunny areas);
6. Rotting and dead wood.
(*Photograph taken in maturing woodland off-site*).

The plantations already provide a resource for a variety fauna, such as birds, invertebrates and potential bats and badgers. However, further resources will become available as the habitat matures and further enhancement of the woodland will make it more attractive to a wider range of birds, small mammals and other faunal species.

Thinning
Thinning should remove 10-15% of stock and be aimed at removing less healthy or less desirable trees (i.e. non-natives, such as sycamore). Consultation with a qualified arboriculturist to determine which trees are the most suitable for removal is recommended. Lack of thinning, will promote a tall, densely canopied woodland which would reduce the diversity of the understorey and ground flora, or prevent woodland ground flora from developing.

The thinning operation should be repeated every 3 – 5 years. As the trees become larger and begin to reach maturity this should be reduced to around every 8 years. As the woodlands mature, consideration should also be given to creating small 'glades' or 'clearings' within the woodlands, where appropriate. Woodland edges should always remain intact.

Internal rides, glades and other open spaces are important structural elements within woodland, providing valuable habitat for a wide range of wildlife, much of which differs from the internal woodland areas. A diverse range of sun-loving plants and insects benefit from these sunny open areas and, in contrast, other insects, plants, birds and mammals benefit from the woodland edge, which is essentially the interface between the woodland and open ground. The woodland already comprises two rides (footpaths) but a small glade could be considered in the future. An ideal location and sizes of glades could be considered during the recommended walk-over surveys in year 3 of the management plan (see Objective 7; Section 6.2.7), when the woodlands have been thinned and had time to mature further.

Habitat piles of logs and/or brash should be created through the thinning process. Sometimes in management of woodlands there is the over emphasis to 'tidy' the woodland; however piles of deadwood would create further habitat for invertebrates and refuge for common amphibians and potentially reptile species. These should be located close to the edge of the woodland.

Any works which involve tree or shrub removal should be timed to avoid the bird breeding season (March to September inclusive).

Woodland Ground Flora
The ground flora already comprises a number of interesting woodland plant species, including small amounts of native bluebell, and it is therefore not considered necessary to introduce further species at this stage.

<u>Small Plantations in Compartment B</u>

The small, immature plantations within Compartment B contribute to habitat diversity within the site and will continue to increase in value as they mature. They will provide bird nesting and foraging habitat as well as foraging potential for bats and a resource for invertebrates.

As are currently immature, with trees up to a maximum of 3m tall, 'passive' enhancement, i.e. allowing the trees to grow, is all that is necessary in the short-term. In future, however it is likely that thinning will be required in order to encourage the broadening spread of tree crowns and prevent 'leggy' or spindly growth form. This should be assessed in Year 3 of the management plan.

6.3.2 Objective 2: Hedgerows

- Rationale

Enhance the habitats bordering Daisy Farm Brook through trimming and laying of hawthorn.

Management of the hawthorn trees either side of Daisy Farm Brook should be carried out in order to reduce shading of the watercourse and its banks and encourage the growth of marginal vegetation. Creating hedgerows, a habitat lacking within Smithurst Meadows LNR, will help to protect the water course from disturbance and would also provide enhanced nesting opportunities for birds and will continue to provide a flightline and foraging habitat for bats.

Ideally, the hawthorn should be trimmed and laid, where possible, to create hedgerows. However, it is possible that the trees will be too mature or unsuitable to effectively carry out this procedure. The trees would therefore require assessment by a trained arboriculturist or contractor. Laying promotes a healthy, thick and bushy hedgerow and involves partially cutting the stems of hedgerow shrubs and bending them over at an angle. Laying a vigorous tree or shrub in such a way will stimulate new vertical growth from beneath the cut, helping to fill in gaps at the base of the hedge.

However, if the hawthorn is considered to be unsuitable for laying, then coppicing (cutting stems close to ground level) could be carried out. Both coppicing and laying should be carried out rotationally rather than managing large sections in one year. Coppicing in particular will result in the loss of the barrier for a few years, until the new growth reaches a decent height.

Few standard trees are currently present along the banks of the brook, other than occasional semi-mature ash. The growth of occasional self-seeded saplings should be encouraged and it may be useful to tag saplings earmarked as potential standard trees so that machinery does not damage them during trimming.

As the hedgerows mature, trimming should be carried out as necessary, to help develop and maintain a thick, bushy structure. Hedgerows should be trimmed in January or February (to avoid the bird breeding season and to allow the berry crop to be utilised by wintering birds. Trimming should be carried out on a 2 – 3 year rotation and trimming of all hedgerows in the same year should be avoided. Flail mowing or circular saws can be used for trimming: a flail for stems of less than 1.5 cm in diameter, and a circular saw for stem thickness greater than this.

Trimming is likely to keep hedgerows in good condition for many years. However, occasional restoration work will be necessary to prevent hedgerows becoming 'gappy' (as branches low down on the main stems gradually die off) or developing into a line of trees.

6.3.3 Objective 3: Grassland

Create species-rich meadows within the amenity grassland areas and increase botanical diversity further the planting of bulbs.

Maintain the rough grassland/tall ruderal/scrub mosaic and manage sensitively to increase its potential for wildlife.

Rationale

Amenity Grassland
Large areas of amenity grassland are present throughout Smithurst Meadows LNR. It is recommended that some of these areas are enhanced through the introduction of wildflower seed and bulbs. This will provide greatly enhanced habitat in terms of floral diversity and sward structure and resources for pollinating insects, which will in turn encourage additional fauna such as birds.

Recommended areas for wildflower seeding and bulb planting are illustrated on Figure 3 in Appendix 1. Suitable species for planting and sowing are provided in Appendix 3.

Initially, in the recommended wildflower areas, a fine but firm seedbed should be prepared by digging or rotovating and then raking over. The soil should then be allowed to settle for four to six weeks prior to sowing the seed. This will allow any vigorous weed species, such as nettle, to germinate, which can then be hoed out.

The seed should be sown by hand preferably in early autumn, or spring. Seed should be sown at a rate of $5g/m^2$. Following seed distribution, very light raking will ensure good seed to soil contact and the area should be watered in.

