



Darwin Green 1 Ecological Management Plan

South Cambridge District Council Condition 8

Produced for Barrett Eastern Counties

By Applied Ecology Ltd

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1 Introduction

- 1.1 Applied Ecology Ltd (AEL) has been appointed by Barratt Eastern Counties to produce an Ecological Management Plan (EMP) with respect to satisfying South Cambridgeshire District Council planning condition 8 in relation to the DG 1 residential development, located off Huntingdon Road, Cambridge.
- 1.2 The development site boundary is shown by **Figure 1.1** and the planning condition referred to above is set out in **Table 1.1** below. The majority of the site falls within the administrative area of Cambridge City Council, with only a small area to the north of the proposed development area within the South Cambridgeshire District Council (SCDC) administrative area (land coloured pink on **Figure 1.1**).

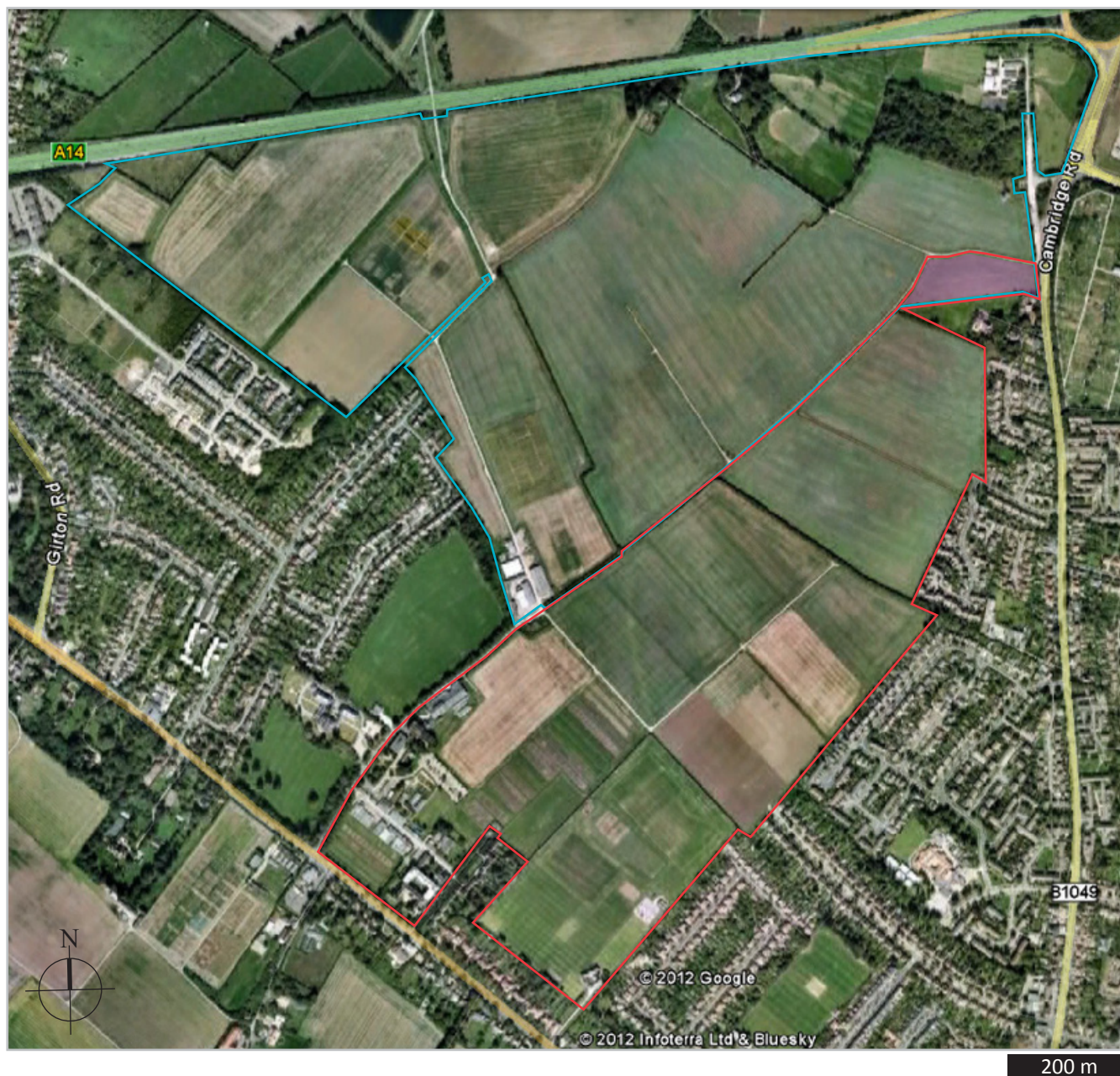
Table 1.1: DG 1 Ecology and Biodiversity Planning Condition

South Cambridgeshire District Council condition no. 7	Ecological Maintenance Plan including: <ul style="list-style-type: none"> • Habitat and Species Survey • Plan of areas of important bio-diversity • Identification of habitat and species worthy of management and enhancement • Summary work schedule table • Ten year strategy for monitoring and implementation • Confirmation of ecological clerk of works • Species and habitat protection / enhancement
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- 1.3 The following report is structured such that the condition is addressed in subsequent report chapters as follows:

Chapter 2	Habitat and Species Survey
Chapter 3	Plan of areas of important bio-diversity
Chapter 3	Identification of habitats and species worthy of management and enhancement
Chapter 4	Summary of work schedule table
Chapter 5	Ten year strategy for monitoring and implementation
Chapter 6	Conformation of ecological clerk of works
Chapter 7	Species and habitat protection/enhancement





Key

- DG 1 site boundary
- DG 2 survey area
- Land within the adminstration of South Cambridgeshire District Council

DG 1, Cambridge

Figure 1.1 - Site Boundary

2 Habitat and Species Survey

Habitats

- 2.1 The proposed development site has a central grid reference of TL 43742, 60638 and is located on the northern outskirts of the City of Cambridge on land that is primarily agricultural and dominated by large arable fields within the administrative area of Cambridge City Council. A small proportion of the DG 1 site falls within the administrative area of South Cambridgeshire District Council (SCDC) as highlighted previously on **Figure 1.1**.
- 2.2 A previous Phase 1 habitat survey of the site (2006) that was updated in 2011¹ and revisited again in April 2012, February 2013 and April 2013 by AEL has been completed. The 2012 survey found that the 2011 habitat report and map was still accurate and the 2011 Phase 1 habitat map is provided in **Appendix 1** for reference purposes.
- 2.3 The habitat map confirms that the site is dominated by arable fields that are typically bordered by species poor hawthorn *Crataegus monogyna* dominated hedgerows and a drainage ditch that holds water on a temporary basis. A single more species rich hedgerow forms part of the western boundary of the site and possesses a variety of woody hedgerow species including hawthorn, midland hawthorn *Crataegus laevigata* blackthorn *Prunus spinosa*, dogwood *Cornus sanguinea*, field maple *Acer campestre* and crab apple *Malus sylvestris*.
- 2.4 Other habitats are less well represented and include a narrow central field strip of species poor false-oat grass *Arrhenatherum elatius* dominated semi-improved grassland that is thought to be a beetle bank or similar.
- 2.5 Amenity grassland, hard standing, buildings, two small ornamental ponds and a construction working area occur close to Huntingdon Road characterise the south western part of the site.
- 2.6 All of the land within the SCDC administrative area is arable and of low biodiversity value.

