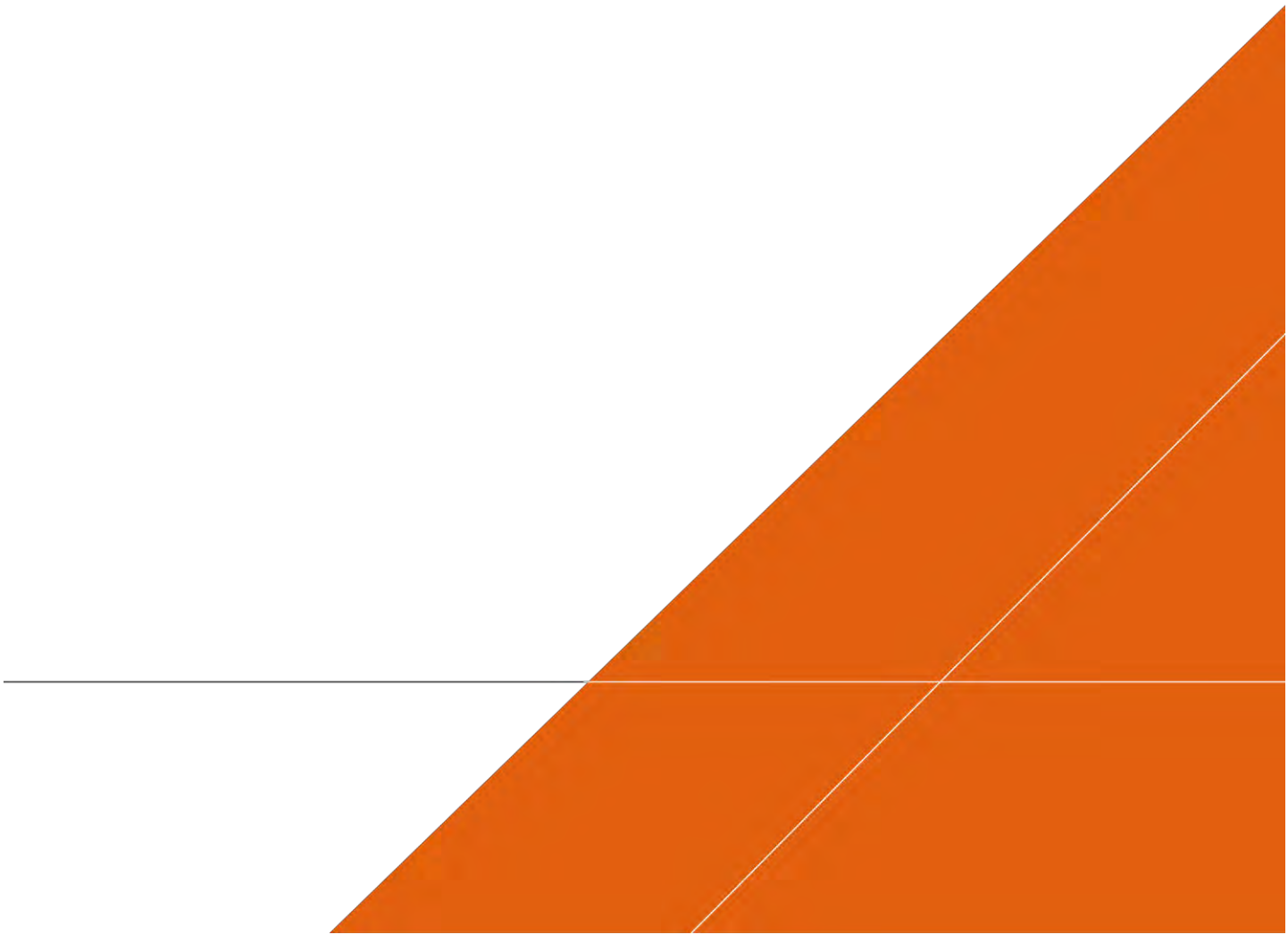
OTTERPOOL PARK

Environmental Statement Appendix 7.18 Targeted Species Mitigation Strategies BADGER INFORMATION IS CONFIDENTIAL

MARCH 2022



CONTENTS

TABLES

FIGURES

APPENDICES

Executive Summary

Arcadis Consulting (UK) Limited has been commissioned on behalf Otterpool Park LLP to undertake a habitat survey and masterplanning exercise for a proposed new development. The proposed Development is 'Otterpool Park', a garden settlement located within Kent.

The site is located within Folkestone, Kent within the administrative boundary of Folkestone and Hythe District Council (F&HDC) and spans a large area located immediately south of Junction 11 of the M20. The site is largely agricultural in nature with the majority of the site comprising arable and pasture fields, a disused horseracing course with an artificial lake ('Folkestone Racecourse Lake'), areas modified from historical use (airfields), existing historic settlements and relatively new industrial areas.

This report discusses the methodology for demonstrating how the outline application can mitigate for key faunal receptors on-site, namely:

- Great crested newt;
- Reptiles;
- Water vole;
- Bats; and
- Badger (confidential – some information redacted).

This document outlines an overview of the approach to mitigation. It will be necessary for the approach to mitigation to be evolved throughout the planning and build out process, as each indicative phase progresses through reserved matters. It is not practicable to outline all the details of the mitigation at the outline planning stage as:

- Aspects of detailed design have not been completed;
- The legislative and policy regime to which the developments are required to apply is likely to evolve throughout the extended buildout;
- As the proposed Development progresses, it may be necessary to determine the success of the completed mitigation to maximise the success of subsequent mitigation.

The key aims of this document are to evidence that adequate mitigation can be incorporated within the proposed Development, maintaining the favourable conservation status of the key receptors.

This document should be read alongside the following ES Appendices:

- 7.6: Reptile Survey Report
- 7.7: Badger Survey Report
- 7.9: Great Crested Newt Survey Report
- 7.10: Otter and Water Vole Survey Report
- 7.11: Bat Survey Results Summary Report and Impact Assessment
- 7.12: Bat Transect Survey Report
- 7.13: Bat Emergence Survey Report
- 7.14: Bat Static Survey Report

This document demonstrates that the project can accommodate the proposed protected species mitigation and can comply with relevant legislation and policy.

1 Introduction

1.1 Overview

1.1.1 Arcadis Consulting (UK) was commissioned on behalf of by Otterpool Park LLP to outline Targeted Species mitigation for notable species with the potential to be impacted on a proposed masterplan for 'Otterpool Park' a proposed garden settlement within Kent.

1.2 Site Location and Setting

1.2.1 The proposed Development, as referred to within this report, is the Outline Planning Application (OPA) boundary. The OPA is located within Folkestone, Kent, within the administrative boundary of Folkestone and Hythe District Council (F&HDC), and spans a large area located south of Junction 11 of the M20. The OPA is approximately 589 hectares in area and is largely agricultural in nature with the majority of the proposed Development comprising arable and pasture fields, a disused horse racing course with an artificial lake ('Folkestone Racecourse Lake'), areas modified from historical use (airfields), existing historic settlements and relatively new industrial areas. Within this agricultural setting, there are the M20 and railway line with Westenhanger Station to the north, beyond which lies villages within a largely rural setting including the Kent Downs AONB (Area of Outstanding Natural Beauty). This AONB extends to the east beyond which lies the town of Hythe and to the south-east which includes Lympne village. The proposed site also includes areas of Barrowhill, Sellindge, Westenhanger, Newingreen and Lympne Industrial Park, and some areas of woodland. The proposed site is centred on National Grid Reference (NGR) TR 111 363.

1.3 Proposed Development

1.3.1 The proposed Development area is located on approximately 589 ha of land. The development proposals are to be submitted in outline as an amendment for a new garden settlement accommodating up to 8,500 dwellings (Use Classes C2 and C3) and Use Class E, F, B2, C1, Sui Generis development, including use of retained buildings as identified with related infrastructure, highway works, green and blue infrastructure, with access, appearance, landscaping, layout and scale matters to be reserved.

1.3.2 The masterplan demonstrates that the proposed design can appropriately accommodate the mitigation proposed (illustrated in ES Appendices 7.18, 7.21, the Green Infrastructure (GI) Strategy (ES Appendix 4.11) and the Design and Access Statement (DAS)(ES Appendix 4.16)). Additionally, it is considered that there is sufficient flexibility in mitigation parameters to respond appropriately to likely flex in planning policy, potential future baselines, best practice guidance and/or legislation.

1.3.3 Following consultation on the ES submitted as part of the 2019 planning application (the '2019 ES'), a 'three-tier' approach is proposed for the amended planning application and accompanying EIA. This comprises the three stages of the planning process: Tier 1 Outline Planning Application, Tier 2 detailed masterplan and Tier 3 reserved matters application. The design and mitigation will therefore evolve in line with the tiers. The table below (Table 1) outlines the proposed methodology for evolving the planning permission through the tiers in relation to biodiversity.

Table 1: Methodology for the evolution of ecological mitigation through the tiered planning process

Aspect of the development	Tier 1	Tier 2	Tier 3
Species mitigation	Outline of accommodation of species needs within the landscape masterplan, including identification of areas for species mitigation. Identification of key corridors for wildlife, including habitat creation (including tunnels etc. and dark corridors).	Inclusion of aspects of the mitigation in the design code, for example bird and bat boxes in built parcels. Accommodation of dark corridor requirements. Ensuring the Tier 2 application meets the parameters of Tier 1 to accommodate required mitigation. Determination of appropriate licensing system for the Phase being progressed through Tier 2 (if appropriate)	Detailed species mitigation for each Tier 3 application area, tying in with licensing approach outlined at Tier 2. The detailed approach to mitigation will need to evolve at Tier 3 to remain compliant with best practice at the time of the Tier 3 applications.

1.4 Structure of This Report

1.4.1 This report outlines the proposed on-site mitigation approach for key faunal receptors, namely:

- Great crested newt;
- Reptiles;
- Water vole;
- Bats; and
- Badger.

1.4.2 The following figures should be read alongside this document:

- Figure 1: Overview of GCN mitigation;
- Figure 2: Overview of reptile mitigation;
- Figure 3: Overview of water vole mitigation;
- Figure 4: Overview of bat mitigation;
- Figure 5: Overview of badger mitigation;
- Figure 6: Indicative Phases; and
- Figure 7: 4002.

1.4.3 This document should be read alongside the following ES Appendices:

- 7.6: Reptile Survey Report
- 7.7: Badger Survey Report
- 7.9: Great Crested Newt Survey Report
- 7.10: Otter and Water Vole Survey Report
- 7.11: Bat Survey Results Summary Report and Impact Assessment
- 7.12: Bat Transect Survey Report
- 7.13: Bat Emergence Survey Report
- 7.14: Bat Static Survey Report

1.5 Overview of On-Site Mitigation

1.5.1 In line with the mitigation hierarchy, the design of the proposed Development has been iterated throughout the design process to limit impacts to important ecological receptors.

- Across the site, a range of habitats are proposed to maximise the value of other proposed green infrastructure (GI) around the site. Within the GI, valuable habitats are proposed. These habitats include:
- Ponds created for biodiversity, these will be designed to meet the prescriptions of the relevant 'habitat of principal importance' description. Areas where ponds are to be created include the buffer around Harringe Brooks Wood and south of the Folkestone Racecourse Lake.
- A large wildlife and wetland area in the north-west is proposed for water management and to create habitat for key fauna;
- Areas of woodland planting, these areas are to be planted to screen the proposed Development and to create connectivity. This includes planting linking Harringe Brooks Wood to the river corridor to the north. This tree planting will be to the west of the proposed Development. Screening planting is also to be included;
- Sustainable Urban Drainage Systems (SuDS) features including ponds, drainage ditches, swales and rain gardens (some of which will be primarily for biodiversity value, others primarily for drainage, but all will have biodiversity value);
- Ditches are to be created;
- Hedgerows will be planted across the proposed Development. These will be native species hedges and will be planted to subdivide parcels within the proposed Development, and also to provide a permeable barrier for wildlife between properties and GI. These features will provide a notable habitat for a range of species;
- Areas of species rich wildflower grassland will be created across the site. The habitat composition/seed and planting mix should be based upon the soil present but would largely be based upon the descriptions of priority habitat (lowland meadow);
- Scattered trees are to be planted through the GI of the proposed Development. The species of these will be designed to safeguard against disease and climate change but will be native where appropriate.
- Areas of scrub will be created/allowed to develop, which will have value for invertebrates and provide a heterogeneous habitat;
- Microhabitat features will also be created for a range of receptors, including earth banks and deadwood piles; and
- GI and artificial habitats will also be integrated into indicative phases.

1.5.2 Biodiversity net gain has been calculated using the Defra offsetting metric. It is calculated that there will be biodiversity net gain of c.20% (calculated using BM 3.0) once the proposed Development is completed. This gain in biodiversity value will benefit many fauna, including those specifically addressed within this report.

2 Great Crested Newt Mitigation

2.1 Overview of Mitigation / Landscape Scale Mitigation

2.1.1 This section of the report outlines the mitigation proposed for great crested newt (GCN).

2.1.2 The proposed mitigation for GCN is outlined at a landscape scale. This looks at the populations present within the site and the likely connectivity to off-site ponds. It also takes into consideration the targets for areas within the site outlined in the draft approach to the Natural England (NE) GCN district licensing strategy for Kent. This was informally communicated to Arcadis ecologists in a meeting conducted on 07/12/2017 (details are presented in ES Appendix 7.2).

2.1.3 In summary, the OPA and immediately adjacent areas contained seven ponds with a low GCN population and one pond with a medium GCN population. The locations of these ponds and the identification numbers stated within this report are presented in ES Appendix 7.9. There was limited connectivity between the on-site populations. Where connectivity existed, it was identified between the following ponds:

- Connectivity in the west and south west of the site between ponds 5, 11, 9, and 12;
- Connectivity between pond 15 and other occupied GCN ponds was poor, with connectivity between this pond and ponds 5, 11 and 12 being intersected by the A20 road; and the next nearest pond, pond 23, being over 1km to the east of this pond;
- Pond 17 is also isolated, with all other ponds occupied by GCN being isolated by roads and / or a significant distance (over 1km);
- Pond 23 is within 50m of two other ponds: 22 and 23a, both of which have been identified as supporting GCN.

2.1.4 When approaching the proposed mitigation for GCN, the mitigation hierarchy was utilised, whereby the ponds were initially identified for retention. Of the ponds identified within the site which supported GCN, only one is to be removed to facilitate the development, pond 27. All other ponds are retained.

2.1.5 Connectivity between the ponds is retained or enhanced as a component of the proposed Development. Connectivity between ponds 5, 9, 11 and 12 is retained, through wide ‘green corridors’, under passes and retained habitats. Connectivity between pond 15 and the ponds to the east (pond 22, 23 and 23a) is enhanced with the creation of a ‘riparian park’ through the site. New ponds will create stepping stones for GCN through the landscape.

2.1.6 In addition to the avoidance, there is also compensation within the proposed masterplan. Additional areas of pond creation are proposed, including:

- Ponds around the periphery of Harringe Brooks Wood;
- Ponds within the riparian park, north of pond 15;
- Ponds and aquatic features (including SuDS etc.) in the south-east of the site with connectivity to retained pond 17;
- Extensive pond creation proposed in the north-west of the site.

2.1.7 The proposed masterplan has also taken into consideration the landscape scale targets of the district licensing mitigation strategy. As explained above, it is not possible at this stage to determine if, or exactly how the site will contribute to the emerging district licensing approach to GCN. However, the following approaches have been incorporated.

- The area around Harringe Brooks Wood was identified as an area where pond creation would be beneficial. This is incorporated in the landscape approach to the proposed Development.
- The area to the east of ponds 11 and 12 is identified as an area where terrestrial habitat enhancement for GCN would be beneficial. Within this area, creation of areas of rough grassland with hibernacula is proposed. This will be of benefit for GCN and reptiles.

Connectivity to this area is enhanced through the proposed installation of an underpass beneath Otterpool Lane.

- A large area designed specifically for wildlife, including areas of ponds, ditches.

2.2 Habitat Loss / Gain

2.2.1 In total, c.200ha of area within 500m of a GCN pond will be impacted by the proposed Development. Of this, an estimated 50ha offers terrestrial habitat for GCN (approximately 25%), with the remaining area being intensively farmed arable land and improved grassland. Extensive areas of existing habitat are retained, and approximately 85ha of GCN habitat will be enhanced within the proposed Development.

