



REDROW HOMES


GREAT WILSEY PARK,  
HAVERHILL:  
INFRASTRUCTURE  
RESERVED MATTERS  
APPLICATION

**Ecological Implementation  
Strategy**  
Pursuant to Condition 42 of  
DC/15/2151/OUT

## **COPYRIGHT**

The copyright of this document remains with Ecology Solutions. The contents of this document therefore must not be copied or reproduced in whole or in part for any purpose without the written consent of Ecology Solutions.

## CONTENTS

|    |   |    |
|----|---|----|
| 1  | INTRODUCTION  | 1  |
| 2  | PURPOSE AND CONSERVATION OBJECTIVES   | 2  |
| 3  | REVIEW OF SITE POTENTIAL AND CONSTRAINTS  | 3  |
| 4  | HABITATS  | 5  |
|    |  | 18 |
| 6  | BATS  | 22 |
| 7  | OTTERS  | 27 |
| 8  | WATER VOLES   | 29 |
| 9  | DORMICE   | 32 |
| 10 | HEDGEHOGS   | 37 |
| 11 | BIRDS   | 40 |
| 12 | REPTILES  | 44 |
| 13 | AMPHIBIANS  | 47 |
| 14 | INVERTEBRATES   | 50 |
| 15 | TIMETABLE OF WORKS  | 52 |

## PLANS

|            |   |
|------------|---|
| PLAN ECO1  | Site Location and Ecological Designations |
| PLAN ECO2  | Ecological Features                       |
| PLAN ECO3  | Ecological Constraints                    |
| PLAN ECO4a | Ecological Implementation Strategy 1      |
| PLAN ECO4b | Ecological Implementation Strategy 2      |
| PLAN ECO4c | Ecological Implementation Strategy 3      |
| PLAN ECO4d | Ecological Implementation Strategy 4      |

## **APPENDICES**

|            |   |
|------------|---|
| APPENDIX 1 | Hedgerow Removal Plan 5055-L-112 rev C  |
| APPENDIX 2 | Bat Box Specifications                  |
| APPENDIX 3 | Hedgehog Gateway Specification          |
| APPENDIX 4 | Hedgehog House Specifications           |
| APPENDIX 5 | Bird Box Specifications                 |
| APPENDIX 6 | Reptile Hibernacula Specification       |
| APPENDIX 7 | Stag beetle Loggery Specification       |
| APPENDIX 8 | Invertebrate Nesting Aid Specifications |

## 1. INTRODUCTION

### 1.1 Background

- 1.1.1 Ecology Solutions was commissioned by Redrow Homes in October 2018 to prepare materials to address the requirements of planning conditions for the development at Great Wilsey Park (reference: DC/15/2151/OUT). A series of Reserved Matters Applications (RMAs) is to be submitted in early 2019.
- 1.1.2 Condition 42 requires that an Ecological Implementation Strategy be submitted and approved prior to commencement of development. The condition states:

**No development shall take place on any phase or reserved matters application (including demolition, archaeological investigation, ground works and vegetation clearance) until an ecological implementation strategy for that particular phase or reserved matters application addressing the mitigation measures set out in Volume 2 Section 9 of the Environmental Statement dated September 2015, relevant appendices and subsequent Addendum document May 2016 has been submitted to and approved in writing by the local planning authority. The implementation strategy shall include the following:**

- a. ES mitigation measures to be addressed
- b. Purpose and conservation objectives for the proposed works.
- c. Review of site potential and constraints informed by up to date survey.
- d. Detailed design(s) and / or working method(s) to achieve stated objectives.
- e. Extent and location / area of proposed works on appropriate scale maps and plans.
- f. Type and source of materials to be used where appropriate, e.g. native species of local provenance.
- g. Timetable for implementation demonstrating that works are aligned with the proposed phasing of development.
- h. Persons responsible for implementing the works.
- i. Details of initial aftercare and long-term maintenance.
- j. Requirement for monitoring and remedial measures.
- k. Details for disposal of any wastes arising from works.

**The implementation strategy shall be implemented in accordance with the approved details and all features shall be retained in that manner thereafter.**

**Reason: To ensure the satisfactory development of the site at the appropriate time to protect vulnerable ecological habitats and ensure the satisfactory development of the site.**

### 1.2 Purpose of this Report

- 1.2.1 This report has been prepared to address the requirements of condition 42, providing details of the ecological implementation strategy to be adopted within the infrastructure phase of the Redrow development, with particular attention paid to the mitigation measures set out in Volume 2 Section 9 of the Environmental Statement, relevant appendices and subsequent Addendum. Due regard is had to the baseline information and long term objectives for the site where these are relevant. As necessary, mitigation and enhancement strategies are proposed such that the development would be in line with all relevant legislative and planning policy requirements. This document should be read in conjunction with materials produced by Exterior Architecture concerning the landscape strategy.

## **2. PURPOSE AND CONSERVATION OBJECTIVES**

### **2.1 Purpose of the Strategy**

2.1.1 The purpose of this strategy is to address the mitigation measures set out in Volume 2 Section 9 of the Environmental Statement (ES) dated September 2015, relevant appendices and the subsequent Addendum document dated May 2016.

2.1.2 The scope of the ES relates to the wider site and the ecological receptors identified during work to inform the outline application. The purpose of the current strategy, relates solely to infrastructure reserved matters application for the land in the ownership of Redrow Homes.

### **2.2 Conservation Objectives**

2.2.1 Specific objectives for the conservation of particular species or groups and particular habitats of nature conservation interest are set out in the relevant sections below. The nature of these objectives has been guided by the principles set out in UK and European wildlife legislation, notably the Wildlife & Countryside Act 1981 (as amended), the Conservation of Habitat and Species Regulations 2017 and the Natural Environment & Rural Communities Act 2006. Furthermore, the formulation of these objectives has also been influenced by national and local biodiversity and conservation targets, as set out in the UK Post-2010 Biodiversity Framework and the Sussex Biodiversity Action Plan (BAP).