Careful management is required during the first growing season to control competition from undesirable species and to encourage establishment of the sown sward. To encourage perennial flowers and grasses to make good root development, it is important to mow the meadow areas regularly in the first year after sowing. Cut to a height of 5cm every two months or when the sward reaches 15cm. Stop cutting between June and August to allow flowers to set seed, then cut for a final time in late September. Remove all clippings.

Following establishment, the wildflower grassland areas should be mown once annually in late August or early September, after flowering has finished, preferably with a scalloped edge. It is extremely important that the clippings are removed following cutting, to prevent nutrient enrichment of the grassland habitat. However, it is a good idea to leave the clippings in situ for a few days to allow seed to drop to the ground prior to removal. The wildflower grassland areas should not receive any fertilizer.

Semi-Improved Grassland
The small grassland area at the western end of Compartment D was not accessed, however, it was noted to be dominated by common grasses and herbs. It is recommended that this is mown twice annually, once in spring to control species such as thistle and dock which may have taken hold over the winter, and again in September when plants have finished flowering and dropped their seed. If possible, 3m margins should be retained around the field edges which should be mown on rotation, i.e. two

margins mown once annually. This will create a variety of sward heights and a resource for birds and insects.

Bulbs

It is recommended that native bulb planting is also carried out in shady areas, for example beneath the trees (where possible) and around the site boundaries, which will provide an early spring bloom. Species to consider include native daffodil (*Narcissus pseudonarcissus*), snowdrop (*Galanthus nivalis*), native bluebell (*Hyacinthoides non-scriptus*), winter aconite (*Eranthis hyemalis*) and wild garlic (*Allium ursinum*). Bulbs should also be planted in early autumn so that they have time to develop roots before the winter.

6.3.4 Objective 4: Supplementary habitat for faunal species

Install bird nest boxes and bat roost boxes to increase the value of the site for faunal species.

Rationale

To further enhance Smithurst Meadows LNR for faunal species, supplementary habitat should be offered including bird nest boxes and bat roost boxes. Examples of suitable boxes are illustrated overleaf. It is recommended that a variety of designs are utilised in order to attract a greater diversity of species.

Invertebrate boxes should also be considered although if the recommendations given in the management plan are followed, such as creating wildflower areas, retaining rough grassland and scrub and enhancing the ponds, these will provide good habitat for a variety of arthropods.

Bats
Ten to twelve semi-mature trees should be identified which would be suitable to support bat roost boxes. The boxes should be sited ideally over 3m high, with **three boxes per tree**, in order to ensure that the boxes have different aspects, and with a clear flight path to the box. Bat boxes suitable for a number of species can be bought online or hand-made.

Suggested locations for bat boxes include the white willow trees in Compartment A (3x); the crack willows around the pond in Compartment B (1x); four of the more mature trees in the dense scrub area in the south of Compartment C (4x); and trees within the woodland edge in Compartment D (3x).

Birds
It is also recommended that 20 bird nest boxes be installed on trees within the site (in similar areas to those recommended for bat boxes). Ideally, the entrance holes into bird nest boxes should be reinforced with steel plating to prevent access to squirrels, magpies and other predators who may try to gnaw or peck their way in (see image below).

Invertebrates
Insect boxes should ideally be situated within warm, sheltered habitats. Those shown overleaf are suitable for range of invertebrates including butterflies, ladybirds, lacewings and solitary bees.

2F Schwegler Bat Box
General purpose bat box ideal for smaller bats. It can be sited in trees or on buildings and is best positioned at a height of 3-6m. Bat boxes should ideally be sited in open sunny positions and in groups of 3 to 5 boxes facing different directions to provide a variety of micro-habitats.

1FF Schwegler bat box
This box is spacious enough for bats to use as a summer roost or nursery site. It is a good box for erecting high up in trees as it requires little maintenance.

Starling nest box
Also suitable for woodpeckers. Can be fixed to a wall, fence, tree or building in a position which is not exposed to full sun or prevailing wind/rain. Site approximately 3-4m above ground level where there is easy flight access and where it cannot be reached by cats or other potential predators.

Open-fronted box
Suitable for robins. Site approximately 2-4m above ground on a wall or tree trunk. If possible, place it in a creeping plant (such as ivy or rose) with an open outlook.

Treecreeper box
Treecreepers like to nest in narrow gaps or clefts such as behind the bark in mature trees. This box provides a suitable artificial alternative.

Blackbird box
Designed for blackbirds, but may be used by robins and wrens. Site in a sheltered, shaded spot at least 2m above ground. Fix to a tree or wall.

From left to right: insect tower, bee and bug biome, solitary beehive, pollinating bee log.




All designs are available from NHBS (www.nhbs.com)

6.3.5 Objective 5: Ponds

Enhance the existing ponds by re-profiling and planting of native aquatic and marginal species.
Potentially create further diverse wetland features.
Manage sensitively for amphibians.

Rationale

Existing Pond
It is recommended that the pond within Compartments B be re-profiled to enable it to hold water throughout most of the summer and to prevent it from drying out permanently over the coming years. This could be done through the use of a mini-digger which would cause no permanent damage to the surrounding grassland. It is normally advisable to de-silt half of a pond one year and complete the task the following year as this assists natural re-colonization by existing pond flora and fauna.

Ideally, for amphibians, the pond should have gently sloping sides with plenty of vegetation with a deeper section in the centre, at least 60cm.

Depending on the rate of colonisation by wetland plant species, it is likely that a small amount of additional planting would further enhance the habitat. Only native wetland plants of local provenance should be used; a suitable list of species is provided in Appendix 5.