2.3 Further Survey

2.3.1 The requirement for further survey at later stages of the planning process will be determined by the details of the phasing of the proposed Development and the mitigation approach determined for each area. If an individual licence approach (or site wide licence) is determined to be the most appropriate mitigation strategy, updated population surveys may be required but should be considered in line with NE's planning policy implementation approach which allows more holistic decisions to be undertaken.

2.4 Licensing

2.4.1 It is likely that European Protected Species (EPS) licensing will be required to facilitate the proposed Development. However, it is not considered appropriate at this time to outline exactly how the proposed Development in each indicative phase will contribute to the licence. The exact licensing approach will depend upon the regulatory site in place at the time of the subsequent applications. NE's policies with regard to the EPS licensing and the emerging, district licence, which take into account the county wide distribution of GCN, will be utilised, as appropriate, as set out below. The following will need to be determined as the proposed Development proceeds through the planning process (at Tier 2 and 3):

- Whether a licence is required;
- The most practicable approach for licensing in a given area;
- Whether GI in a given area can contribute towards wider district goals (for example, a wildlife area in the north-west of the site may contribute towards the district licensing approach for Kent (the area may generate surplus mitigation).

2.4.2 This document seeks to demonstrate that within the site, the favourable conservation status of GCN can be maintained and can comply with relevant legislation and policy.

2.5 Construction Mitigation

2.5.1 Details of construction mitigation will need to be determined on an area-by-area basis, as the proposed Development moves through the tiers (and subsequent reserved matters applications), but is likely to include:

- Specific timings of works to avoid impacts;
- Supervision by an Ecological Clerk of Works (ECoW);
- Habitat creation;
- Trapping and translocation of GCN.

2.6 Indicative Phasing, Impacts and Mitigation Table

2.6.1 This section of the report outlines how impacts to GCN will be mitigated for on a phased basis, and how mitigation for impacts at each phase will be addressed chronologically within the proposed Development. These mitigation measures are presented in Table 2. An overview of the mitigation features referred to in this section are presented in Appendix A and a timetable for the actions referred to is presented in Appendix F.

Table 2: Mitigation associated with impacts of each indicative phase of the development

Indicative phases	Impact Summary (Extracts from ES Appendix 7.9)	Proposed mitigation overview	Proposed licensing approach / mitigation location	Enhancement / improvement works required in receptor / enhancement areas(s)
Hill Top	No loss of GCN ponds. There will be a loss of terrestrial habitat within 250m of pond 9, which supports a small population of GCN, partial fragmentation of linkages between ponds 11,12 and 5, which are likely in the same metapopulation.	Fragmentation is mitigated via tunnel creation and new pond creation around Harringe Brooks Wood. Terrestrial habitat loss is mitigated for through habitat creation and enhancement including greater connectivity around Harringe Brooks Wood. A large area in the north of Hill Top will form a nature area. Within this area, a range of S41 (habitats of principal importance) quality habitats for a range of species will be created, including high quality GCN habitat. This forms a large component of the strategic and landscape scale mitigation within the Otterpool Park development. There may be an opportunity for this area to provide mitigation for off-site developments utilising the district level licensing approach. Reasonable avoidance measures may be employed to safeguard GCN in this area.	An individual licensing approach may be most appropriate in this situation, utilising NE's policy approaches. It is considered that it may be appropriate to conduct targeted trapping and translocation within the quality habitat on the periphery of pond 9 and ensure the favourable conservation status of GCN is maintained through habitat enhancement around the periphery of Harringe Brooks Woods and improvement of the metapopulation connectivity.	Creation of ponds within the areas around the periphery of Harringe Brooks Woods and in the north will likely be required ahead of any habitat loss or fragmentation of habitat.
Woodland Ridge	No loss of GCN ponds, but pond 9 which supports a small GCN population, will be partially fragmented from likely ponds within the same metapopulation, ponds 11 and 12, pond 5. There will be significant loss of terrestrial habitats around pond 9 (core habitats within 50m and 250m and wider habitats within 500m). There will be a small loss of habitat within 500m of pond 5 and a small loss of terrestrial habitat within 250m of ponds 11 and 12, and a loss of	Fragmentation is mitigated via tunnel creation and new pond creation around Harringe Brooks Wood. Terrestrial habitat loss is mitigated for through habitat creation and enhancement including greater connectivity around Harringe Brooks Wood. Mitigation for ponds 11 and 12 will comprise habitat creation including greater connectivity around Harringe Brooks Wood and within the SSSI east of the ponds (enhanced connectivity across Otterpool Lane).	An individual licensing approach may be most appropriate in this situation, utilising the NE's policy approaches. It is considered that it may be appropriate to conduct some targeted trapping and translocation within the quality habitat around the periphery of pond 9 and ensure the favourable conservation status of GCN is maintained through habitat enhancement around the	Creation of ponds within the areas around the periphery of Harringe Brooks Woods will likely be required ahead of any habitat loss or fragmentation of habitat.

Indicative phases	Impact Summary (Extracts from ES Appendix 7.9)	Proposed mitigation overview	Proposed licensing approach / mitigation location	Enhancement / improvement works required in receptor / enhancement areas(s)
	some habitats within 500m of ponds 11 and 12.		periphery of Harringe Brooks Woods and improvement of the metapopulation connectivity.	
Airfield Park	Within Airfield Park there are no impacts to ponds or loss of terrestrial habitat. Impacts are limited to distant terrestrial habitats which are from 250m to 500m from pond 17.	Design mitigation within this area will include the retention and enhancement of connectivity. Very minimal impacts to GCN are predicted to result from the development within Airfield Park. Reasonable avoidance measures may be employed to safeguard individual GCN. Significant areas in the east will be enhanced for terrestrial habitats for GCN (shown in blue), this will largely be mitigation for impacts within other areas of the Otterpool Park development.	This will likely be included within the licensing for other areas, with no trapping or translocation considered necessary.	Enhancements within the east (hibernacula, modified management to increase habitat heterogeneity). Will need to be completed as a component of the development of some of the earlier construction phases.
Country Park	The primary impacts from this indicative phase of development is the loss of terrestrial GCN habitat associated with pond 17. Pond 17 supported a small GCN population.	Impacts associated with this indicative phase will be mitigated through the design retention of the core habitats around pond 17. Pond 17 will be retained within a mosaic of GI, including SuDS, trees and sports pitches, allotments etc. Connectivity between terrestrial habitats will be maintained and enhanced. There will be some loss of terrestrial habitats over 250m from pond 17. When works in these areas are being conducted, reasonable avoidance measures would be employed. Mitigation would be in the form of terrestrial habitat enhancement	No trapping or translocation is considered necessary. Licenced under 'new' policies / district licence.	N/A
Hillhurst Farm	Hillhurst Farm is the only indicative phase within the proposed Development where a GCN breeding pond will be lost	Mitigation for impacts in Hillhurst Farm will not involve any avoidance or design mitigation, it is not practicable to retain GCN habitats within this Zone. The population in this area is	This area is likely to require a licence to develop as a pond will be lost.	Creation of ponds adjacent to Harringe Brooks Wood,

Indicative phases	Impact Summary (Extracts from ES Appendix 7.9)	Proposed mitigation overview	Proposed licensing approach / mitigation location	Enhancement / improvement works required in receptor / enhancement areas(s)
	to development. Pond 27 will be removed, which supports a small population of GCN. This GCN population is an isolated population with no nearby ponds to suggest a wider metapopulation.	isolated and the pond with which it is associated (pond 17) is declining in value (being very shallow and overgrown with non-native invasive species). Mitigation will involve habitat creation, enhancement and pond creation within areas adjacent to Harringe Brooks Woods and within the north-west of the site. Individual GCN may need to be translocated to newly created / enhanced habitats. The areas identified for this is adjacent to Harringe Brooks Woods or the wildlife area proposed in the north-west of the development.	The exact type of licence will need to be determined at an appropriate stage of the planning process (Tier 2 / 3).	Terrestrial enhancement in the SSSI south of the A20.
Town Centre & Castle Park	No GCN ponds will be lost. Terrestrial habitat will be impacted >50m from ponds 22, 23 and 23a, which have been identified as having small GCN populations within each of the ponds.	Mitigation will comprise pond creation, habitat creation and enhancement around the East Stour River corridor and within the park between Westenhanger Castle and the retained racecourse lake.	Licensing using NE's licencing policies (No trapping / translocation considered necessary)	Enhancement should be commenced in line with the proposed Development, to ensure that there is a net gain of habitat value within 500m of retained ponds.
River Stour	No loss of GCN ponds. Pond 15 has a medium population of GCN. Terrestrial habitat loss >50m from the pond is anticipated.	Design mitigation within this area would include the retention of the pond within this area (pond 15) within mixed GI (including sports fields, SuDS areas and enhanced habitats). Connectivity to habitats elsewhere within the site would be maintained. Additional ponds will be created around the East Stour River corridor, particularly to the north. Additional mitigation will be in the form of habitat creation and enhancement around the East Stour River corridor and particularly to the north of pond 15, associated with a SuDS area. Reasonable avoidance measures may need to be employed to safeguard individual GCN.	Licensing utilising NE's policies. No trapping or translocation is deemed necessary.	Enhancement within the East Stour river corridor would need to be completed prior to the development works in this area.

3 Reptile mitigation

3.1 Overview of Mitigation / Landscape Scale Approach and Habitat Loss / Gain

3.1.1 The mitigation proposed for reptiles follows the mitigation hierarchy. Initially, impacts to key areas were avoided, where possible. Key areas for reptiles, including areas around Harringe Brooks Wood, to the north and west of Folkestone Racecourse Lake and along the East Stour River corridor and its tributaries are retained within the proposed Development.

3.1.2 A holistic approach to assessing the impacts to reptiles resulting from the proposed Development was taken, whereby an estimate of the minimum amount of 'reptile habitat' required within the site was estimated. This was identified as being a minimum provision of c.50ha across the site.

3.1.3 In total, after the completion of the proposed Development, it is calculated that suitable habitat will more than double the availability of habitat for this species group across the proposed Development.

3.2 Licensing

3.2.1 No licences are required in relation to the reptile species present within the site.

3.3 Construction Mitigation

Details of construction mitigation will need to be determined at planning Tiers 2 and 3, but may include:

- Receptors for which a priority Habitat or Species Action Plan is the most appropriate mechanism for safeguarding their status;
- Specific timings of works to avoid impacts;
- Supervision by an ECoW;
- Displacement of reptiles from an area; and
- Trapping and translocation of reptiles.

3.4 Indicative Phasing, Impacts and Mitigation Table

3.4.1 This section of the report outlines how impacts to reptiles are going to be mitigated on a phased basis, and how mitigation for impacts to each phase will be addressed chronologically within the proposed Development. This is detailed in Table 3. An overview of the mitigation features referred to in this section are presented in Appendix B and a timetable for the actions referred to is presented in Appendix F.

Table 3: Details of construction indicative phasing and proposed mitigation for reptiles.

Indicative phasing	Impact Summary (Extracts from ES Appendix 7.6)	Proposed mitigation overview	Enhancement works required in receptor areas(s)
Hill Top	Within this area, small areas of field margin habitats and woodland edge habitats which were found to support a low population of slow worm, common lizard and grass snake will be lost to the development. There may be a loss of value of some retained habitats due to human disturbance and impacts from domestic animals.	Within this area, connectivity into habitats to the north and south will be a key component of the design. For small areas which will be lost, reptiles will be displaced into adjacent retained and enhanced habitats. In addition, a strategic area in the north will be enhanced to form a 'nature area' This will be designed to provide excellent habitat for multiple species including common reptiles. Woodland edge habitats will also be retained and enhanced to maximise value for reptiles. This area forms a key component of the landscape scale mitigation for many species, including reptiles.	Enhancement area will need to be enhanced prior to any animals of any species being translocated into these areas.
Woodland Ridge	A low population of grass snake and common lizard was found to be present in this area, largely along the woodland edge and within field margins. Minimal reptile habitat is to be lost to the development within this area. Full surveys could not be conducted in this area (south) as part of the baseline data collection due to practical considerations. Habitat assessments within this area showed that there is limited potential for low numbers of reptiles to be present within this area, within retained woodland edge habitats. There may be a loss of value of some retained habitats due to human disturbance and domestic animals.	Design mitigation includes the retention of key areas for reptiles and the improvement of connectivity between retained and enhanced habitats within the wider site. Key retention includes the woodland edge habitats, and connectivity includes the enhanced habitat around the woodland and connectivity north to the East Stour river corridor, along the north to south tributary. Very minor reptile translocation is predicted to be required within this area, the proposed area to receive these animals is an enhanced area of habitat within the woodland buffer.	Enhancement for reptiles within woodland buffer area required ahead of the translocation of reptiles into this area.
Airfield Park	Within the north-west of this area habitat supporting a good population of common	The design retains the best value habitats for reptiles, minimising impacts. In addition, a large receptor area for reptiles will be	The enhancement will be required

Indicative phasing	Impact Summary (Extracts from ES Appendix 7.6)	Proposed mitigation overview	Enhancement works required in receptor areas(s)
	lizard and a low population of grass snake will be lost, primarily within the area north of Link Park. The runway, the edge habitats around the periphery of the site and the bunds between the site and Link Park supported a low population of common lizard and a low population of grass snake. In the east of the site adjacent to Lympne village, a low population of slow worm was recorded. This area is not to be impacted by the proposed works. The majority of the areas which support reptiles are being retained and enhanced within the design. There may be a loss of value of some retained habitats due to human disturbance and domestic animals	created in the east of the Airfield Park, this area will primarily be utilised as a receptor site for other areas of the proposed Development. Connectivity within this area and wider habitats is maintained and enhanced. Key design mitigation includes the retention of landscaping bunds around the periphery of the northern link park area and within the airfield, the habitat along the runway within the Lympne Airfield and field margin habitats. These areas were found to support reptile populations. The design will also ensure that connectivity to retained and newly created habitats within the wider site are maintained and enhanced. Translocation of reptiles within the areas of reptile habitat to be lost will be to habitats within the SuDS infiltration areas in the north and south of Airfield Park.	ahead of the translocations so that an appropriately mature habitat is available for the translocation receptor area.
Country Park	Habitat assessments within the accessed areas in the east suggest that there is limited potential for low numbers of reptiles to be present within this area. Some small field margin and garden areas which may support limited populations reptiles may be impacted. There may be a loss of value of some retained habitats due to human disturbance and domestic animals. Within the west of this area, the majority of reptile habitats are retained or enhanced.	Design mitigation is mainly ensuring that connectivity of reptile habitats is maintained and enhanced. Design mitigation includes the enhancement of reptile habitats along the East Stour tributary to other retained habitats and design of GI such as sports pitch buffers to provide reptile habitat. The SSSI within this area also forms a major component of the mitigation for impacts within other areas of the proposed Development. There is predicted to be a very minimal loss of reptile habitat within the area. It would be initially proposed that reptiles within this area are safeguarded through habitat manipulation and displacement into retained habitats within and adjacent to this area. Some small field margin areas and garden habitats which may support low populations of reptiles may be impacted, if this	Enhancement of the reptile receptor area will be required ahead of any translocation. This will need to be conducted in sufficient time to allow a good quality habitat to develop. The SSSI receptor area will have

Indicative phasing	Impact Summary (Extracts from ES Appendix 7.6)	Proposed mitigation overview	Enhancement works required in receptor areas(s)
	The SSSI area which is due to be enhanced for reptiles will be enhanced as mitigation for earlier phases.	is the case, it is likely that reptiles within these areas would be displaced through habitat manipulation into adjacent retained and enhanced habitats. If a small translocation is required on targeted areas of the site. Any reptiles captured would be translocated to the prepared receptor area within the SSSI.	been enhanced as a component of earlier phasing of the development.
Hillhurst Farm	The north-eastern area was found to have a good population of slow worm and common lizard, and a small population of grass snake. These populations were within a disturbed area of land in the north-east of the area and associated with edge habitats around a nearby ditch and pond. The total area found to have reptiles present is approximately 2.2ha. A small field margin area in the west was also found to have a low population of common lizard present. There may be a loss of value of some retained habitats due to human disturbance and domestic animals.	Within the area, there is extensive pressure from the proposed Development, and it is unlikely that a significant proportion of the reptiles within this area will be retained. A proportion of the reptiles are likely to be displaced into newly created habitats along the northern boundary of the area. The rest of the reptiles are likely to be translocated into habitats within the SSSI, woodland edge habitats and newly created habitats around the park. The proportion of reptiles translocated into these areas will be determined from calculated carrying capacities based upon the habitat quality, previously translocated animals (from other areas) and the area of the receptor site. There will be sufficient area for translocation as an approximate area of reptile habitat of 3.5ha is to be created as a minimum, which far exceeds the total area to be lost.	Enhancement to receptor areas will be required prior to any translocation. Habitat improvement will be required in the displacement area within the northern area ahead of any animals being translocated into this area.
Town Centre & Castle Park	Within this area there is a good population of slow worm, a low population of grass snakes and a good population of common lizards, largely along the woodland edge and within field margins. The majority of the key habitats for these species are to be retained and enhanced, within the areas around the racecourse lake and adjacent to the river corridor / flood plain. However, there is an area adjacent to the	Design mitigation in this area includes the retention, buffering and enhancement of key areas for reptiles and the maintenance and improvement of connectivity between retained and enhanced habitats within the wider site. Key retention includes the woodland edge habitats. There is likely to be a requirement to translocate individual reptiles in discreet locations, where habitat is lost or impacted. Translocated animals would be translocated to retained and enhanced habitats and habitat within the SSSI.	Enhancement of the reptile receptor areas will be required ahead of any translocation. This will need to be conducted in sufficient time to allow a good