2.2.2 The overarching objectives for nature conservation are as follows:

- To safeguard habitats and species that are important in the national and local context, and to maintain or enhance their conservation status as appropriate;
- To ensure that the site continues to support a similar complement of species to that already existing (with the exception of invasive non-native species); and
- To enhance the biodiversity of the site, where this is compatible with the above objectives.

2.2.3 Information on the existing situation at the site and its environs regarding habitats of ecological interest and the presence of protected species has been collated as part of the preparation of this document. It is upon this foundation that the specific enhancements and management prescriptions to follow are based.

2.2.4 These initiatives fall into two broad categories:

- Species-specific or group-specific measures designed to conserve and enhance the circumstances for species of interest; and
- Conservation and enhancement measures for particular areas of nature conservation interest and general measures for the creation and management of proposed habitats.

### **3. REVIEW OF SITE POTENTIAL AND CONSTRAINTS**

3.1 This section addresses point (c) of Condition 42, detailing the ecological potential and constraints of the site.

#### **3.2 Constraints**

3.2.1 The following main habitat / vegetation types were identified within the areas proposed for infrastructure within the site:

- Arable;
- Improved Grassland;
- Hedgerow;
- Watercourse;
- Pond;
- Ditch;
- Trees;
- Plantation; and
- Field Margins.

3.2.2 The location of these habitats is shown on Plan ECO2.

3.2.3 Habitats of value in the context of the site include mixed and broadleaf plantation, hedgerows, trees (especially where these also offer suitable nesting opportunities for bird species or potential roosting opportunities for bats), field margins, watercourse, ditches and ponds. The arable land and improved grassland are of limited intrinsic nature conservation value.

3.2.4 None of the above habitats pose an overriding ecological constraint in themselves that would prevent the development proceeding, with the majority of the habitats of greater value being retained and enhanced as part of the green infrastructure for the site.

3.2.5 Other ecological constraints within the areas of infrastructure are attributed to the known or potential presence of Badgers, bats, Otters, Water Voles, Dormice, Hedgehogs, birds, common reptiles, amphibians and invertebrates. These constraints are addressed by mitigation measures detailed in later sections of this document.

3.2.6 The ecological constraints are illustrated on Plan ECO3.

#### **3.3 Potential**

3.3.1 The majority of the site consists of intensively managed arable fields, with areas of improved grassland. These are intrinsically of low ecological interest, with the large arable fields in particular offering relatively little for wildlife. The plantations are generally even-aged; Great Field Plantation has minimal understorey and a depauperate ground flora. The hedgerows, while a significant ecological asset, are gappy or missing in places. Hence the site possesses excellent potential for wildlife gains, retaining and enhancing the best of the existing habitats, while promoting new opportunities through the strategies for green and blue infrastructure networks. The establishment of new habitats and future management of the network as a whole will deliver significant benefits.

- 3.3.2 Surveys undertaken to inform the outline planning application and those completed in 2018 identified a complement of bat species using the site for foraging and dispersal; some use of the site by Badgers, though this appears to have declined over time; an assemblage of breeding birds; the presence of two species of reptile, Common Lizard and Grass Snake; and the amphibians Common Toad and Smooth Newt. Some limited evidence of Dormice was recorded in the wider site subject to the outline application (though not the Redrow site). Otters and Water Voles are known to be present in the wider locality. The site is expected to support a range of common invertebrates, but interest will be limited by the intensive arable management.
- 3.3.3 Overall, there is significant potential to enhance the site for the species known to be present, and to provide opportunities for those present in the wider environment to colonise naturally over time.

### 3.4 **Survey Information**

- 3.4.1 This Ecological Implementation Strategy is informed by the range of survey work completed as part of the outline planning application, which has been reviewed in full, and surveys carried out by Ecology Solutions on behalf of Redrow Homes in 2018. The ecological constraints are well understood. The mitigation and enhancement strategy for this reserved matters application has adopted in full the approved measures in the Environmental Statement and ES Addendum accompanying the outline planning application. The strategy is therefore comprehensive and robust. As part of the Biodiversity Monitoring Strategy for Condition 45, further survey updates are to be completed during 2019.



## 4. HABITATS

4.1 This section addresses points (a) and (d) to (k) of Condition 42 in respect of retained and newly created habitats across the site.

4.2 Existing ecological constraints are shown on Plan ECO3. The Ecological Implementation Strategy is illustrated on Plans ECO4a to ECO4d.

### 4.3 Baseline Information

4.3.1 The areas subject to the infrastructure reserved matters application comprise intensively managed arable fields, with field margins and hedgerows. Great Field Plantation – a large mixed woodland – is situated in the centre of the site, with an area of improved grassland present to the south of the plantation. A smaller, younger mixed (largely broadleaved) plantation is situated in the south of the site. A number of other trees are present, associated with the hedgerows and the Stour Brook tributary. The Stour Brook tributary is the main watercourse on site, with a series of ditches also present. Two ponds fall within the boundary for the infrastructure of the site, with several more ponds located adjacent to the site.

### 4.4 Objective

4.4.1 To avoid significant adverse effects on habitats of ecological interest during the infrastructure phase of the development where possible, and to enhance and create new habitats as part of the green and blue infrastructure for the site.

### 4.5 Mitigation and Enhancements

#### *Construction Phase Mitigation*

4.5.1 All habitats to be retained as part of development will be appropriately protected using robust fencing, i.e. Heras fencing or similar. Tree root protection areas will be safeguarded through fencing complying with the British Standard. Site personnel will be briefed as to the presence of these important retained areas. No storage of materials will be permitted within 10m of retained habitats, and vehicle movements within this area will be for essential works only.