Animal Species

- 2.7 The land within the DG 1 site boundary has been subject to animal species survey work in 2005-06, with selective update survey work completed in 2011. Applied Ecology Ltd has been provided with a summary of the 2006-06 work (in the form of an Environmental Statement chapter) and survey reports of the updated animal species work completed in 2011. The 2011 survey work was completed to assess the presence of badger (ibid), bats² and great crested newt³.
- 2.8 A summary of the known protected species interest of the DG 1 site is provided here based on: the data cited above; a follow-up 2012 protected species survey walkover survey

¹ LDA Design (20 August 2011). City NIAB 1 – Updated Phase 1 Habitat Survey and Badger Survey.

² LDA Design (8 February 2012) Bat Survey Report. City NIAB 1, Cambridge.

³ LDA Design (8 February 2012). Great Crested Newt Survey Report. City NIAB 1, Cambridge.



completed by AEL in April 2012; and a bat roost emergence and return to roost survey of building no. 27 – a former cricket pavilion in the south-east corner of the site completed by ecologists from AEL in July 2012. Building 27 was subjected to two previous bat activity surveys in 2011 by other ecologists.

- 2.9 A follow-up badger sett survey was completed in February 2013 and a water vole survey of water filled drainage ditches in April 2013.

Badger

- 2.10 A small number of low status outlying badger setts have been recorded in the DG 1 site previously. A walkover survey completed in April 2012 and February 2013 by AEL provides up to date information on badger sett distribution and status within the DG 1 land area and on adjoining land. Four separate badger setts were present within the DG 1 site in April 2012 and February 2013. **Figure 2.1** shows the distribution and status of these setts and other setts on off-site land.
- 2.11 None of the setts within the DG 1 site are high status breeding or annex setts, and all almost certainly occur within the territorial range of a high status main (breeding) sett located in woodland to the north of DG 1.
- 2.12 It is of note that there are no known badger setts within the DG 1 land area within the SCDC administrative area.

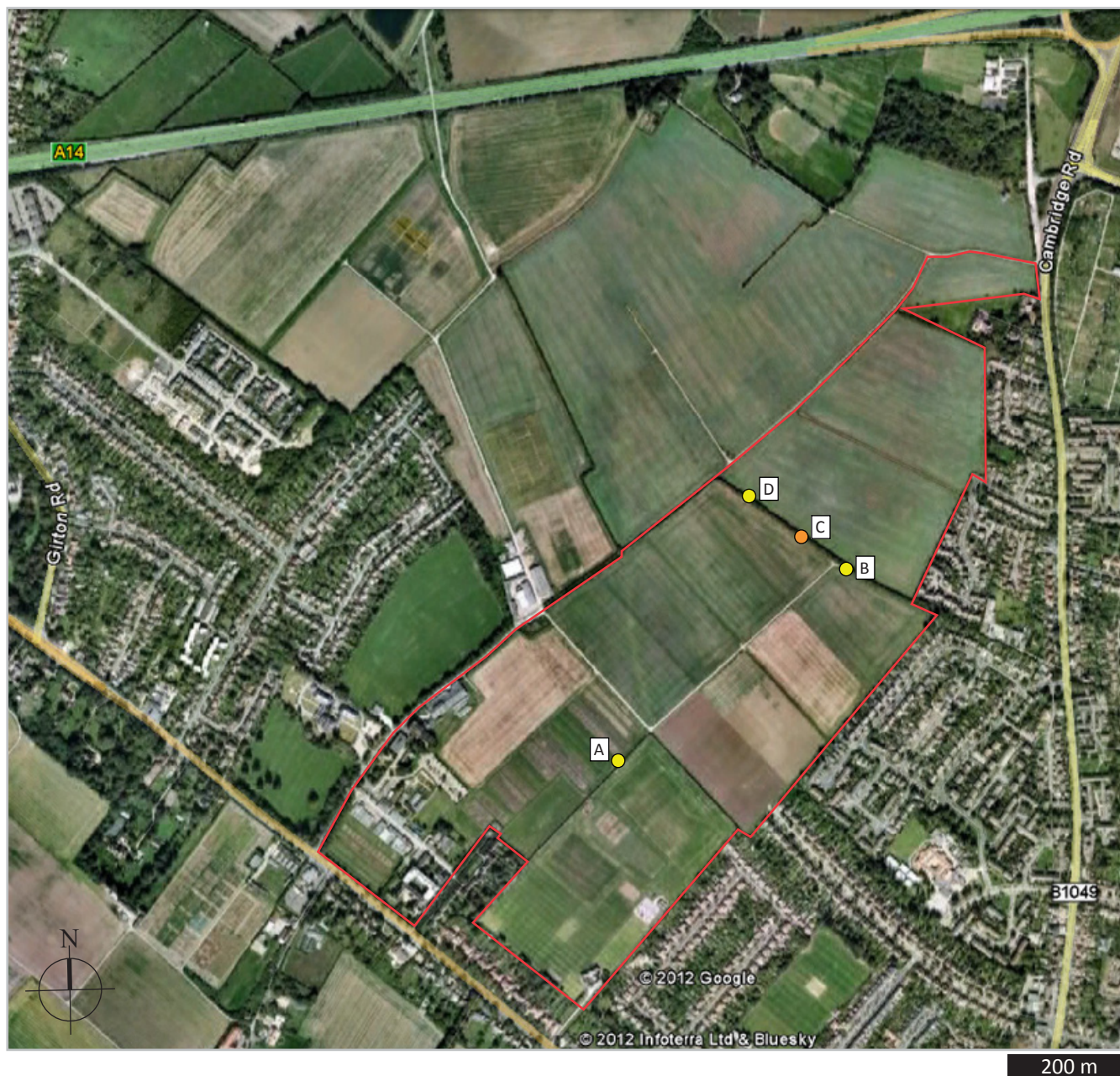
Bats

- 2.13 A bat survey report of the DG 1 site completed in 2011 which summarises the results of previous 2006 bat survey work, and confirms the presence of four buildings that have been identified as possessing evidence that they support roosting bats, and five trees (Tree A, B, C, D & E) with features of theoretical value to tree roosting bats – see **Figure 2.2** for locations.
- 2.14 Four of the trees (Tree A, C, D and E) are located around existing DG office buildings and are unaffected by the DG 1 development. Tree B, an ash *Fraxinus excelsior* is located in a hedgerow along the northern boundary of the site and may have to be felled as part of the DG 1 development.
- 2.15 There are no buildings or trees with bat roost potential within the SCDC administrative area part of the DG 1 site.

Building 1a

- 2.16 Physical evidence to suggest the presence of a transitory roost of a brown long-eared bat/s *Plecotus auritus*, and a pipistrelle bat/s was recorded in Building 1a in 2006. Building 1a was not subject to building inspection survey in 2011 as a result of an identified asbestos risk. However, it was subject a roost emergence and return survey in June 2011 and a return to roost survey in September 2011. The June survey recorded no evidence of roosting bat presence, the September survey recorded a single brown long-eared bat that appeared to enter a roost location on the east end of the building.