Indicative phasing	Impact Summary (Extracts from ES Appendix 7.6)	Proposed mitigation overview	Enhancement works required in receptor areas(s)
	east of the racecourse lake where drainage ditches are to be lost to the proposed Development, there will be a loss of reptile habitat in this area. There will also be a small area of field edge habitat lost in the south of the area which is likely to support a small population of reptiles. In addition, there is likely to be a loss of quality of some of the retained habitats from human disturbance and impacts form domestic animals.	Minor displacement / translocation out of impacted areas, such as road crossings and to allow SuDS installation may be required. In this instance, adjacent enhanced habitats within the East Stour River corridor will be utilised as receptor sites. An area in the north will also have value for reptiles.	quality habitat to develop.
River Stour	Within this area, the majority of the reptile habitats present are within the river corridor and in narrow field margin habitats. These areas contained a good population of slow worm, a good population of common lizard and a low population of grass snake. The majority of the areas which support reptiles are being retained and enhanced within the design. There may be a loss of value of some retained habitats due to human disturbance and impacts from domestic animals.	The design mitigation involves retention, buffering and enhancement of key habitats and maintenance of connectivity of habitats along the East Stour River corridor. Minor displacement / translocation out of impacted areas, such as road crossings and to allow SuDS installation may be required. In this instance, adjacent enhanced habitats within the East Stour River corridor will be utilised as receptor sites. An area in the north will also have value for reptiles as well as other receptors, including GCN. To mitigate for loss of reptile value due to disturbance and domestic animals, the strategic area in Hill Top (north) will provide mitigation.	The receptor area should be completed and established to mitigated for disturbance.

4 Water vole mitigation

4.1 Overview of Mitigation

4.1.1 In areas where water bodies which support water vole would be removed to facilitate the proposed Development, there is likely to be a requirement for measures to safeguard individual water vole and populations of water vole. These measures may include translocation (whereby animals are captured and moved to newly created or enhanced habitats) or displacement (whereby animals are encouraged to move away from the works through habitat manipulation). The preferred method between these two broad options will be outlined in more detail in the water vole mitigation strategy, however, it is likely that the exact methodology will need to be determined on a phased basis, as the most appropriate option will need to be determined by:

- The water vole population in the affected water bodies at the time of the mitigation implementation;
- The status of adjacent water bodies, with regards to habitat, connectivity and population status;
- The habitat and population status of translocation receptor areas; and
- The current best practice guidelines.

4.1.2 It is likely that an appropriate conservation licence to conduct translocation works would need to be obtained from the relevant statutory body (currently Natural England).

4.1.3 There is a risk of pollution to water bodies due to construction. This could negatively impact the availability of foraging and sheltering resources, adversely impacting the water vole population. It is therefore important that best practice industry pollution prevention measures are implemented, for example, soil would be prevented from entering the watercourses using soakaways and silt fencing and all chemicals and waste materials would be stored in secure containers with drip trays etc. This mitigation would be specified within a Code of Construction Practice plan () and/or a bespoke method statement.

4.1.4 The CoCP will also detail measures to reduce noise levels, particularly when construction is taking place less than 30m away from a water body where water vole are present. Light pollution, especially at night, would be regulated, ensuring that light is focussed on only what is necessary for night working.

4.1.5 Construction workers would be made aware of water vole on site before work begins; any vegetation clearance within/in close proximity to the water body would be supervised by the named individual on the conservation licence.

4.1.6 Habitat Loss / Gain

4.1.7 In total, approximately 950m of water vole ditch will be lost to the proposed Development, and approximately 2200m of water vole habitat will be reduced in value for this species, predominantly due to the potential for increased disturbance. However, 3700m of water vole habitat/potential water vole habitat will be enhanced (primarily along the East Stour River corridor), and 3 – 4 km of water vole ditches will be created in a c.14ha area in the north-west of the site. This is a total of:

- Replacement of 3 X the amount of ditch lost:
- Enhancement of 1.5 X the amount of habitat reduced in value.

4.2 Further Survey

4.2.1 Updated water vole surveys are likely to be required to inform the licencing to facilitate water vole mitigation and for detailed design iteration (at Tiers 2 and 3). The need for further survey would be monitored throughout the build out process.

4.3 Licensing

4.3.1 Translocation and displacement will be required from ditches to the east of the Folkestone Racecourse lake (as presented on Figure 3) and potentially areas of the East Stour River.

4.4 Construction Mitigation

4.4.1 In areas where water bodies which support water vole would be removed to facilitate the proposed Development, there is likely to be a requirement for measures to safeguard individual water vole and populations of water vole. These measures may include translocation (whereby animals are captured and moved to newly created or enhanced habitats) or displacement (whereby animals are encouraged to move away from the works through habitat manipulation. It is likely that the exact methodology will need to be determined on a phased basis (i.e. at Tier 2 / Tier 3), as the most appropriate option will need to be determined by:

- The water vole population in the affected water bodies at the time of the mitigation implementation;
- The status of adjacent water bodies, with regards to habitat, connectivity and population status;
- The habitat and population status of translocation receptor areas; and
- The current best practice guidelines.

4.4.2 The CoCP will also detail measures to reduce noise levels, particularly when construction is taking place less than 30m away from a water body where water vole are present. Light pollution, especially at night, would be regulated, ensuring that light is focussed on only what is necessary for night working.

4.4.3 Construction workers would be made aware of water vole on site before work begins; any vegetation clearance within/in close proximity to the water body would be supervised by a licenced Ecologist.

4.5 Indicative Phasing, Impacts and Mitigation Table

4.5.1 This section of the report outlines how impacts to water voles are going to be mitigated for on an indicative phase basis, and how mitigation for impacts to each phase will be addressed chronologically within the proposed Development. These are outlined in Table 4. An overview of the mitigation features referred to in this section are presented in Appendix C and a timetable for the actions referred to is presented in Appendix F.

Table 4: Details of indicative phasing and proposed mitigation for water voles.

Indicative phases	Impact Summary (Extracts from ES Appendix 7.10)	Proposed mitigation overview	Proposed licensing approach / mitigation location (Zone(s))	Habitat improvement works required in receptor / enhancement areas(s)
Hill Top	No confirmed water vole habitats are present. The diches which would be impacted were not possible to fully survey due to thick vegetation; however, for the EIA a precautionary assessment of a low population was made, within water vole ditch 21. Direct impacts to ditch 21 would be limited to impacts from the installation of a road crossing across this ditch In addition, adjacent water bodies within Harringe Brooks Woods were found to support low populations of water voles. There is potential for a loss of value of these habitats through human disturbance and impacts from domestic animals.	Mitigation within will include avoidance, whereby none of the ditches with the potential to be lost to the development. There will likely be minor habitat disturbance where roads etc. cross these ditches (ditch 21), these impacts will be temporary and individual water voles within these habitats will be safeguarded via displacement and subsequent habitat restoration. Ditches and ponds within Harringe Brooks Woods will be safeguarded through buffers to the woodland (of > 50m) and discouragement of usage by humans through fencing and usage of varying topography and planting within the buffer area. Potential fragmentation impacts will be avoided through the inclusion of bridges etc which permit water vole movement along the ditches on the site. Impacts from the reduction in quality of habitats due to the presence of residential developments within the vicinity of the retained ditches would largely be mitigated for within the proposed nature area to the north of Hill Top, subsequent to the development within Town Centre and Castle Park. The large 'nature area' is designed for a number of receptors, including water voles and provides	A conservation licence may be required to displace water voles from the areas where crossings of water body 21 are required.	No habitat creation ahead of displacement would be required. Measures to reduce human disturbance will need to be in place prior to occupation of residential units.

Indicative phases	Impact Summary (Extracts from ES Appendix 7.10)	Proposed mitigation overview	Proposed licensing approach / mitigation location (Zone(s))	Habitat improvement works required in receptor / enhancement areas(s)
		partial mitigation for many of the proposed Development areas. Mitigation for impacts resulting from the development will also include measures to reduce the effects of human and domestic animal impacts upon retained ditches (especially within Harringe Brooks Woods). This will include the design of buffer areas to reduce human disturbance of retained habitats.		
Woodland Ridge	No confirmed water vole habitats are present to the north of this area. The diches which would be impacted were not possible to fully survey due to thick vegetation, however for the EIA a precautionary assessment of a low population was made, within water vole ditches 19 and 21. In addition, adjacent water bodies within Harringe Brooks Woods were found to support low populations of water vole. There is potential for a loss of value of these habitats through human disturbance and impacts from domestic animals. No direct impacts to water vole will result from development within the south of the area (no ditches or	Mitigation will include avoidance, whereby none of the ditches with the potential to be lost to the development. There will likely be minor habitat disturbance where roads etc. cross these ditches, these impacts will be temporary and individual water voles within these habitats will be safeguarded via displacement. Ditches and ponds within Harringe Brooks Woods will be safeguarded through buffers to the woodland (of approximately 70m) and discouragement of usage by humans through fencing and usage of varying topography and planting within the buffer area. Potential fragmentation impacts will be avoided through the inclusion of bridges etc which permit water vole movement along the ditches on the site. Impacts from the reduction in quality of habitats due to the presence of residential developments within the vicinity of the retained ditches would	No licence would be required.	No habitat creation ahead of displacement would be required.

Indicative phases	Impact Summary (Extracts from ES Appendix 7.10)	Proposed mitigation overview	Proposed licensing approach / mitigation location (Zone(s))	Habitat improvement works required in receptor / enhancement areas(s)
	water bodies supporting water vole are present.	largely be mitigated for within Hill Top, subsequent to development within Woodland Ridge. The mitigation in Hill Top includes a large 'nature area' designed for a number of receptors, including water vole.		
Airfield Park	No water vole habitats will be impacted.	N/A	N/A	N/A
Country Park	Within this area, the predominant impacts to water voles consist of potential fragmentation of connectivity and minor temporary habitat loss resulting from the installation of a road which crosses the tributary to the East Stour, water vole ditch 11a. There is potential for a reduction in value of adjacent water vole habitats through human disturbance and impacts from domestic animals (particularly ditches 14a, 14b,15, 11a and 11b.	Mitigation would include avoidance, whereby none of the ditches with water voles present will be lost to the development. There will likely be minor habitat disturbance where roads etc. cross water body 11a, these impacts will be temporary and individual water voles within these habitats will be safeguarded via displacement and subsequent habitat restoration. Mitigation for impacts resulting from the development include measures to reduce the effects of human and domestic animal impacts upon retained ditches. This will include the design of buffer areas designed to reduce human disturbance of retained habitats. Potential fragmentation impacts will be avoided through the inclusion of bridges etc which permit water vole movement along the retained ditches. Impacts from the reduction in quality of habitats due to the presence of residential developments within the vicinity of the retained ditches would largely be mitigated for within Hill Top. The	A conservation licence may be required to facilitate the road crossing across water body 11a.	Enhancements within diches required to enable displacement will be required ahead of any displacement works. Measures to reduce human disturbance will need to be in place prior to occupation of residential units.

Indicative phases	Impact Summary (Extracts from ES Appendix 7.10)	Proposed mitigation overview	Proposed licensing approach / mitigation location (Zone(s))	Habitat improvement works required in receptor / enhancement areas(s)
		mitigation in Hill Top includes a large 'nature area' designed for a number of receptors, including water voles.		
Hillhurst Farm	Within Hillhurst Farm, no confirmed water vole populations were identified. Ditch 16 was dredged prior to the surveys in 2017, with all emergent vegetation being removed. In 2018, no conclusive signs of water voles were observed. Surveys in 2020 found no water vole presence. It is concluded that water voles are not present.	Prior to works commencing, it will be necessary to conduct a follow up survey on water vole water body 16. If water voles are present, this population will be lost to the development. No adjacent ditches are present; therefore water voles cannot be displaced in to these habitats. If water voles are present, these individuals will need to be captured and translocated into suitable habitats. It is considered likely that the likely location for translocation would be into new habitats in Hill Top.	If water voles are present at the time of the development, a conservation licence would be required to enable the development. Mitigation may be required.	The receptor area, if required, would need to be created and provide suitable habitat for water voles prior to any translocation occurring.
Town Centre & Castle Park	In this area, the most significant loss of water vole habitat will occur. In total, approximately 600m of ditch which supports a low population of water voles will be lost to facilitate the development. Water body 5 supported a low water vole population but this water body is likely to be important for water vole movement through the site into other water vole habitats (such as within water body 6A). Water body 12 supported a medium population of water voles.	In total, it is proposed that in order to safeguard the individual water voles, a combination of avoidance, displacement and translocation will be undertaken. There will likely be minor area of habitat loss where roads etc. cross water bodies especially water body 5, these impacts will be largely temporary and individual water voles within these habitats will be safeguarded via displacement into adjacent habitats and subsequent habitat restoration. Potential fragmentation impacts will be avoided through the inclusion of bridges etc designed to	A conservation licence would be required to enable the displacement / capture and translocation of water voles from water vole ditch 1 and from the areas where crossings of water body 5 and 12 are required. Mitigation would be within Hill Top	Mitigation would need to be installed and allowed to mature into quality habitat prior to water voles being released into this habitat. Measures to reduce human disturbance will need to be in place prior to

Indicative phases	Impact Summary (Extracts from ES Appendix 7.10)	Proposed mitigation overview	Proposed licensing approach / mitigation location (Zone(s))	Habitat improvement works required in receptor / enhancement areas(s)
	Direct impacts are predominantly related to small areas of habitat loss, required to enable crossings across the East Stour River (water body 5) and water body 12. There is potential for a reduction in value of adjacent water vole habitats through human disturbance and impacts from domestic animals (particularly water bodies 5 and 12)	permit water vole movement through the retained ditches, and particularly through Ditch 5. Impacts from the reduction in quality of habitats due to the presence of residential developments within the vicinity of the retained ditches would largely be mitigated with habitat enhancements including management works to increase the heterogeneity of the habitats in water body 5 and creating a denser bankside vegetation type with emergent vegetation including reed and sedges. Within the design, ditches south of the Folkestone Racecourse Lake, and the ditches 30 and 30A will be retained. For the diches to be lost (the northern 3 ditches of ditch cluster 1), where appropriate, water vole will be displaced into the adjacent habitat of ditch 30 and into the edge habitats of Folkestone racecourse (water vole water body 2, pond 19). In addition, new water vole habitat will be created with an approximate ditch length of 600m within Country Park. Dependent upon the water vole population within this area to be impacted at the time of the development, it may be necessary for water voles to be captured and translocated into the newly created habitat. In addition, a new water vole ditch would be dug connected to the retained sections of water vole ditch 1. Water voles would not be translocated into		occupation of residential units.

Indicative phases	Impact Summary (Extracts from ES Appendix 7.10)	Proposed mitigation overview	Proposed licensing approach / mitigation location (Zone(s))	Habitat improvement works required in receptor / enhancement areas(s)
		this ditch but it is predicted that the retained population would expand into this area. Impacts from the reduction in quality of habitats due to the presence of residential developments within the vicinity of the retained ditches would largely be mitigated for within Hill Top, subsequent to the development within Town Centre and Castle Park. The mitigation in Hill Top includes a large 'nature area' designed for a number of receptors, including water voles. Mitigation for indirect impacts would include measures to reduce the effects of human and domestic animal impacts upon retained ditches. This will include the design of buffer areas designed to reduce human disturbance of retained habitats.		
River Stour	Confirmed water vole habitats are present. These include water body 5 and 5C. Water body 5 supported a low water vole population but this water body is likely to be important for water vole movement through the site into other water vole habitats (such as within water body 6A). Water body 5C supported a medium population of water voles. Direct impacts are predominantly related to small areas of habitat loss, required to enable crossings	Mitigation within Zone 7 would primarily consist of avoidance, whereby none of the ditches with water voles present will be completely lost to the development. There will likely be minor area of habitat loss where roads etc. cross water bodies especially water body 5, these impacts will be largely temporary and individual water voles within these habitats will be safeguarded via displacement into adjacent habitats and subsequent habitat restoration. Potential fragmentation impacts will be avoided through the inclusion of bridges etc designed to	A conservation licence may be required to displace water voles from the areas where crossings of water body 5 and 5C are required.	Measures to reduce human disturbance will need to be in place prior to occupation of residential units.

