



Land East of Tye Lane,
Walberton

Ecological Mitigation and Management Plan

Prepared by
CSA Environmental

on behalf of
Linden Horries Southern

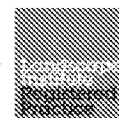
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EXECUTIVE SUMMARY

This report has been prepared by CSA Environmental on behalf of Linden Homes Southern. It sets out ecological mitigation and management measures to be implemented in association with proposed residential development at Land East of Tye Lane, Walberton (hereafter referred to as 'the Site').

This report has been prepared in consideration of Condition 13 of the outline planning consent (ref: WA/44/17/OUT), which requires the production of an Ecological Mitigation and Management Plan as follows:

"Prior to the commencement of construction works or any preparatory works detailed Ecological Management and Mitigation Plan including a Schedule of Works shall be submitted to the LPA for approval and will be based on the recommendations within the supporting Preliminary Ecological Appraisal Report, and the Bat and Reptile Survey Report (September 2017). All approved details shall then be implemented in full and in accordance with the agreed timings and details."

The Site currently comprises a large arable field with narrow field margins, bordered by native hedgerows and trees. A small paddock of semi-improved grassland, with occasional patches of dense scrub is also present in the north-eastern extent of the Site (as shown on the Habitats Plan CSA/3823/100).

Important Ecological Features (IEFs) identified within this report comprise the following:

- **Habitats and Flora:** Native hedgerows, trees and woodland.
- **Fauna:** Bats, nesting birds, badgers, other mammals, reptiles and amphibians

This report sets out a strategy for avoidance, mitigation and where necessary compensation for potential impacts to these IEFs, as well as provision of ecological enhancement and measures and management prescriptions to be delivered alongside the proposed development.

A monitoring strategy for these ecological mitigation and management measures is included in order to inform their successful implementation and maintenance. Responsible parties are identified and mitigation proposals are assimilated into a Works Schedule so as to aid enactment. Details regarding habitat management are provided with a Landscape Management Plan (CSA/3823/03) which should be read in conjunction with this report.

1.0 INTRODUCTION

- 1.1 This Ecological Mitigation and Management Plan (EMMP) has been prepared by CSA Environmental on behalf of Linden Homes Southern to support a Reserved Matters application (following granted outline consent, ref: WA/44/17/OUT) for residential development of up to 175 units. It sets ecological mitigation and management measures to be implemented in association with proposed residential development and provision of two new children's play areas, tennis courts, a community orchard, SUDs features and associated landscaping at Land East of Tye Lane, Walberton (hereafter referred to as 'the Site'). The proposed development is shown on the Landscape Masterplan (CSA/3823/111).
- 1.2 The approach and prescriptions set out within this document are in line with National and local planning policy (as summarized within Section 2), and seeks to provide the relevant information pursuant to of the outline consent, as follows:

Condition 13

"Prior to the commencement of construction works or any preparatory works detailed Ecological Management and Mitigation Plan including a Schedule of Works shall be submitted to the LPA for approval and will be based on the recommendations within the supporting Preliminary Ecological Appraisal Report, and the Bat and Reptile Survey Report (September 2017). All approved details shall then be implemented in full and in accordance with the agreed timings and details.

The Ecological Management and Mitigation Plan shall include but not be restricted to:

- *Timings for clearance of trees or scrub to avoid impacts on breeding birds*
- *Two phased cutting of grassland along site boundaries to deter reptiles and amphibians*
- *Details of compensatory and additional tree planting*
- *Details of compensatory boundary habitat planting*
- *Details and location of bird and bat boxers, log piles around the site boundaries*
- *Creation of at least three wildlife ponds**
- *Boundary features to measure at least 5m width for the majority of the site to allow for commuting badgers*
- *Measures to minimise the disturbance of badgers.*

Should the detailed layout of the site require the removal of further trees which have the potential to support bats, a climbed tree inspection survey will be required."

* It has been agreed via email confirmation from the case officer on 10.09.2018 that one wildlife pond is satisfactory.

- 1.3 The Site occupies an area of c. 11ha and is located around central grid reference SU 97310 0622, in the northern extent of Walberton. It consists of an arable field bordered by native hedgerows and trees, with a small paddock of semi-improved grassland and occasional patches of dense scrub (as shown in the Habitats Plan CSA/3823/100, provided in Appendix A).
- 1.4 Important Ecological Features (IEFs) identified within this report comprise the following:
 - **Habitats and Flora:** Native hedgerows, trees and woodland.
 - **Fauna:** Bats, nesting birds, badgers, other mammals, reptiles and amphibians
- 1.5 This document sets out how potential impacts of development construction and operation will be addressed and details ecological enhancement measures to be delivered in line with the 'mitigation hierarchy' set out within the British Standard BS 42020:2013, which involves the following step-wise process:
 - **Avoidance** – avoiding adverse effects through good design;
 - **Mitigation** – where impacts are unavoidable, mitigation should be employed to minimise adverse effects;
 - **Compensation** – where residual effects remain after mitigation it may be necessary to provide compensation to offset any harm;
 - **Enhancement** – maximise opportunities to deliver biodiversity benefits, which can be delivered alongside the above to resolve potential adverse effects.
- 1.6 Mitigation to be implemented to avoid, mitigate and / or compensate for potential impacts to these IEFs are set out within this document, together with details of implementation and legal responsibilities (as appropriate) and monitoring.
- 1.7 Mitigation prescriptions have been informed by ecological survey information collected between 2017 and 2018, provided as part of the Ecological Assessment (EPR Ltd, June 2017; Ref. P17/01-1C), addendum reports detailing survey results in relation to reptiles and bats (Pursuant to Condition 12 of the outline planning consent (EPR Ltd, 31 August 2017 and 21 September 2017)) and Ecological Technical Note (CSA/3823/01), which should be read in conjunction with this report.

2.0 RELEVANT LEGISLATION AND PLANNING POLICY

Legislation

2.1 Key wildlife legislation of relevance to ecological features identified within this Strategy are listed below:

- The Conservation of Habitats and Species Regulations 2017 (as amended)
- Wildlife and Countryside Act 1981 (as amended)
- Protection of Badgers Act 1992
- Natural Environment and Rural Communities (NERC) Act 2006
- The Hedgerow Regulations 1997

European Protected Species

2.2 The **Conservation of Habitats and Species Regulations 2017** (as amended) enacts the Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora, and Council Directive 79/409/EEC on the Conservation of Wild Birds, into UK law. The Regulations allow for the designation of Statutory Nature Conservation-sites (SACs and SPAs) and European Protected Species ('EPS' including all UK bat species, great crested newt, hazel dormouse and otter) which are assigned a greater level of protection than under national legislation.

2.3 These regulations make it an offence to deliberately capture, injure, kill or disturb (impairing their ability to survive, breed reproduce or rear/nurture their young) an EPS or to damage or destroy a breeding site or resting place of an EPS. Where development is proposed that would result in an offence under the Habitats and Species Regulations an EPS licence needs to be granted by Natural England to permit an act that would otherwise be unlawful. This provides for a specific derogation from the legislation, to prevent a legal infringement occurring.