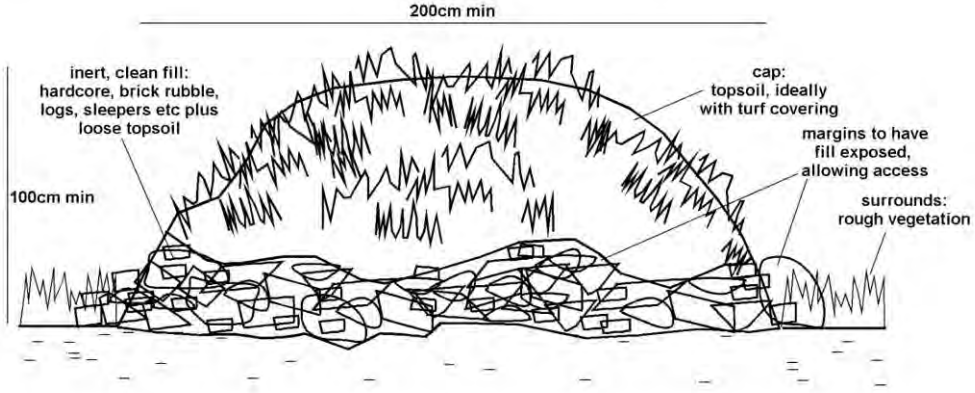
The list provides a selection of plants suitable for each of the following zones:
1. Totally submerged (in deeper water) - oxygenating plants;
2. Submerged but with floating leaves (also in deep water) - oxygenating plants;
3. Emergent (in shallower area);
4. Marginal (growing in the pond edge).

As the pond is small, the vegetation should be closely monitored and should be maintained by keeping a balance between vegetation and open water areas. It is recommended that marginal vegetation should be maintained at below 50% of the total pond cover, to ensure areas where submerged plants can thrive and open water areas are retained. Surplus plants should be removed and allowed to remain at the pond's edge to dry, to allow pond invertebrates and juvenile amphibians to crawl back into the water, before being disposed of.

Shading from surrounding trees is currently not a problem with a good ratio of shade and open sunny areas. This should be monitored and maintained however. Surrounding trees and scrub should be managed in order to allow light to penetrate the surface of the pond and to reduce the amount of leaf litter which may cause enrichment of the water. Shading should not be eliminated altogether however, as too much light would encourage the growth of algae.

The enhancement of the pond would greatly benefit amphibians. We would also recommend that an artificial hibernaculum (rubble, logs and loose soil partly buried) is created close to the pond. The suggested hibernaculum design, taken from the great crested newt mitigation guidelines (English Nature 2001), is shown overleaf.

Figure 3: Suggested hibernaculum design
This design mimics artificial and natural conditions in which great crested newts have frequently been found over-wintering. Dimensions should not be below 2m length x 1m width x 1m height. The illustrated design would be suitable for locating on an impermeable substrate. On free-draining substrates, the design is largely similar but the bulk of the fill is sited in an excavated depression in the ground. Hibernacula should ideally be positioned across a site, both close to and distant from breeding ponds, always in suitable terrestrial habitat and above the flood-line.



The photographs below show a hibernaculum that EMEC Ecology recently constructed for a project in Leicestershire. The photograph on the left shows the pile of bricks and logs which were placed into a shallow hollow in the ground. The photograph on the right shows the hibernaculum after it was covered with soil. Ideally, a layer of carpet (or similar) is placed between the refuges and the soil to ensure gaps between refuges are maintained.

Potential Balancing Lagoon
The balancing lagoon proposed as part of the potential housing development to the north will be located within the north of Compartment B. Recommendations are included below to maximise the wildlife benefits of the scheme should permission be granted.

The SuDS pond is expected to be dry for most of the time but will be occasionally be inundated. To encourage high species diversity in SuDS schemes, ponds should ideally be designed with:

- separate permanent, semi-permanent and seasonal water bodies;
- gentle sloping sides that cover a large area;
- hummocky, undulating margins.

The addition of small scale topographic features will increase the habitat value, for example, re-profiling of pond margins to increase the extent of seasonal drawdown zones.

The banks of the pond and the margins of the drawdown zone should be planted with a seed mix tolerant of occasional flooding, such as Naturescape's N8; Waters Edge Meadow Mix. The species in this mix will all tolerate flooding once established, and many would grow in the pond itself. Care must be taken to ensure sowings are given as much time as possible before flooding of the area occurs.

If permanent areas of standing water are to be present, then these should be planted with native wetland plants to provide potential habitat for a variety of invertebrates and birds, as well as potential breeding habitat for amphibians.

Trees, such as willow (*Salix* sp.) and alder (*Alnus glutinosa*) should be planted around the banks of the pond in order to provide some shading.

As recommended above, the lagoon should be maintained by keeping a balance between vegetation and open water areas, i.e. marginal vegetation should be maintained at below 50% of the total pond cover. As also recommended above, the lagoon should have gently sloping sides with plenty of vegetation with a deeper section in the centre, at least 60cm, to maximise its value for amphibians, and hibernacula bunds should be created.

6.3.6 Objective 6: Local Community and Visitors

Ensure the site is secure from off-road motorcycles and the site free of litter and vandalism, where possible.
Ensure access points and paths are maintained.
Ensure provision is made for interpretation.

Rationale

The site should be made secure from off-road motorcycles where possible. The entrances to Compartments D and E from Halls Lane and Ludlam Avenue are currently easily accessible by motorcyclists. This is a public bridleway so should retain access for horses. A 'horse stile' or a specially designed 'equestrian gate could be considered if off-road motorcycles continue to be a problem (shown below).

All paths should be well maintained in order to encourage users to keep to footpaths. The grass either side of the footpaths should be mown regularly (1m either side).

Since the site is situated within a sub-urban area it is likely to be prone to littering, potentially the dumping of waste (particularly garden cuttings) and also vandalism. These activities reduce the sites intrinsic appeal and amenity value and could also have a negative impact on the sites ecological value, for example, the introduction of non-native plant species from garden waste. These potential problems can be reduced by the regular provision of litter picking on the site and consultation being carried out with local residents about the management work being carried out to promote biodiversity.

Litter and dog waste bins currently installed along the walkways should be maintained.

There is scope for making visitors more aware of the importance of the site for nature conservation, thereby enhancing their experience of it. It is recommended that interpretation boards are installed in order to make the public aware of the management being carried out to enhance the wildlife interest of the site. It is recommended that these are installed at key points, such as close to footpaths but near to specific wildlife areas such as wildflower meadow areas and woodland edges, to inform the public about the significance of the habitats for flora and fauna and the importance of keeping to marked footpaths in that area. The signs should be of sturdy construction and be of a height visible to children and disabled people. It is advised that the signs also provide contact names and numbers for the public to raise any concerns.

6.3.7 Objective 7: Monitoring

Monitor the effects of management on flora and fauna.