Key

— DG 1 site boundary

● A Badger sett (with reference letter)

● C Active badger sett located within INSET 5 hedge removal area

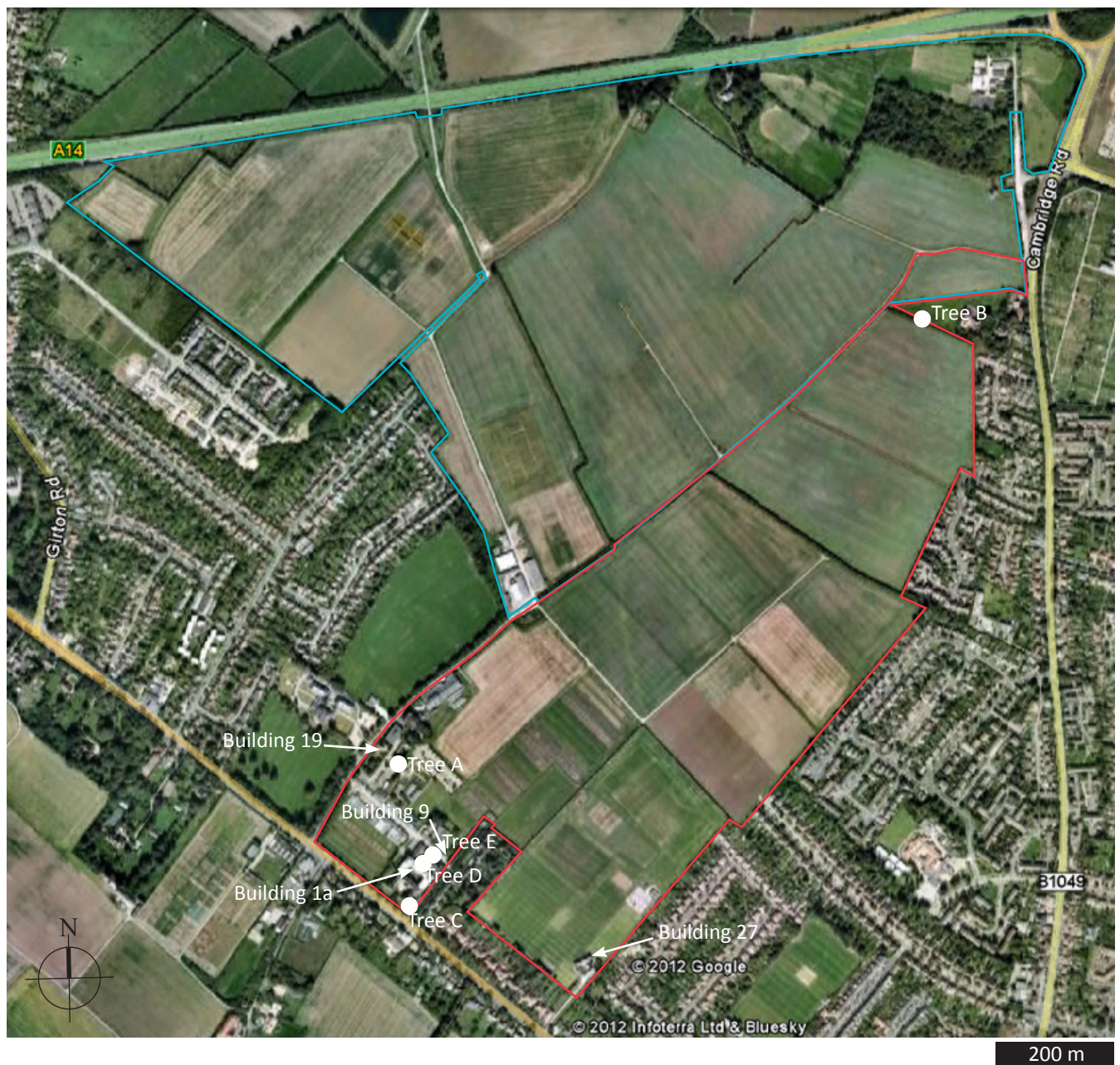
Sett ID	Grid ref.	No. holes	Sett Status April 2012	Sett Status February 2013
A	TL 43641 60514	4	Active subsidiary	Partly used subsidiary
B	TL 43640 60515	1	Active outlier	Partly used outlier
C	TL 43861 60902	1	Active outlier	Active outlier
D	TL 43806 60942	1	Partly used outlier	Disused outlier

CONFIDENTIAL

DG1, Cambridge

Figure 2.1: Badger sett locations and status





Key

- DG 1 site boundary
- DG 2 survey area

DG 1, Cambridge

Figure 2.2 - Bat Buildings & Trees

- 2.17 Building 1a is occupied by the National Institute of Agricultural Botany (NIAB) and will not form part of the Barratt residential development within the DG 1 site. Building 1a is not therefore considered further by this report.

Building 9

- 2.18 Physical evidence to suggest the presence of a transitory roost of a brown long-eared bat/s *Plecotus auritus* and a pipistrelle bat/s was recorded in Building 9 in 2006. Building 9 was not subject to building inspection survey in 2011 as a result of an identified asbestos risk. However, it was subject a roost emergence and return survey in June 2011, and a return to roost survey in September 2011. The June survey recorded no evidence of roosting bat presence, the September survey recorded a single brown long-eared bat that appeared to enter a roost location on the east end of the building.
- 2.19 Building 9 is occupied by NIAB and will not form part of the Barratt residential development within the DG 1 site. Building 9 is not therefore considered further by this report.

Building 19

- 2.20 Approximately 150 pipistrelle bat type droppings (estimated to be more than one year old) were recorded in the roof of Building 19 in 2011. Building 19 was subject to a roost emergence and return survey in June 2011, and a return to roost survey in August 2011. No evidence of roosting bats was seen during either activity survey.
- 2.21 Building 19 has been demolished by other developers and does not form part of the Barratt residential development within the DG 1 site. Building 19 is not therefore considered further by this report.

Building 27

- 2.22 Building 27 is a former cricket pavilion that is now derelict and unoccupied. It is located in the south-east corner of the DG 1 site and will be converted into residential accommodation as part of the first phase of the DG 1 development. Building 27 was the subject of a building inspection survey in 2011 that found two bat droppings (of a size and form consistent with those produced by a pipistrelle bat inside the building). One dropping was reported to be old and the other fresh, and both were present inside the roof void.
- 2.23 Building 27 has also been subject to a roost emergence and return survey in June 2011 and a roost emergence survey in August 2011. Neither survey recorded any evidence of roosting bats.
- 2.24 In April 2012 the building was subjected to a second systematic internal and external survey by an experienced and licenced bat worker from AEL (Dr Duncan Painter CEnv MIEEM) who was equipped with ladders, boroscope, high powered torch and dental mirrors. This survey recorded no physical evidence of bats on or inside the building.
- 2.25 In July 2012, two experienced AEL ecologists and bat surveyors (Miss Crystal Acquaviva (NE bat licence holder) and Dr Martin Brammah) completed a third bat roost emergence and return survey of the building in weather conditions that were optimal for bats to be active. Each surveyor was equipped with a hand-held Pettersson D230 electronic bat detector with ear phones, and was assisted by six tripod mounted Anabat electronic bat detectors



stationed around the building perimeter. The surveyors remained stationary during the 90 minute emergence survey (23 July) at opposite corners of the building and slowly patrolled respective sides of the building during the return survey the following morning (24 July) – commencing the return survey in darkness 90 minutes before sun-rise. No evidence of roosting bats was seen or recorded during either the 23-24 July 2012 emergence or return survey only low numbers of individual foraging or commuting bats were seen and recorded as summarised by **Figure 2.3**.

- 2.26 In summary, Building 27 has been subjected three bat activity surveys in June and September 2011 and July 2012 that have found no evidence to suggest that it supports roosting bats. The two bat droppings found inside the roof void in 2011 could be easily explained by a bat investigating inside the building and not necessarily roosting there. On balance we believe that the building does not support a bat roost (either current or historic), and that its conversion to residential accommodation does not need to be completed under the auspices of a Natural England European Protected Species licence provided appropriate bat roost mitigation and compensation measures are implemented as part of the re-development.