2.4 EPS species of relevance to the proposed development and this EMMP comprise the following;

- **Bats** - Potential impacts to bat foraging and dispersal considered in relation to construction and operation phases (habitat protection and lighting disturbance); and bat roosting (trees with low roosting potential identified within the Site.)

UK Protected Species

2.5 The **Wildlife and Countryside Act 1981** (as amended) forms the primary piece of UK legislation relating to the protection of habitats and species. The following fauna protected by this legislation, of relevance to construction and operational phases of development are as follows:

- **Birds** - With regards to wild birds, the Act makes it an offence to kill, injure or take any wild bird, or to take, damage or the nest of a wild bird, or to take or destroy eggs. Potential for impacts to nesting birds nesting during vegetation clearance. Species listed on Schedule 1 of the Wildlife and Countryside Act, 1981; therefore the birds, their nests, eggs and young are fully protected at all times throughout the UK. It is also an offence to intentionally or recklessly disturb Schedule 1 species at an active nest site with eggs or young or before eggs are laid, or to disturb the dependent young.
- 2.6 Under Section 5, Schedule 9(4) of the Act it is an offence to intentionally or recklessly disturb a species whilst occupying a structure or place which it uses for shelter or protection, or to obstruct access to such a place. This schedule will be of relevance to the following:
- **Bats** – A number of trees with roosting potential for bats are present across the Site.
- 2.7 Under Section 5, Schedule 9(1) of the Act is an offence to intentionally or recklessly kill or injure a species listed under this schedule. This schedule will be of relevance to the following:
- **Reptiles** - Not recorded on Site, but precautionary measures considered to be relevant to construction and operation phases (should reptiles disperse from adjacent suitable areas into marginal areas of habitat present on-Site)
- 2.8 The **Protection of Badgers Act, 1992** affords protection to badgers and their setts. It is considered likely that badgers will use the site for commuting and foraging and although no badger setts have been identified on Site there is potential for new excavations to be made. Therefore potential impacts to this species which could occur during the site preparation and construction phase have been considered. Precautionary measures to be implemented in order to avoid any potential impacts to badgers and an offence are set out herein.

Priority Species for Conservation

- 2.9 Section 40(1) of the **Natural Environment and Rural Communities (NERC) Act 2006** states that each public authority “must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity”. This legislation makes it clear that planning authorities should consider impacts to biodiversity when determining planning applications, with particular regard to the Section 41 list of 56 habitats and 943 species of principal importance, irrespective of whether they are covered by other legislation.
- 2.10 The S41 list was taken forward for action under the UK BAP (first published in 1994). The UK BAP has now been superseded by the Biodiversity 2020 Strategy, which continues to prioritise the S41 list, setting national targets for the period to 2020, and the UK Post-2010 Biodiversity

Framework, which shows how these contribute to targets at the European level. Whilst BAPs are therefore no longer formally recognised, many of the tools and resources originally developed for the BAP remain in use, such as the background information which still forms the basis of work at national level. However, the Sussex BAP has not been update since 2007 and no current target for biodiversity within Sussex are currently available.

2.11 S41 list species and Birds of conservation Concern (BoCC) of relevance to the 'construction and operational phases' include:

- **S41 Habitats** (woodland, hedgerows);
- **S41 bat species** (habitats at the site have the potential to support a range of S41 bat species e.g. common pipistrelle, soprano pipistrelle *Pipistrellus pygmaeus*, brown long-eared *Plecotus auritus* and barbastelle bat *Barbastella barbastellus*);
- **S41 reptile species** (survey work completed in 2017 did not indicate that reptiles are currently present on this site however habitats at the site could have the potential to support a range of S41 reptile species in the future e.g. slow worm *Anguis fragilis*, common lizard *Zootoca vivipara*, grass snake *Natrix natrix* and adder *Vipera berus*);
- **S41 bird species** (hedgerow and tree along the Site margins have the potential to support a range of S41 and/or SBAP species e.g. linnet *Carduelis cannabina* starling *Sturnus vulgaris*, house sparrow *Passer domesticus*, song thrush *Turdus philomelos* and yellowhammer *Emberiza citrinella*);
- **BoCC bird species** (habitats at the site have the potential to support a range of BoCC species e.g. dunnock *Prunella modularis*).

Planning Policy and Guidance

2.12 Relevant national and local planning policy and guidance considered within the Strategy document are listed below:

- National Planning Policy Framework (NPPF)
- Arun District Local Plan 2003 saved policies
- Arun District Local Plan 2011-2031 draft policies
- Walberton Neighbourhood Development Plan 2015 – 2035

National Planning Policy Framework

2.13 Within the NPPF with regards to ecology and biodiversity, Chapter 15: Conserving and Enhancing the Natural Environment, paragraph 170, states that the planning system and planning policies should “minimise impacts on and provide net gains for biodiversity, including by *establishing coherent ecological networks that are more resilient to current and future pressures*”.

- 2.14 Paragraph 175 sets out the principles that local planning authorities should apply when determining planning applications and advises that they should refuse planning permission if:
- Significant harm to biodiversity resulting from a development cannot be avoided.
 - Development results in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees).
- 2.15 It also states that development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity.

Arun District Development Plan

- 2.16 Within the Arun District Local Plan 2011-2031, the relevant wording of policies of importance to the proposed development include:

Policy	Relevant Wording
Policy ENV SP1 Natural Environment	<i>"Arun District Council will encourage and promote the preservation, restoration and enhancement of biodiversity and the natural environment through the development process and particularly through policies for the protection of both designated and non-designated sites. Where possible it shall also promote the creation of new areas for habitats and species".</i>
Policy ENV DM4 Protection of Trees	<i>"Development will be permitted where it can be demonstrated that trees protected by a Tree Preservation Order(s), (TPO) identified as Ancient Woodland, in a Conservation Area or contributing to local amenity, will not be damaged or destroyed now and as they reach maturity, unless:</i> <i>a. Would result in the removal of one or more trees in the interests of good arboricultural practice. This shall be demonstrated by the developer following the advice of a suitably qualified person which shall be guided by BS 5837 (2012). Details of any advice received having regard to BS 5837 (2012) shall be submitted, in writing, as part of a planning application; or</i> <i>b. Would enhance the survival and growth prospects of other protected trees;</i> <i>c. The benefits of the proposed development in a particular location outweigh the loss of trees or woodland, especially ancient woodland.</i> <i>Proper provision must be made for the protection and management of trees or areas of woodland onsite when undertaking development. A management plan shall be provided as part of a planning application in accordance with BS 5837 (2012) in order to ensure that trees are adequately protected during development and appropriately maintained in the future. Conditions for the continued protection of trees on sites shall be included in any planning permission given.</i>