Rationale

Ecological monitoring is essential to assess the effects of management and inform future changes in management. Ideally we recommend that walk-over surveys be undertaken in years 3 and 5 of the plan, so that the effects of management can be assessed and amended as appropriate.

It is also recommended that surveys for the following groups are carried out to inform future management recommendations:

Walk-over and Botanical Surveys
Walk-over surveys, which should include botanical surveys, should be carried out in years 3 and 5 to ensure that the wildflower meadow areas to be created are undergoing the correct management to maximise floristic diversity. The woodland will also be assessed to ensure that management is having the desired affect and potential locations for a woodland glade could be considered.

Bats
It is recommended that bat boxes are checked once a year by a licenced ecologist or by the local (Nottinghamshire) Bat Group. Bat transect surveys would be beneficial in future years, in order to monitor the effect of management on bat use of the site and to further inform ideal locations of bat boxes.

Birds
Surveys during the bird breeding season could assess the use of nest boxes as well as general use of the site by birds.

Amphibians
Full surveys for great crested newts involve a standard methodology of torch surveying, bottle trapping and egg searching over a minimum of four visits. However, simple torch surveys of the ponds would determine presence or absence of amphibians (but will not give definitive numbers present). These should ideally be carried out in year 2 of the plan, following enhancement of the two ponds.

6.4 Management Operations: Plan of Work

The following is an ideal plan of work. Although every effort should be made to implement the actions listed, this will be governed by certain constraining factors including resource availability.

6.4.1 Objective 1: Woodlands

Enhance the woodland areas to encourage the healthy growth of trees and create a mosaic of woodland habitats.

Obj.	Action	Year 1	Year 2	Year 3	Year 4	Year 5
1/1	**Woodlands in Compartments D (and E)**: Selective thinning should be carried out in areas where the canopy is particularly dense. This should be aimed at removing 10-15% of trees (focusing on less desirable species such as sycamore and non-native cherry) or sufficient to allow more mature specimens to thrive. Woodland edges should be maintained more or less intact. (*Compartment E is outside Council ownership*).	◆ winter			◆ winter	
1/2	Any trees to be felled either to facilitate the thinning, or trees that are dying or falling, must be carried out under advice trained arboriculturist.	As necessary				
1/3	All works to the woodlands should be carried out outside the breeding bird season.	◆ October to February (inclusive)				
1/4	Deadwood removed during any work operations should be kept in habitat piles to enhance invertebrate interest and provide shelter for other faunal species. All timber not required for making log piles should be removed off site.			◆		
1/6	Monitor all woodlands for continued healthy growth of trees and development of woodland ground flora (including new plantations in Compartment B).		◆	◆	◆	◆

6.4.2 Objective 2: Hedgerows

Enhance the habitats bordering Daisy Farm Brook through trimming and laying of hawthorn.

Obj.	Action	Year 1	Year 2	Year 3	Year 4	Year 5
2/1	Create hedgerows along Daisy Farm Brook through laying or coppicing of hawthorn.	◆ Oct - Feb	◆ Oct - Feb	◆ Oct - Feb	◆ Oct - Feb	◆ Oct - Feb
2/2	Laid / coppiced hedgerows should be monitored and trimmed as necessary. Trim hedgerows using a flail or circular saw, on a rotational basis (not all hedgerows in same year). Saplings earmarked as standard trees should be considered during the trimming process.		◆ Jan/Feb (if necessary)	◆ Jan/Feb (if necessary)	◆ Jan/Feb	◆ Jan/Feb
2/3	Replanting or coppicing to fill gaps in mature hedgerows, where necessary.	As necessary				

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6.4.3 Objective 3: Grassland

Create species-rich meadows within the amenity grassland areas and increase botanical diversity further the planting of bulbs.

Maintain the rough grassland/tall ruderal/ scrub mosaic and manage sensitively to increase its potential for wildlife.

Obj.	Action	Year 1	Year 2	Year 3	Year 4	Year 5
3/1	Sowing of grassland/wildflower seed mixes in recommended areas. Careful management required in the first year (refer to Section 6.2.3).	◆ Early autumn				
3/2	Cutting of species-rich meadow areas; to be carried once per year in late August early September. Meadow areas should be mown with a scalloped edge.		◆ Late August/ early Sept	◆ Late August/ early Sept	◆ Late August/ early Sept	◆ Late August/ early Sept
3/3	The small grassland field to the west of Compartment D should be cut twice annually as recommended in Section 6.2.3. 3m margins should be retained around the field edges and mown once annually on rotation.	◆ Sept	◆ April and Sept	◆ April and Sept	◆ April and Sept	◆ April and Sept
3/4	Bulb planting in shady areas.	◆ Early autumn				

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6.4.4 Objective 4: Supplementary habitat for faunal species

Install bird nest boxes and bat roost boxes to increase the value of the site for faunal species.

Obj.	Action	Year 1	Year 2	Year 3	Year 4	Year 5
4/1	Install bat, bird and insect boxes as specified in Section 6.2.4.	◆	◆			

6.4.5 Objective 5: Ponds

Enhance the existing ponds by re-profiling and planting of native aquatic and marginal species. Manage sensitively for amphibians.

Obj.	Action	Year 1	Year 2	Year 3	Year 4	Year 5
5/1	Re-profile ponds in Compartments B and C. Ideally with gently sloping sides and at least 60cm deep in the centre. De-silt half of each pond in the first year and the other half in the following year.		◆ Winter	◆ Winter		
5/2	Possible planting of wetland plant species in the pond in Compartment B, in all zones, as specified in Section 6.2.5.			◆		
5/3	The ponds should be maintained by keeping a balance between vegetation and open water areas; maintain at below 50% of the total pond cover, to ensure areas where submerged plants can thrive and open water areas are retained. Surplus plants should be removed and allowed to remain at the pond edge to dry, to allow pond invertebrates to crawl back into the water.		◆ If necessary	◆ If necessary	◆ If necessary	◆ If necessary
5/4	Installation of hibernacula, as illustrated in Section 6.2.5.		◆			

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6.4.6 Objective 6: Local Community and Visitors

Ensure the site is secure from off-road motorcycles and the site free of litter and vandalism, where possible.
Ensure access points and paths are maintained.
Ensure provision is made for interpretation.