4.5.2 The clearance of the arable land is not considered likely to produce high levels of dust, but during periods of dry weather the work area will be sprayed with water to suppress the dust.

4.5.3 The effect on the arable areas and improved grassland is of negligible ecological significance and no mitigation is necessary.

#### *Landscape Planting Mixes*

4.5.4 New planting undertaken as part of the infrastructure of the site will include native species with an emphasis on trees and plants of known value to wildlife.

4.5.5 The planting schedule includes the provision of wet and dry grassland habitat, designed to encourage greater wildflower diversity, and the provision of

swales and ponds as habitats containing taller vegetation. This habitat diversification will favour invertebrates and will in turn provide net gains for local wildlife.

- 4.5.6 Areas of amenity grassland within the infrastructure for the site will be seeded with a flowering lawn mix (see Table 4.1 below).

| <b>EL1 Flowering Lawn Mixture Species</b>                       | <b>% per Mix</b> |
|---|------------------|
| <b>Wild Flowers</b>   |                  |
| Lady's Bedstraw <i>Galium verum</i>                             | 4%               |
| Rough Hawkbit <i>Leontodon hispidus</i>                         | 0.5%             |
| Oxeye Daisy <i>Leucanthemum vulgare</i>                         | 1%               |
| Birdsfoot Trefoil <i>Lotus corniculatus</i>                     | 3.7%             |
| Cowslip <i>Primula veris</i>                                    | 3.0%             |
| Selfheal <i>Prunella vulgaris</i>                               | 4.0%             |
| Meadow Buttercup <i>Ranunculus acris</i>                        | 3.5%             |
| Red Clover <i>Trifolium pratense</i>                            | 0.1%             |
|   | <b>20%</b>       |
| <b>Grasses</b>  |                  |
| Common Bent <i>Agrostis capillaris</i>                          | 8.0%             |
| Crested Dog's-tail <i>Cynosurus cristatus</i>                   | 40.0%            |
| Slender Creeping Red Fescue <i>Festuca rubra ssp. litoralis</i> | 28.0%            |
| Smaller Cat's-tail <i>Phleum bertolonii</i>                     | 4.0%             |
|   | <b>80%</b>       |

**Table 4.1.** Emorsgate Seeds EL1 Flowering Lawn Mixture species list.

- 4.5.7 Avenue trees (see Table 4.2 below) will be planted along primary roads screening play areas and parkland. This will help to increase connectivity throughout the site and offer habitats for nesting birds and invertebrates.

| <b>Avenue Tree Species</b>   |
|--|
| Field Maple 'Elsrijk' <i>Acer campestre</i> 'Elsrijk'              |
| Norway Maple 'Crimson King' <i>Acer platanoides</i> 'Crimson King' |
| Hornbeam 'Fastigiata' <i>Carpinus betulus</i> 'Fastigiata'         |
| Cherry 'Accolade' <i>Prunus</i> 'Accolade'                         |

**Table 4.2.** Avenue Tree species list.

#### *Green Spine / Linear Country Park*

- 4.5.8 The Linear Country Park will be a core component of the new development. Green corridors throughout the new development will serve as conduits for wildlife, encouraging natural processes to permeate into the establishing community. They will include new areas of wildflower grassland, native tree and shrub planting, and new swales and attenuation basins as part of the drainage strategy.
- 4.5.9 The Northern Gateway Park will incorporate a large number of parkland trees (see Table 4.3 below), increasing the diversity and age range of tree species within site.

| <b>Parkland Tree Species</b>                 |
|--|
| Field Maple <i>Acer campestre</i>            |
| Norway Maple <i>Acer platanoides</i>         |
| Indian Horse-chestnut <i>Aesculus indica</i> |

|  |
|--|
| Alder <i>Alnus glutinosa</i>                               |
| Silver Birch <i>Betula pendula</i>                         |
| Hornbeam <i>Carpinus betulus</i>                           |
| Hornbeam 'Fastigiata' <i>Carpinus betulus</i> 'Fastigiata' |
| Beech <i>Fagus sylvatica</i>                               |
| Copper Beech <i>Fagus sylvatica</i> 'Purpurea'             |
| Holly <i>Ilex aquifolium</i>                               |
| Crab Apple 'Evereste' <i>Malus sylvestris</i> 'Evereste'   |
| Crab Apple <i>Malus sylvestris</i>                         |
| Canadian Poplar <i>Populus x canadensis</i>                |
| Bird Cherry <i>Prunus padus</i>                            |
| Blackthorn <i>Prunus spinosa</i>                           |
| Pin Oak <i>Quercus palustris</i>                           |
| Oak <i>Quercus robur</i>                                   |
| Whitebeam 'Majestica' <i>Sorbus aria</i> 'Majestica'       |
| Rowan <i>Sorbus aucuparia</i>                              |
| Wild Service-tree <i>Sorbus torminalis</i>                 |
| Bald Cypress <i>Taxodium distichum</i>                     |
| Small-leaved Lime <i>Tilia cordata</i>                     |
| Common Lime <i>Tilia x europaea</i>                        |