	Where there are existing trees on or adjacent to a development site, developers shall be required to provide: g. Land and tree surveys h. A tree constraints plan i. An arboricultural impact assessment to include a tree protection plan and arboricultural method statement These will ensure that development is planned to take a comprehensive view of tree issues at an early stage in the design process and that development works do not have a negative impact on existing trees".
Policy ENV DM5 Development and Biodiversity	"Development schemes shall, in the first instance, seek to achieve a net gain in biodiversity and protect existing habitats on site. They shall also however incorporate elements of biodiversity including green walls, roofs, bat and bird boxes as well as landscape features minimising adverse impacts on existing habitats (whether designated or not). Development schemes shall also be appropriately designed to facilitate the emergence of new habitats through the creation of links between habitat areas and open spaces. Together, these provide a network of green spaces which serve to reconnect isolated sites and facilitate species movement. Where there is evidence of a protected species on a proposed development site, planning applications shall include a detailed survey of the subject species, with details of measures to be incorporated into the development scheme to avoid loss of the species. This involves consideration of any impacts that will affect the species directly or indirectly, whether within the application site or in an area outside of the site, which may be indirectly affected by the proposals. All surveys shall be carried out at an appropriate time of year and shall be undertaken by a qualified and, where appropriate, suitably licensed person. All developments shall have regard to Natural England's standing advice for protected species".
GI SP1: Green Infrastructure and Development	"Green Infrastructure and development The existing Green Infrastructure Network, as shown on the Green Network Maps for each parish and town, must be considered at an early stage of the design process for all major development proposals. All major development must be designed to protect and enhance existing Green Infrastructure assets, and the connections between them, in order to ensure a joined up Green Infrastructure Network. The Green Infrastructure Network must be protected from light pollution to ensure that areas defined by their tranquillity are protected from the negative effects of light in development. Where compatible with nature conservation objectives, development proposals must identify opportunities to connect existing Green Infrastructure assets with the coast, the South Downs National Park or to the District's inland villages. Opportunities to enhance the network should take account of the multiple functions of Green Infrastructure assets and should be based upon those opportunities set out in the supporting text".

3.0 AIMS AND OBJECTIVES

Overview

- 3.1 In line with national and local planning policy, this strategy aims to minimise adverse effects on protected species and IEFs during the construction and operation phases of development. To meet this aim, objectives have been set out for each protected species and IEF below.
- 3.2 Where appropriate, impact avoidance and mitigation measures during the construction and operational phases (including management and monitoring) are provided in the sections below, along with proposed biodiversity enhancements.
- 3.3 Further details regarding mitigation, compensation and enhancement measures are provided within the Landscape Management Plan (LEMP) (CSA/3823/03).

Aim

- 3.4 The Strategy aims to retain, protect and where possible reinstate semi-natural habitat resources (with a focus on S41 habitats protected under the NERC Act 2006) across the Site. This Strategy also aims to avoid or minimise adverse effects to protected species, or compensate for these effects if they cannot be prevented

Objectives

Avoidance

- Retain and protect hedgerows, trees, woodland and grassland on-Site, wherever possible.
- Retain habitat which is suitable to support protected species on-Site, where possible.

Mitigation

- Undertake replacement hedgerow and tree planting, or grassland seeding, of equal or greater quality or quantity to that which is lost.
- Where habitat is lost as a result of development seek to reduce potential impacts through sensitive working practices, timing of works and mitigation provision, in particular to protected species at risk of harm or disturbance (bats, badgers, nesting birds, reptiles and amphibians) if present.
- Minimise potential for visitor related impacts to habitats the fauna they support onsite and in the local area through the provision of suitable formal and informal POS within the development.

- Ensure that mitigation is legally compliant and subject to Natural England licencing as appropriate.

Compensation

- Compensate / offset any residual impacts from development where this is not possible through impact avoidance and mitigation measures
- Undertake habitat creation which will be in line with national and local planning policy.

Enhancement

- Ensure that habitat management practices ensure that the value of retained and newly created habitats are maximised through the implementation of a suitable Landscape and Ecology Management Plan (LEMP).
- Provide habitat enhancement features of benefit to S41 species known to be present onsite / locally.
- Provide long-term benefits for wildlife during the operational phases through suitable habitat provision and management.

Policy and legislation

- Objectives are in line with the NPPF and Local Planning Policy (Arun District Council saved policy GEN 29, and draft policies ENV SP1 and DM5) by maintaining the conservation status of habitats present and the fauna they support.
- Protection of trees, woodland and hedgerows will also be in line with saved policies GEN28 and draft policy ENV DM4 (Arun District Council, 2014).
- The above objectives will ensure that the proposed development is in line with legislation contained within the Conservation of Habitats and Species Regulations 2017, the Wildlife and Countryside Act 1981 (as amended), and the Protection of Badgers Act 1992.
- These objectives will aim to conserve species of conservation interest, and biodiversity, which will be in line with national planning policy, saved policy GEN 29, and draft policies ENV SP1 and DM5.

4.0 IMPACT AVOIDANCE AND MITIGATION MEASURES

Habitats and Flora

Hedgerows, Trees and Woodland

- 4.1 The majority of hedgerows and trees on-Site will be retained and protected with significant semi-natural habitat buffers (5m in width). These features will be protected during construction by tree protection fencing in line with BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations (BSI, 2012). The habitat buffers will help to further reduce potential impacts to retained vegetation.
- 4.2 The minimal loss of trees (c. 17m of tree line) to facilitate new vehicle and pedestrian access will be mitigated for through replacement planting. The proposed development will include new native thicket, hedgerow and tree planting (c.0.5ha of thicket planting, c. 0.12ha of native hedgerow planting and over 190 new trees), with scope for additional planting in the POS and residential parcels.
- 4.3 All construction will strictly adhere to a Construction Environmental Management Plan (CMP) as required under Condition 6 of the outline planning consent. The CMP will ensure the impact to onsite habitats from construction noise, dust and run-off is minimised.

Fauna

Roosting Bats

- 4.4 One tree (at the eastern end of G1 on the Tree Survey and Constraints Plan. Ref: BHA_401_01) was assessed as having low potential to support bats and is scheduled to be removed to facilitate the scheme. This tree was subject to an activity survey in August 2017 (Pursuant to Condition 12 of the outline planning consent) which recorded no bats emerging from the tree. Under the current development proposals, no other trees considered to hold potential roosting opportunities for bats will be lost.
- 4.5 A precautionary approach to tree felling will be undertaken and methods will be used which minimise the risk of killing or injury to roosting bats in line with the Bat Conservation Trust guidelines for trees with low roosting potential¹. This will include sectional felling of any trees requiring removal following a pre-works check by a suitably qualified ecologist.