Indicative phases	Impact Summary (Extracts from ES Appendix 7.10)	Proposed mitigation overview	Proposed licensing approach / mitigation location (Zone(s))	Habitat improvement works required in receptor / enhancement areas(s)
	across the East Stour River (water body 5) and water body 12. There is potential for a reduction in value of adjacent water vole habitats through human disturbance and impacts from domestic animals (particularly water bodies 5 and 5C).	permit water vole movement through the retained ditches, and particularly through Ditch 5. Mitigation for indirect impacts would include measures to reduce the effects of human and domestic animal impacts upon retained ditches. This will include the design of buffer areas designed to reduce human disturbance of retained habitats. Impacts from the reduction in quality of habitats due to the presence of residential developments within the vicinity of the retained ditches would largely be mitigated for with habitat enhancements including management works to increase the heterogeneity of the habitats in water body 5 and creating a denser bankside vegetation type with emergent vegetation including reed and sedges.		

5 Bat mitigation

5.1 Overview of Mitigation and Landscape Scale Mitigation

5.1.1 In summary, within the proposed masterplan, the following approaches are proposed to safeguard bats;

- Retention and buffering of important foraging areas;
- Maintenance of known and likely commuting routes between foraging and roosting areas across the site;
- Creation of new habitats likely to be of high value for foraging bats.
- Creation of new valuable habitats such as ponds and SuDs;
- Enhancement of existing habitats, such as creating heterogeneity in the East Stour River Corridor.

5.1.2 This information will allow the impact to bats resulting from the proposed Development being minimised at the masterplanning stage. The approach for areas of high commuting activity will include:

- Maintenance of known and likely commuting routes between foraging and roosting areas across the site;
- Where roads, etc., cross commuting corridors, planting/underpasses/bridges will be included to ensure that bats can continue to traverse these features;
- Masterplanning to limit light spill onto retained habitats and design specifications that all artificial lighting must be directional and low light spill;
- Creation of dark corridors within the proposed Development, that are designed to ensure that bats can continue to use the area for commuting and foraging. These will be designed to limit light spill into these areas and maximise continuity of these dark areas;
- Identification of commuting routes and enhancement of these corridors, including landscaping and maintenance of low light levels;
- Masterplanning to limit impacts (pollution, light spill, recreational impacts etc.) onto offsite roosts;
- Installation of new roosting opportunities including bat houses/barns and tree/structure mounted boxes;
- Retention and enhancement of connectivity between known/likely roosting sites and foraging habitats;
- Specification for creation of bat roosting features including bat barns and installation of tree roost boxes and roost boxes within newly created structures; and
- Prescriptions for the provision of bat boxes within the developed phases and within retained/created habitats.

5.2 Further Survey

5.2.1 Bat surveys conducted to date are considered sufficient to inform the EIA, masterplan design, and outline planning at Tier 1. However, due to the evolution of the detailed design and the requirement for an extended build out, subsequent surveys are likely to be required to inform each phase of the proposed Development. These surveys will inform detailed planning and construction mitigation and avoidance, at Tiers 2 and 3. This section of the report outlines the survey work likely to be required as the proposed Development progresses. The following surveys are likely to be required during the buildout:

- As the detailed design evolves at Tier 2 and 3, additional areas may require scoping for potential impacts to bats;
- Further ‘preliminary roost assessment’ (PRA) surveys of structures, as access to previously inaccessible areas is obtained;

- Once detailed design is finalised, hibernation surveys may be required on buildings to be removed which have been identified as having hibernation potential during the building assessments (where safe to do so) ES Appendix 7.12.
- Further, and more detailed PRA and subsequent emergence / re-entry surveys to identify roosts to safeguard individual roosts (of structures to be removed, once this is known). These should be conducted as each indicative phase proceeds to planning and be designed to ensure that sufficient data can be collected to allow a licence from Natural England to be obtained (determined by the current best practice and licence guidelines at the time of the development);
- No tree roosting potential has been considered to date. Assessment of the roosting potential of trees, especially those identified within these surveys as likely to support bat roosts, will be undertaken once the details of tree impacts and removal is known. Followed by emergence / re-entry surveys where required. These should be phased as each parcel proceeds to planning.

5.2.2 Monitoring of the bat usage of the site may need to be conducted, to inform detailed design and the success of avoidance mitigation for existing roosts and commuting corridors.

5.3 Construction Mitigation

5.3.1 During demolition and construction on the site, there may be a need to safeguard roosting bats within structures and trees to be removed. Mitigation for these individuals is likely to require a licence from the statutory authority (currently Natural England) and may specify:

- Specific timings for works;
- Displacement and exclusion of bats from structures;
- Supervision of demolition works by a licensed ecologist;
- Suitable alternative roosting provision also be likely to be required, may include bat barns and houses and / or bat boxes.

5.3.2 During the construction phase of the proposed Development, a range of measures will need to be implemented to ensure that impacts to bats are minimised. Prescriptions for the provision of toolbox talks for on-site contractors and staff, informing them of the legal protection afforded to bats;

- Prescriptions for site lighting to minimise the impacts and disturbance to bats;
- Pollution control measures;
- Buffers and offsets from sensitive areas.

5.4 Indicative phasing, impacts and mitigation table

5.4.1 This section of the report outlines the mitigation within each indicative phase of the proposed Development for bats. This is presented in Table 5. An overview of the mitigation features referred to in this section are presented in Appendix D and a timetable for the actions referred to is presented in Appendix F.

Table 5: Mitigation associated with impacts of each indicative phase of the proposed Development

Indicative phase	Impact Summary (Extract from ES Appendices 7.11, 7.12, 7.13, 7.14)	Proposed mitigation overview	Proposed licensing approach
Hill Top	No roosts were identified within this area. There is potential for impacts to tree roosts, but most trees are retained. There is potential for the loss of a foraging area of up to County value, but most of this area is of local value. The proposed Development could result in the severance / reduction in value of commuting routes of up to county value	The GI has been designed to retain, enhance and create foraging and commuting habitats. The following features and areas proposed for bat mitigation: • Commuting and foraging habitat is retained or enhanced along much of the western edge of the area. • Commuting routes connecting the Harringe Brooks Wood and East Stour River are retained and enhanced with dark corridors. • A bat house is proposed on the East Stour River to the north-west of Barrowhill. • Foraging habitat is retained on the eastern edge of the area, to the west of the A20. • Commuting routes are enhanced with dark corridors to the east, connecting to habitat to the east of the A20.	No licence requirement is foreseen as there are no roosts in this area and most trees are to be retained, surveys will be required on trees to be removed.
Woodland Ridge	No structures are present. No roosts were identified within the north of this area. There is potential for impacts to tree roosts, but most trees within this zone are retained. There is potential for indirect impacts to roosts within the off-site area of Otterpool Manor. The proposed Development in this area could result in the loss of area of local foraging value or the reduction in value of areas of County value (the area around Harringe Brooks Wood). The proposed Development could result in the severance / reduction in value of commuting routes of local value.	Within this area, the GI has been designed to retain, enhance and create foraging and commuting habitats. The following features and areas are proposed for bat mitigation: • Commuting routes are retained and enhanced with dark corridors from Otterpool Manor in the east to Harringe Brooks Wood in the west. • To the west of Otterpool Manor key areas for foraging and commuting are retained and commuting routes are enhanced with dark corridors. • To the east of Harringe Brooks Wood commuting routes are enhanced with dark corridors, with foraging and commuting areas retained and enhanced to the east.	No roosts have been identified within this area to date. No licence requirement is foreseen at this time. Surveys will be required on trees to be removed.

Indicative phase	Impact Summary (Extract from ES Appendices 7.11, 7.12, 7.13, 7.14)	Proposed mitigation overview	Proposed licensing approach
Airfield Park	No roosts were identified. There is potential for impacts to tree roosts, but most trees within this area are retained. There is potential for indirect impacts to an off-site maternity roost of brown long—eared bats within Lympne village outside of the OPA to the east. There is potential for the loss of a foraging area of up to local value. The proposed Development could result in the severance / reduction in value of commuting routes of local value.	The GI has been designed to retain, enhance and create foraging and commuting habitats. The following features and areas proposed for bat mitigation: • An extensive area of foraging and commuting habitat is to be retained from the north towards the A20. • Foraging areas to the east of Link Park industrial area is to be retained. • Commuting and foraging areas are to be retained and enhanced in the east, which adjoin onto further areas of retained habitat to the north and south. • Large areas of foraging and commuting habitat is to be retained and enhanced to the west of the village of Lympne.	No licence requirement is foreseen as there are no structures in this area and most trees are to be retained, surveys will be required on trees to be removed.
Country Park	The proposed Development in this area will involve direct impacts (removal) of structures which support roosts of county and local value. The maternity roost of brown-long eared bats is of county value, the pipistrelle roosts local value. There is potential for impacts to tree roosts, but most trees are retained. There is potential for the loss of a foraging area of up to County value, but most of this area is of local value. The proposed Development could result in the severance / reduction in value of commuting routes of county value There is the potential for indirect impacts to roosts of local value within the off-site area of upper Otterpool (house and barns and one likely tree roost).	The GI has been designed to retain, enhance and create foraging and commuting habitats. The following features and areas are proposed for bat mitigation: • The majority is to be retained or enhanced for bat foraging and / commuting. The main exception to this is the quarry. • A bat house is proposed between the tributary to the East Stour River, and the A20. • Commuting routes along the tributary to the East Stour river, south of the A20, are retained and enhanced with dark corridors. To the south of these commuting routes, foraging habitat is retained. • In the west, in Upper Otterpool, a large area of commuting and foraging habitat is retained and enhanced.	The proposed Development in this area is likely to require the removal of some pipistrelle roosts and a brown long-eared maternity roost. These will require an EPS licence from Natural England. The exact details of the licensing requirements will need to be finalised as a component of the detailed design and permissions process for this area. Surveys will be required on trees to be removed.
Hillhurst Farm	Pipistrelle roosts of local value will be removed to facilitate the proposed Development as structures in Hillhurst Farm are removed. There is potential for	Within this area, the GI has been designed to retain, enhance and create foraging and commuting habitats. The following features and areas proposed for bat mitigation:	The proposed Development in this area is likely to require the removal of several pipistrelle

Indicative phase	Impact Summary (Extract from ES Appendices 7.11, 7.12, 7.13, 7.14)	Proposed mitigation overview	Proposed licensing approach
	impacts to tree roosts, but most trees within are retained There is potential for indirect impacts to local value roosts within the off-site areas of Little Greys Cottage and Twin Chimneys. The proposed Development in this area could result in the loss of area of local foraging value. The proposed Development could result in the severance / reduction in value of commuting routes of local value.	• Commuting routes from Westenhanger village are retained. • Commuting routes from Kiln Wood towards the Racecourse are retained and enhanced with dark corridors. • Further foraging and commuting areas are retained and enhanced to the west • A bat house is proposed in the north of the area, to the south of junction 11 on the M20. • Along the northern boundary, foraging and commuting areas are retained and enhanced.	roosts. These will require an EPS licence from Natural England. The exact details of the licensing requirements will need to be finalised as a component of the detailed design and permissions process for this area.
Town Centre & Castle Park	Multiple roosts of local importance within this area are likely to be directly impacted by removal of buildings. There is potential for impacts to tree roosts, but most trees within this area are retained. There is potential for indirect impacts to local value roosts within the off-site areas of Little Greys Cottage and Twin Chimneys (south). There is potential for indirect impacts to the local value pipistrelle roosts identified within the Westenhanger Castle buildings. There is potential for the loss of a foraging area of up to County value, but most of this area is of local value The proposed Development could result in the severance / reduction in value of commuting routes of county value.	Within this area, the GI has been designed to retain, enhance and create foraging and commuting habitats. The following features and areas are proposed for bat mitigation: • Two bat houses are proposed adjacent to Westenhanger Castle and adjacent to Folkestone Racecourse Lake; • A bat house is proposed adjacent to the tributary to the East Stour river, south of the A20, to the west of Newingreen. • Commuting routes are retained north of this area through the Westenhanger Castle grounds; and from the east (i.e. Kiln Wood) to the Folkestone Racecourse Lake. • Commuting routes are retained and enhanced with dark corridors through this area and to the East Stour River to the west. • Further foraging and commuting habitat is retained and enhanced between the tributary to the East Stour river, south of the A20, and Newingreen. • The Folkestone Racecourse Lake foraging area is retained, and a retained / enhanced area of foraging habitat is present to the west of the Folkestone Racecourse Lake.	The proposed Development in this area is likely to require the removal of a number of pipistrelle roosts. These will require an EPS licence from Natural England. The exact details of the licensing requirements will need to be finalised as a component of the detailed design and permissions process for this area. Surveys will be required on trees to be removed.

Indicative phase	Impact Summary (Extract from ES Appendices 7.11, 7.12, 7.13, 7.14)	Proposed mitigation overview	Proposed licensing approach
		• A large area of enhanced foraging and commuting area is present to the south-west • A commuting route runs along the northern edge of the zone, parallel to the M20. This is retained and enhanced with dark corridors.	
River Stour	No roosts were identified. There is potential for impacts to tree roosts, but most trees are retained. There is a low potential for indirect impacts to unknown roosts within Barrowhill, Sellindge to the west. There is potential for the loss of a foraging area of up to local value. The proposed Development could result in the severance / reduction in value of commuting routes of local value.	The GI has been designed to retain, enhance and create foraging and commuting habitats. The following features and areas proposed for bat mitigation: • A commuting route runs up the centre, from the A20 towards the M20. This is to be retained and enhanced. • Two further commuting routes run east-west, connecting to the racecourse and Westenhanger Castle grounds. These are to be retained and enhanced with dark corridors. • Commuting routes in the south are buffered with retained foraging habitat. • Commuting and foraging areas are retained or enhanced up the middle and from the centre to the east.	No licence requirement is foreseen as there are no roosts in this area and most trees are to be retained, however surveys will be required on trees to be removed.

6 [redacted]

[redacted]

- [redacted]
- [redacted]
- [redacted]
- [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

6.4 [redacted]

[redacted]

6.5 [redacted]

[redacted]

- [redacted]
- [redacted]
- [redacted]

[redacted]

[redacted]

Otterpool Park
Targeted species mitigation strategies

[redacted]

[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]

Otterpool Park
Targeted species mitigation strategies

[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]

Otterpool Park
Targeted species mitigation strategies

[redacted]	[redacted]	[redacted]	[redacted]
		[redacted]	
[redacted]	[redacted]	[redacted]	[redacted]

7 Conclusions

7.1.1 This report details the methodology for demonstrating how the outline application can mitigate for key faunal receptors on-site at Tier 1, namely:

- Great crested newt;
- Reptiles;
- Water vole;
- Bats; and
- Badger.

7.1.2 This document outlines an overview of the proposed approach to mitigation. It will be necessary for the approach to mitigation to be evolved throughout the planning and build out process, at Tier 2 and 3. It is not practicable to outline all of the details of the mitigation at the outline planning stage as:

- Aspects of detailed design have not been completed;
- The legislative and policy regime to which the developments are required to apply is likely to evolve throughout the extended buildout;
- As the proposed Development progresses, it may be necessary to determine the success of the completed mitigation to maximise the success of subsequent mitigation.

7.1.3 The key aims of this document are to evidence that adequate mitigation can be incorporated within the proposed Development as outlined in the parameter plans (ES Appendix 4.2), maintaining the favourable conservation status of the key receptors.