Trees

- 2.27 Five trees have been identified in the DG 1 site boundary that possess features that could theoretically be used by tree roosting bats for shelter and are identified on **Figure 2.2**. Mitigation measures for tree lopping and felling in relation to roosting bats and nesting birds are outlined in **Chapter 7**.

Breeding Birds

- 2.28 The survey work completed in 2006 to inform the DG 1 ES chapter, reports the suspected presence of 38 breeding bird species within the DG 1 land area including the following seven *Red List* species of conservation concern: house sparrow; linnet; reed bunting; song thrush; starling; skylark and yellow hammer. Of these species, four (underlined) are also listed as Section 41 species under the 2006 NERC Act as species of biodiversity importance in the UK.
- 2.29 The 2012 walkover survey of the site in April recorded a number of skylark on territory over the DG 1 site.

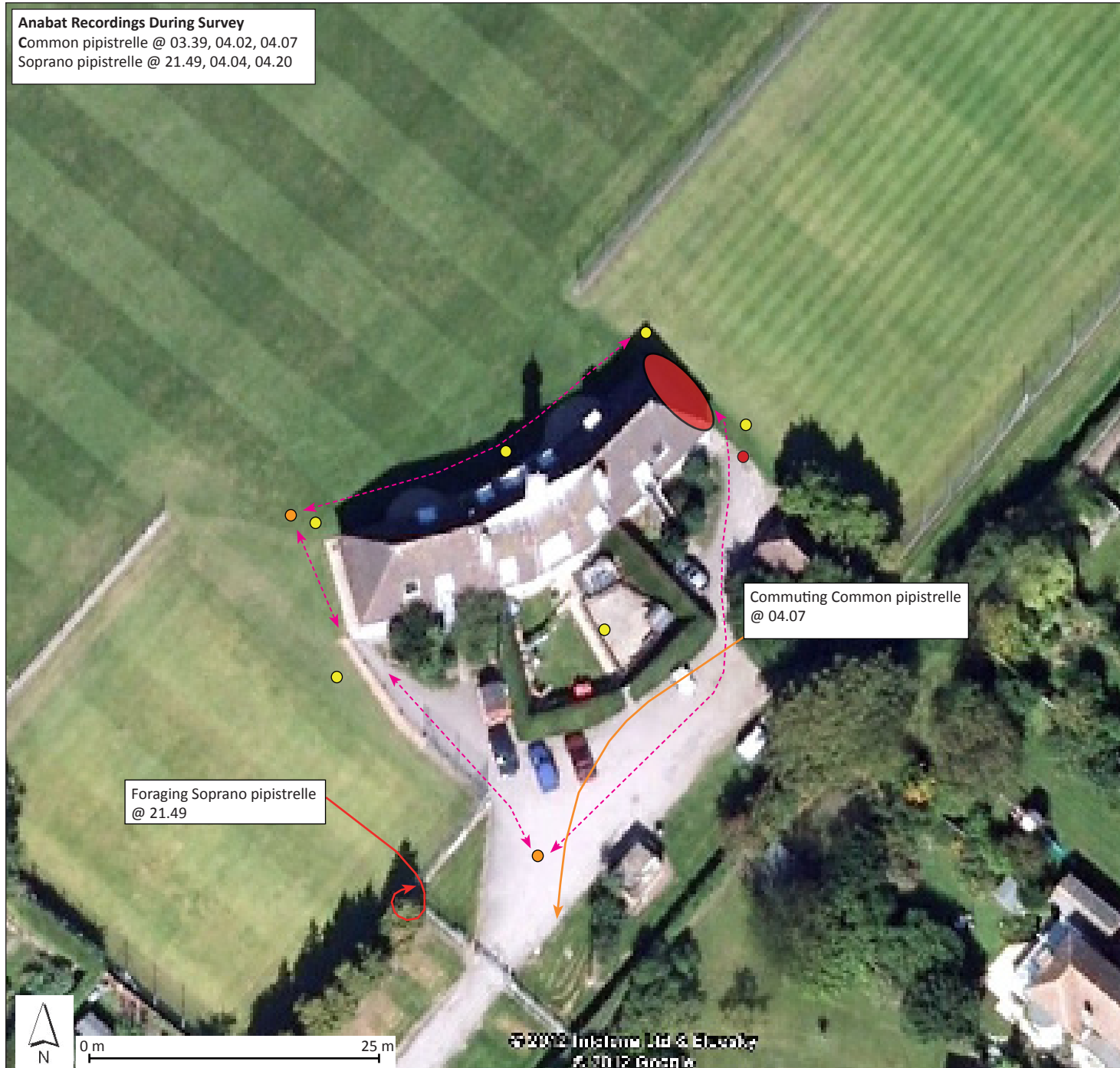
Great Crested Newt

- 2.30 Great crested newt surveys of two small ornamental ponds within the DG 1 site were completed in 2006 and 2011 in accordance with best practice guidance for conducting GCN survey⁴. The two surveys confirmed GCN absence from the site. No off site ponds are known to occur within GCN commuting range of the DG 1 site. The nearest known GCN published record occurs to west Huntingdon Road which is a significant barrier to GCN movement and would prevent GCN reaching DG 1 in any significant numbers. In summary, GCN is considered to be absent from the site and is not considered further in this report.

⁴ English Nature (2001) *Great Crested Newt Mitigation Guidelines*. EN, Peterborough.



Anabat Recordings During Survey
 Common pipistrelle @ 03.39, 04.02, 04.07
 Soprano pipistrelle @ 21.49, 04.04, 04.20



DG I Pavilion Huntington Road

Bat Roost Emergence & Return Survey

- surveyor position (dusk)
- ↔ surveyor patrol route (dawn)
- tripod mounted Anabat bat detector
- video camera with infra-red capability
- ◌ video camera field of view
- bat flight path (dusk)
- bat flight path (dawn)

Surveyed by: CA and MB

Survey date: 23 July 2012

Drawn by: MB

Checked by: DP

Status: Final



- 2.31 There is no habitat suitable for great crested newt within the SCDC administrative area part of the DG 1 site.

Reptiles

- 2.32 Targeted surveys for reptiles were completed in 2005 and are reported in the ES to have found no evidence that the DG 1 site supports reptiles. In general, it is evident that the DG 1 site is devoid of habitat that would be considered suitable for reptiles, and its current agricultural management and relative isolation from reptile friendly off-site habitats restricts the value of the site for this taxa in our opinion. Reptiles are therefore not considered further by this assessment.

Water Vole

- 2.33 The 2006 survey reported in the ES confirmed the presence of water vole *Arvicola amphibious* field signs along drainage ditches within the site.
- 2.34 The 2011 survey of the same ditches found them both to be dry and unsuitable for water vole.
- 2.35 The April 2012 by AEL also found the ditches to be dry and unsuitable for water vole.
- 2.36 In April 2013 the drainage ditches within the DG1 site were water-filled and subject to a full water vole field sign survey by AEL. Only signs of bank vole were recorded by the survey along ditch banks, and it is concluded that water vole are currently absent from the site.
- 2.37 There is no habitat suitable for water vole within the SCDC administrative area part of the DG 1 site.



3 Important Biodiversity and Features Worthy of Management & Enhancement

Important Biodiversity

- 3.1 The Phase 1 habitat map provided in **Appendix 1** of this report confirms that the site is dominated by arable land of low relative biodiversity importance. All of the land within the South Cambridgeshire District Council administrative area within the DG 1 site is under arable production bordered by two relatively short lengths of species poor hedgerow.

