



UNIVERSAL DESTINATIONS & EXPERIENCES UK PROJECT

Former Kempston Hardwick Brickworks
and adjoining land, Bedford

Environmental Statement Volume 3

Appendix 6.4 - Outline Habitat Creation and Enhancement Plan

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1 INTRODUCTION

- 1.1.1. This Outline Habitat Creation and Enhancement Plan (OHCEP) has been prepared in support of the planning proposal for the Proposed Development as described in **Chapter 2: Description of the Proposed Development (Volume 1)** of the Environmental Statement. This OHCEP sets out the framework for the creation and establishment of habitats at the Site. Prior to commencement of construction works¹, a detailed Habitat Creation and Enhancement Plan (HCEP) for the Site will be submitted for approval. This detailed HCEP will include details of habitat areas and locations, specifications and densities for habitats and planting, and numbers, specifications and locations for habitat structures such as bird nesting and bat boxes, and detailed designs for wildlife crossing or underpass structures.
- 1.1.2. Construction related mitigation measures are presented in **Appendix 2.3: OCEMP (Volume 3)**. This contains the ecological mitigation measures set out in **Chapter 6: Ecology and Nature Conservation (Volume 1)** to be implemented during the construction of the Proposed Development. These include protected species licensing, Site clearance requirements and appropriate monitoring and ecological Site support.
- 1.1.3. Habitat management, monitoring, and maintenance measures are presented in the Outline Landscape and Ecology Management Plan (OLEMP) (**Appendix 6.5: Outline Landscape and Ecology Management Plan (Volume 3)**) for the Proposed Development. That document sets out measures such as monitoring of features beyond the construction stage and Site-specific procedures and processes for management such that habitats are created/enhanced according to programme and are establishing as expected.

¹ The construction works trigger for the submission of a detailed Habitat and Creation Enhancement Plan excludes the following: permitted preliminary works, archaeological works, ground remediation works, diversion and laying of underground apparatus (including utility infrastructure, erection and installation of site compounds), demolition works, the erection and installation of site compounds (including plant and equipment), mass grading, and creation of site accesses)

2 OUTLINE HABITAT CREATION AND ENHANCEMENT PLAN

2.1 OVERVIEW

- 2.1.1. This OHCEP sets out indicative proposals for habitat creation, retention and enhancement for the Proposed Development.
- 2.1.2. The mitigation measures described within this OHCEP have been designed on a precautionary but informed basis, using all available ecological baseline information (as detailed in **Chapter 6: Ecology and Nature Conservation (Volume 1)** and the Proposed Development description provided in **Chapter 2: Description of Proposed Development (Volume 1)**) alongside professional judgement. Detailed locations or specifications and extent of certain mitigation or compensation features (such as receptor sites, confirmed numbers of bat boxes etc.) have not been included. These details will be subject to a further approval, as explained in Section 5.
- 2.1.3. Mitigation measures have been designed to:
- Avoid, reduce or compensate for impacts arising from the Proposed Development;
 - Mitigate for impacts on legally protected species as required to meet species licensing; and
 - Maximise opportunities for biodiversity through the Proposed Development.

2.2 INDICATIVE HABITAT CREATION AND ENHANCEMENT PLAN

- 2.2.1. **Figure 1: Indicative Habitat Creation and Enhancement Plan of Appendix 6.4: Outline Habitat Creation and Enhancement Plan (Volume 3)** is an indicative plan which shows the intended spatial configuration of new habitat, along with drainage and landscape elements across the fully operational Proposed Development. This plan forms the basis of assessment in **Chapter 6: Ecology and Nature Conservation (Volume 1)**. It also sets out and establishes key areas for habitat creation, retention and enhancement. The newly created/retained habitat areas will also act as receptor sites for species translocation.
- 2.2.2. **Figure 1: Indicative Habitat Creation and Enhancement Plan of Appendix 6.4: Outline Habitat Creation and Enhancement Plan (Volume 3)** also sets out the major habitat areas which will be created in a number of EEAs distributed across the Site. Detail of the ongoing management of these habitats is described in **Appendix 6.5: Outline Landscape and Ecology Management Plan (Volume 3)**.
- 2.2.3. These proposals are informed by available survey data and the impact assessment in **Chapter 6: Ecology and Nature Conservation (Volume 1)**.
- 2.2.4. A detailed HCEP may be required for each specific Zone of the Proposed Development as detailed design progresses. The habitat creation obligations described within the detailed HCEP will be adopted by UDX or relevant Undertakers².