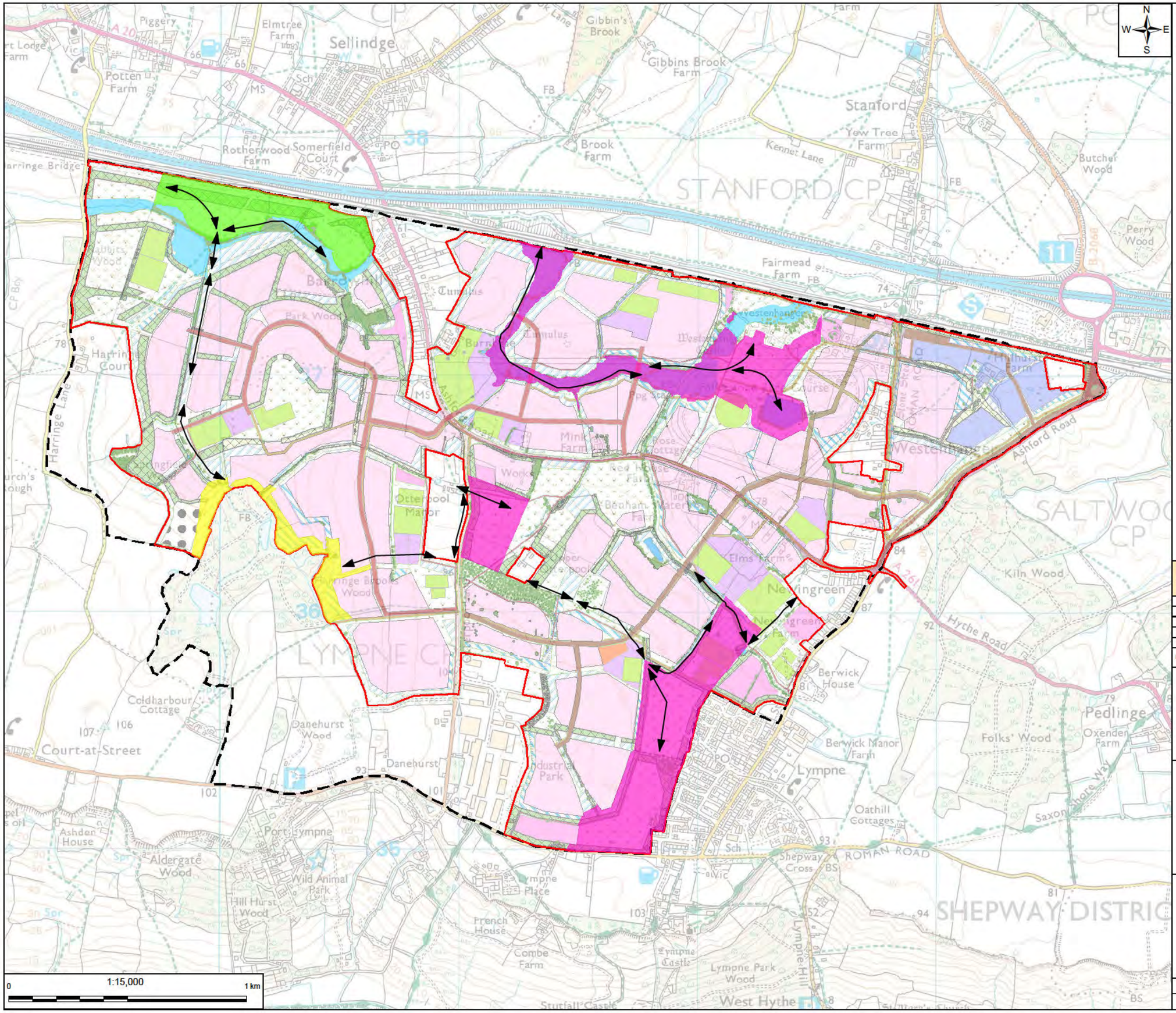
7.1.4 This document demonstrates that the project is able to accommodate the protected species mitigation requirements and can comply with current relevant legislation and policy.

8 Reference

Reference	Title
Ref 1	Anon (1981) Wildlife and Countryside Act 1981. HMSO, London. [Online] Available from: http://www.legislation.gov.uk/ukpga/1981/69 [Accessed: September 2017].
Ref 2	Anon (1996) Wild Mammals (Protection) Act 1996. HMSO, London. [Online] Available from: http://www.legislation.gov.uk/ukpga/1996/3/section/1 [Accessed: September 2017].
Ref 3	Anon (2000) Countryside and Rights of Way Act 2000. HMSO, London. [Online] Available from: http://www.legislation.gov.uk/ukpga/2000/37/introduction [Accessed: September 2017].
Ref 4	Anon (2006) Best Practice Guidance - Creation of Artificial Setts.
Ref 5	Anon (2006) The Natural Environment and Rural Communities Act HMSO, London.
Ref 6	Anon (2007) UK BAP priority terrestrial mammal species. [Online] Available from: http://jncc.defra.gov.uk/page-5170 [Accessed: September 2017].
Ref 7	Anon (2019) The Conservation of Habitats and Species Regulations 2019 (EU Exit).
Ref 8	Bat Conservation Trust (2018) Bats and artificial lighting in the UK.
Ref 9	Bright, P., Morris, P. and Mitchell-Jones, T. (2006) The Dormouse Conservation Handbook, 2nd edn. English Nature, Peterborough.
Ref 10	Ecotricity (2012) Harringe Brooks Wind Park Environmental Statement
Ref 11	Edgar et al. (2010). Reptile Habitat Management Handbook. Amphibian and Reptile Conservation, Bournemouth.
Ref 12	English Nature (2001) Great crested newt mitigation guidelines.
Ref 13	English Nature (2002) Badgers and Development.
Ref 14	English Nature (2004) Bat mitigation guidelines.
Ref 15	Highways Agency (1997) Design Manual for Roads and Bridges: Mitigating against effects on badgers.
Ref 16	JNCC (2001) Habitat management for bats: A guide for land managers, land owners and their advisors.
Ref 17	JNCC (2004) Bat Workers Manual 3rd ed.
Ref 18	Langton, T.E.S., Beckett, C.L., and Foster, J.P. (2001) Great Crested Newt Conservation Handbook, Froglife, Halesworth.
Ref 19	Mortelliti, A., Sozio, G., Driscoll, DA., Bani, L., Boitani L., Lindenmayer, DB. (2014) 'Population and individual-scale responses to patch size, isolation and quality in the hazel dormouse'. Ecosphere, 5: 1-13.
Ref 20	Natural England (2011) Interim Natural England Advice Note - Dormouse surveys for mitigation licensing – best practice and common misconceptions.
Ref 21	Natural England (2011) Natural England Technical Information Note TIN102: Reptile mitigation guidelines.
Ref 22	Natural England (2011) Natural England Technical Information Note TIN025: Using one-way gates on badger sett entrances. 2nd ed.
Ref 23	NBN Atlas online https://nbnatlas.org/ [accessed April 2018]

Reference	Title
Ref 24	Pond Conservation (2013) Species Dossier: Water Vole.
Ref 25	Salix (2014) Coir Roll.
Ref 26	Stone, E.L. (2013) Bats and lighting: Overview of current evidence and mitigation.
Ref 27	Wembridge, D., Al-Fulaij, N., Langton, S. (2016) The State of Britatin;s Dormice 2016, PTES, available onlince at: https://ptes.org/wp-content/uploads/2016/09/State-of-Britains-Dormice-2016.pdfPeople's Trust for Endangered Species (PTES) (2017) [Online] Available from: https://ptes.org/get-informed/facts-figures/hazel-common-dormouse-muscardinus-avellanarius/ [Accessed June 2017].
Ref 28	Pond Conservation (2013) Species Dossier: Water Vole.

Figure 1: Overview of GCN mitigation



REV	Date	Description	Drawn	Check	Approv
01	15/03/22	FOR INFORMATION	PN	BM	MG

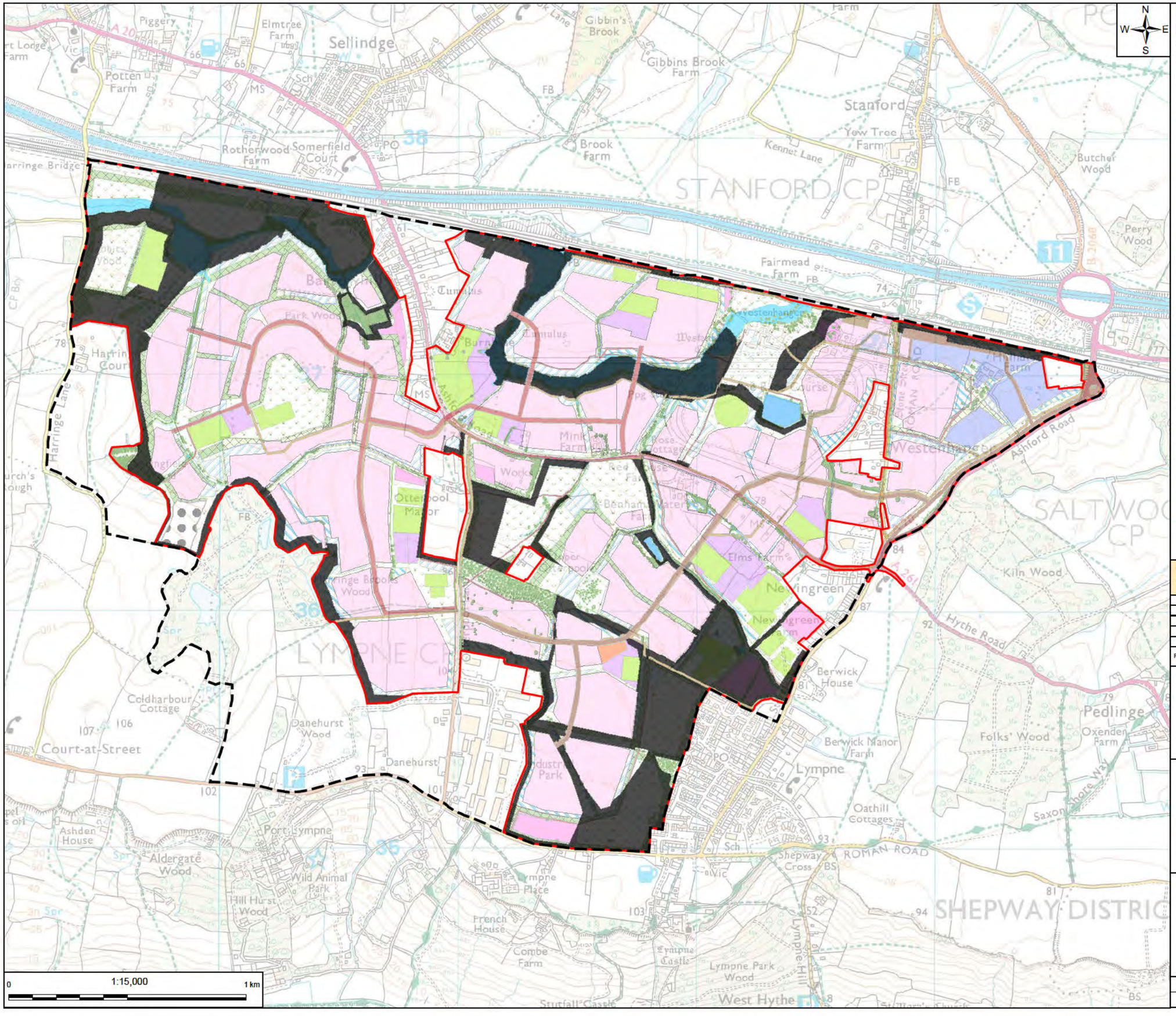
ARCADIS
80Fen
80 Fenchurch Street
London
EC3M 4BY

OTTERPOOL PARK
COUNTRYSIDE · CONNECTED · CREATIVE

Figure 1
Great crested newt mitigation overview- Key mitigation areas

scale	original size	datum	grid
1:15,000	A3	Sx	BNG

Figure 2: Overview of reptile mitigation



Legend

- Outline Planning Application Boundary
- Framework Masterplan Boundary

Reptile Habitat Area

- Reptile Habitat Area
- Advance Planting Phase 1
- Advance Planting Phase 2 & 3
- Existing Road
- Existing Scattered Trees
- Existing Trees Existing Hedges
- Existing Water Pond
- Existing Water Area / Proposed River Park
- Existing Woods
- Existing Woods Outside
- Proposed Allotments
- Proposed Bridge Crossing
- Proposed Burial Ground
- Proposed Business
- Proposed Cycleways
- Proposed Development Areas.
- Proposed Footpaths
- Proposed General Green infrastructure
- Proposed High School
- Proposed Movement corridor
- Proposed Phasing 1A
- Proposed Potential Accessibility
- Proposed Primary Roads
- Proposed School Area
- Proposed Sport Field
- Proposed Suds Hatch
- Proposed Suds Water Management
- Proposed Woodland

REV	Date	Description	Drawn	Check	Approv
02	03/11/21	FOR INFORMATION	PS	BM	MG
01	22/11/18	FOR INFORMATION	AD	BM	MG

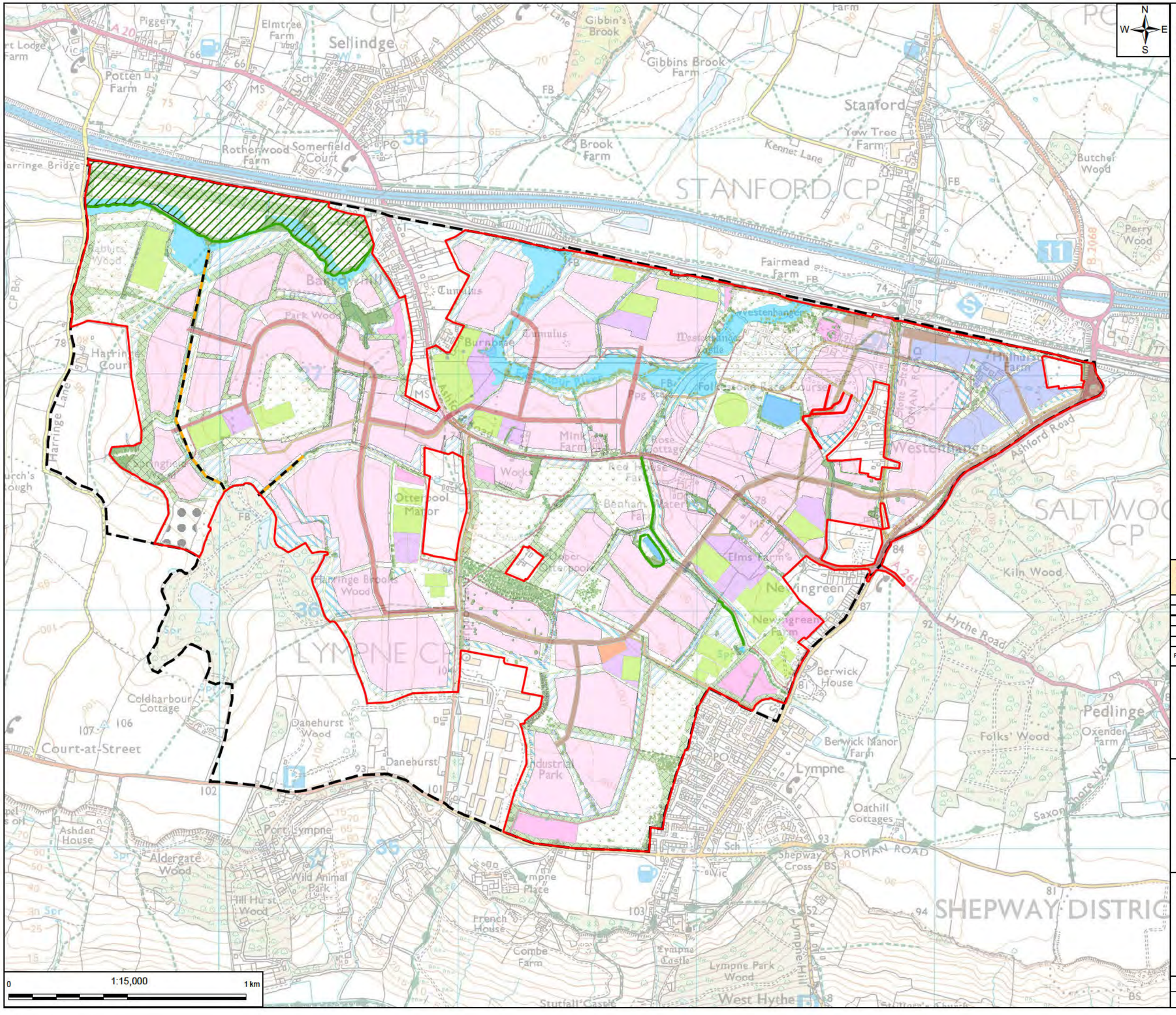
ARCADIS
80Fen
80 Fenchurch Street
London
EC3M 4BY