Features Worthy of Management & Enhancement

Habitats

- 3.2 There are no habitats within the site that have particularly high levels of ecological or biodiversity importance that could not be re-created in the medium to long-term by planting and appropriate management of native trees and shrubs as part of a site wide landscape strategy.
- 3.3 The existing field boundary hedgerows, and particularly the species rich hedge that forms part of the western site boundary (outside of the South Cambridgeshire District Council administrative area), provide local wildlife corridors, above ground dense vegetation suitable for nesting birds and shelter along their bases for badgers to dig setts. In light of this, it is recommended that, wherever practicable, the existing hedgerow network within the site is supplementary planted and managed for the benefit of wildlife in addition to other landscape objectives.
- 3.4 Mature trees, particularly those with identified bat roost potential should also, where practicable, be retained and protected moving forward. However, where such trees pose a health and safety concern, it is recognised that it may not be practical to retain them because of their likely future proximity to the new residential population and they may need to be removed.

Animal Species

- 3.5 The proposed DG 1 residential development will replace the mainly agricultural landscape with a largely suburban environment that will result in an inevitable change in the breeding bird assemblage of the site. In particular the site will experience a decline in the number of farmland bird species of conservation concern including skylark, linnet and yellowhammer.
- 3.6 Given the planned and permitted land use change, it is not considered possible or feasible to retain, with the possible exception of house sparrow, the same assemblage of birds that currently characterise the site in the long term. Habitat creation looking forward, should therefore focus on promoting a different breeding bird and wildlife assemblage by habitat planting, management and nest box provision in existing and new habitats and buildings within the site.



- 3.7 With respect to badger, consideration has been given to the retention of the existing four badger setts that occur within hedgerows within the site but, on balance, given the increased levels of disturbance that is likely to result from construction and recreational use of the site close to these setts, it is considered more desirable from a badger welfare perspective to close down any existing active sett prior to construction operations commencing.
- 3.8 With respect to building roosting bats, only one building previously identified with high bat roost potential will be impacted by the DG 1 development. This is building no. 27 (a former cricket pavilion) that bat survey work completed in 2011 and 2012 has demonstrated does not support a bat roost. The building is to be converted into residential units, and it is recommended that bat roost features such as enclosed brick faced bat boxes are built into suitable elevations away from external lighting for the benefit of roosting. In addition, it is recommended that bat boxes are built into a selection of other suitable buildings within the DG 1 scheme and are erected at strategic locations on poles and on trees within hedgerows and close to wetland habitats within the DG 1 landscape.



4 Schedule of Works

Development Phasing

- 4.1 The development will be built out over four phases as shown by **Figure 4.1** with development Phase 4 effecting South Cambridgeshire District Council administered land.

Biodiversity Impacts

- 4.2 With respect to potential impacts of the proposed development phasing on known badger setts (see **Figure 2.1**) it is clear that only Phases 1-3 will have potential impacts on badger setts as follows:
- Phase 1 – coincident with sett A
 - Phase 2 – coincident with setts C and D
 - Phase 3 coincident with sett B
- 4.3 As highlighted previously, the setts will be monitored and closed down in advance of each respective development phase as necessary.
- 4.4 A single ash tree (marked as Tree B on **Figure 2.2**) is coincident with land within Phase 2.

Delivering Biodiversity Enhancement

- 4.5 Table 6.1 confirms the anticipated number of biodiversity enhancement features to be delivered by each development phase

Table 6.1: Summary of Biodiversity Monitoring Outlined in Chapter 2

Feature	Delivery
Swifts 30 swift bricks	Phase 1 – 10 bricks Phase 2 – 10 bricks Phase 3 – 5 bricks Phase 4 – 5 bricks
Other Birds 30 Schwegler 2m nest boxes	Phase 1 – 10 boxes Phase 2 – 10 boxes Phase 3 – 5 boxes Phase 4 – 5 boxes
Bats 20 enclosed bat boxes built into new buildings	Phase 1 – 5 boxes Phase 2 – 5 boxes Phase 3 – 5 boxes Phase 4 – 5 boxes



Bats Herpetosure Four Seasons Bat Box	Phase 4 – 1 box
Invertebrates Construction of a loggery in each allotment	Phase 1 – one loggery Phase 2 – zero Phase 3 – zero Phase 4 – two loggeries



5 Biodiversity Monitoring & Implementation Strategy

- 5.1 Details of Cambridge County Council, South Cambridgeshire Council, and the DG management company responsibilities with respect to biodiversity monitoring and implementation are to be confirmed.
- 5.2 It is anticipated that the DG management company will take responsibility for implementing the 10 year post construction biodiversity monitoring outlined in **Table 5.1**.

Monitoring Biodiversity Enhancement

- 5.3 A summary of the proposed biodiversity monitoring is provided in **Table 5.1** below and focusses on the Additional Biodiversity Enhancement Measures outlined in Chapter 7 of this report. Environmental monitoring and audit of the new landscape and drainage network to ensure successful establishment and operation is detailed elsewhere.

Table 5.1: Summary of Biodiversity Monitoring Outlined in Chapter 7

Taxa	Feature	Monitoring	Duration
Swift	40 swift bricks built into new buildings Playing of swift calls during the summer months until 25% take up by swifts	Nesting use of swift boxes by birds to be monitored annually in the summer (April-August) by a suitably experienced person	10 years post construction
Other Birds	40 post mounted Schwegler 2M nest boxes incorporated into existing hedgerows	Boxes to be maintained annually and monitored annually in the summer (April-August) by a suitably experienced person	10 years post construction
Bats	20 enclosed bat boxes built into new buildings	Boxes to be monitored annually in the summer (May-September) by an experienced and licenced bat worker by conducting at least one roost emergence survey and visual inspection annually	10 years post construction
Bats	One Pole mounted Herpetosure Four Seasons Bat Box	Box to be monitored annually in the summer (May-September) by an experienced bat worker by conducting at least two roost emergence surveys annually	10 years post construction
Invertebrates	Three loggeries	Presence and condition of loggeries to be monitored annually with replacement logs as necessary	10 years post construction



6 Ecological Clerk of Works

- 6.1 The building contractor will be responsible for appointing a suitably qualified and experienced ecologist who will perform a call-off contract Ecological Clerk of Works (ECoW) role during the entire construction period in order to minimise the risk of accidental adverse impacts on protected wildlife occurring as a result of construction operations.
- 6.2 The specific role of the ECoW is to:
- over-see and confirm that agreed biodiversity features are constructed/implemented appropriately.
 - provide ecological and biodiversity advice to the building contractors as considered necessary throughout the construction process.
- 6.3 The ECoW will be an experienced Senior Ecologist from Applied Ecology Ltd who is a full member of the Institute of Ecology and Environmental Management (IEEM) and who has a minimum of 10 years professional experience – example CV is provided in **Appendix 2**.
- 6.4 The building contractor will be responsible for informing the ECoW of any operation that could result in adverse impacts on wildlife, agreeing unforeseen changes in proposed work schedules that effect biodiversity and ecological matters, and the discovery of previously unknown wildlife issues.
- 6.5 At the start of the construction process, and after any significant change in construction staff personnel, the ECoW will brief contractors on potential ecological issues, in particular the potential presence of badgers, nesting birds, water vole and tree roosting bats.
- 6.6 The ECoW will undertake regular site walkover surveys (at least one a month) to check for the presence of new badger setts, water vole, and other important ecological receptors while construction operations are on-going.