² The persons (corporate or otherwise) who are permitted to carry out the Proposed Development (including their contractors and other persons appointed by them in connection with the carrying out of the Proposed Development).

2.3 TIMING

- 2.3.1. Chronologically, habitats will largely be created prior to or during the Construction Phase during Phase 1a and Phase 1b as set out in **Annex 3 of Appendix 2.3: OCEMP (Volume 3)**.

2.4 LAKE ZONE ECOLOGICAL ENHANCEMENT AREAS

- 2.4.1. In the Lake Zone, the former claypit lakes will be connected and enhanced to create the following habitats:
- A single large lake will be created in the Lake Zone where presently there are three disconnected/partially disconnected former quarry/brick pit lakes. Water levels in the re-profiled lake or new combined lake will be deeper and more permanent than the current shallow and partly ephemeral waterbodies. Water supply for these lakes will be attenuated from the Proposed Development during rainfall and storm events. The new lake will partly act as a reservoir, providing a source for treated water (non-potable) to the operational Proposed Development, as required. However, it will also be designed as varied wildlife habitat and will serve a dual function;
 - The new lake will support shallow, littoral banks with aquatic vegetation;
 - Fringing marginal reedbeds and swamp habitat around approximately 60% of the new re-profiled lake;
 - Shallow areas with small islands suitable to support nesting/roosting wetland birds in locations that minimise risk from terrestrial predators; and
 - Steep bank/cliff habitat which could support sand martin or kingfisher.
- 2.4.2. On the new lake southern shore, an open mosaic of grassland, scrub and ruderal vegetation will be created. Additional EEAs in the Lake Zone will include:
- **Northern Ecology Area** - along the north boundary of the Lake Zone an area of grassland, scrub and woodland will be created (currently arable land is present). This land is expected to be used for species translocation purposes, including for badgers and reptiles. It is understood that this area is also required for flood attenuation purposes, however the artificial badger sett and any reptile hibernation features or basking banks will be constructed above ground and therefore should not be subject to inundation; and
 - **Scrub and Open Mosaic Habitat (OMH)** - east of the lake, in the Lake Zone. In this location, existing habitat within the Kempston Hardwick Pit County Wildlife Site (CWS) will be enhanced as a mosaic of grassland, scrub and open mosaic vegetation and habitats.

2.5 ECOLOGICAL ENHANCEMENT AREAS IN OTHER ZONES

- 2.5.1. Additional EEAs across the Site will include:
- **Elstow Brook Corridor** - is along the west boundary of the Lake Zone and flows through the West Gateway Zone. The brook itself will be maintained by the Internal Drainage Board (IDB). Parallel to the Elstow Brook in both the Core Zone and West Gateway Zone, riparian habitats will be maintained as predominantly grassland habitat with occasional scattered trees/shrubs (provided they do not block IDB access for maintenance); and

- **Diverted Core Zone Watercourse** – along the eastern Core Zone boundary, a new diverted watercourse will be constructed. The watercourse will typically have a 10m buffer either side (the ‘Riparian Zone’) and incorporation of grassland and scrub/trees, created through planting, seeding and natural colonisation/existing vegetation where appropriate.