Obj.	Action	Year 1	Year 2	Year 3	Year 4	Year 5
6/1	Ensure site is secure from off-road motorcycles if they continue to be a problem. A horse stile or an equestrian gate could be considered.	◆	◆	◆	◆	◆
6/2	Footpaths should be monitored each year and maintenance works carried out as necessary to keep them in good condition. The grass 1m either side of the footpaths should be mown regularly.	◆	◆	◆	◆	◆
6/3	Empty and maintain litter bins and dog waste bins. Carry out litter collection (including any garden waste) on a regular basis.	◆	◆	◆	◆	◆
6/4	Consider installing interpretation boards to inform the public of the nature conservation value of the site and of management being undertaken to enhance this.		◆	◆		

6.4.7 Objective 7: Monitoring

Monitor the effects of management on flora and fauna.

Obj.	Action	Year 1	Year 2	Year 3	Year 4	Year 5
7/1	Walk-over and botanical surveys to monitor wildflower meadow areas and woodland management.			◆		◆
7/2	It is recommended that bat boxes are checked once a year by a licenced ecologist or by the local (Nottinghamshire) Bat Group.		◆	◆	◆	◆
7/3	Surveys during the bird breeding season could assess the use of nest boxes installed in the woodland edges as well as general use of the site by birds.		◆		◆	
7/4	Torch surveys of the enhanced ponds to determine presence or absence of amphibians.		◆		◆	

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APPENDIX 1: FIGURES

Figure 1: Site Location Plan (approximate compartment boundaries shown in red)

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Figure 2a: Compartment A

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Figure 2b: Compartment B

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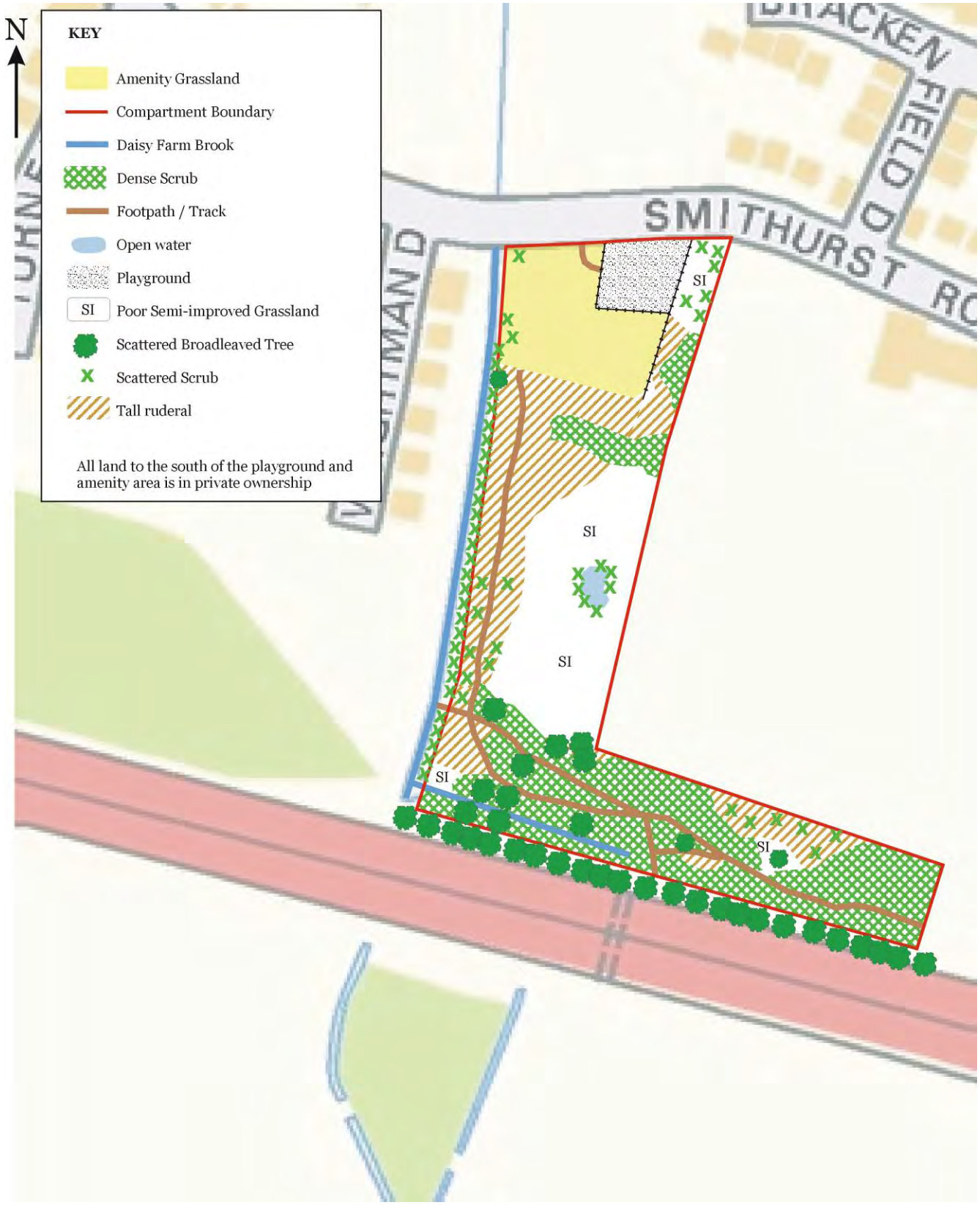
Figure 2c: Compartment C