OTTERPOOL PARK
COUNTRYSIDE · CONNECTED · CREATIVE

Figure 2
Reptile Mitigation Strategy

scale	original size	datum	grid
1:15,000	A3	Sx	BNG

Figure 3: Overview of water vole mitigation



Layer Credits: Contains Ordnance Survey data © Crown copyright 2018 OS 0100031673

REV	Date	Description	Drawn	Check	Approv
02	17/11/21	FOR INFORMATION	RM	BM	MG
01	23/11/18	FOR INFORMATION	PN	BM	MG

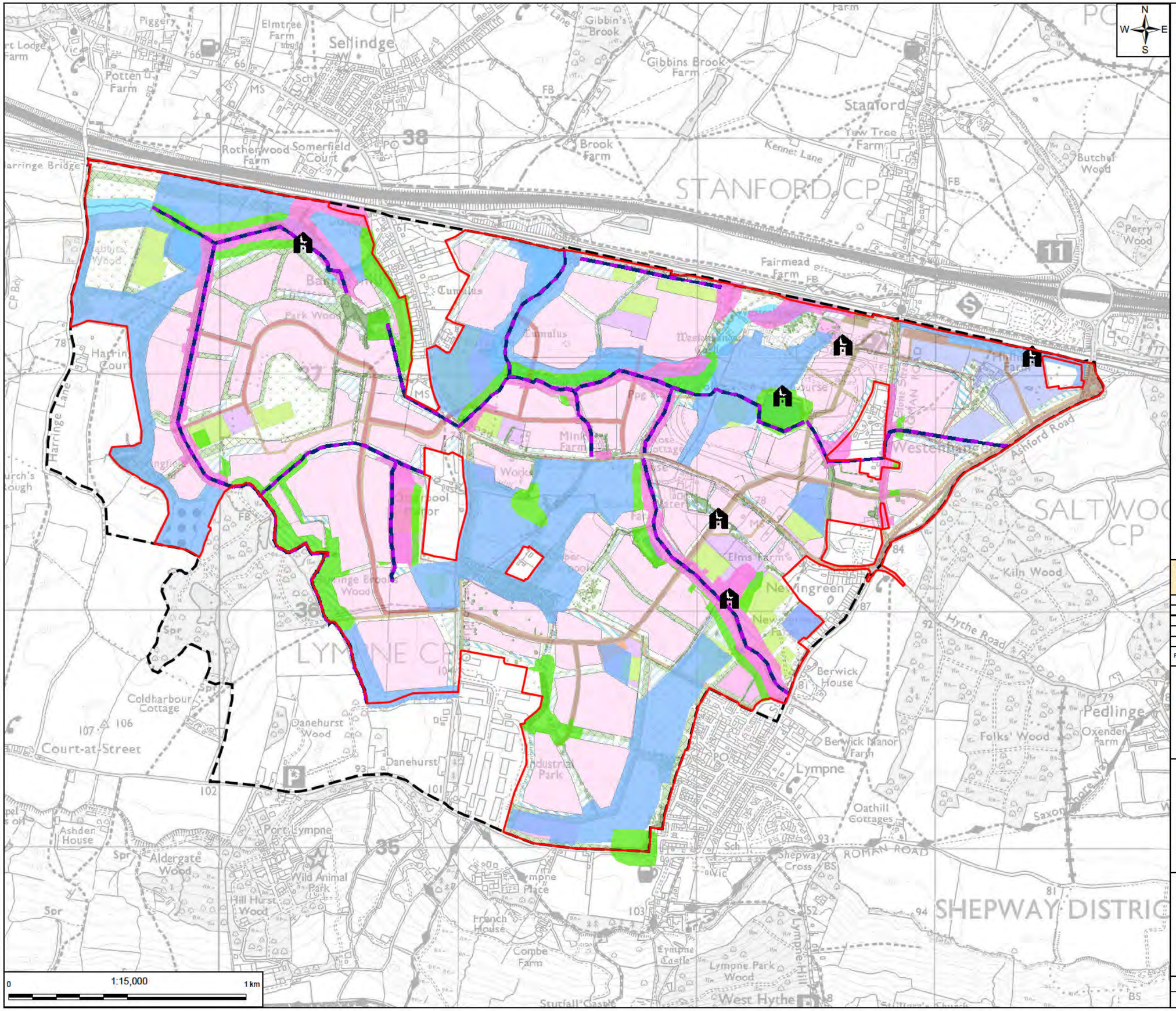
ARCADIS
80Fen
80 Fenchurch Street
London
EC3M 4BY

OTTERPOOL PARK
COUNTRYSIDE · CONNECTED · CREATIVE

Figure 3
Water Vole Mitigation Overview

scale	original size	datum	grid
1:15,000	A3	Sx	BNG

Figure 4: Overview of bat mitigation



REV	Date	Description	Drawn	Check	Approv
01	17/11/21	FOR INFORMATION	RM	BM	MG
01	16/01/19	FOR INFORMATION	PN	BM	MG

ARCADIS
80Fen
80 Fenchurch Street
London
EC3M 4BY

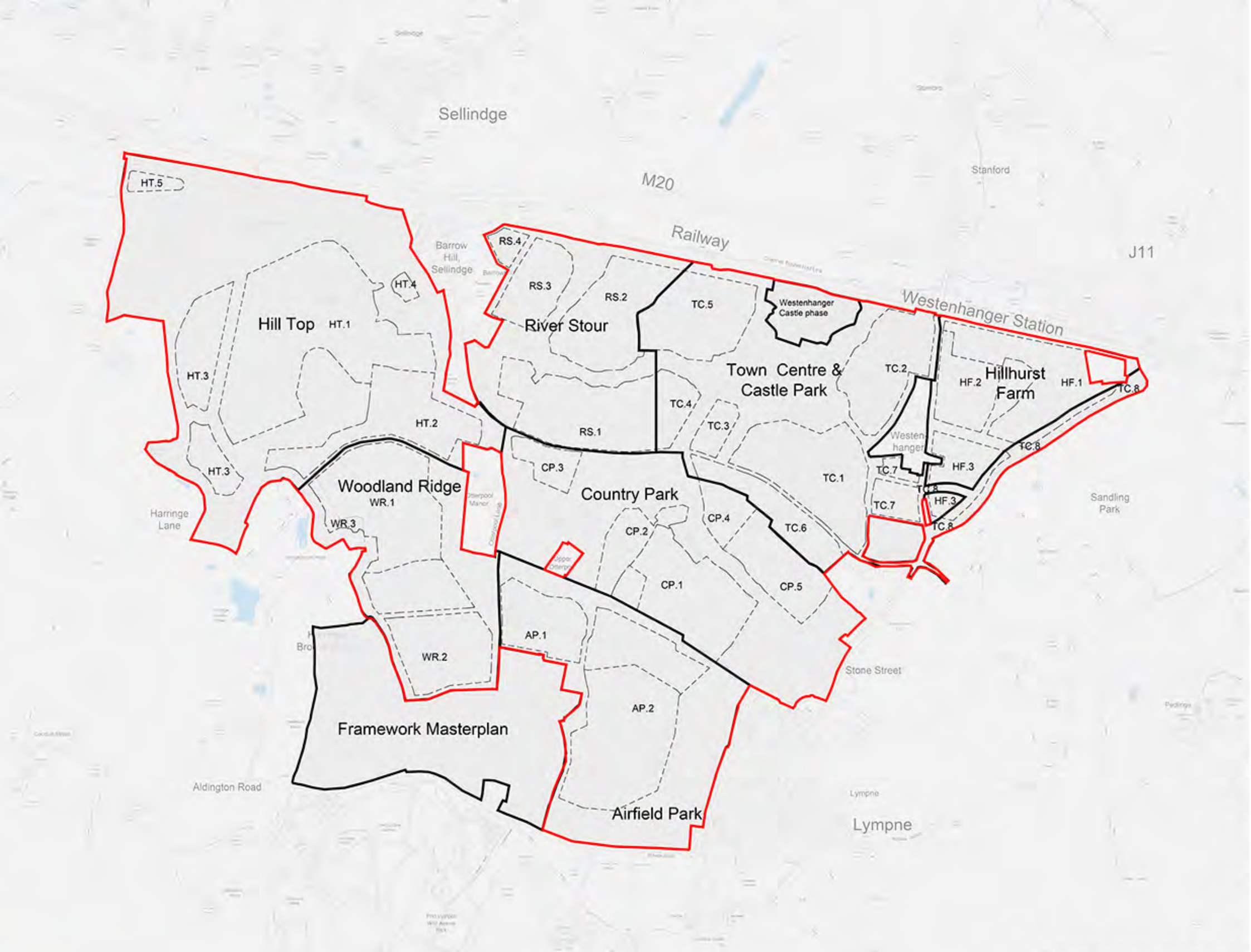
OTTERPOOL PARK
COUNTRYSIDE · CONNECTED · CREATIVE

Figure 4
Summary of all Bat Mitigation

scale	original size	datum	grid
1:15,000	A3	Sx	BNG

Figure 5: Overview of badger mitigation - CONFIDENTIAL

Figure 6: Indicative Phases (in Support) (OPM(P) 4004_Y)



OTTERPOOL PARK
COUNTRYSIDE • CONNECTED • CREATIVE

Client:
Otterpool Park LLP

Masterplanner:
FARRELLS

Project:
Otterpool Park

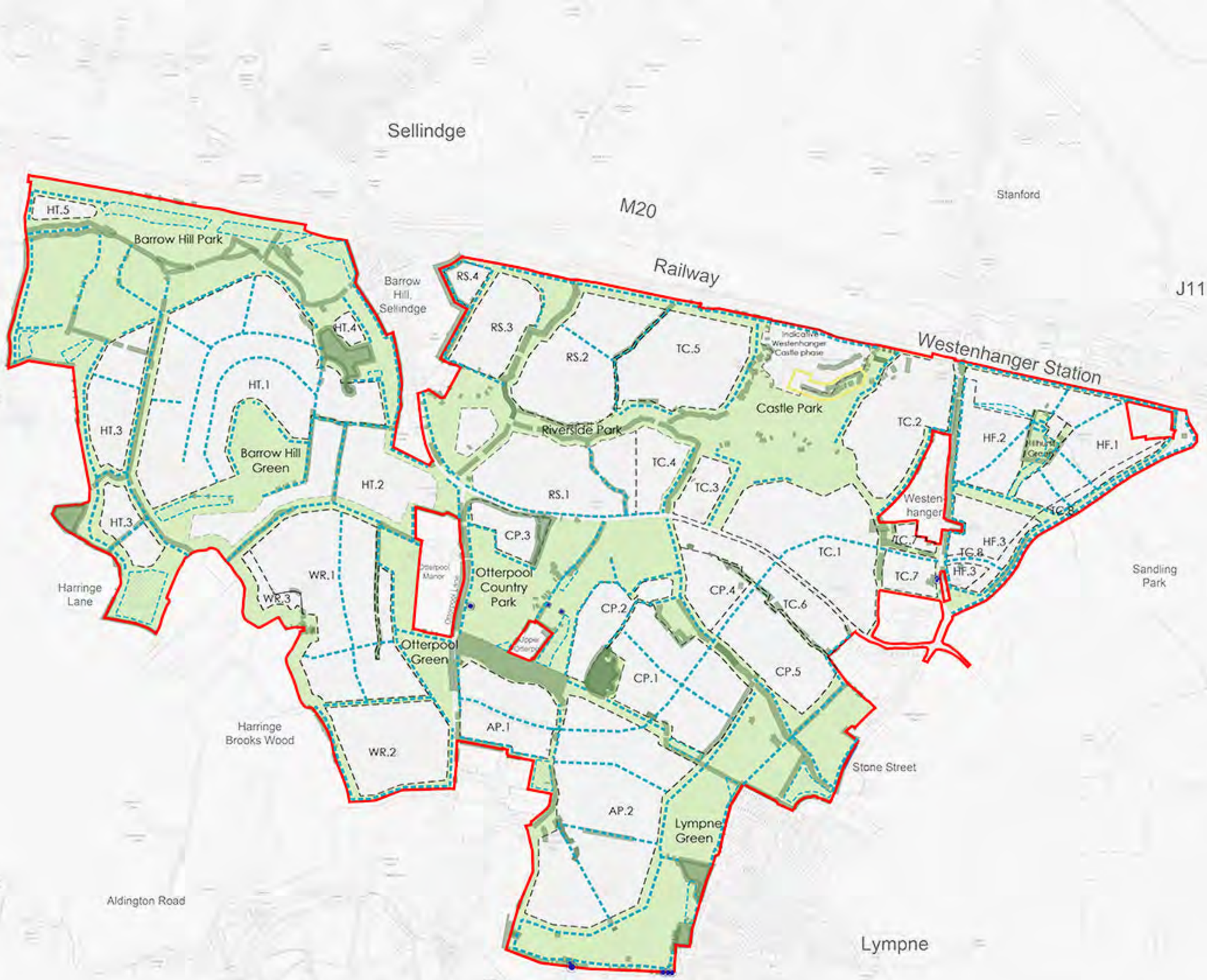
Drawing:
Indicative Phases

Scale:
1:7,500 @ A1, 1:15,000 @A3

Status:
In Support

Drawing Number:
OPM(P)4004_rev YY

Figure 7: Open Space and Vegetation Parameter Plan



Existing

Existing woodlands, trees, treebelts and hedgerows retained.
This Parameter Plan shows where vegetation is proposed to be retained. Breaks in this retained vegetation may however be required to facilitate the proposed development. This will be confirmed at the Tier 2 and Tier 3 stages once detailed tree and vegetation surveys have been conducted and the design has been further progressed.

Area in front of Westenhanger Castle with vegetation to be removed subject to further survey and Conservation Management Plan

Existing trees with TPO retained

Proposed

Proposed development areas

n.n Numbered key to reflect development areas in illustrative phasing plan

Proposed indicative Westenhanger Castle phase

The indicative Westenhanger Castle phase relates to an area of development will be the subject of future consideration/approval

Proposed areas of structural planting

Proposed rows of structural planting

Structural planting must be provided in the general location indicated on this Parameter Plan. The precise location and type of structural planting is to be defined at Tier 2. To inform the Tier 2 structural planting proposals see the Green Infrastructure Strategy for details regarding planting type, location and the necessary advance planting required.