2.6 SUPPLEMENTARY HABITAT PROVISION

2.6.1. In addition to the EEAs, supplementary habitat will be provided within the following areas across the Site:

- **East Gateway Zone** – several parcels of broadleaved woodland will be retained in the East Gateway Zone. They will be managed to promote their ecological value;
- **West Gateway Zone** – the detailed design of this zone is not yet available, but it will contain some hedgerow habitat and areas of grassland, scrub and tree planting around the retained Elstow Brook; and
- **Core Zone** – Existing scrub and woodland located along the southern boundary of the Core Zone will be retained, with additional areas of new woodland and scrub planting provided in this location.

2.6.2. **Table 2-1** - provides a breakdown of areas for the broad habitat types to be created/enhanced across the Site. **Table 2-2** - provides a break-down of the new habitats to be created in each of the habitat creation areas. Outline specifications for creating these habitats are provided in Section 3 below.

Table 2-1 - Areas/lengths of broad habitat types to be created/enhanced across the Site

Broad Habitat Type	Approximate Area/Length ³
Area Habitats	
Standing Water (ponds and lakes)	20.5ha
Woodlands	16.1ha
Reedbeds	3.6ha
Meadow Grassland	3.4ha
Scrub (dense and scattered)	3.2ha
Open Mosaic Habitat	2.5ha
Total	49.3ha
Linear Habitat Lengths	
Watercourse	4.2km
Hedgerow	2.4km

³ The data in this table is rounded up or down to the nearest one decimal place.

Table 2-2 - Broad habitat types to be created or managed in each habitat creation area

Compartment	Woodland	Scrub	Hedgerow	Grassland	Standing Water	Reedbed/Swamp	Bank/cliff	Pond	Watercourse	Open mosaic	Islands	Scattered trees	Amenity and ornamental
Main Lake Area	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	
Northern Ecology Area	Y	Y	Y	Y				Y	Y				
Elstow Brook		Y		Y					Y			Y	
Diverted Watercourse		Y		Y					Y			Y	
East Gateway Zone	Y		Y										
West Gateway Zone	Y	Y	Y	Y					Y			Y	Y
Core Zone	Y	Y	Y									Y	Y

3 PROPOSED HABITATS

3.1 GENERAL PRINCIPLES

3.1.1. Specific landscape and ecological principles, which seek to guide habitat creation are as follows:

- On-Site ecology and landscape mitigation, compensation and enhancement will be delivered within the EEAs as described in Section 2 above and shown on **Figure 1: Indicative Habitat Creation and Enhancement Plan of Appendix 6.4: Outline Habitat Creation and Enhancement Plan (Volume 3)**;
- Environmental gain is to be promoted as an intrinsic part of the detailed design;
- To promote the capacity of wildlife and landscape to cope with climate change, a planting palette of species resilient to drought and disease, that are less reliant on irrigation measures will be used where practicable;
- Materials such as logs, rocks, rubble and earth should be re-used where practicable during the creation of species-specific mitigation features; and
- All works contained within the HCEP shall be carried out in accordance with the current British Standards with particular reference to:
 - BS 3998:2010 Recommendations for tree work⁴;
 - BS 5837:2012 Trees in relation to design, demolition and construction⁵;
 - BS 3882:2015 Specification for topsoil⁶; and
 - BS 4428:1989 Code of practice for general landscape operations⁷.

3.1.2. UDX will exercise appropriate oversight over all aspects of development of the ERC, including initial planning and design, coordination of the infrastructure, construction and setting the framework for the long-term management of the ERC. This “unified control” approach will ensure that the landscape planting and ecological features will be maintained, managed, and monitored as appropriate throughout Operational Phase of the ERC to achieve the desired communities and quality.

⁴ British Standards Institution (2010) *BS 3998:2010 - Tree work. Recommendations*. Available at: <https://knowledge.bsigroup.com/products/tree-work-recommendations> [Accessed: 23 April 2025].

⁵ British Standards Institution (2012) *BS 5837:2012 - Trees in relation to design, demolition and construction. Recommendations*. Available at: <https://knowledge.bsigroup.com/products/trees-in-relation-to-design-demolition-and-construction-recommendations> [Accessed: 23 April 2025].