7 Species and Habitat Protection & Enhancement

Protection Measures

Badger

- 7.1 Badger activity at setts within the DG 1 site will be monitored by the Ecological Clerk of Works, and active setts will be closed under the auspices of a Natural England licence in advance of the first development phase as necessary. Badger setts will be closed and their occupants excluded between July and the end of November following mitigation and exclusion methods described and agreed with NE in the licence application. In practice badger exclusion will be based on the use of one-way badger gates constructed over sett entrance holes, followed by a period of gate monitoring then supervised sett deconstruction with machinery.
- 7.2 The ECoW will brief all contractors to maintain a watching brief for the presence of mammal dug holes as works are on-going. Construction operations close to (within 30m) of any hole suspected to have been dug by a badger will be stopped until the ECoW has checked the hole and made appropriate recommendations for ecological mitigation as necessary.
- 7.3 The following best practice measures will be adopted to avoid/minimise temporary threats and/or disturbance to badgers during the development construction phase.
- All setts prior to their closure would be protected from accidental machine incursion by stand-off protection zones established using temporary post and wire fencing under the direction of the ECoW.
 - All protection zones will be monitored by the ECoW while construction operations are on-going.
 - The use of noisy plant and machinery in the vicinity of the protection zone will cease at least two hours before sun-set.
 - Security lighting will be directed away from setts.
 - Chemicals will be stored as far as possible away from setts and badger paths.
 - Trenches and open excavations will be covered at the end of each working day, or include a means of escape for any animal falling in.
 - Any temporarily exposed open pipe system will be capped in such a way as to prevent badgers gaining access as may happen when contractors are off site.
 - Badger gates will be installed in any perimeter fencing as considered necessary by the ECoW.
 - Water sources for badgers will be safeguarded.



Bats

- 7.4 All semi-mature and mature trees within the DG 1 site that will be required to be felled to enable development will be assessed by visual inspection prior to their removal. Tree removal will be timed to avoid the bird nesting period and the bat maternity period and will take place in the months of September, October and early November.
- 7.5 An initial ground level inspection of the trees will be completed by the ECoW (who should also be a licenced bat worker), ideally during the early spring to identify the presence of features (splits, crevices, holes, thick-stemmed ivy or lifting bark plates) that could support tree roosting bats. All trees with theoretical bat roost features will be numbered with a prominent tag or sprayed paint and investigated in more detail by the ECoW or arborist under the direction of the ECoW using a boroscope, ladders, tree climbing ropes, or cherry picker as necessary to safely enable inspection of crevices or holes and internal cavities for evidence of roosting bats (live bats, grease/oil marks and bat droppings).
- 7.6 All trees with confirmed bat roost presence will be left standing and undisturbed and subject to summer (May-August) bat activity survey to confirm bat species, number of bats and nature of the bat roost as necessary. A Natural England European Protected Species (EPS) development licence will then be applied to legally enable the tree to be felled.
- 7.7 Any tree with theoretical bat roost features that lack obvious evidence of bats during the detailed tree survey inspection, but has roost features that cannot be confidently discounted as supporting bats (e.g. cavities that cannot be safely or fully inspected), will be soft-felled in sections so as to minimise the risk of killing or injuring bats that might be sheltering inside the feature under the direction of the licenced bat worker. All felled timber sections to be gently lowered to the ground and left in situ for 48 hours to enable any roosting bat to escape.

Breeding Birds

- 7.8 Site clearance and construction of the DG 1 development has the potential to accidentally disturb, kill or injure wild birds that might be nesting on the ground in fields, or nesting in trees, hedgerows, or built structures.
- 7.9 All site clearance operations will therefore be programmed to take place outside the bird nesting period during the autumn and winter months (between September and February) to minimise adverse impacts on nesting birds. Where it is not practicable to avoid the nesting period, i.e. during the period March to August, the ECoW will complete survey work to check areas to be cleared are free of nesting birds and their dependent young.
- 7.10 If evidence of nesting birds is seen by the ECoW, appropriate no-go stand-offs will be set-up using temporary post and high visibility tape and agreed with the building contractor site manager. The nest site stand-offs will be respected by the building contractors and monitored by the ECoW until such time that young birds have fledged and are no longer dependent on the adult birds for survival.



Water Vole

- 7.11 A follow-up survey of the drainage ditches within the DG1 site will be completed in spring 2013 to reassess their suitability for water vole and check for the presence of water vole field signs.
- 7.12 In the unlikely event that water vole have colonised the ditches, a detailed mitigation strategy will be agreed with Natural England based on the creation of replacement drainage ditch habitat suitable for water voles and the capture and relocation of animals from the old ditch system, or the use of “passive” water vole re-colonisation methods whereby water voles are encouraged to colonise new drainage ditch habitats (once established and suitable for water voles) by connecting existing ditches to new and pumping dry the old ditches.

Delivering Biodiversity Enhancement

- 7.13 The building contractors will be responsible for implementing the DG 1 development drainage and landscape strategy outlined below and as shown by **Figure 7.1** (detailed plans provided elsewhere), plus the additional biodiversity enhancement measures described below.

Drainage

- 7.14 The drainage strategy is based on sustainable design principles and seeks to retain and enhance the existing drainage network, as far as is practicable, and construct, plant and manage a network of swales, and on-line ephemeral ponds (that will hold water for longer periods than the swales), and a permanent surface water attenuation pond.
- 7.15 The swales, on-line ephemeral ponds and the attenuation pond will be planted with native damp-ground, wetland and submerged and emergent aquatic plants (as detailed in the landscape strategy), and will provide distinct wetland and aquatic habitats in the long-term that will be passively colonised by a range of wetland invertebrates (water beetles, dragonflies and damselflies etc.) and other wildlife such as toads and frogs. The more permanent wetland areas, but particularly the surface water attenuation pond, will provide a source of winged invertebrates that will be attractive to foraging bats, and bat boxes on poles or other structures will be sited close to and/or in the pond for the benefit of roosting as well as foraging bats.

Green Corridors

- 7.16 The landscape strategy has been informed by the ecological assessment and consultation with the Cambridge City Ecologist. It aims to provide a series of multifunctional green corridors based mainly around the existing field boundary hedgerows to provide a continuous network of habitats which permit and promote movement of wildlife within the immediate setting and broader context of the site.
- 7.17 The green corridors have been designed with the following landscape and biodiversity aspirations:





DG 1, Cambridge
Figure 7.1: Landscape Masterplan



- To retain the best of the existing landscape features including trees, hedges, tree belts and, where possible, water courses.
- To develop a mosaic of green spaces and habitats set within a continuous linked hierarchy of open space.
- To develop habitat networks and corridors for wildlife to move.
- Connect and enrich existing and proposed habitats to enhance biodiversity.
- Provide opportunities for new habitats and species, including plants, insects and animals to colonise and the incorporation of bird and bat boxes
- Integrate pedestrian activities sensitively within the green corridors so as not to compromise potential wildlife habitats.
- To promote a range of habitats including: rough grass, aquatic planting, native tree species, open water, flowering/fruiting plant species, wildflower meadows, south-facing glades, log/stone invertebrate habitats combined with informal play.
- To promote a lighting scheme that promotes safe lighting for pedestrian movement while respecting the night time environment and nocturnal wildlife – notably commuting and foraging bats.

7.18 The existing hedgerow resource is to be largely retained, supplementary planted and better managed to maximise its ecological corridor potential as follows:

- Implementation of structured hedgerow management including thinning, laying and edge scalloping
- Supplementary planting to increased plant species variety by planting of native woody hedgerow species and hedgerow trees.
- Provision of, through hedgerow management, a variety of boundary heights to create a varied visual character and selection of habitat types.

7.19 Where hedgerows are punctured by access routes, tree planting at either side of the break will be implemented to encourage canopy overgrowth in the long-term for the benefit of bats and birds.

Additional Biodiversity Enhancement

7.20 Additional biodiversity enhancement measures are recommended below for other target animal species and taxa as set out below.