**Table 4.3.** Parkland tree species list.

4.5.10 New areas of extensive tree planting will be under-sown with Emorsgate Seeds woodland mix (see Table 4.4 below).

| <b>EW1 Woodland Mixture Species</b>                                       | <b>% per Mix</b> |
|---|------------------|
| <b>Wild Flowers</b>   |                  |
| Garlic Mustard <i>Alliaria petiolata</i>                                  | 3%               |
| Ramsons <i>Allium ursinum</i>   | 0.8%             |
| Betony <i>Stachys officinalis</i>   | 1.6%             |
| Rough Chervil <i>Chaerophyllum temulum</i>                                | 1%               |
| Foxglove <i>Digitalis purpurea</i>  | 0.2%             |
| Meadowsweet <i>Filipendula ulmaria</i>                                    | 2%               |
| Hedge Bedstraw <i>Galium album</i>  | 1%               |
| Water Avens <i>Geum rivale</i>  | 1%               |
| Wood Avens <i>Geum urbanum</i>  | 0.2%             |
| Bluebell <i>Hyacinthoides non-scripta</i>                                 | 2.8%             |
| Hairy St John's-wort <i>Hypericum hirsutum</i>                            | 0.8%             |
| Primrose <i>Primula vulgaris</i>  | 0.2%             |
| Selfheal <i>Prunella vulgaris</i>   | 1.5%             |
| Red Campion <i>Silene dioica</i>  | 2.7%             |
| Ragged Robin <i>Lychnis flos-cuculi</i>                                   | 0.2%             |
| Wood Sage <i>Teucrium scorodonia</i>                                      | 1%               |
|   | <b>20%</b>       |
| <b>Grasses</b>  |                  |
| Common Bent <i>Agrostis capillaris</i>                                    | 10%              |
| Sweet Vernal Grass <i>Anthoxanthum odoratum</i>                           | 2%               |
| False Brome <i>Brachypodium sylvaticum</i>                                | 7%               |
| Crested Dog's-tail <i>Cynosurus cristatus</i>                             | 28%              |
| Tufted Hair-Grass <i>Deschampsia cespitosa</i>                            | 1%               |
| Slender Creeping Red Fescue <i>Festuca rubra</i><br><i>ssp. litoralis</i> | 20%              |
| Wood Meadow-grass <i>Poa nemoralis</i>                                    | 12%              |
|   | <b>80%</b>       |

**Table 4.4.** Emorsgate Seeds EW1 Woodland Mixture species list.

- 4.5.11 An 'edible spine' will be established within the linear country park focusing on edible and foraging plants (see Table 4.5 below).

| <b>Edible Planting Species</b>              |
|---|
| Wild Garlic <i>Allium ursinum</i>           |
| Hazel <i>Corylus avellana</i>               |
| Purple Coneflower <i>Echinacea purpurea</i> |
| Wild Strawberry <i>Fragaria vesca</i>       |
| Crab Apple <i>Malus sylvestris</i>          |
| Water Mint <i>Mentha aquatica</i>           |
| Wild Marjoram <i>Origanum vulgare</i>       |
| Blackthorn <i>Prunus spinosa</i>            |
| Dog Rose <i>Rosa canina</i>                 |
| Elder <i>Sambucus nigra</i>                 |
| Rowan <i>Sorbus aucuparia</i>               |

**Table 4.5.** Edible Planting species list.

- 4.5.12 Significant new tree planting will be undertaken in this area with an emphasis on orchard tree species (see Table 4.6 below).

| <b>Wild Orchard Tree Species</b>  |
|---|
| Apple 'Annie Elizabeth' <i>Malus domestica</i> 'Annie Elizabeth'          |
| Apple 'Red Falstaff' <i>Malus domestica</i> 'Red Falstaff'                |
| Wild Cherry 'Amber Heart' <i>Prunus avium</i> 'Amber Heart'               |
| Wild Cherry 'Knight Early Black' <i>Prunus avium</i> 'Knight Early Black' |
| Wild Cherry 'Penny' <i>Prunus avium</i> 'Penny'                           |
| Plum 'Avalon' <i>Prunus domestica</i> 'Avalon'                            |
| Plum 'Cambridge Gage' <i>Prunus domestica</i> 'Cambridge Gage'            |
| Plum 'Denniston's Superb' <i>Prunus domestica</i> 'Denniston's Superb'    |
| Bird Cherry <i>Prunus padus</i>   |

**Table 4.6.** Wild Orchard tree species list.

- 4.5.13 New habitats to be established as part of the Green Spine and Linear Country Park are shown on Plans ECO4a to ECO4d.
- 4.5.14 These features will offer new habitats for local wildlife, in particular birds, bats, small mammals and invertebrates.

#### *Great Field Plantation*

- 4.5.15 Overall, while Great Field Plantation does offer opportunities to wildlife, it is of limited intrinsic nature conservation interest. The understorey is virtually absent and the field layer is very impoverished, with little light penetrating to the woodland floor. The aims of management will therefore be to facilitate a gradual conversion to a more naturalistic woodland with greater structural diversity, focusing on native species as opposed to introduced conifers.

#### Conversion of Even-aged Plantation to Uneven-aged System

- 4.5.16 The principal advantage of the phased removal of conifers and the introduction of native broadleaves is that disruption to wildlife is minimised. A phased approach is therefore favoured over a clear-fell approach, which

would have an adverse effect on protected and notable species, and is in any case unacceptable from a landscape and visual standpoint.

- 4.5.17 Three glades will be established in the woodland by felling conifer species. New understorey planting will be undertaken using native species. Existing broadleaved species will be encouraged to grow to maturity.
- 4.5.18 Felled timber will be cut into logs and set into 'loggeries' and more informal log piles to encourage saproxylic invertebrates. Felled trees will not be shredded or mulched.
- 4.5.19 New planting will exclusively be locally native species e.g. Oak *Quercus robur*; Hazel *Corylus avellana*, Hornbeam *Carpinus betulus*; Field Maple *Acer campestre*, Holly *Ilex aquifolium*, Guelder Rose *Viburnum opulus*; Hawthorn *Crataegus monogyna*; Spindle *Euonymus europaeus*, Honeysuckle *Lonicera periclymenum*, Dog Rose *Rosa canina*, Silver Birch *Betula pendula*, Cherry *Prunus avium*, Bird Cherry *Prunus padus*, Crab Apple *Malus sylvestris* and Rowan *Sorbus aucuparia*. The aim will be to encourage strong growth of these species to canopy and understorey layer as appropriate.