⁶ British Standards Institution (2015) *BS 3882:2015 - Specification for topsoil*. Available at: <https://knowledge.bsigroup.com/products/specification-for-topsoil> [Accessed: 23 April 2025].

⁷ British Standards Institution (1989) *BS 4428:1989 - Code of practice for general landscape operations (excluding hard surfaces)*. Available at: <https://knowledge.bsigroup.com/products/code-of-practice-for-general-landscape-operations-excluding-hard-surfaces> [Accessed: 23 April 2025].

HABITAT RETENTION AND CREATION

- 3.1.3. An indicative representation of all habitats which will be retained and enhanced or created within the Site is shown in **Figure 1: Indicative Habitat Creation and Enhancement Plan of Appendix 6.4: Outline Habitat Creation and Enhancement Plan (Volume 3)**. This shows all habitat types including woodland, trees, hedgerows and other vegetation such as scrub and grassland.
- 3.1.4. The **Arboricultural Impact Assessment (Document Reference 6.11.0)** which includes the **Tree Removal and Protection Plan (Document Reference 6.11.0)** specifically detail the woodland and trees which will be retained and protected within the Site.
- 3.1.5. Retained and created habitats will be protected through the provision of suitable barrier fencing and retained trees (including woodland) should be protected in accordance with British Standard BS5837:2012 Trees in Relation to Construction⁵, including the erection of protective fencing (or similar) encompassing or demarcating root protection.
- 3.1.6. Habitat creation proposals are outlined in Section 2 above and further detail for rationale and objectives given in Sections 3.4 and 3.5 below.

LIGHTING

- 3.1.7. Operational Phase lighting will be designed to limit stray light into EEA's, off-Site habitats and in locations identified as 'dark corridors'. In these locations, lighting will be designed in accordance with the Institution of Lighting Professionals Guidance Notes guidance on Bats and Artificial Lighting at Night⁸, as far as is possible. The design will minimise light spill both laterally and vertically. Lighting will be focussed inwards and will use appropriate cowls to reduce night-time glare to surrounding areas.
- 3.1.8. The designation of 'dark corridors' cannot be finalised until detailed design is complete but is likely to include land linking the Core Zone and the Lake Zone; land between the Proposed Development and off-Site habitats (e.g. in adjacent off-Site CWSs), and the Elstow Brook and Diverted Watercourse corridors. A dark corridor will be an area of land that is not subject to artificial illumination and/or meets the requirements specified in the Institution of Lighting Professionals Guidance Note: Bats and Artificial Lighting in the UK⁹. The dark corridor locations will be confirmed in the detailed HCEP.
- 3.1.9. In addition, wider lighting design details are secured by the Design Standards SW5.5, CZ5.1, LZ5.1, LZ5.2 and LZ5.3 (relevant for each Zone) in the **Design Standards (Document Reference 6.3.0)**.

DISTURBANCE

- 3.1.10. Measures to control disturbance of protected and otherwise notable species within the EEAs during the Construction Phase are set out in Section 3.2 of **Appendix 2.3: OCEMP (Volume 3)**.
- 3.1.11. Measures to control disturbance of protected and otherwise notable species within the EEAs during the Operational Phase will also be implemented. These will include:

⁸ Institution of Lighting Professionals (2023) *Guidance Note 08/23 – Bats and Artificial Lighting*. Available at: <https://theilp.org.uk/publication/guidance-note-8-bats-and-artificial-lighting/> [Accessed: 23 April 2025].

⁹ Institution of Lighting Professionals (2018) *Guidance Note 08/18 – Bats and Artificial Lighting in the UK*. Available at: <https://cdn.bats.org.uk/uploads/pdf/Resources/ilp-guidance-note-8-bats-and-artificial-lighting-compressed.pdf?v=1542109349> [Accessed: 23 April 2025].

- Consideration of fencing and/or planting of dense vegetation to manage access and screen areas from visual and noise disturbance;
- Locating pedestrian/maintenance accesses in areas to minimise impacts from disturbance; and
- Consideration of seasonal restrictions on access to certain areas to minimise disturbance during sensitive time periods for protected species.