Proposed open space

Application Red Line Boundary

0 250 500

OTTERPOOL PARK
COUNTRYSIDE · CONNECTED · CREATIVE

Client:
Otterpool Park LLP

Masterplanner:

FARRELLS

Project:
Otterpool Park

Drawing:
Open Space & Vegetation

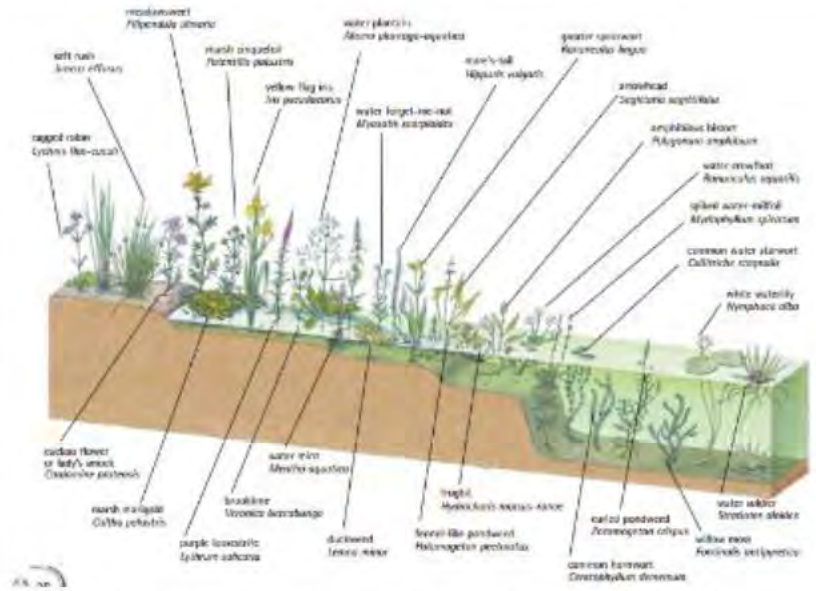
Scale:
1:7,500 @ A1, 1:15,000 @A3

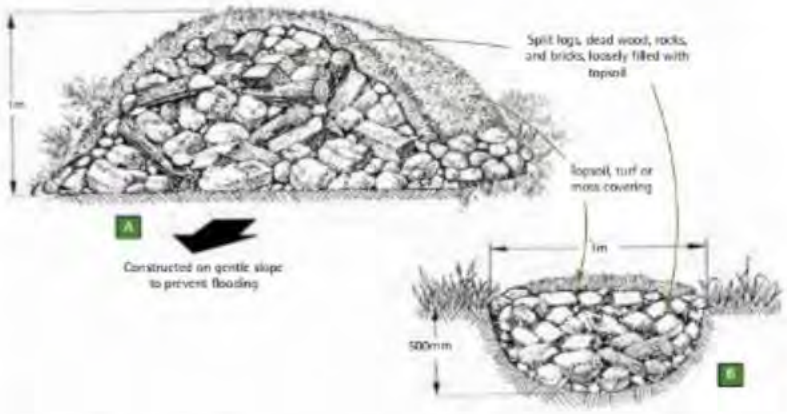
Status:
For Approval

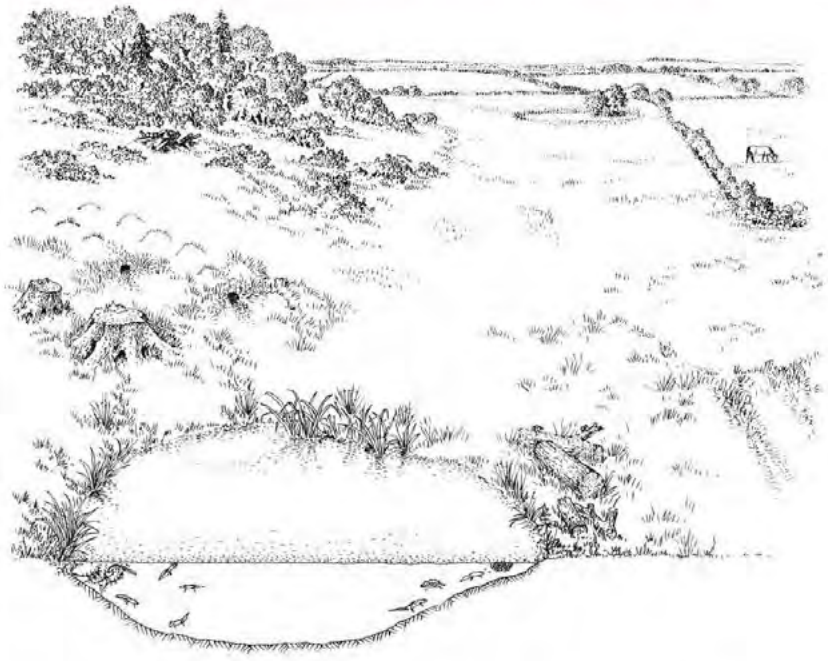
Drawing No. OPM(P)4002_rev YY

APPENDIX A: Great crested newt mitigation habitat enhancements and features

Table 7: Great crested newt mitigation habitat enhancements and features

Feature and description	Photograph / drawing
New pond detail *"Great crested newts need both aquatic and terrestrial habitat. They prefer small to medium sized breeding ponds, around 50-250m2, with smaller ponds being used more successfully where they occur in clusters. Very small ponds (e.g. garden ponds, small bog ponds) and larger lakes are usually not used. Breeding ponds should support aquatic vegetation for egg laying. It appears that great crested newts prefer extensively vegetated ponds with a submerged plant cover of about two thirds of the pond and emergent/floating vegetation cover of one quarter to one half of a pond; in other words a well established, mid-succession pond. Ideally there should be open, less vegetated areas within the pond to allow adult males to display in clear view of females. Ponds that lack shade on the southern margin seem to be preferred."* – Langton, T., Beckett, C., and Foster, J. (2001) *Great Crested Newt Conservation Handbook*, Froglife, Halesworth.	
New pond planting *"For great crested newt projects that involve the recovery of very small populations, or at introduction sites where animals may be released, some planting may be necessary, but must be carried out only with careful planning and rigorous checks throughout. Planting helps to ensure that cover is established relatively quickly, and invertebrate food to sustain the newt population is available (see above photo opposite). Where planting is advised, aquatic plants should be appropriate for the habitat concerned and sourced from nearby ponds, not from outside the local region. Very careful checks are needed to avoid the transferral of fish, or the seeds or fragments of undesirable invasive or exotic plants."* – Langton, T., Beckett, C., and Foster, J. (2001) *Great Crested Newt Conservation Handbook*, Froglife, Halesworth.	 Langton, T., Beckett, C., and Foster, J. (2001) *Great Crested Newt Conservation Handbook*, Froglife, Halesworth.

Feature and description	Photograph / drawing
Mosaic of ponds *"Great crested newts in the landscape. Ponds act as stepping stones for newt dispersal in the landscape. In this example, features such as hedgerows and woodlands, ditches and river banks act as habitat corridors between the ponds and prevent the newt metapopulations from being isolated."* – Langton, T., Beckett, C., and Foster, J. (2001) *Great Crested Newt Conservation Handbook*, Froglife, Halesworth.	 Langton, T., Beckett, C., and Foster, J. (2001) *Great Crested Newt Conservation Handbook*, Froglife, Halesworth.
Hibernacula / log pile *"Providing wood and rock piles for shelter and over-wintering is important in management for great crested newts. Dead wood and the thick litter layer of old woodland and scrub provides the moist stable environment that they need."* – Langton, T., Beckett, C., and Foster, J. (2001) *Great Crested Newt Conservation Handbook*, Froglife, Halesworth.	 Langton, T., Beckett, C., and Foster, J. (2001) *Great Crested Newt Conservation Handbook*, Froglife, Halesworth.

Feature and description	Photograph / drawing
Underpasses / tunnels *"Mitigation ponds should be located away from such roads, but where this is unavoidable and problems are likely to occur, permanent amphibian fencing should be used. If this is likely to prevent dispersal to suitable habitat on the other side of the road, tunnels or culverts can be incorporated."* – English Nature (2001) *Great crested newt mitigation guidelines*.	
Terrestrial habitats *"The primary requirements for great crested newt terrestrial habitats are that they should provide (1) permanent areas of refuge habitat for shelter in the more extreme weather conditions (i.e. drought in summer and freezing in winter), (2) daytime refuges, (3) foraging opportunities, and (4) dispersal opportunities."* – Langton, T., Beckett, C., and Foster, J. (2001) *Great Crested Newt Conservation Handbook*, Froglife, Halesworth.	 Langton, T., Beckett, C., and Foster, J. (2001) *Great Crested Newt Conservation Handbook*, Froglife, Halesworth.

APPENDIX B: Reptile mitigation habitat enhancements and features

Table 8: Reptile mitigation habitat enhancements and features

Feature and description	Photograph
Hibernacula / basking bank / log pile *"Brash/log piles can be created from arisings of scrub control. Piles should be placed in a sunny location and set within existing vegetation (for example, areas of long grass or long grass and scattered scrub), so that there is cover immediately surrounding, or adjacent to, the pile."* – Edgar et al. (2010). *Reptile Habitat Management Handbook*. Amphibian and Reptile Conservation, Bournemouth. *"Creating hibernation sites (hibernacula) is a useful management measure either following recent habitat restoration, where such features may be absent, or where traditional hibernation sites are degrading through subsidence or excessive shade."* – Edgar et al. (2010). *Reptile Habitat Management Handbook*. Amphibian and Reptile Conservation, Bournemouth.	
Egg laying site *"For many sites with grass snake present, creating egg-laying heaps is one of the most productive management measures. Egg-laying sites are often a limiting factor, and population declines may be traced back to their destruction or reduction in quality. If grass snakes currently only disperse through a site (as is often the case with this highly mobile species), creating an egg-laying site may encourage the snakes to form a new population centre, and spend more time there.* *Grass snakes usually nest in heaps of decaying organic material of various kinds, where the heat of decomposition incubates the eggs. Natural nesting sites include piles of vegetation deposited by flood water or cavities within dead, rotting tree trunks and, in coastal areas, seaweed piles. More commonly, grass snakes use material provided by humans, including heaps of manure, compost, grass clippings, sawdust, garden waste or cut reeds.."* – Edgar et al. (2010). *Reptile Habitat Management Handbook*. Amphibian and Reptile Conservation, Bournemouth.	 Natural England (2011) *Natural England Technical Information Note TIN102: Reptile mitigation guidelines*.

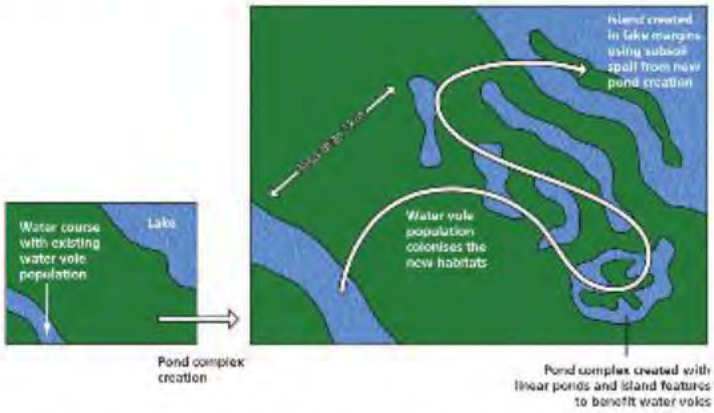
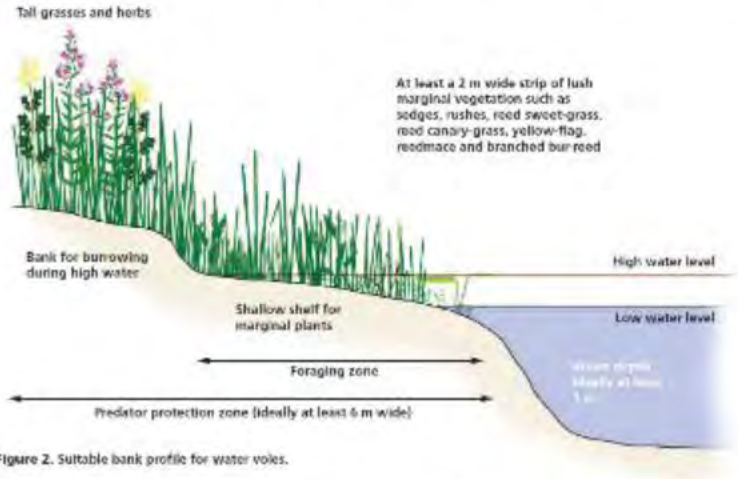
Feature and description	Photograph
Mosaic of water and grassland / scrub *"Due to their need for warm sites, reptiles prefer south-facing slopes, or varied topography, usually on well-drained soils. They also need diverse vegetation structure, creating open areas and nearby cover, to provide protection from predators and the elements."* – Edgar et al. (2010). *Reptile Habitat Management Handbook*. Amphibian and Reptile Conservation, Bournemouth.	

APPENDIX C: Water vole mitigation habitat enhancements and features

Table 9: Water vole mitigation habitat enhancements and features

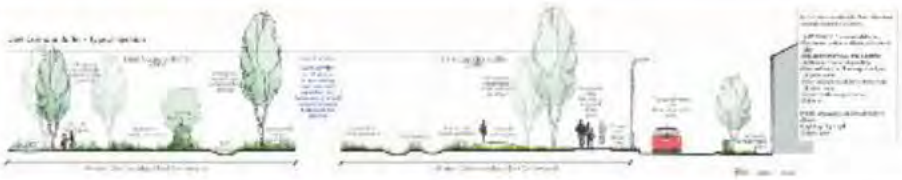
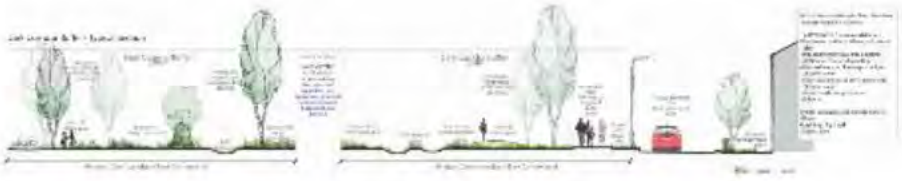
Feature and description	Photograph / drawing
Enhanced habitat – improved with new emergent vegetation *"Design of the shallow-water edge area is critical. Water voles need extensive, thick fringes of tall wetland plants. Extensive stands of marginal vegetation are used both as foraging habitat and as protection from predators. Suitable plants such as sedges, branched bur-reed and reed sweet-grass grow best in shallow water 0 – 0.3 m deep and so new ponds should be designed to have extensive shallow-water zones that extend at least 2 m into the pond. Areas with steep banks that open on to deeper water are also valuable to provide quick escape routes.* *Above water level, pond banks need to be mainly clay, silt or earth so that water voles can burrow in to them easily and create nest chambers above the water table. Steep or stepped bank faces, close to the water are often preferred areas for burrows. The pond banks should generally be well covered by tall vegetation. Multi-layered mixes of tall grasses and herbs such as meadowsweet, willowherb or nettle are best. Occasional trees such as willow and hawthorn are also useful to provide bark and roots for winter feeding. However, too many bank-side trees or shrubs will create problems by shading out vegetation, thus reducing access to forage and protection from predation for water voles."* – Pond Conservation (2013) *Species Dossier: Water Vole*.	

Feature and description	Photograph / drawing
Enhanced habitat – coir roll *"A planting shelf immediately below normal water levels can help to ensure a fringe of marginal vegetation. Pre-planted coir fibre rolls can also be used to reduce the establishment time, and to provide support at the toe of the bank, although they are often less effective at establishing vegetation than the translocation of the existing material."* – Dean et al. (2016) *The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series)*. Eds Fiona Mathews and Paul Chanin. The Mammal Society, London.	
New habitats – linear ditches *"Habitat loss will need to be mitigated for or offset by the creation of new habitat, or the improvement of existing habitat for water voles. The area and quality of habitat created should be at least equivalent to that lost and ideally greater (a net gain in terms of habitat available to the water vole population is likely to be a requirement where works are carried out under licence). In most cases. The losses and gains will be measured in terms of the length of bankside habitat, although the quality of the habitat being lost/gained should also be accounted for."* – Dean et al. (2016) *The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series)*. Eds Fiona Mathews and Paul Chanin. The Mammal Society, London.	 Dean et al. (2016) *The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series)*. Eds Fiona Mathews and Paul Chanin. The Mammal Society, London.

Feature and description	Photograph / drawing
New habitats – complex of ditches and ponds *"Create new water vole ponds near to existing populations to allow colonisation and spread from existing sites (see Figure 1). Ponds should be located as near to existing colonies as possible, up to a distance of around 1 km. Ideally, ponds should help to create or extend wetland complexes that include other ponds, ditches, rivers, backwaters or canals."* – Pond Conservation (2013) *Species Dossier: Water Vole*.	 Pond Conservation (2013) *Species Dossier: Water Vole*.
New habitats – planting *"Planting up ponds is generally to be avoided. If the right bank structure is created, appropriate plants will usually colonise within a few years. However, there may be advantages in introducing some favoured plant species if there is a need for rapid colonisation to benefit water vole populations at risk. If so, use only native plants of local provenance, and take particular care not to introduce invasive alien plant species. Also avoid using some of our more invasive native plants, such as common reed. Water voles eat a wide range of wetland plants, including common reed, but it is not a favoured food plant.* – Pond Conservation (2013) *Species Dossier: Water Vole*.	 **Figure 2.** Suitable bank profile for water voles. Pond Conservation (2013) *Species Dossier: Water Vole*.