#### Coppicing

- 4.5.20 Existing Hazel stools will be coppiced on a 15-year rotation to encourage greater structural diversity, and layered to produce new coppice stools and expand the understorey. Cut wood will be used to diversify the habitat through establishment of wood piles.

#### Ground Flora

- 4.5.21 The effects of habitat management on the ground flora will be monitored. Though the intention will be to encourage natural regeneration, if this proves difficult consideration will be given to the introduction of plug-planted locally native species.

#### Wildlife Opportunities

- 4.5.22 It is expected that the habitat enhancements will generate greater wildlife interest. Additional opportunities will be established by providing a series of bat, bird and invertebrate boxes (see following sections).

#### Public Use and Recreation

- 4.5.23 Public use of the woodland will be monitored and management operations adapted where necessary. Generally it is envisaged that fencing will be avoided. Where it is necessary to dissuade the public from accessing certain areas (for example around the Badger setts and where new planting has been undertaken) this will be by means of dead hedging or planting thorny species. If fencing must be used it will be suitable for the area, e.g. natural woven Willow or Hazel hurdles.

#### Southern Plantation

- 4.5.24 The woodland in the south of the site is currently a mixed plantation, with a good proportion of native species, though largely even-aged. Long term management will encourage growth of native species and diversification of

the habitat. Non-native conifers will be selectively felled to introduce habitat diversity, with timber retained as for Great Field Plantation.

- 4.5.25 An appropriate coppicing regime will be introduced on a 15-year rotation to encourage a vigorous understorey.
- 4.5.26 Bat and Dormouse ‘hop-overs’ will be established using native trees approximately 6m in height at edges of new accesses. The species to be used are listed in Table 4.7 below.

| <b>Bat Hop-over Tree Species</b>           |
|--|
| Field Maple <i>Acer campestre</i>          |
| Alder <i>Alnus glutinosa</i>               |
| Hornbeam <i>Carpinus betulus</i>           |
| Beech <i>Fagus sylvatica</i>               |
| Bird Cherry <i>Prunus padus</i>            |
| Blackthorn <i>Prunus spinosa</i>           |
| Oak <i>Quercus robur</i>                   |
| Wild Service-tree <i>Sorbus torminalis</i> |
| Small-leaved Lime <i>Tilia cordata</i>     |

**Table 4.7.** Bat Hop-over tree species list.

#### *Stour Brook Tributary*

- 4.5.27 Generally the woodland along the watercourse is more semi-natural than that of the plantations, with mature broadleaved trees and a good understorey and field layer. At this stage it is considered that minimal intervention is necessary. Enhancements will focus on the provision of dead wood piles for habitat diversification. The existing footbridge will be replaced to facilitate safe public access and recreation.

#### *Hedgerows*

- 4.5.28 The existing hedgerow network is a key green infrastructure asset and is to be retained and enhanced wherever possible. Unless otherwise stated on the Hedgerow Removal Plan 5055-L-112 rev C accompanying the outline application (see Appendix 1), new gaps established will generally be maximum of 12m to allow for Dormouse dispersal. Gaps in existing hedgerows will be reinforced with native species. New hedgerow and shrub planting will comprise native species as listed in Table 4.8 below.

| <b>Native Hedgerow and Shrub Species</b> |
|--|
| Field Maple <i>Acer campestre</i>        |
| Dogwood <i>Cornus sanguinea</i>          |
| Hazel <i>Corylus avellana</i>            |
| Hawthorn <i>Crataegus monogyna</i>       |
| Spindle <i>Euonymus europaeus</i>        |
| Crab Apple <i>Malus sylvestris</i>       |
| Wild Cherry <i>Prunus avium</i>          |
| Blackthorn <i>Prunus spinosa</i>         |
| Dog Rose <i>Rosa canina</i>              |
| Elder <i>Sambucus nigra</i>              |
| Guelder Rose <i>Viburnum opulus</i>      |

**Table 4.8.** Native Hedgerow and Shrub species list.

- 4.5.29 Hedgerows will continue to be managed. Management will aim to ensure continued good structure. Hedgerows will be cut on rotation, so that not all are cut in any one year. This will encourage greater availability of winter forage for birds. Hedgerows will be laid on rotation to encourage greater structural diversity.
- 4.5.30 Bat / Dormouse 'hop-overs' will be established using native trees approximately 6m in height at the edges of new accesses. Where gaps in existing hedgerows are created as part of the development, dropped kerbs will be installed on either side of the road in that location to aid the movement of wildlife through the site.

*Field Margins / Wildflower Grassland Meadow*

- 4.5.31 The existing field margins are recognised to be of relatively higher botanical interest, particularly in the north of the site. These will be retained and subject to ongoing management to maximise their botanical interest. There will be no storage of materials or tracking over of these areas, and no new tree planting.
- 4.5.32 New areas of wildflower grassland are to be established throughout the Green Spine and Linear Park. These areas are currently principally intensive arable and improved grassland respectively. In conjunction with the drainage strategy, areas of dry and wet grassland will be established (see Tables 4.9 and 4.10 below).
- 4.5.33 Newly established meadows will be cut on an annual basis as required, with the arisings removed. These would be retained as 'habitat piles' in suitable locations to encourage reptiles.