3.1.12. To protect habitat in the Lake Zone EEAs, the following measures will be established to limit disturbance:

- A visitor pressure, public interpretation and site wardening protocol will be developed for the new lake environment and parts of the CWS that will be made accessible to visitors from the Proposed Development. This will contain measures including clearly waymarked trails, sensitive areas to be excluded from public, signage, appropriate landscape barrier and/or fencing to direct visitors and provision of screens and bird hides. Consideration will be given to provision of site wildlife staff/wardens, depending on usage numbers; and
- The new lake environment will not be used for fishing, water sports or hunting (wildfowling) or other activities which are in conflict with wildlife conservation. This will be supported by appropriate design and routing of footpaths and, where appropriate, use of fencing and/or other barriers to manage access to these locations.

3.1.13. The monitoring, management and ongoing implementation of these measures is set out in the OLEMP (**Appendix 6.5: Outline Landscape and Ecology Management Plan (Volume 3)**).

Wildlife Crossing Structures

3.1.14. The Northern Ecology Area EEA will be separated from the retained enhanced lake environment EEA in the Lake Zone habitats by an internal new road layout. To mitigate for the impact of the road as a barrier to wildlife movement, two wildlife crossing structures will be provided to facilitate connectivity across the new road for badger, reptiles, amphibians and small mammal species.

Figure 1: Indicative Habitat Creation and Enhancement Plan of Appendix 6.4: Outline Habitat Creation and Enhancement Plan (Volume 3) shows indicative locations for two structures; either as an underpass or an overbridge. The position and design of the wildlife crossing structure(s) has not been finalised, but will follow best practice guidance such as that published in the Design Manual for Roads and Bridges¹⁰. For the crossing structures, in the form of an underpass or tunnel to be of best value to a range of different species, they will be a minimum dimension of 3m x 3m which may be integrated into the design of Public Road B. Specific locations and design of the crossing points will be provided at the detailed design stage upon submission of the detailed HCEP for approval.

¹⁰ Standards for Highways (n.d.) *Design Manual for Roads and Bridges*. Available at: <https://www.standardsforhighways.co.uk/dmrb> [Accessed: 23 April 2025].

3.2 DESIGNATED SITES

- 3.2.1. Measures detailed in the **Appendix 2.3: OCEMP (Volume 3)** to protect the retained areas of Kempston Hardwick Pit CWS and Coronation Pit CWS during the Construction Phase and avoid hydrological pollution must be continued into the Operational Phase. The boundaries of these CWSs should be delineated with appropriate fencing (or other appropriate demarcation) with signage displayed to ensure that these sensitive areas are protected.
- 3.2.2. The habitat creation and enhancement measures detailed below are designed to compensate the habitat loss predicted within Kempston Hardwick Pit CWS and Coronation Pit CWS.

3.3 HABITATS OF PRINCIPAL IMPORTANCE

- 3.3.1. The Site contains the following habitats of principal importance (approximate areas are given in **Chapter 6: Ecology and Nature Conservation (Volume 1)**):
- Open Mosaic on Previously Developed Land;
 - Lowland Mixed Deciduous Woodland;
 - Standing Open Waters and Canals (ponds and lakes);
 - Ponds; and
 - Native hedgerows.
- 3.3.2. Key measures to compensate for Construction Phase significant effects on these Habitats of Principal Importance include:
- Vegetation retention; and
 - Habitat creation measures outlined below.