Swifts

7.21 It is recommended that a total of 40 swift bricks (*Ibstock Eco-habitat for Swifts* or similar as shown by the image below) are incorporated into a top course of external brickwork of at least three tall buildings within the site.





- 7.22 The locations of the boxes should be agreed with the ECoW and, once installed, recordings of swift calls should be played during the summer months post construction to attract swifts to the boxes until such time that there has been at least 25% take up of the boxes by swifts.
- 7.23 The use of the boxes by swifts and other birds (notably house sparrow) should also be monitored by an ecologist annually for 10 years post construction, with efforts made to encourage the new residents of the site to take part in the monitoring and eventually “take ownership” of the monitoring of their swift colony.

Other Birds

- 7.24 It is recommended that a total of 40 Schwegler 2M nest boxes are post mounted and incorporated into hedgerows within the DG 1 site in locations to be agreed with the ECoW.



- 7.25 The boxes should be monitored and maintained annually by an ecologist for 10 years post construction.

Bats

Building Mounted Bat Boxes

- 7.26 It is recommended that a total of 20 enclosed bat boxes (Ibstock *Enclosed Bat Box B* (see below) or similar design) that are specifically designed to be used by pipistrelle bats are incorporated close to the top course of external brickwork of at least five new buildings



within the site in locations free from external lighting after dark and to be agreed with an ecologist. One of these buildings should be the former cricket pavilion (no. 27).



- 7.27 A number of different enclosed bat box designs are commercially available for this purpose that would provide a discrete design solution. Alternatively, a bespoke (behind brickwork/within cavity) design should be provided based on architects drawings provided in the RIBA publication *Biodiversity for Low and Zero Carbon Buildings: A Technical Guide for New Build* (ISBN: 9781859463536).

Pole Mounted Bat Box

- 7.28 It is recommended that one pole-mounted *Herpetosure Four Seasons Bat Box* is erected within or close to the edge of the attenuation pond within the DG 1 site to provide all year round roost habitat for bats within the site.
- 7.29 Images of the four season bat box are shown below - the box and integral pole are supplied by the manufacturers.



- 7.30 The use of the boxes by bats should also be monitored by an ecologist annually for 10 years post construction, with efforts made to encourage the new residents and of the site to take part in the monitoring and eventually “take ownership” of the monitoring in the long-term.



Invertebrates

- 7.31 It is recommended that timber logs resulting from tree felling or other site clearance operations is retained and dug into the ground (as shown below) within allotments areas within the DG 1 site. It is recommended that a total of three loggeries are constructed (corresponding with the three proposed allotments) with 2m diameters, and that suitable timber is imported as necessary to create them.

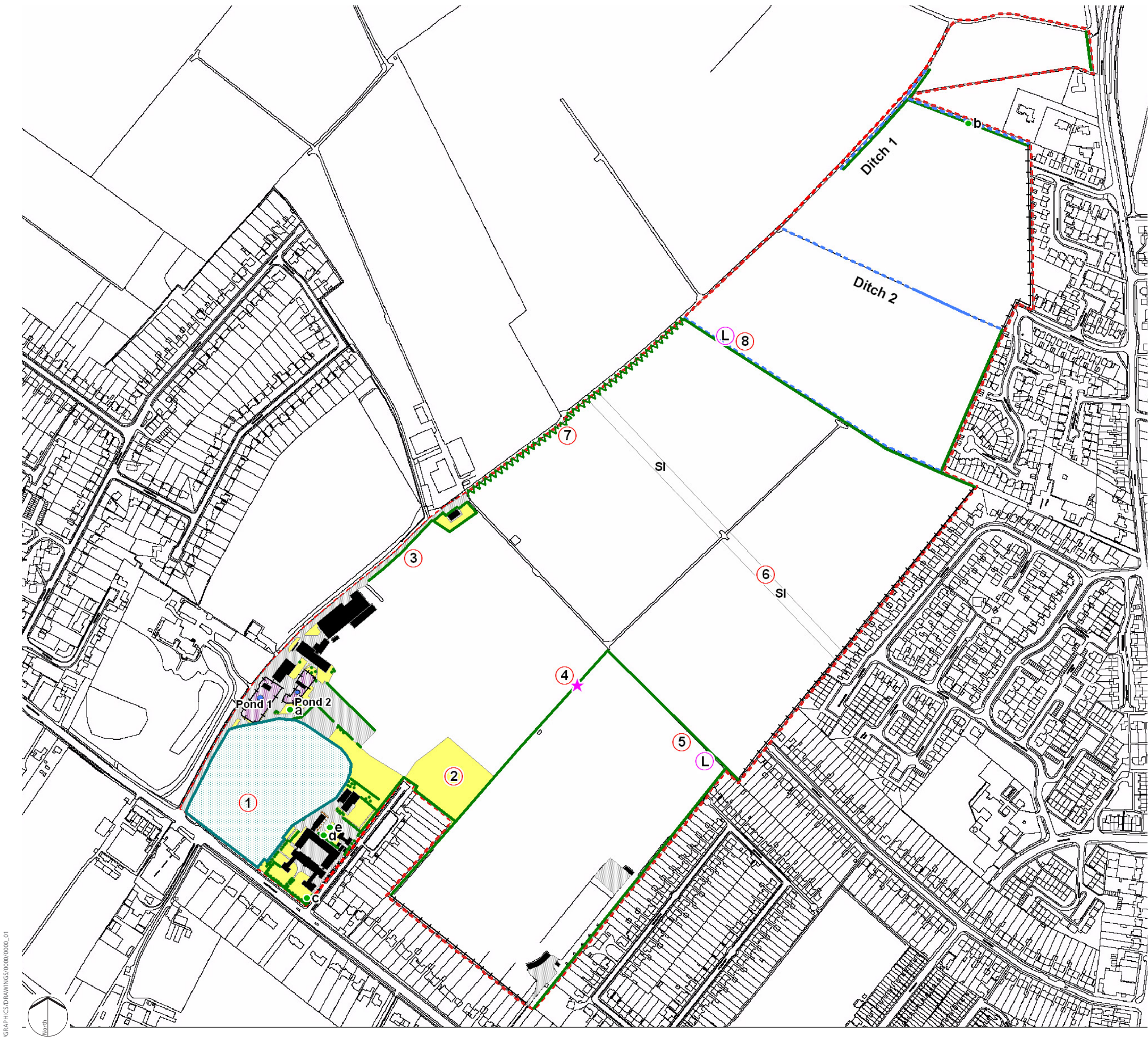


- 7.32 These buried log habitats will be of benefit of saproxylic (dead wood loving) invertebrate species.



Appendix 1





Legend

Site boundary

Dry ditch

Wet ditch

Species-poor hedgerow

Species-rich hedgerow

Individual tree

Tree reference number

Badger sett

Badger latrine

Target Note reference number

Arable field

Species-poor semi-improved grassland

Amenity grassland

Building

Hard standing

Residential garden

New development/construction site

Pond

Pond reference

REV.

DESCRIPTION

APP.

DATE

London

T 020 7467 1470

LDADesign

LANDSCAPE

URBAN

ENVIRONMENT

ECOLOGY

CITY NIAB 1, CAMBRIDGE

Figure 1 : Phase 1 Habitat Survey and Badger Survey Plan

DATE

AUG '11

DRAWN

LRJ

SCALE

NTS

CHECKED

LRJ

STATUS

FINAL

APPROVED

CS

DWG. NO

FIGURE 1

TN1 Area of construction and new development which has been enlarged since the 2010 survey. Includes areas of completed houses with gardens and show rooms and areas that are still being built.