Foraging and Commuting Bats

- 4.6 The majority of trees, hedgerows and boundary woodland currently present which is likely to be utilised by bats for foraging and commuting will be retained, with significant buffers (a buffer of c. 24m from the woodland along the western boundary and a minimum buffer of 2.5m between the development area and boundary vegetation) from new

¹ Collins, J., ed. (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines*. 3rd ed. London: The Bat Conservation Trust.

development being provided in many parts of the Site through the creation of new semi-natural habitats (wildflower and wet meadow seeding, a number of SUDs features in the southern extent of the Site which will include two wet wildlife ponds) which will also be of value to bats due to the invertebrate prey they will support. Details regarding wildflower mixes are provided on the Landscape Plans (CSA/3823/101-106).

4.7 Light spill onto habitat used by commuting and foraging bats will be minimised through a sensitive lighting scheme design as detailed below. The scheme aims to:

- Achieve a maximum light-spill of 1 lux onto the woodland edge to the west and retained boundary vegetation.
- Directional light sources and shielding, including anti-glare shields, louvres and cowls, will be used as appropriate as part of any lighting strategy to minimise light spill.
- Lighting columns to be erected alongside mature trees and hedgerows will be aligned to minimise light spill onto these habitat corridors.
- Where light spill onto retained / created habitats cannot be avoided additional mitigation measures, such as restricting the time periods when lighting is turned on, should be considered to ensure that habitat useable resources do not become fragmented by light disturbance.

Badger

4.8 Three mammal tunnels with no signs of activity were identified at the base of the mature pedunculate oak *Quercus robur*, located centrally within the south of the Site (T28 on the Tree Survey and Constraints Plan. Ref: BHA_401_01). An additional five small tunnels, two of which are collapsed and one of which looks to be in use by rabbit, were identified along the western boundary of the Site. No evidence of badger using these tunnels or being active across the Site (i.e. latrines / foraging signs) was recorded during the survey, however it is considered likely that badgers could use the Site for dispersal and foraging purposes.

4.9 As no signs of badger have been recorded, therefore on-Site impacts upon badgers are not currently anticipated. However, badgers are highly mobile and it is possible that new setts could be created onsite at any time. Hence, as a precaution, a pre-construction check will be completed to confirm the absence of setts prior to the start of site clearance and construction works. Should any active setts be identified which would be impacted by the construction phase, appropriate mitigation (i.e. sett closure) would need to be undertaken under licence from Natural England before works could commence.

4.10 Precautionary measures to be implemented during the construction phase, to prevent any harm / injury to badgers which may cross the site,

shall comprise the following and will be detailed within the CMP which should reference this report:

- Where any pits/trenches are left open overnight, secured planks should be placed within these at an angle of no more than 45 degrees in order to provide a means of escape for any badgers.
- In the event that badgers are found to be trapped or injured within the site no attempt should be made to approach the badger and the RSPCA should be contacted immediately.
- Due to the inquisitive nature of badgers any litter, tools and machinery that could potentially cause harm should be kept away from badgers by appropriate overnight storage.
- Avoid presenting new digging opportunities for badgers, e.g. by leaving stockpiled soil on the edge of the development for prolonged periods.

Nesting Birds

- 4.11 The majority of suitable foraging, dispersal and nesting resources will be maintained through the retention of semi-natural habitats within the POS and retained trees will be protected during construction.
- 4.12 The proposed development will result in some minor loss of nesting habitat (c. 0.1ha of scrub and c. 17m of trees) for species which nest in scrub vegetation such as dunnock *Prunus modularis*. This is limited to the north east of the Site to allow for new vehicular access.
- 4.13 Any removal of hedgerows or trees during the construction phase will be undertaken sensitively, avoiding the peak nesting season of 01 March to 01 September inclusive. If this is not feasible, clearance / demolition will immediately follow a check by a suitably qualified ecologist to confirm there are no active birds' nests present.
- 4.14 If an active bird's nest is found, an exclusion zone will be set up around the nest and no works will take place until the ecologist has verified that all dependent young have fledged. The radius of this exclusion zone will be species-dependent, varying according to the conservation status and vulnerability to disturbance of the species in question.
- 4.15 Habitat loss will be mitigated for through replacement planting, including native thicket, hedgerow and tree planting, with scope for additional planting in the POS and residential parcels.
- 4.16 Disturbance impacts to nesting and foraging birds during the operational phase of development shall be minimised through the sensitive design of access routes through POS, with some dense undisturbed areas of scrub and trees being maintained.

Reptiles

- 4.17 Although no reptiles have been recorded on Site, the area of semi-improved grassland in the north east of the Site and grassland field

margins / areas of scrub provide suitable habitat for reptiles to disperse into the Site from suitable habitat adjacent if left unmanaged.

4.18 As no reptiles have been found on-Site but there is potential for reptiles to disperse into the Site, habitat manipulation and displacement into retained habitat will be undertaken to minimise the risk of harming individuals which could disperse in. Where suitable reptile habitat will be lost, the following approach will be taken to minimise the risk of killing / injury of individuals:

- Habitat manipulation works shall take place between April and October, during the reptile active period (to avoid potential impacts to hibernating reptiles);
- Habitat manipulation works shall be undertaken during dry and warm conditions (above 10°C) when reptiles will be active and able to move away from disturbance;
- The working area will be subject to a visual search for reptiles by a suitably experienced ecologist prior to any vegetation removal works commencing.
- Grassland habitat will gradually be cut, in a systematic manner working from the east of the construction working area required towards the west and north, to encourage any reptiles that may be present to disperse away from the working area to retained habitat along the western and northern boundaries of the north east extent of the Site. The first round of cutting shall be taken to c.20cm above ground level, unless already at this level or below due to current farming practices.
- A second round of cutting, to ground level shall be undertaken after a period of 24hrs has elapsed, allowing time for any reptiles still present to disperse.
- Any reptiles found within the working areas during the vegetation removal works shall be placed within retained habitat in the north of the Site, which will be retained and managed for reptiles and other wildlife in the long term.
- Habitat manipulation will be used to displace reptiles into the retained habitat along the northern, western and southern boundaries of the Site, predominantly the boundaries of the north eastern corner.
- Retained habitat will be enhanced through creation of log piles and hibernacula to raise its carrying capacity, and ensure that a population can be supported.
- As a final stage turf will be stripped from construction zones, to remove any habitat resource which may attract reptiles to recolonize prior to construction commencing.

Amphibians

4.19 Although there are no ponds present on-Site some suitable terrestrial habitat connects the Site to off-Site ponds within a dispersible distance of the Site, including four ponds within the adjoining golf course to the

north. Great crested newt have not been recorded within any of the ponds; however other amphibian species are present. As such, precautionary measures as outlined for reptiles will be employed to reduce the risk of harming any individuals present within the Site.

Invertebrates

- 4.20 Development is not anticipated to have a significant impact on the local invertebrate population, although removal of grassland and hedgerows will remove some foraging and sheltering opportunities. To mitigate for this new flower, shrub and tree planting will occur with open green spaces at the Site to provide new opportunities for invertebrates. Wildflower seed mixes (such as Emorsgate EM2- Standard General Purpose Meadow Mixture, EM8- Meadow Mixture for Wetland and EG1- General Purpose Meadow Grass Mixture) will be used throughout semi-natural green infrastructure planting, providing a more diverse resource for pollen-/nectar –feeding species.