| <b>EM6 Meadow Mixture for Chalk &amp; Limestone Soils</b> | <b>% per Mix</b> |
|---|------------------|
| <b>Species</b>  |                  |
| <b>Wild Flowers</b>                                       |                  |
| Yarrow <i>Achillea millefolium</i>                        | 0.5%             |
| Kidney Vetch <i>Anthyllis vulneraria</i>                  | 0.5%             |
| Common Knapweed <i>Centaurea nigra</i>                    | 1.5%             |
| Greater Knapweed <i>Centaurea scabiosa</i>                | 2%               |
| Wild Basil <i>Clinopodium vulgare</i>                     | 0.4%             |
| Wild Carrot <i>Daucus carota</i>                          | 1%               |
| Lady's Bedstraw <i>Galium verum</i>                       | 2%               |
| Field Scabious <i>Knautia arvensis</i>                    | 1.5%             |
| Rough Hawkbit <i>Leontodon hispidus</i>                   | 0.4%             |
| Oxeye Daisy <i>Leucanthemum vulgare</i>                   | 0.5%             |
| Bird's-foot Trefoil <i>Lotus corniculatus</i>             | 0.6%             |
| Sainfoin <i>Onobrychis viciifolia</i>                     | 1.5%             |
| Wild Marjoram <i>Origanum vulgare</i>                     | 0.2%             |
| Hoary Plantain <i>Plantago media</i>                      | 0.7%             |
| Salad Burnet <i>Sanguisorba minor</i>                     | 2%               |
| Cowslip <i>Primula veris</i>                              | 1%               |
| Selfheal <i>Prunella vulgaris</i>                         | 1%               |
| Meadow Buttercup <i>Ranunculus acris</i>                  | 1%               |
| Bulbous Buttercup <i>Ranunculus bulbosus</i>              | 1.5%             |
| Small Scabious <i>Scabiosa columbaria</i>                 | 0.2%             |
|   | <b>20%</b>       |
| <b>Grasses</b>  |                  |
| Quaking-grass <i>Briza media</i>                          | 4%               |

|   |            |
|---|------------|
| Glaucous Sedge <i>Carex flacca</i>                              | 0.2%       |
| Crested Dog's-tail <i>Cynosurus cristatus</i>                   | 32%        |
| Sheep's-fescue <i>Festuca ovina</i>                             | 24%        |
| Slender Creeping Red Fescue <i>Festuca rubra ssp. litoralis</i> | 12.6%      |
| Crested Hair-grass <i>Koeleria macrantha</i>                    | 2%         |
| Smaller Cat's-tail <i>Phleum bertolonii</i>                     | 4%         |
| Yellow Oat-grass <i>Trisetum flavescens</i>                     | 1.2%       |
|   | <b>80%</b> |

**Table 4.9.** Emorsgate Seeds EM6 Meadow Mixture for Chalk and Limestone Soils species list.

| <b>EM8 Meadow Mixture for Wetlands Species</b>                  | <b>% per Mix</b> |
|---|------------------|
| <b>Wild Flowers</b>   |                  |
| Yarrow <i>Achillea millefolium</i>                              | 0.2%             |
| Sneezewort <i>Achillea ptarmica</i>                             | 0.2%             |
| Betony <i>Stachys officinalis</i>                               | 1%               |
| Common Knapweed <i>Centaurea nigra</i>                          | 2.5%             |
| Meadowsweet <i>Filipendula ulmaria</i>                          | 2%               |
| Lady's Bedstraw <i>Galium verum</i>                             | 2%               |
| Rough Hawkbit <i>Leontodon hispidus</i>                         | 0.5%             |
| Oxeye Daisy <i>Leucanthemum vulgare</i>                         | 0.5%             |
| Bird's-foot Trefoil <i>Lotus corniculatus</i>                   | 0.7%             |
| Greater Bird's-foot-trefoil <i>Lotus pedunculatus</i>           | 0.5%             |
| Ribwort Plantain <i>Plantago lanceolata</i>                     | 1%               |
| Cowslip <i>Primula veris</i>                                    | 1%               |
| Selfheal <i>Prunella vulgaris</i>                               | 1.5%             |
| Meadow Buttercup <i>Ranunculus acris</i>                        | 2%               |
| Yellow Rattle <i>Rhinanthus minor</i>                           | 1.5%             |
| Great Burnet <i>Sanguisorba officinalis</i>                     | 1.5%             |
| Pepper-saxifrage <i>Silaum silaus</i>                           | 0.5%             |
| Ragged Robin <i>Lychnis flos-cuculi</i>                         | 0.4%             |
| Devil's-bit Scabious <i>Succisa pratensis</i>                   | 0.5%             |
|   | <b>20%</b>       |
| <b>Grasses</b>  |                  |
| Common Bent <i>Agrostis capillaris</i>                          | 10%              |
| Meadow Foxtail <i>Alopecurus pratensis</i>                      | 1%               |
| Sweet Vernal Grass <i>Anthoxanthum odoratum</i>                 | 3%               |
| Quaking-grass <i>Briza media</i>                                | 2%               |
| Crested Dog's-tail <i>Cynosurus cristatus</i>                   | 32%              |
| Tufted Hair-Grass <i>Deschampsia cespitosa</i>                  | 1%               |
| Slender Creeping Red Fescue <i>Festuca rubra ssp. litoralis</i> | 24%              |
| Meadow Barley <i>Hordeum brachyantherum</i>                     | 1%               |
| Meadow Fescue <i>Festuca pratensis</i>                          | 6%               |
|   | <b>80%</b>       |

**Table 4.10.** Emorsgate Seeds EM8 Meadow Mixture for Wetlands species list.

4.5.34 Areas of tussocky grassland will be established using Emorsgate Seeds EG10 Tussock Grass Mixture (see Table 4.11 below) to create greater opportunities for reptiles and other wildlife.

| <b>EG10 Tussock Grass Mixture Species</b>      | <b>% per Mix</b> |
|--|------------------|
| Meadow Foxtail <i>Alopecurus pratensis</i>     | 2.5%             |
| Crested Dog's-tail <i>Cynosurus cristatus</i>  | 25.0%            |
| Cocksfoot <i>Dactylis glomerata</i>            | 20.0%            |
| Tufted Hair-Grass <i>Deschampsia cespitosa</i> | 2.5%             |



|  |             |
|--|-------------|
| Strong-creeping Red Fescue             | 25.0%       |
| Yorkshire Fog <i>Holcus lanatus</i>    | 2.5%        |
| Tall Fescue <i>Festuca arundinacea</i> | 12.5%       |
| Meadow Fescue <i>Festuca pratensis</i> | 10%         |
|  | <b>100%</b> |