Prepared by EMEC Ecology
Tel: 0115 964 4828

Figure 2d: Compartments D and E

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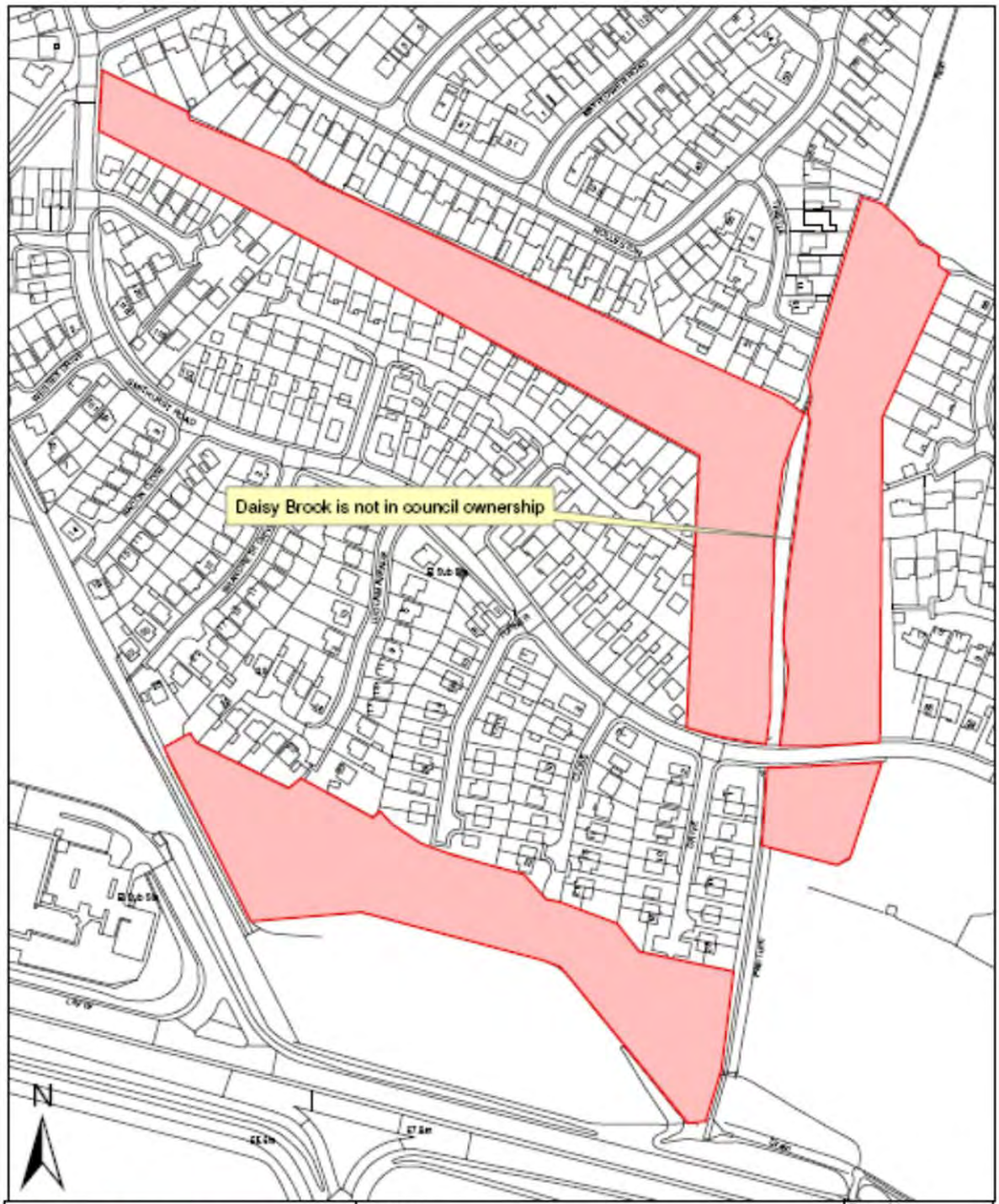
Tel: 0115 964 4828

Figure 3: Recommended Planting and Sowing

Prepared by EMEC Ecology
Tel: 0115 964 4828

Figure 4: Extent of Broxtowe Borough Council Site Ownership



Broxtowe Borough Council

Positive People - Positive Leadership - Positive Partnerships

Directorate of Environment
Council Offices, Foster Avenue,
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Project	Appendix 6 Smithurst Meadows	Dwg No. ENV/SM/06
Title	Extent of Broxtowe Councils Site Ownership (4.6 ha)	Drawn by WJA
Scale 1:2,500		Date Aug 09

APPENDIX 2: BOTANICAL SPECIES LIST

English Name	Scientific Name
Annual meadow-grass	*Poa annua*
Alder	*Alnus glutinosa*
Apple species	*Malus* sp.
Ash	*Fraxinus excelsior*
Berberis	*Berberis sp.*
Blackthorn	*Prunus spinosa*
Bluebell	*Hyacinthoides non-scripta*
Box	*Buxus sempervirens*
Bramble	*Rubus fruticosus* agg.
Broadleaved dock	*Rumex obtusifolius*
Bush vetch	*Vicia sepium*
Cherry laurel	*Prunus laurocerasus*
Cherry species	*Prunus spp.*
Cleavers	*Galium aparine*
Cock's-foot	*Dactylis glomerata*
Common cat's-ear	*Hypochaeris radicata*
Common daisy	*Bellis perennis*
Common knapweed	*Centaurea nigra*
Common nettle	*Urtica dioica*
Cotoneaster	*Cotoneaster* sp.
Cow parsley	*Anthriscus sylvestris*
Crack willow	*Salix fragilis*
Creeping bent	*Agrostis stolonifera*
Creeping buttercup	*Ranunculus repens*
Creeping cinquefoil	*Potentilla reptans*
Creeping thistle	*Cirsium arvense*
Dandelion	*Taraxacum officinale* agg.
Dog-rose	*Rosa canina* agg.
Dogwood	*Cornus sanguinea*
Duckweed species	*Lemna* sp.
Elder	*Sambucus nigra*
False oat-grass	*Arrhenatherum elatius*
Field forget-me-not	*Myosotis arvensis*
Field maple	*Acer campestre*
Garlic mustard	*Alliaria petiolata*
Goat willow	*Salix caprea*
Gooseberry	*Ribes uva-crispa*
Great burnet	*Sanguisorba officinalis*
Great willowherb	*Epilobium hirsutum*
Greater plantain	*Plantago major*
Greater reedmace	*Typha latifolia*
Greater stitchwort	*Stellaria holostea*
Hairy bitter-cress	*Cardamine hirsuta*
Hard rush	*Juncus inflexus*
Hawthorn	*Crataegus monogyna*
Hazel	*Corylus avellana*
Hedge bedstraw	*Galium mollugo*
Hedge woundwort	*Stachys sylvatica*
Herb Robert	*Geranium robertianum*
Hogweed	*Heracleum sphondylium*