5.0 COMPENSATION AND ENHANCEMENT MEASURES

Native Grassland Creation

- 5.1 The proposed scheme will provide the scope for a significant amount of new meadow seeding using wildflower seed mixes (such as Emorsgate EM2- Standard General Purpose Meadow Mixture, EM8- Meadow Mixture for Wetland and EG1- General Purpose Meadow Grass Mixture) within the POS along the southern and western boundaries, and within the SUDs basin. The ecological value of retained areas of existing grassland and new species-rich native grassland seeding will be maximised through the implementation of appropriate management to be secured through a LEMP.
- 5.2 Species rich native grassland areas will be managed as meadow habitat, with a single hay cut taken in August or September depending on the species mix allowing sufficient time for flowering and seeding. Grass cutting and clearance of encroaching scrub will be in line with herptile mitigation measures as appropriate, to ensure that opportunities for herptiles continue to be provided across the site in the long term. Further details are provided in section 5.19 below.
- 5.3 Habitat creation will increase foraging opportunities a variety of fauna. The value of these areas of informal open space shall be maximised by avoiding the use of pesticides to ensure that healthy invertebrate (e.g. worm / mollusc) populations thrive which provide an important foraging resource for badgers, bats, birds and herptiles.
- 5.4 In the POS sensitive design of access routes and management practices which retain some dense undisturbed areas of scrub will be implemented to discourage access from people and dogs, to minimise habitat disturbance to herptiles, birds and other species.

Hedgerow, Buffer and Tree Planting

- 5.5 The proposed scheme will provide the scope for a significant amount of new thicket, hedgerow and tree planting within the POS (c. 0.5ha of thicket planting, c. 0.12ha of native hedgerow planting and over 190 new trees). Within informal areas of open space, native species of known benefit to wildlife will be selected to maximise the biodiversity value, such as hazel *Corylus avellana*, dog rose *Rosa canina*, holly *Ilex aquifolium* and hawthorn *Crataegus monogyna* and blackthorn *Prunus spinosa*. A community orchard will also be located in the south extent of the Site and will include native cultivars such as *Malus* 'Annie Elizabeth'.
- 5.6 Landscape design will seek to provide a range of eco-tones between areas of tree / woodland planting and grassland areas through the use of low growing shrubs at woodland block margins. Through this habitat diversification, a habitat matrix will be produced, offering a greater variety of opportunities for wildlife. This will benefit invertebrates and

herptiles in particular by creating open basking opportunities and refuge areas. Foraging resources will be increased for a range of fauna, including bats and birds.

- 5.7 Within development areas, the use of native tree and hedgerow planting shall be incorporated into areas of more formal planting as appropriate. This will provide benefits in terms of habitat connectivity and green infrastructure as well as boosting resources across the development, in line with Policy GI SP1 of the Arun District Local Plan 2011-2031.
- 5.8 The new planting will compensate for the minor loss of current bird nesting habitat through hedgerow, scrub and tree removal, with a net gain of available foraging and nesting habitat. Natural roosting opportunities for bats, such as abandoned woodpecker holes, rot holes and splits, will take significantly longer to develop, however a number of trees present on-Site which support these features are to be retained.
- 5.9 Sensitive management of hedgerow and tree planting, along with retained existing habitat, will be delivered through the LEMP. Management shall take account of ecological constraints such as the bird nesting period (March to August inclusive), herptile active season (March to September inclusive), and aim to maintain or increase the abundance and diversity of invertebrate prey species.

Wildlife Features

- 5.10 A number of SUDs basins and swales are to be provided within the southern extent of the Site, including two wet ponds at the head of the drainage basins which will be enhanced to benefit wildlife. The western basin will be c. 177m² and will hold a permanent water volume of c. 111m³, while the eastern basin will be c. 155m² and will hold a permanent water volume of c. 117m³. The basins will be seeded with species-rich wildflower wet meadow mixes and with grassland seeding to the banks to provide suitable terrestrial habitat for amphibians. Native aquatic and marginal species will also be included to provide suitable aquatic habitat. Marginal species will include meadow sweet *Filipendula eulmaria*, yellow iris *Iris pseudacorus*, meadow buttercup *Ranunculus acris*, greater pond sedge *Carex riparia* and soft rush *Juncus effesus*. Submerged/emergent species will include water-starwort *Callitriche stagnalis*, water forget-me-not *Myosotis scorpioides* and water soldier *Stratiotes aloides*.
- 5.11 The proposed development scheme is considered to offer significant scope for the provision of compensatory habitat for amphibians (i.e. through new planting, of SuDS basin, log piles), and subject to sensitive working practices / seasonality of vegetation works direct impacts could be avoided and the suitability of on-Site habitats retained.
- 5.12 To enhance roosting opportunities for bats across the site a total of:-

- **5 artificial bat roost boxes** (2FN Bat Box or equivalent; see Appendix C) will be erected on retained trees along the Site boundaries and within the open space and along Site boundaries.
 - **5 bat tubes** (Habibat, or similar) will be installed into new buildings or garages within the development by way of enhancement.
- 5.13 These will be placed in sheltered areas close to retained / new planting and away from new external light sources. All bat boxes / tubes should be located:-
- with a broadly south-facing aspect,
 - at a height of c. 3-6m above ground level and
 - away from areas which could be accessible by predators (e.g. domestic cats).
- 5.14 Details of the locations and specifications of new bat roost enhancement features are provided on the Ecological Mitigation and Enhancements Plan in Appendix B.
- 5.15 Lost nesting opportunities for bird species which nest in the on-Site areas of scrub, hedgerow and trees will be compensated for and enhanced with the provision of a variety of artificial, purpose-built nest boxes. A total of:-
- **5 bird boxes** will be installed into new buildings within the development (NHBS integrated starling box, terraced sparrow box, and swift box or equivalent; see Appendix C).
 - **5 woodcrete nest boxes** (1MR Avianex nest box, or equivalent; see Appendix C) will be erected on trees throughout the proposed POS and along the Site boundaries.
- 5.16 These will be placed in sheltered areas close to retained / new planting and away from new external light sources. All bird boxes should be located:-
- with a broadly north-facing aspect
 - away from direct sunlight and prevailing winds,
 - at a height of c. 2-4m above ground level and
 - away from areas which could be accessible by predators (e.g. domestic cats).
- 5.17 The locations of the bird boxes are provided on the Ecological Mitigation and Enhancements Plan in Appendix B.
- 5.18 The proposed development provides good scope for the future dispersal of reptiles into the Site and the establishment of a stable population. New planting will provide additional opportunities for reptiles, including seeding of native species-rich wildflower meadow

and wet meadow will be provided in the southern extent of the Site with new thicket planting, and creation of a wildlife pond and SUDs features.