**Table 4.11.** Emorsgate Seeds EG10 Tussock Grass Mixture species list.

- 4.5.35 The periphery of the wildflower meadows will be planted with native tree species (see Table 4.12 below), bolstering the existing woodland edge and mature Oak trees present along the boundaries of the linear park.

| <b>Woodland Meadow Edge Tree Species</b> |
|--|
| Field Maple <i>Acer campestre</i>        |
| Alder <i>Alnus glutinosa</i>             |
| Silver Birch <i>Betula pendula</i>       |
| Hazel <i>Corylus avellana</i>            |
| Bird Cherry <i>Prunus padus</i>          |
| White Willow <i>Salix alba</i>           |
| Crack Willow <i>Salix fragilis</i>       |
| Yew <i>Taxus baccata</i>                 |

**Table 4.12.** Woodland Meadow Edge tree species list.

#### *New Attenuation Features*

- 4.5.36 For the most part these new features will not be permanently wet, but some areas will be designed to retain water. This will diversify the habitats present. Locally native aquatic and emergent species will be planted to encourage early naturalisation. Swales will be planted with appropriate mix of native species (see Table 4.13 and 4.14 below).

| <b>Marginal Planting Species</b>                |
|---|
| Marsh-marigold <i>Caltha palustris</i>          |
| Lesser Pond-sedge <i>Carex acutiformis</i>      |
| Common Spike-rush <i>Eleocharis palustris</i>   |
| Water Avens <i>Geum rivale</i>                  |
| Yellow Iris <i>Iris pseudacorus</i>             |
| Jointed Rush <i>Juncus articulatus</i>          |
| Purple-loosestrife <i>Lythrum salicaria</i>     |
| Water Mint <i>Mentha aquatica</i>               |
| Water Forget-me-not <i>Myosotis scorpioides</i> |
| Reed Canary Grass <i>Phalaris arundinacea</i>   |

**Table 4.13.** Marginal planting species list.

- 4.5.37 Newly established basins will be seeded with locally native species mixes and managed appropriately. Areas of dry and wet grassland will be established. The blue infrastructure network of swales will provide new foraging and dispersal opportunities for a variety of wildlife.

| <b>EP1F Wild Flowers for Pond Edges Species</b> | <b>% per Mix</b> |
|---|------------------|
| Sneezewort <i>Achillea ptarmica</i>             | 2.5%             |
| Wild Angelica <i>Angelica sylvestris</i>        | 10%              |
| Marsh-marigold <i>Caltha palustris</i>          | 1%               |
| Common Knapweed <i>Centaurea nigra</i>          | 7.5%             |

|  |             |
|--|-------------|
| Hemp-agrimony <i>Eupatorium cannabinum</i>                 | 5%          |
| Meadowsweet <i>Filipendula ulmaria</i>                     | 15%         |
| Water Avens <i>Geum rivale</i>                             | 2.5%        |
| Square-stalked St John's-wort <i>Hypericum tetrapterum</i> | 2.5%        |
| Yellow Iris <i>Iris pseudacorus</i>                        | 20%         |
| Greater Bird's-foot-trefoil <i>Lotus pedunculatus</i>      | 5%          |
| Gypsywort <i>Lycopus europaeus</i>                         | 4%          |
| Purple-loosestrife <i>Lythrum salicaria</i>                | 3%          |
| Water Mint <i>Mentha aquatica</i>                          | 0.5%        |
| Common Fleabane <i>Pulicaria dysenterica</i>               | 0.5%        |
| Meadow Buttercup <i>Ranunculus acris</i>                   | 10%         |
| Great Burnet <i>Sanguisorba officinalis</i>                | 3%          |
| Ragged Robin <i>Lychnis flos-cuculi</i>                    | 4%          |
| Devil's-bit Scabious <i>Succisa pratensis</i>              | 2.5%        |
| Tufted Vetch <i>Vicia cracca</i>                           | 1.5%        |
|  | <b>100%</b> |

**Table 4.14.** Emorsgate Seeds EP1F Wild Flowers for Pond Edges species list.

### Lighting Strategy

- 4.5.38 Pedestrian spaces and routes will be lit with low level path lighting (below 1 lux) to minimise any light pollution. Lighting of the vehicular routes will also have carefully considered lighting to reduce any adverse effects.
- 4.5.39 Bat hop-overs will be incorporated into the scheme where hedgerows are intersected by a lit road, footpath or cycle path. The bat hop-overs will encourage bats to fly at a height greater than that of the street lighting, enabling them to cross in darkness. Greater detail on bat hop-overs is provided in the bat section below.
- 4.5.40 Such an approach to lighting will reduce adverse effects on nocturnal wildlife and encourage use of habitats by bats and invertebrates.

### 4.6 Type and Source of Materials

- 4.6.1 New planting undertaken as part of the infrastructure of the site will be based around native species with an emphasis on trees and plants of known value to wildlife.
- 4.6.2 Liaison with Suffolk Wildlife Trust will be held to determine the feasibility of using seed sourced from local nature reserves and designated sites, to ensure locally native varieties. Should this not be practicable, approved seed mixes appropriate for the habitat and soil type will be used.