English Name	Scientific Name
Holm oak	*Quercus ilex*
Honesty	*Lunaria annua*
Honeysuckle	*Lonicera periclymenum*
Hornbeam	*Carpinus betulus*
Horse chestnut	*Aesculus hippocastanum*
Horsetail species	*Equisetum* sp.
Ivy	*Hedera helix* ssp. *Helix*
Ivy-leaved speedwell	*Veronica hederifolia*
Laurel (non-native)	*Prunus* spp.
Lesser celandine	*Ranunculus ficaria*
Lime	*Tilia cordata x platyphyllos (T. x vulgaris)*
Lombardy poplar	*Populus nigra*
London plane	*Platanus × acerifolia*
Lords-and-ladies	*Arum maculatum*
Mahonia	*Mahonia* sp.
Meadow buttercup	*Ranunculus acris*
Meadow foxtail	*Alopecurus pratensis*
Meadowsweet	*Filipendula ulmaria*
Perennial rye-grass	*Lolium perenne*
Poplar species (non-native)	*Populus* sp.
Red campion	*Silene dioica*
Red fescue	*Festuca rubra*
Ribwort plantain	*Plantago lanceolata*
Rosebay willowherb	*Chamerion angustifolium*
Rowan	*Sorbus aucuparia*
Scots pine	*Pinus sylvestris*
Silver birch	*Betula pendula*
Skimmia	*Skimmia* sp.
Smooth sow-thistle	*Sonchus oleraceus*
Soft rush	*Juncus effusus*
Sycamore	*Acer pseudoplatanus*
Tufted hair-grass	*Deschampsia caespitosa*
White clover	*Trifolium repens*
White dead-nettle	*Lamium album*
White willow	*Salix alba*
Wood avens	*Geum urbanum*
Wood forget-me-not	*Myosotis sylvatica*
Yarrow	*Achillea millefolium*
Yellow iris	*Iris pseudacorus*
Yew	*Taxus baccata*
Yorkshire-fog	*Holcus lanatus*

APPENDIX 3: RECOMMENDED SPECIES FOR PLANTING AND SOWING

Species-rich Meadow Mix *(Naturescape N5 Long Season Meadow Mixture)*	
Wildflowers	
Yarrow	*Achillea millefolium*
Common knapweed	*Centaurea nigra*
Greater knapweed	*Centaurea scabiosa*
Wild carrot	*Daucus carota*
Viper's bugloss	*Echium vulgare*
Lady's bedstraw	*Galium verum*
Meadow crane's-bill	*Geranium pratense*
Common cat's-ear	*Hypochaeris radicata*
Common St. John's-wort	*Hypericum perforatum*
Field scabious	*Knautia arvensis*
Meadow vetchling	*Lathyrus pratensis*
Rough hawkbit	*Leontodon hispidus*
Ox-eye daisy	*Leucanthemum vulgare*
Common toadflax	*Linaria vulgaris*
Bird's-foot trefoil	*Lotus corniculatus*
Musk mallow	*Malva moschata*
Hoary plantain	*Plantago media*
Cowslip	*Primula veris*
Self-heal	*Prunella vulgaris*
Meadow buttercup	*Ranunculus acris*
Bulbous buttercup	*Ranunulus bulbosus*
Yellow rattle	*Rhinanthus minor*
Common sorrel	*Rumex acetosa*
Small scabious	*Scabiosa columbaria*
Red campion	*Silene dioica*
Betony	*Stachys officinalis*
Devil's-bit scabious	*Succisa pratensis*
Red clover	*Trifolium pratense*
Dark mullein	*Verbascum nigrum*
Tufted vetch	*Vicia cracca*
Grass species	
Common bent	*Agrostis capillaris*
Sweet vernal-grass	*Anthoxanthum odoratum*
Quaking grass	*Briza media*
Crested dog's-tail	*Cynosurus cristatus*
Sheep's fescue	*Festuca ovina*
Chewing's fescue	*Festuca rubra* ssp. *commutata*
Slender creeping red fescue	*Festuca rubra* ssp. *litoralis*
Meadow barley	*Hordeum secalinum*
Smooth-stalked meadow grass	*Poa pratensis*
Yellow oat-grass	*Trisetum flavescens*

Ponds/wetland areas mix	
Bank-sides	
Broadleaved willowherb	*Epilobium angustifolium*
Celery-leaved buttercup	*Ranunculus sceleratus*
Common marsh bedstraw	*Galium palustre*
Cuckoo flower	*Cardamine pratensis*
Great willowherb	*Epilobium hirsutum*
Lesser celandine	*Ranunculus ficaria*
Lesser spearwort	*Ranunculus flammula*
Marsh willowherb	*Epilobium palustre*
Meadowsweet	*Filipendula ulmaria*
Purple loosestrife	*Lythrum salicaria*
Ragged robin	*Lychnis flos-cuculi*
Wild angelica	*Angelica sylvestris*
Marsh, marginal and emergent plants	
Brooklime	*Veronica beccabunga*
Common reed	*Phragmites australis*
Gipsywort	*Lycopus europaeus*
Greater pond sedge	*Carex riparia*
Hard rush	*Juncus inflexus*
Jointed rush	*Juncus articulatus*
Lesser pond sedge	*Carex acutiformis*
Lesser water parsnip	*Berula erecta*
Marsh marigold	*Caltha palustris*
Nodding bur-marigold	*Bidens cernua*
Soft rush	*Juncus effusus*
Water forget-me-not	*Myosotis scorpioides*
Water mint	*Mentha aquatica*
Yellow flag	*Iris pseudacorus*
Submerged & floating leaved plants	
Amphibious bistort	*Persicaria amphibia*
Common duckweed	*Lemna minor*
Common water starwort	*Callitriche stagnalis*
Spiked water milfoil	*Myriophyllum spicatum*
Water crowfoot	*Ranunculus omiophyllus*
Water crowfoot	*Ranunculus peltatus*
Yellow flag	*Iris pseudacorus*

APPENDIX 4: PROTECTED SPECIES LEGISLATION

Plants

All wild plants are protected against unauthorised removal or uprooting under Section 13 of the Wildlife and Countryside Act (WCA) 1981 (as amended). Plants listed on Schedule 8 of the Act (e.g. triangular club rush and Deptford Pink) are afforded additional protection against picking, uprooting, destruction and sale. Bluebell is protected by WCA 1981 (as amended), in respect of Section 13(2), which protects it from sale.