5.19 The POS will be designed and managed to ensure it remains suitable to support reptiles, including grassland with a dense and tussocky sward, and some scrub to provide cover and foraging resources for reptiles. Appropriate management measures are set out below:

- Existing grassland and hedgerow bases will be retained where possible, and additional areas of meadow created within the POS.
- Following establishment, some areas of grassland will be left to grow long during the summer, with a hay cut taken in late summer to no lower than 150mm.
- Cutting within long grassland must occur during suitable weather conditions (warm and sunny, temperature at least 10°C) to minimise the risk of harming reptiles.
- Low intervention scrub management will help to maintain open grassland areas for basking reptiles which will involve annual strimming back of encroaching scrub in late autumn.
- Arisings from habitat management will be raked up and used to make habitat piles, which will provide refuge, foraging and egg-laying resources for reptiles and other fauna.
- Access routes and planting in the POS have been sensitively designed with an aim to minimise disturbance from walkers and dogs. Some have been designed to limit public access through the absence of recreational paths and planting of dense, thorny plant species in key locations.

5.20 To enhance sheltering opportunities for herptiles and invertebrates, dead wood arising through habitat management will be retained onsite and used to create log or brash piles. A minimum of three log piles, one hibernacula, and one invertebrate box will be provided within the POS. Log piles should be secured to the ground with wire, where possible, to avoid vandalism or collapse. Specifications for the construction of the hibernacula are provided in Appendix C. Locations of the hibernacula and invertebrate box are provided on the Ecological Mitigation and Enhancements Plan in Appendix B.

6.0 IMPLEMENTATION AND MANAGEMENT

Implementation

- 6.1 Implementation of the Site enhancement measures detailed in this report will be the responsibility of Linden Homes Southern and will be delivered alongside the construction and operational phases of development as detailed in Table 2 below.

Table 2. Work Schedule to cover delivery of ecological mitigation works. (ECoW = Ecological Clerk of Works)

Ecological receptor	Task	Works Phase	Implemented by
Trees / shrubs	Installation of Tree Protection Fencing	Construction	Linden Homes Southern
	New tree / shrub planting	In line with Construction Programme; within suitable planting season (Nov – March)	Linden Homes Southern / Landscape Contractor
Grassland	New wildflower seeding	In line with Construction Programme; within suitable planting season (April / late summer)	Linden Homes Southern / Landscape Contractor
Ponds and SUDs Basins	Construction of SUDs basins, two SUDs wildlife ponds and marginal planting	In line with Construction Programme; within suitable planting season (April / late summer)	Linden Homes Southern / appointed contractor
Bats	Precautionary measures for tree felling	In line with Construction Programme	ECoW
	Implementation of sensitive lighting strategy	Construction & operation	Linden Homes Southern
	Erection of 5 bat boxes on trees within landscape buffers and, by way of enhancement of roosting opportunities	In line with Construction Programme	ECoW
	5 bat tubes to be built into new dwellings by way of enhancement	In line with Construction Programme	
Badger	Update badger survey across the site prior to any ground works or vegetation removal.	Prior to commencement of construction	ECoW
	Precautionary measures to prevent potential impacts to badgers during demolition and construction.	Construction	Linden Homes Southern
Birds	Removal of trees / scrub where birds may nest	Sept – Feb outside of the nesting bird season	Linden Homes Southern / Landscape Contractor

	Erection of bird nesting boxes within retained woodland and on trees at the margins of the Phase 1 development area.	In line with Construction Programme	Linden Homes Southern + ECoW
	Bird nesting boxes to be built into new dwellings / garage units	In line with Construction Programme	Linden Homes Southern + ECoW
Reptiles	Gradual vegetation clearance of suitable areas where reptiles have not been recorded to encourage dispersal of any individuals present, away from the construction zones	Prior to commencement of construction and during active season for reptiles (April to Oct)	Linden Homes Southern / appointed contractor + ECoW
	Installation of log piles and hibernacula features.	In line with Construction Programme	Linden Homes Southern / appointed contractor + ECoW
Invertebrates	Implementation of landscape planting.	In line with Construction Programme; within suitable planting period.	Linden Homes Southern / Landscape contractor
	Installation of bug box	In line with Construction Programme	Linden Homes Southern / appointed contractor + ECoW

Management

6.3 Prescriptions for habitat management of retained and newly created semi-natural habitats have been set out within this report as appropriate. A Landscape Management Plan (CSA/3823/03) has been produced alongside the detailed development proposals and includes the following:-

- Details of habitat types and areas to be provided;
- Planting and seeding specification;
- Details of management for both establishment of new habitats and ongoing management, with details of at least the first 10 years of management to be set out;
- A works schedule detailing annual management actions; and
- Details of management responsibilities and funding.

Monitoring

6.4 A programme of monitoring is included within the LEMP to ensure that the success of mitigation and management can be measured, and measures amended as necessary to achieve the objectives set out within this document. The monitoring frame work includes the following:-

- Planting – success of new planting to inform replacement as necessary;
- Pond creation – success of new pond creation providing reptile and amphibian habitat;
- Habitat Assessment – to assess the biodiversity value of habitat delivered in relation to the pre-development baseline;

6.5 The success of the mitigation and enhancement works detailed in this report will be monitored during years two and five following implementation, as detailed within the Landscape Management Plan (CSA/3823/03). Remedial actions will be taken and management regimes reviewed should populations recorded decrease.