### 4.7 Timetable of Works

| Receptor | Action  | Timing                       |
|----------|---|------------------------------|
| Habitats | Habitat creation and enhancement for each phase | In concert with construction |

**Table 4.15.** Methods and timetable for implementation of mitigation and enhancements for habitats.

#### 4.8 Implementation Responsibilities

- 4.8.1 Peter Hadfield, Director of Ecology Solutions, has ultimate responsibility for the implementation of this strategy.
- 4.8.2 Richard Franks, Senior Engineering Manager at Redrow Homes, is leading for Redrow Homes.
- 4.8.3 Clear channels between these parties and their associates on the ground will be in operation at all times, by email and telephone as appropriate.
- 4.8.4 A copy of this strategy will be kept in the site office and form part of any site induction.
- 4.8.5 Redrow and the landowner will establish a joint management company to manage and maintain the public landscape areas across Phase 1 of Great Wilsey Park. The management company will be responsible for the ongoing maintenance of areas of hard and soft landscaping within public open spaces, attenuation basins, children's play areas, Great Field Plantation, paths, cyclepaths and allotments.

#### 4.9 Initial Aftercare and Long-term Management and Maintenance

##### *Trees*

- 4.9.1 Watering will be required during periods of drought for no less than the first three years after planting to ensure satisfactory establishment.
- 4.9.2 Trees will be inspected every six months for the first two years to ensure that they are healthy, not diseased or damaged, or dead. After the first two years, trees can be inspected annually if found to be establishing well.
- 4.9.3 Any failed trees within the first five years will be replaced and maintained for a subsequent five years. Tree replacement will occur in early spring or late autumn.
- 4.9.4 Annual pruning will be completed between January and March. Emergency pruning will be undertaken immediately after a critical fault is identified.

##### *Shrub and Hedgerows*

- 4.9.5 Shrub and hedgerow planting will be inspected every three months to ensure that they are healthy, not diseased or damaged, or dead. Any failed species will be removed and replaced with the same species and size.
- 4.9.6 Pruning and dead-heading will be completed at the end of the plant flowering seasons (spring to autumn) as required.

##### *Grassland*

- 4.9.7 Seed is best sown in the autumn or spring but can be sown at other times of the year if there is sufficient warmth and moisture.
- 4.9.8 **EG10 Tussock Grass Mixture.** Once established, tussocky grassland requires very little management.

- 4.9.9 In the first year, mow regularly to 40-60mm throughout the growing season to prevent annual weeds smothering the slower growing grasses. Cuttings will be removed if dense.
- 4.9.10 After the first year, unwanted perennial weeds can be occasionally spot treated.
- 4.9.11 Tussocky areas may need to be cut every 2-3 years between October and February to control scrub and bramble development. This should be done on a rotational basis, so that no more than half of the area is cut in any one year to allow an area of safe refuge for wildlife.
- 4.9.12 **EP1F Wild Flowers for Pond Edges.** In the first year, annual weed growth should be cut back to encourage the development of a good perennial ground cover.
- 4.9.13 Once established, vegetation should be managed on a rotational basis, removing short sections every 2-3 years to provide a variation in structure. Dense stands of single species may also benefit from selective thinning. Vegetation removal should be undertaken between September and November to cause the least disruption to wildlife.
- 4.9.14 **EL1 Flowering Lawn Mixture.** Newly sown flowering lawns should be mown every 7-10 days during the growing season of the first year to a height of 40-60mm. Residual perennial weeds will be carefully dug out or spot treated.
- 4.9.15 After the first year the grass will be mown regularly to a height of 25-40mm. Management can be relaxed from late June for 4-8 weeks to allow for flowering (mowing may be suspended earlier to allow for Cowslip to flower). Heavy quantities of cuttings should be collected and removed from site.
- 4.9.16 **EW1 Woodland Mixture.** In established woodland the woodland mix requires very little management.
- 4.9.17 In young or open woodland with higher light levels, the mix should be cut annually in mid-summer until the tree cover has established.
- 4.9.18 **EM6 Meadow Mixture for Chalk and Limestone Soils and EM8 Meadow Mixture for Wetlands.** Newly sown meadows will be mown regularly throughout the first year of establishment to a height of 40-60mm. This will control annual weeds and help maintain balance between faster growing grasses and slower developing wild flowers. Cuttings will be removed if dense. Residual perennial weeds will be carefully dug out or spot treated.
- 4.9.19 In subsequent years, on poor shallow soils the grass will be cut once or twice at the end of the summer.
- 4.9.20 On deeper soils best results are usually obtained by traditional meadow management. This will include a cut to 50mm after flowering in July or August. The cuttings will be left to dry and shed seed for 1-7 days before being removed from the site. The grass can then be maintained at a height of 50mm through to spring.

- 4.9.21 Areas of new and retained and enhanced planting, as well as ponds and swales, will be monitored annually for the first five years to ensure that the species diversity and composition is developing in such a way as to enhance the site for wildlife.
- 4.9.22 Watering will be required during periods of drought to ensure satisfactory establishment. Watering will be undertaken as required to maintain healthy plant growth.
- 4.9.23 Dead or diseased plants will be removed and replaced with the same species immediately after identification.

#### **4.10 Monitoring and Remedial Measures**

- 4.10.1 Site visits by a suitably qualified ecologist will be undertaken throughout the programme of works to establish the infrastructure of the site. Effects on ecological receptors will be monitored, and conclusions drawn as to the significance of any effects, and any measures that may need to be implemented to mitigate for any effects identified. Following completion of the work, the effects will be analysed and any significant changes will be reported.
- 4.10.2 A separate Biodiversity Monitoring Strategy for the infrastructure application has been prepared to address the requirements of Condition 45.

#### **4.11 Disposal of Waste**

- 4.11.1 Waste arising from the proposed works will be disposed of as per standard construction practice.
- 4.11.2 During the operational phase of the development, the appointed management contractor will allow for the off-site disposal of all litter and landscape maintenance waste. The contractor will be responsible for all waste disposal costs and approvals.
- 4.11.3 Any invasive plant species material will be disposed of at an approved facility.