TN2 Area of amenity grassland that is used as a football pitch.

TN3 Species poor hedgerow. Trimmed 2m in height with a 1m mown grass verge. Species present include hawthorn *Crataegus monogyna*, elder *Sambucus nigra* and ivy *Hedera helix*.

TN4 Outlier badger sett in hedgerow, 2 entrance holes with mammal track leading into hedgerow.

TN5 Badger latrine in field margin adjacent to hedgerow

TN6 Grass strip through arable field may be old footpath or ditch or planted as a beetle bank. Dominated by false oat grass *Arrhenatherum elatius* and cocksfoot *Dactylis glomerata* with ruderal vegetation such as hogweed *Heracleum sphondylium*, nettle *Urtica dioica* and cleavers *Galium aparine*.

TN7 Species rich hedge along green lane with hedge opposite that is outside site boundary. Species include: hawthorn, blackthorn *Prunus spinosa*, dogwood *Cornus sanguinea*, field maple *Acer campestre*, rose *Rosa spp*, crab apple *Malus sylvestris* and midland hawthorn *Crataegus laevigata*.

TN8 Badger latrine in field margin adjacent to hedgerow

Appendix 2





Rob Hutchinson

BSc MSc MIEEM

Principal Ecologist

Key Skills

- Habitat and Botanical Survey
- Protected Species Survey and Mitigation Planning
- Ecological Appraisal and Impact Assessment
- Habitat Management and Planning
- BREEAM Assessment
- Reporting and Project Management

Qualifications

BSc (Hons) Conservation Management, Otley College (1995-1998), 2:1

MSc (distinction) Vegetation Survey and Assessment, University of Reading (2000-2001)

Professional memberships

MIEEM

Scientific and Conservation Licences Held

Natural England Great Crested Newt Licence (Level 2)

Natural England Dormouse Licence

Brings to the Project

Rob has over 12 years' experience as a professional ecologist, specialising in botanical survey and assessment, and Ecological Impact Assessment. He is a Principal Ecologist at AEL, and is involved in a range of development and conservation projects across the UK, including large scale projects in Scotland. His role is varied, and includes field survey, reporting, project management and client liaison. Rob is a highly competent field botanist, and leads much of our terrestrial and aquatic plant survey work from our Cambridge office. He also has significant experience and involvement in protected species surveys (he is licensed by Natural England to survey for great crested newt and dormice), as well as in mitigation planning, habitat management and BREEAM assessment. Rob has excellent reporting and project management skills.

Selected Relevant Experience

A list of selected and relevant projects undertaken by Rob is provided below.

Recent botanical and EcIA work completed in Scotland

- **Tornagrain New Town, Invernesshire** (2006-2012). Phase 1 habitat, botanical assessment and Ecological Impact Assessment for proposed new town development near to Inverness. [Moray Estates Development Company Ltd.](#)
- **Glen Affric Hydro-scheme, Scottish Highlands** (2010-2012). National Vegetation Classification survey, mapping, and Ecological Impact Assessment of a proposed Estate hydro-scheme located within Affric-Cannich Hills Site of Special Scientific Interest (SSSI) and Strathglass Complex Special Area of Conservation (SAC). [Beaufort Enterprise SA.](#)
- **Elsick, Aberdeenshire** (2010-2012). Phase 1 habitat survey and Ecological Impact Assessment of proposed new town near Aberdeen. [Elsick Development Company.](#)
- **Cumbernauld Growth Areas, North Lanarkshire** (2009-2011). Phase 1 habitat, rare plant and protected species surveys of four large potential growth areas in north Lanarkshire. [North Lanarkshire Council.](#)
- **Inverness Airport, Invernesshire** (2006). Phase 1 habitat survey and Ecological Impact Assessment for a new business park development located close to Inverness Airport. [Highlands and Islands Airports Ltd.](#)
- **Sandown, Nairn, Highlands** (2007). Habitat and protected species assessment of proposed housing development near Nairn, Scotland. [Deveron Homes Ltd.](#)



Other relevant projects

- **Upper Thames Major Resource Development, Oxfordshire** (2006-2009). Phase 1 habitat survey, National Vegetation Classification survey, aquatic plant, hedgerow and veteran tree surveys of a large scale water resource development in the upper Thames catchment near Abingdon. [Cascade Consulting/Thames Water](#).
- **Dartford Fresh Marshes, East London** (2006-2012). National Vegetation Classification and mapping of grazing marsh habitat in the Thames Gateway region of London, designated as a County Wildlife Site, in relation to proposed development. [GlaxoSmithKline](#).
- **Perkins Engines, Peterborough** (2007-2008). Habitat survey and protected species assessment for proposed re-development at the Perkins Engines site. [Perkins Engines Ltd](#).
- **BP Hamble Oil Terminal, Hamble-le-Rice, Hampshire** (2008). Habitat survey and protected species assessment of large Oil Terminal site. [URS Corporation](#).
- **Stratton Business Park, Biggleswade, Bedfordshire** (2008). Habitat survey and protected species assessment of proposed business park development. [Mouchel](#).
- **Battersea Power Station, London** (2008-2009). Habitat and botanical survey of Battersea Power Station site. [URS Corporation](#).
- **Ivy House Farm, Oulton Broad, Suffolk** (2010). Assessment of the potential impacts of proposed holiday home development on Broadland SPA and RAMSAR interests. [Ivy House Farm](#).
- **Marsh Farm Country Park, Essex** (2010). Habitat and protected species survey of proposed development at public farm and recreation facility. [Essex County Council](#).
- **Dreamland Amusement Park, Margate** (2010). Habitat and protected species assessment of derelict amusement park in Margate. [Gardiner and Theobald LLP Management Services](#).
- **Robsack Avenue, Hastings** (2010-2012). Habitat and protected species walkover of potential residential development site. [Hastings Borough Council](#).
- **Ocado Distribution Centre, Byfleet, Surrey** (2010). Habitat and protected species walkover survey of proposed car-park extension. [Ocado](#).
- **Tesco dot.com, Crawley, West Sussex** (2010-2012). Habitat and protected species assessment of new distribution warehouse. [Lynton Developments](#).
- **Cleeve to Hagbourn Hill Water Main, Oxfordshire/Berkshire** (2006). Assessment of ponds for great created newt suitability. [Thames Water](#).
- **South Killingholme, Hull** (2010-current). Phase 1 habitat survey of a large commercial development alongside the Humber Estuary. [Able UK Ltd](#).
- **Queensway North, Hastings, Sussex** (2006-current). Baseline ecology surveys and proposed EcIA for new development project near Hastings. [Sea Space/Sea Change Sussex](#).
- **The Lakes, Coln Park, Gloucestershire** (2008 - current). EcIA, ecological mitigation and management planning for exclusive lake-side housing development near Lechlade. [Yoo Ltd](#).
- **Milton Lake Business Park, Northamptonshire** (2006-2012). Habitat, protected species survey and EcIA for proposed new business park development, near Northampton. [Parkridge/BNP Paribas Real Estate](#).
- **Tavistock Road, Hillingdon, London** (2009-2011) Baseline ecology surveys and EcIA of proposed Material Recycling and Recovery Facility. [Powerday Plc](#).
- **Ascot Heath, Ascot Racecourse, Berkshire** (2008 - 2009). Production of detailed prescriptive management plan for heath and acid grassland communities at Ascot Heath. [Ascot Authority](#).
- **Hadleigh Farm and Country Park Olympic Legacy Project** (2010-2012). Preparation of a habitat management plan for Hadleigh Country Park and adjoining land in respect of the Legacy Mountain Bike Trail. [Essex County Council](#).