3.4 HABITATS

OVERVIEW

- 3.4.1. **Figure 1: Indicative Habitat Creation and Enhancement Plan of Appendix 6.4: Outline Habitat Creation and Enhancement Plan (Volume 3)** shows the indicative proposed layout of habitats within the EEA at Full Buildout of the Proposed Development. Specific locations, selected species for planting and habitat extents will be provided at the detailed design stage upon submission of the detailed HCEP for approval. These areas are referred to as EEAs as described in Sections 2.4 and 2.5. Indicative locations for habitat retention, loss and creation are shown on **Figure 1: Indicative Habitat Creation and Enhancement Plan of Appendix 6.4: Outline Habitat Creation and Enhancement Plan (Volume 3)**.
- 3.4.2. The habitat types to be created or enhanced, are as follows (also see **Table 2-1 -**):
- Woodland;
 - Scrub;
 - Hedgerow;
 - Grassland;
 - Wetland;

- Standing Water;
- Reedbed/Swamp;
- Bank/cliff;
- Pond;
- Islands;
- Watercourse;
- Open mosaic;
- Scattered trees; and
- Amenity and ornamental.

WOODLAND

- 3.4.3. Woodland will be created and enhanced in locations shown in **Figure 1: Indicative Habitat Creation and Enhancement Plan of Appendix 6.4: Outline Habitat Creation and Enhancement Plan (Volume 3)**, to provide habitat for a range of bird, mammal, invertebrate and plant species, and provide linear habitat features for other species such as foraging and nesting birds and commuting and foraging bats.
- 3.4.4. Areas of new woodland will link to existing areas of woodland where the detailed design of transport and building infrastructure allows it and will be designed to provide visual and acoustic screening where appropriate. Woodland areas will be predominantly native broadleaved woodland, with a smaller component of mixed woodland to increase climate change resilience. The management of areas of woodland will be aimed at ensuring the safety of visitors and staff, and where appropriate the appearance of the planting and potential for enhancing biodiversity value and be designed to ensure structural and species diversity.
- 3.4.5. Woodland should be created by planting saplings at an appropriate density (a tree approximately every approximately 3m) in locations identified for woodland creation. Soil preparation may be necessary prior to planting including light harrowing of the soil surface to break up clods of earth and to ensure new saplings may be appropriately dug-in. The planting pattern should be irregular where possible and the planting design should aim to create different woodland storeys appropriately by planting understorey shrubs in clusters with canopy trees around the edges. For areas of woodland creation or enhancement, this planting should take place between November to March (inclusive) and would ideally be completed when the ground is free from frost and snow, prior to the end of December. Consideration should be given to allowing woodland to regenerate naturally in certain places. Consideration should be given to collecting tree seed of local origin and sowing this in tree planting areas.
- 3.4.6. The enhancement of existing woodland will be undertaken to promote the appearance of woodland in guest facing areas, and the improvement of the natural habitat for native species in other locations. Measures will include increasing the diversity of the canopy cover through the removal of species not native to the locality and the planting of native species, such as oak, hazel, silver birch, beech and field maple, to increase their distribution.

- 3.4.7. The removal of species not native or invasive e.g. buddleia will provide the opportunity for the creation of glades and rides within woodland areas. The creation of glades and rides, coupled with canopy thinning, will provide varying light levels, and promote the establishment of a diverse understory flora. The implementation of deer fencing would further improve the understorey by reducing browsing pressure and would allow for natural tree regeneration and an increased diversity of understorey plants. The placing of log piles will be considered to increase the retention of deadwood, where suitable arisings are available.
- 3.4.8. Areas of retained woodland would also benefit from the veteranisation of a selection of trees. Trees can be 'veteranised' to artificially create features that mimic natural damage caused by, for example, lightning strikes, branch failure and woodpecker holes. The trees would be selected based on a detailed appraisal by suitably experienced and qualified arborist.
- 3.4.9. The targeted removal of brambles and nettles should be considered where saplings are planted, to control competition.