7.0 REFERENCES

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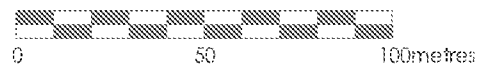
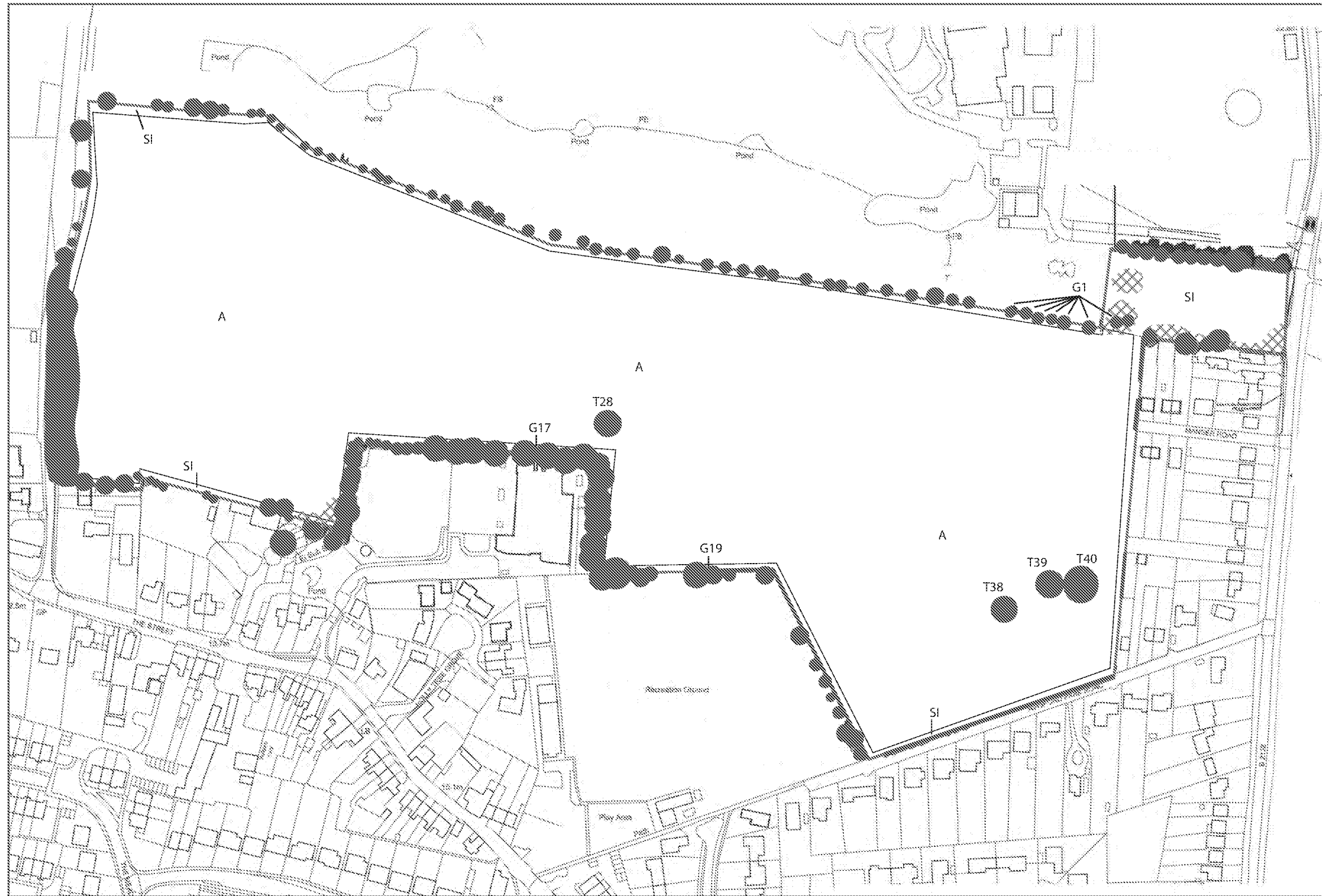
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Appendix A

Habitats Plan (CSA/3823/100)



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Brighton BN1 4ST

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Project	Land East of Tye Lane, Walberton	Date	October 2018	Drawing No	CSA/3823/100
Drawing Title	Habitats Plan	Scale	See Bar	Rev	-
Client	Linden Homes Southern	Drawn	TF	Checked	CC

Appendix B

Ecological Mitigation and Enhancement Plan (CSA/3823/114)



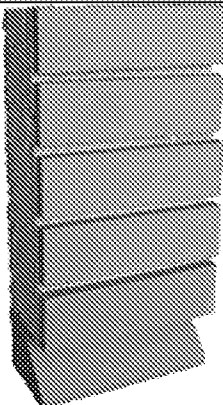
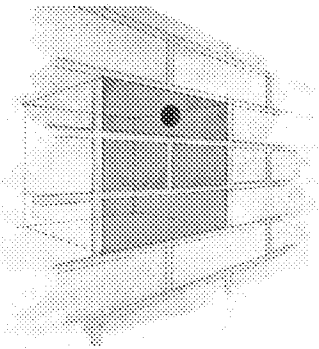
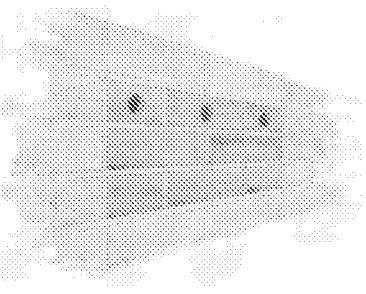
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|---|---|---|---|
|  Site Boundary |  Aquatic Planting |  5 x Bird boxes (NHBS integrated starling box, terraced sparrow box, and swift box or equivalent) to be installed onto new buildings |  3 x Log piles to be provided in areas of Public Open Space |
|  Existing Trees / Vegetation |  Wildflower Planting - EM2 Mix |  5 x Woodcrete bird boxes (1MR Avianex nest box, or equivalent) to be installed on retained trees |  1 x Hibernacula to be provided in areas of Public Open Space |
|  Native Hedge Planting |  Wildflower Planting - EM8 Mix |  5 x Bat tubes (Habitat, or similar) to be installed into new buildings |  1 x Invertebrate box to be provided in areas of Public Open Space |
|  Thicket Planting |  Meadow Planting - MG1 Mix |  5 x Artificial bat roost boxes (2FN Bat Box or equivalent) to be erected on retained trees | |

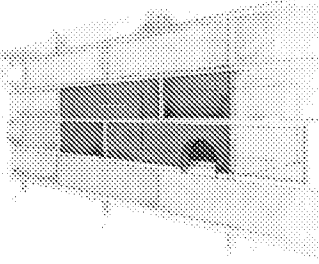
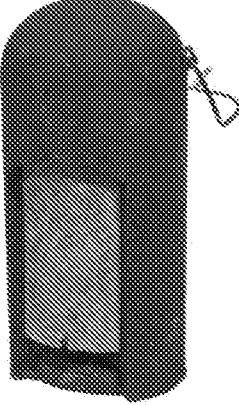
Project	Land East of Tye Lane, Walberton	Date	Oct 2018	Drawing No.	CSA/3823/114
Drawing Title	Ecological Mitigation and Enhancement Plan	Scale	See Bar	Rev	-
Client	Linden Homes	Drawn	TF	Checked	CC