Amphibians (Common Species)

Common amphibian species (i.e. common frog, common toad, smooth newt and palmate newt) are afforded partial legal protection under UK legislation, i.e. Schedule 5, Section 9 (5) of the WCA 1981 (as amended) and the Countryside and Rights of Way (CRoW) Act 2000. This legislation prohibits:

- Sale;
- Transportation; and
- Advertising for sale.

Badger

Badger is a widespread and generally common species. However, they are legally protected under The Protection of Badgers Act 1992, which is based primarily on the need to protect badgers from baiting and deliberate harm or injury. Under this legislation it is illegal to:

- Wilfully kill, injure, take, or cruelly ill-treat a badger, or attempt to do so;
- Possess any dead badger or any part of, or anything derived from, a dead badger; and
- Intentionally or recklessly interfere with a sett by disturbing badgers whilst they are occupying a sett, damaging or destroying a sett, causing a dog to enter a sett, or obstructing access to it.

A badger sett is defined in the legislation as "*any structure or place, which displays signs indicating current use by a badger*".

Bats

All bat species are afforded full protection under UK and European legislation, including the WCA 1981 (as amended), the CRoW Act 2000 and The Conservation of Habitats and Species Regulations 2010 (as amended). Together, this legislation makes it illegal to:

- Intentionally or deliberately take, kill or injure a bat;
- Damage, destroy or obstruct access to bat roosts; and
- Deliberately disturb bats.

A bat roost is defined in the legislation as *"any structure or place which a bat uses for shelter or protection". Roosts are protected whether or not bats are present at the time.* If a development activity is likely to result in disturbance or killing of a bat, damage to its habitat or any of the other activities listed above, then a licence will usually be required from Natural England.

Birds

The bird breeding season generally lasts from early March to September for most species. All wild birds are protected under the WCA 1981 (as amended) and the CRoW Act 2000. This legislation makes it illegal, both intentionally and recklessly to:

- Kill, injure or take any wild bird;
- Take, damage or destroy the nest of any wild bird while it is being built or in use;

- Take or destroy the eggs of any wild bird; and
- Possess or control any wild bird or egg unless obtained legally.

Birds listed under Schedule 1 of the WCA 1981 (as amended) are afforded additional protection, which makes it an offence to disturb a bird while it is nest building, or at a nest containing eggs or young, or disturb the dependent young of such a bird.

The UK's birds can be split in to three categories of conservation importance - red, amber and green (Eaton *et al.* 2009).

Red is the highest conservation priority, with species needing urgent action. Amber is the next most critical group, followed by green.

Red list criteria

- Globally threatened
- Historical population decline in UK during 1800–1995
- Severe (at least 50%) decline in UK breeding population over last 25 years, or longer-term period (the entire period used for assessments since the first BoCC review, starting in 1969).
- Severe (at least 50%) contraction of UK breeding range over last 25 years, or the longer-term period

Amber list criteria

- Species with unfavourable conservation status in Europe (SPEC = Species of European Conservation Concern)
- Historical population decline during 1800–1995, but recovering; population size has more than doubled over last 25 years
- Moderate (25-49%) decline in UK breeding population over last 25 years, or the longer-term period
- Moderate (25-49%) contraction of UK breeding range over last 25 years, or the longer-term period
- Moderate (25-49%) decline in UK non-breeding population over last 25 years, or the longer-term period
- Rare breeder; 1–300 breeding pairs in UK
- Rare non-breeders; less than 900 individuals
- Localised; at least 50% of UK breeding or non-breeding population in 10 or fewer sites, but not applied to rare breeders or non-breeders
- Internationally important; at least 20% of European breeding or non-breeding population in UK (NW European and East Atlantic Flyway populations used for non-breeding wildfowl and waders respectively)

Green list

- Species that occur regularly in the UK but do not qualify under any or the above criteria.

Great Crested Newt

Great crested newts and their habitat are afforded full protection under UK and European legislation, including the WCA 1981 (as amended), the CRoW Act 2000 and The Conservation of Habitats and Species Regulations 2010 (as amended). This makes it is an offence to kill, injure or disturb great crested newts and to destroy any place used for rest or shelter by a newt. The great crested newt is also listed on Annexes II and IV of the EC Habitats Directive and Appendix II of the Bern Convention. If a development activity is likely to result in disturbance

or killing of a great crested newt, damage to its habitat etc, then a licence will usually be required from Natural England.

Reptiles
There are six native species of reptiles in the UK, including slow-worm, common lizard, grass snake and adder, smooth snake and sand lizard, which are afforded varying degrees of protection under UK and European legislation.

Slow-worm, viviparous/common lizard, adder and grass snake are protected under Schedule 5, Section 9 (1 and 5) of the WCA 1981 (as amended) and the CRoW Act 2000 against deliberate or reckless killing and injuring and sale.

Water Vole
The water vole is fully protected under Schedule 5, Section 9 of the WCA 1981 (as amended), which makes it illegal to:

- Intentionally kill, injure or take (capture) a water vole;
- Possess or control a live or dead water vole, or any part of a water vole;
- Intentionally or recklessly damage, destroy or obstruct access to any structure or place which water voles use for shelter or protection or disturb water voles while they are using such a place; and
- Sell, offer for sale or advertise for live or dead water voles.

White-clawed Crayfish
White-clawed crayfish are partially protected under the WCA 1981 (as amended). This legislation makes it illegal to:

- Intentionally take white-clawed crayfish
- Sell, barter or exchange white-clawed crayfish

They are also listed on Annex II of the EC Habitats and Species Directive and are classed as "endangered" by IUCN.

QUALITY ASSURANCE

TITLE: Smithurst Meadows LNR, Giltbrook, Nottinghamshire:
Ecology Report and Management Plan 2015 - 2020

SUBMITTED TO: Broxtowe Borough Council

ISSUE AND REVISION RECORD:

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THE BRITISH ASSESSMENT BUREAU
ISO9001

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