SCRUB

- 3.4.10. New areas of scrub will be planted/allowed to naturally regenerate in locations shown in **Figure 1: Indicative Habitat Creation and Enhancement Plan of Appendix 6.4: Outline Habitat Creation and Enhancement Plan (Volume 3)**. Scrub planting will predominantly be undertaken in the Northern Ecology Area and Scrub and Open Mosaic area.
- 3.4.11. Scrub will be planted in groups of three to nine species at 1m centres. Guards will be removed once plant stock is established. Planting should take place between November to March (inclusive) and would ideally be completed when the ground is free from frost and snow, prior to the end of December. Re-mulching will be applied in July to original depth, or when required.
- 3.4.12. Areas of scrub will be created in locations that support landscape integration and habitat linkages. Scrub will comprise native species and be species-rich. Scrub creation will aim for species mixtures containing at least five native woody species.
- 3.4.13. Scrub habitat will provide for a range of invertebrate species, and the diversity of seed and fruit-bearing species will provide opportunities for species such as foraging and nesting birds.

HEDGEROWS

- 3.4.14. Locations for new hedges are yet to be agreed but they will be in the EEAs identified in **Figure 1: Indicative Habitat Creation and Enhancement Plan of Appendix 6.4: Outline Habitat Creation and Enhancement Plan (Volume 3)** and potentially along access roads and Site boundaries around the Proposed Development. Where they are created, hedgerows will be designed to provide habitat for a range of invertebrate species, and opportunities for other species, such as foraging and nesting birds and commuting and foraging bats in the form of seed- and fruit-bearing species, and linear habitat features. Hedgerows will also provide sheltering opportunities for species such as reptiles and amphibians.
- 3.4.15. Hedgerows will be created to provide landscape integration and habitat linkages, and will comprise native species, be species-rich (approximately five to seven native woodland species), and include a proportion of native broadleaved tree species (i.e. individual trees allowed to mature in each hedge at regular intervals).

- 3.4.16. It is anticipated that, where appropriate to the Site and purpose, hedgerows should include the following species: dogwood *Cornus sanguinea*; hazel *Corylus avellana*; hawthorn *Crataegus monogyna*; spindle *Euonymus europaeus*; holly *Ilex aquifolium*; privet *Ligustrum vulgare*; honeysuckle *Lonicera periclymenum*; blackthorn *Prunus spinosa*; dog rose *Rosa canina*; alder buckthorn *Rhamnus frangula*; and guelder rose *Viburnum opulus*. Proportions of which shall be outlined with the detailed design drawing package.
- 3.4.17. Shrubs should be planted in double staggered rows (rows approximately 25cm apart, with plants spaced approximately 30cm apart in each row) at a density of seven plants per metre to achieve a dense hedgerow. Guards will be removed once plant stock is established.
- 3.4.18. Planting should take place between November to March (inclusive) and would ideally be completed when the ground is free from frost and snow, prior to the end of December.
- 3.4.19. To promote establishment of hedgerows, translocation of sections of species-rich hedgerows (i.e. those with more than four native species) will also be explored where suitable receptor locations around the boundary of the Site are available. If translocation is pursued as a viable option it will require the receptor site to be prepared and made ready before the donor site hedgerow is lost, as hedgerow plant material is unlikely to survive storage for more than several days at most.

GRASSLAND

- 3.4.20. Grassland creation will encourage the presence of pollinating invertebrate species on Site and support a range of other species including mammals, birds, reptiles and amphibians. Grassland will be planted within the EEAs as shown in **Figure 1: Indicative Habitat Creation and Enhancement Plan of Appendix 6.4: Outline Habitat Creation and Enhancement Plan (Volume 3)**.
- 3.4.21. Areas proposed for grassland creation will be seeded to provide species-rich neutral or calcareous grassland (depending on soil type). There will be different end-use requirements dependent on specific locations of the grassland e.g., around infiltration basins and swales or at created ponds. The following grassland types will be created:
- Species-rich meadow grassland;
 - Road verge grassland; and
 - Wet or marshy grassland.
- 3.4.22. It will be necessary to test the soil in grassland creation areas to ascertain their pH, depth and existing nutrient levels prior to deciding what species or species mix would be most appropriate to sow in each area of new grassland creation. Soil testing should be done in advance of grassland creation (no less than six months in advance), so that appropriate plant seed can be sourced and supplied.
- 3.4.23. Species-rich grassland will comprise a native species mix that includes species of local provenance. The species mix is likely to include crested dog's-tail *Cynosurus cristatus*, quaking-grass *Briza media*, sweet vernal-grass *Anthoxanthum odoratum*, yellow oat grass *Trisetum flavescens*, red fescue *Festuca rubra* and common bent *Agrostis capillaris*. Forb species will likely include the following: common knapweed *Centaurea nigra*, oxeye daisy *Leucanthemum vulgare*, common bird's-foot-trefoil *Lotus corniculatus*, lady's bedstraw *Galium verum*, common sorrel *Rumex acetosa*, meadow vetchling *Lathyrus pratensis*, meadow buttercup *Ranunculus acris*, ribwort plantain *Plantago lanceolata*, cowslip *Primula veris* and cat's-ear *Hypochaeris radicata*.