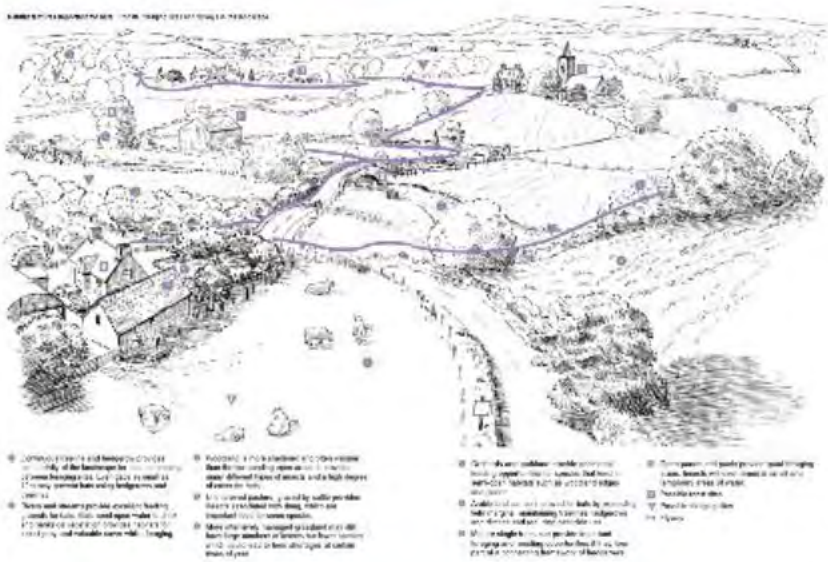
APPENDIX D: Bat mitigation habitat enhancements and features

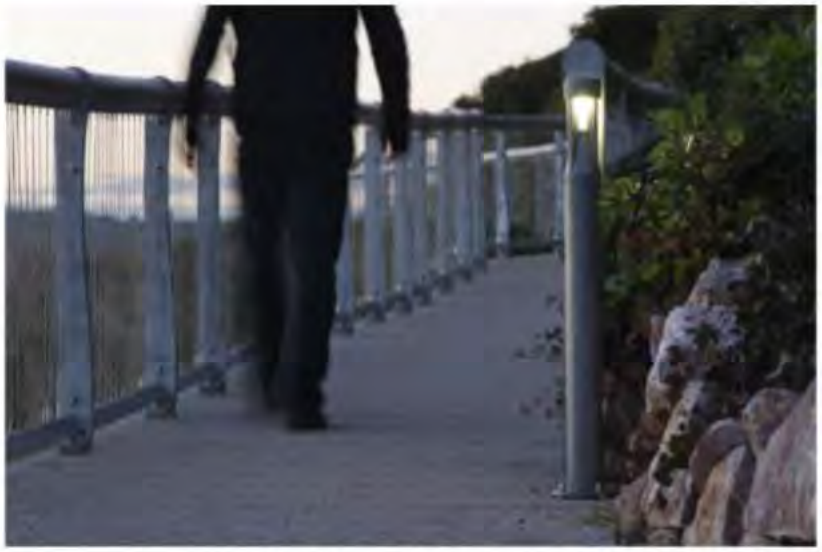
Table 10: Bat mitigation habitat enhancements and features

Feature and description	Photograph
Commuting feature - dark corridor Within this corridor, lighting is kept below 1lux. Planting is used to screen this area.	
Commuting feature – Habitat corridor / hedgerow *"Linear habitats such as hedgerows, tree lines, overgrown banks, ditches and the edges of water courses are important foraging habitats that provide an abundance of insects. Linear features are also important to bats as they move between different foraging sites. Many species will not fly across open areas and instead follow these features that provide shelter from wind for both the bats and their insect prey, as well as cover from predators. Bats may travel significant distances to circumnavigate open areas rather than cross them by the most direct route."* – JNCC (2001) *Habitat management for bats: A guide for land managers, land owners and their advisors.*	
Commuting feature – double hedgerow *"Corridors can be composed of man-made or natural materials (e.g. fences, brick walls, tree lines or hedges). Corridors with outgrown vegetation are preferable as they create dark fly ways sheltered from predators and the elements. Heavily clipped low hedges or tree-lines are less suitable."* – Stone, E.L. (2013) *Bats and lighting: Overview of current evidence and mitigation.*	 Stone, E.L. (2013) *Bats and lighting: Overview of current evidence and mitigation.*

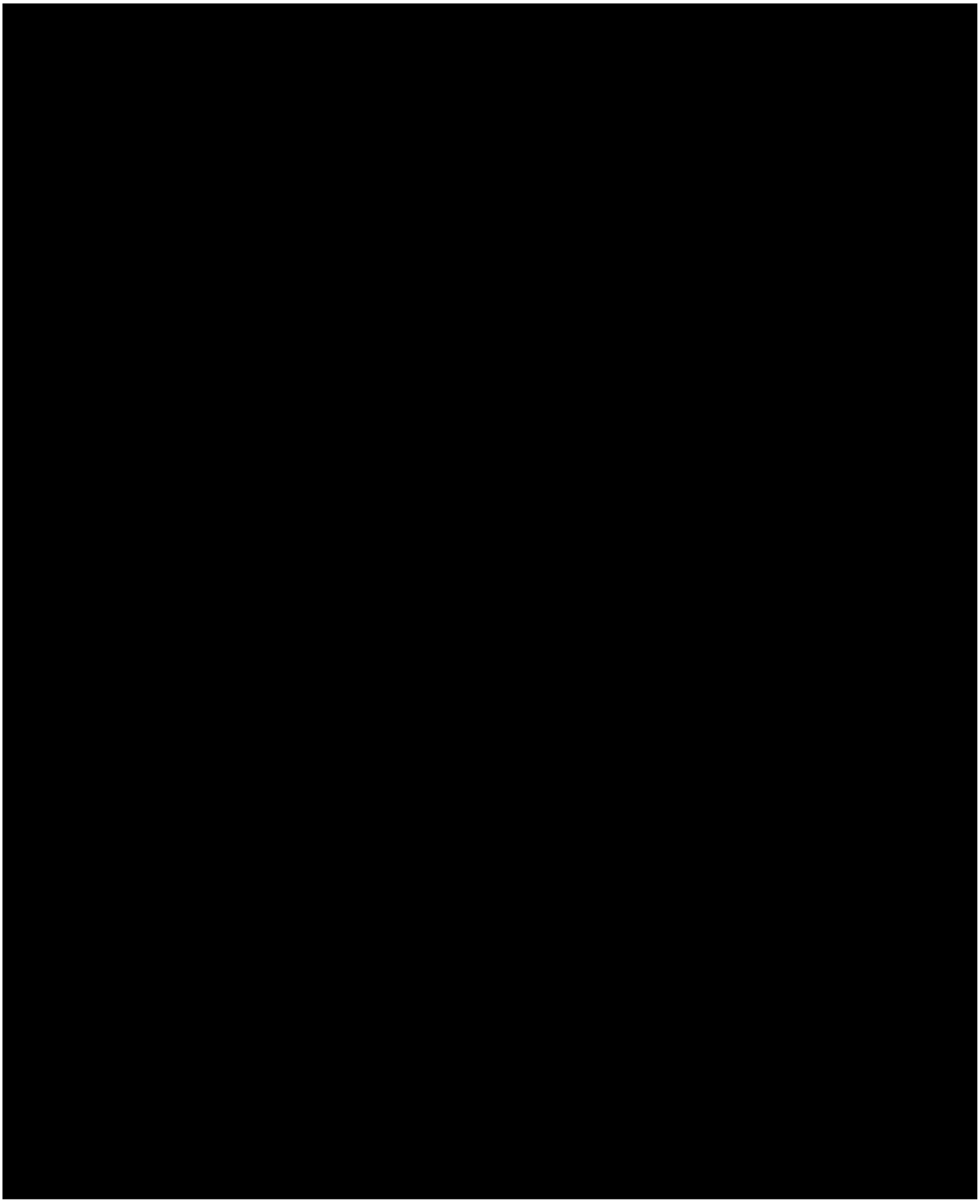
Feature and description	Photograph
Roosting feature – tree bat boxes *"The primary function of bat boxes is to provide artificial roost sites for bats, particularly in areas such as coniferous plantations where there is a shortage of natural sites."* – JNCC (2004) *Bat Workers Manual* 3rd ed.	

Feature and description	Photograph
Roosting feature – integral bat boxes *"Where roosts of low conservation significance are to be lost to development, bat boxes may provide an appropriate form of mitigation, either alone or, preferably, in combination with the provision of new roosts in buildings. In such cases, the type of bat box provided should be appropriate to the species. Bat boxes are generally inappropriate substitutes for significant roosts in buildings and do not constitute 'like for like' replacement."* – English Nature (2004) *Bat mitigation guidelines.*	
Roosting feature – bat house *"Where a careful appraisal of the options indicate it is not feasible to maintain roosts in situ, purpose-built bat houses or bat barns may be considered as an alternative. In view of the limited experience of the use of this compensation technique in the UK, it is essential that the risks of non-adoption by bats are minimised through careful design and site selection. One option might be to translocate an entire roof, or part of a roof, as this may have a good chance of success."* – English Nature (2004) *Bat mitigation guidelines.*	

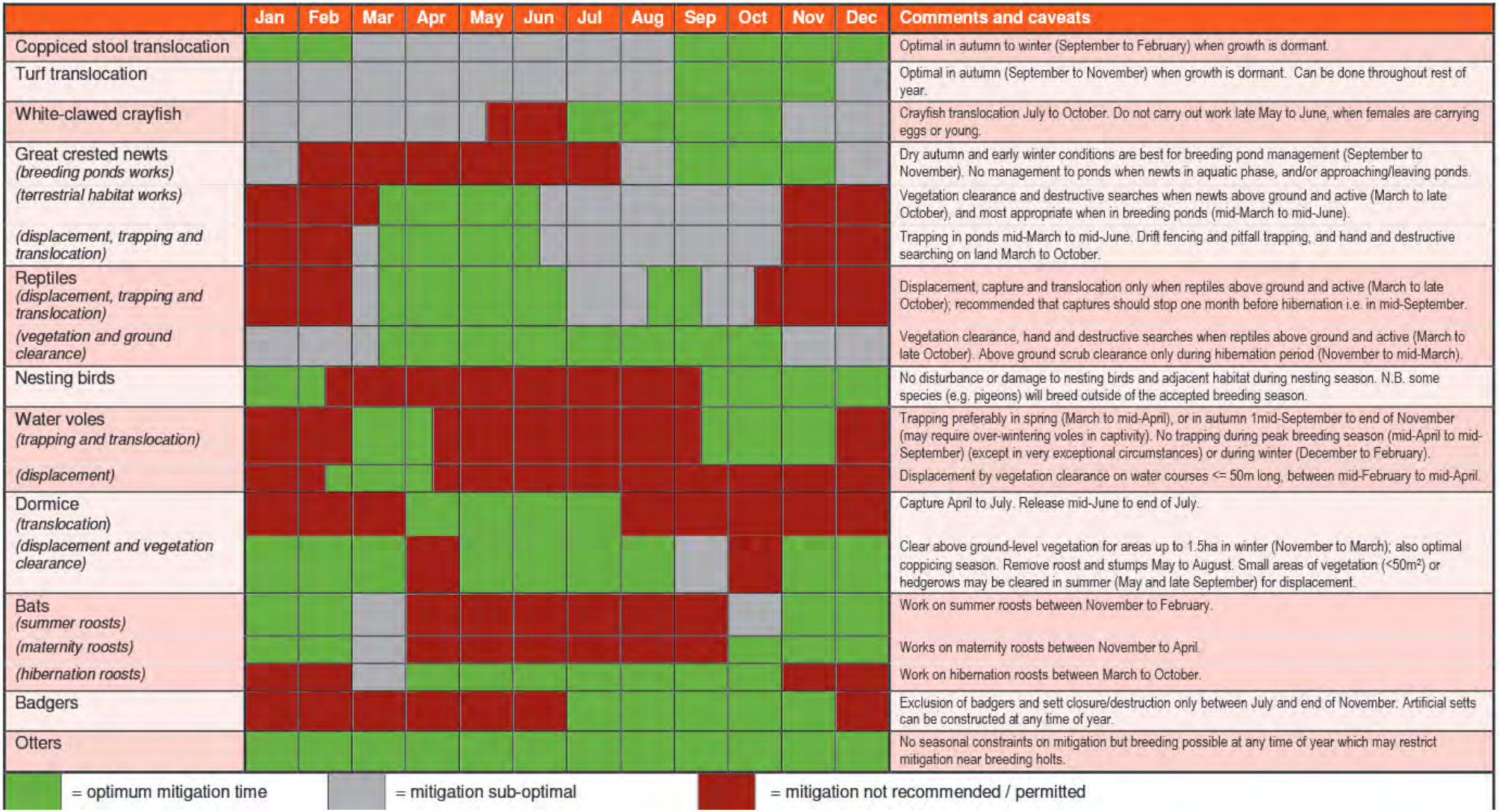
Feature and description	Photograph
Foraging habitat – pond *"Water and wetlands can be excellent feeding grounds for bats. Many insects have aquatic larval stages and bats take advantage of the emerging insects. Bats need open water to drink, and bankside vegetation provides food and valuable cover for foraging. Some species preferentially select roost sites close to water."*	
Foraging habitat scrub, hedgerow, trees, species rich grassland *"Several habitats are particularly important for foraging bats: freshwater, woodland, grassland and linear habitats (see box below, Habitats of importance to particular bat species). This holds true throughout a range of landscape types and across the regions of the UK."* – JNCC (2001) *Habitat management for bats: A guide for land managers, land owners and their advisors.*	
Lighting – LED *"LED units can be used to direct the light into small target areas. Composite LEDs can be switched off to reduce/direct the light beam to specific areas. New design down lights can be used to ensure minimal sky glow and limited trespass"* – Stone, E.L. (2013) *Bats and lighting: Overview of current evidence and mitigation.*	 **Figure 6.7.** LED lamps installed along Warren Footpath, London to reduce spill onto surrounding vegetation (© Alison Furel). Stone, E.L. (2013) *Bats and lighting: Overview of current evidence and mitigation.*

Feature and description	Photograph
Lighting LED bollard *"Reducing the height of light units will keep the light as close to the ground as possible, reducing the volume of illuminated space. This will also give bats a chance to fly over the light units in the dark area above the light (as long as the light does not spill above the vertical plane). There are many low level lighting options for pedestrian and cycle path lighting which minimise spill and reduce overall illumination including: low level illuminated bollards, down-lights, handrail lighting or footpath lighting."* – Stone, E.L. (2013) *Bats and lighting: Overview of current evidence and mitigation.*	 **Figure 6.2.** Pharola illuminated bollard. DW Windsor Ltd. Stone, E.L. (2013) *Bats and lighting: Overview of current evidence and mitigation.*

APPENDIX E: Badger mitigation habitat enhancements and features



APPENDIX F: Timings of mitigation works



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Comments and caveats
Coppiced stool translocation													Optimal in autumn to winter (September to February) when growth is dormant.
Turf translocation													Optimal in autumn (September to November) when growth is dormant. Can be done throughout rest of year.
White-clawed crayfish													Crayfish translocation July to October. Do not carry out work late May to June, when females are carrying eggs or young.
Great crested newts *(breeding ponds works)*													Dry autumn and early winter conditions are best for breeding pond management (September to November). No management to ponds when newts in aquatic phase, and/or approaching/leaving ponds.
(terrestrial habitat works)													Vegetation clearance and destructive searches when newts above ground and active (March to late October), and most appropriate when in breeding ponds (mid-March to mid-June).
(displacement, trapping and translocation)													Trapping in ponds mid-March to mid-June. Drift fencing and pitfall trapping, and hand and destructive searching on land March to October.
Reptiles *(displacement, trapping and translocation)*													Displacement, capture and translocation only when reptiles above ground and active (March to late October); recommended that captures should stop one month before hibernation i.e. in mid-September.
(vegetation and ground clearance)													Vegetation clearance, hand and destructive searches when reptiles above ground and active (March to late October). Above ground scrub clearance only during hibernation period (November to mid-March).
Nesting birds													No disturbance or damage to nesting birds and adjacent habitat during nesting season. N.B. some species (e.g. pigeons) will breed outside of the accepted breeding season.
Water voles *(trapping and translocation)*													Trapping preferably in spring (March to mid-April), or in autumn 1mid-September to end of November (may require over-wintering voles in captivity). No trapping during peak breeding season (mid-April to mid-September) (except in very exceptional circumstances) or during winter (December to February).
(displacement)													Displacement by vegetation clearance on water courses <= 50m long, between mid-February to mid-April.
Dormice *(translocation)*													Capture April to July. Release mid-June to end of July.
(displacement and vegetation clearance)													Clear above ground-level vegetation for areas up to 1.5ha in winter (November to March); also optimal coppicing season. Remove roost and stumps May to August. Small areas of vegetation (<50m²) or hedgerows may be cleared in summer (May and late September) for displacement.
Bats *(summer roosts)*													Work on summer roosts between November to February.
(maternity roosts)													Works on maternity roosts between November to April.
(hibernation roosts)													Work on hibernation roosts between March to October.
Badgers													Exclusion of badgers and sett closure/destruction only between July and end of November. Artificial setts can be constructed at any time of year.
Otters													No seasonal constraints on mitigation but breeding possible at any time of year which may restrict mitigation near breeding holts.

= optimum mitigation time

= mitigation sub-optimal

= mitigation not recommended / permitted

Arcadis (UK) Limited

80 Fen

80 Fenchurch Street

London

T: +44 (0) 20 7812 2000

arcadis.com