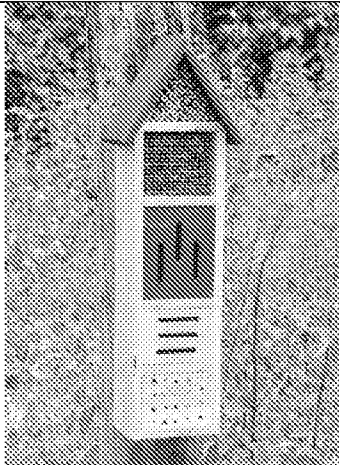
Appendix C

Specification of Proposed Wildlife Boxes and Hibernacula

Table C.1 Wildlife boxes to be installed in POS

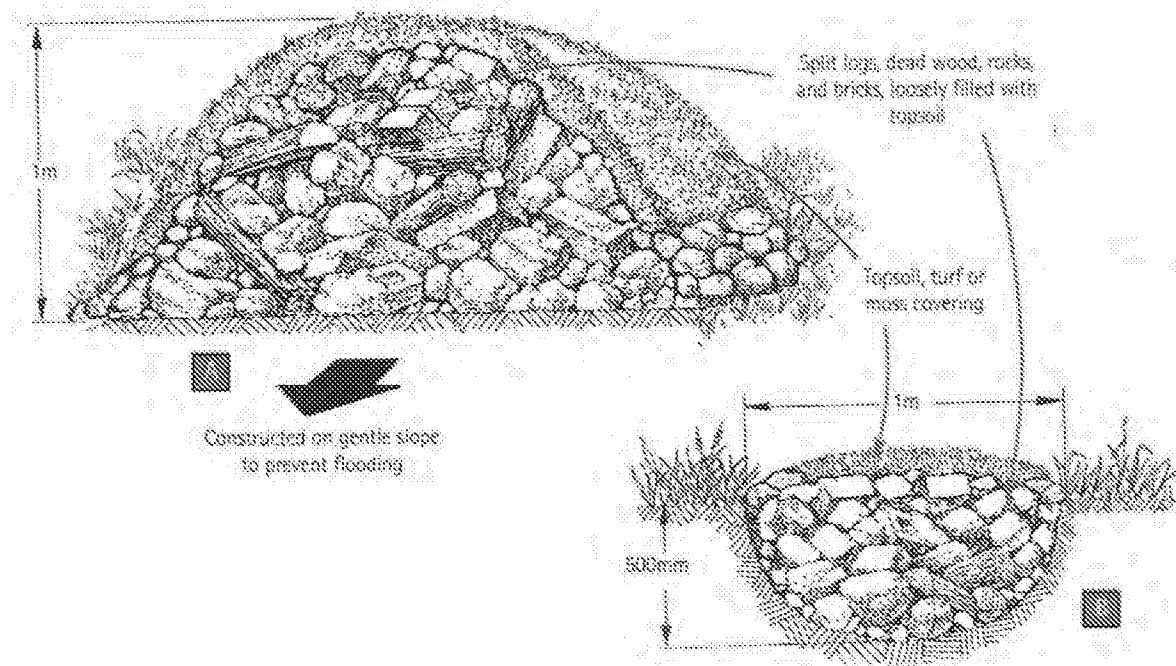
Product	Description	Location
 Habibat Bat Box (or equivalent)	Suitable for: Crevice-dwelling bats Design: Made of insulating concrete with an internal roost space. A variety of facings can be fitted to suit any existing brick, wood, stonework or rendered finish, rendering the box unobtrusive and aesthetically pleasing. Positioning: Should be sited on buildings away from possible access by domestic cats (e.g. window ledges, fences), and is best positioned at a height of between 3 to 6 metres. Should be ideally sites on southeast to southwest aspects, close to suitable foraging habitat (vegetation).	Integrated into new buildings
 Starling Box (NHBS, or equivalent)	Suitable for: Starling Design: Large, solid box made of insulating concrete with an internal nesting space which can be incorporated into the fabric of a building as it is built or renovated. The box is designed especially to be unobtrusive and aesthetically pleasing. Positioning: Should be sited on buildings away from possible access by domestic cats (e.g. window ledges, fences). Best positioned at a height of at least 2m favouring north-east to north-west orientations where possible.	Integrated into new buildings
 Terraced Sparrow Box (NHBS, or equivalent)	Suitable for: House sparrow Design: Large, solid box made of insulating concrete with three internal nesting spaces, allowing three pairs to nest close to each other. This design of box is ideal for house sparrows which are extremely social and prefer to nest near to other pairs. The box is designed to be incorporated into the fabric of a building as it is built or renovated and is both unobtrusive and aesthetically pleasing. Positioning: Should be sited on buildings away from possible access by domestic cats (e.g. window ledges, fences). Best positioned at a height of at least 2m favouring north-east to north-west orientations where possible.	Integrated into new buildings

 Swift Box (NHBS, or equivalent)	Suitable for: Swift Design: Large, solid box made of insulating concrete with three internal nesting spaces, allowing three pairs to nest close to each other. This design of box is ideal for house sparrows which are extremely social and prefer to nest near to other pairs. The box is designed to be incorporated into the fabric of a building as it is built or renovated and is both unobtrusive and aesthetically pleasing. Positioning: Should be sited on buildings away from possible access by domestic cats (e.g. window ledges, fences). Best positioned at a height of at least 2m favouring north-east to north-west orientations where possible.	Integrated into new buildings
 2FN Bat Box (or equivalent)	Suitable for: Crevice-dwelling bats Design: Woodcrete material, which will not rot, leak, crack or warp, and will last for at least 20 - 25 years, making it suitable for long-term mitigation projects Positioning: Should be sited on trees and is best positioned at a height of between 3 to 6 metres. Bat boxes should ideally be sited in open sunny positions with southeast to southwest aspects.	On mature trees within POS and on Site boundaries
 1MR Avianex nest box (or equivalent)	Suitable for: Hole-nesting bird species Design: Woodcrete material, which will not rot, leak, crack or warp, and will last for at least 20 - 25 years, making it suitable for long-term mitigation projects Positioning: Should be sited on trees and is best positioned at a height of at least 2m favouring north-east to north-west orientations where possible.	On mature trees within POS and on Site boundaries

 CJ Wildlife Insect tower	Suitable for: variety of insects Design: The nesting tubes are ideal for solitary bees to build their nests in, the vertical slots are designed to encourage butterflies, other refuge holes are perfect for ladybirds and lacewings and the pine cones offer an excellent habitat for a range of other species. Positioning: Should be sited on a tree facing north-east to north-west, in dappled shade.	On mature trees within POS and on Site boundaries
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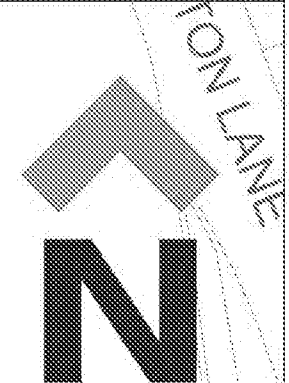
Schwegler and CJ Wildlife products can be purchased from the NHBS website www.nhbs.com

Figure C.1 Hibernacula Design Taken from Great Crested Newt Conservation Handbook. Froglife 2001. Design A can be used on impermeable soils and free-draining soils whereas B should only be used on free-draining soils.



Appendix D

Landscape Masterplan (CSA/3823/111)



XX	XX/XX/XX	XX	XX
Rev	Date	By	Description
CSA environmental			
Dixons Barns, High Street, Ashwell, North Yorkshire SG7 5NT			
t 01442 745647 e ashwell@csaenvironmental.co.uk w csaenvironmental.co.uk			
Project Land East of Eye Lane, Woberton			
Title Landscape Masterplan			
Client Linden Homes			
Scale	Not to Scale	Drawn	SW
Date	October 2018	Checked	GC
Drawing No.	CSA/3826/111	Rev	-

CSA
environmental