- 3.4.24. If available, low nutrient soils/sub-soil arising from earthworks required during the Construction Phase will be used instead of importing new topsoil. The use of low nutrient soils (whether won from Site or obtained via other routes) would be required to promote floral diversity and allow species-rich grassland to be created. Wildflowers and grasses should be established from seed following suitable ground preparation such as cultivation and regrading of land. For wet grassland areas, wildflowers and grasses can be established from seed following the construction of adjacent waterbody features (including ponds, ditches, and sustainable drainage system (SuDS) features). Seed can be sown by surface broadcasting and firmed in with a roll upon completion of ground preparation.
- 3.4.25. Grassland seeding of prepared substrates should be undertaken in the spring and later summer (or early autumn). Sowing into areas of existing grassland should be undertaken in the autumn.

WETLAND

- 3.4.26. As denoted on **Figure 1: Indicative Habitat Creation and Enhancement Plan of Appendix 6.4: Outline Habitat Creation and Enhancement Plan (Volume 3)**; wetland habitats including lakes in the Lake Zone and watercourses will be retained, enhanced and managed to encourage species such as amphibians, fish, aquatic macroinvertebrates, macrophytes, and water voles, and provide foraging areas for other species such as reptiles and bats.
- 3.4.27. To develop a high quality habitat that is of similar or greater quality than equivalent habitat within the adjacent Kempston Harwick Pit CWS and Coronation Pit CWS, the wetland features listed below will be delivered. These features will support comparable invertebrate and vascular plant communities.

Standing Water

- 3.4.28. A new lake will be created in the south of the Lake Zone where presently there are several disconnected/partially disconnected former quarry/brick pit lakes. Water levels in the new lake will be deeper and more permanent than the current shallow and part ephemeral waterbodies. Water supply for these lakes will be attenuated from the Proposed Development during rainfall and storm events. The new lakes will partly act as a reservoir, providing (non-chemically) treated water to the operational Core Zone, as required. However, they will be also designed as varied wildlife habitat and will therefore serve a dual function.
- 3.4.29. The lake environment will contain a varied bank profile including shallow marginal habitats, and a draw-down zone with a fluctuating water level. Aquatic vegetation will be encouraged around the lake shore (see Reedbed). A varied bank profile will be created on the lake-side of the retaining wall (western shore) so that aquatic vegetation can be established and also areas of bare earth/soil comprising a draw-down zone. On the new lake southern shore, an open mosaic of grassland, scrub and ruderal vegetation will be created (see the OMH Open Mosaic Habitat section below).
- 3.4.30. Water quality in the new lake is expected to be improved and enhanced relative to current conditions through implementation of a Surface Water Drainage Strategy (with detailed design to be in accordance with **Appendix 12.3: Drainage Strategy (Volume 3)**).
- 3.4.31. Wetland features (ponds, watercourses) will be created within groundwater basins and excavated to a sufficient depth to ensure they remain permanently wet.

Reedbed/Swamp

- 3.4.32. Reedbeds and other forms of marginal swamp habitat (e.g. dominated by sedges *Carex* species, reedmace *Typha* species and other marginal plants such as *Sparganium* species or other *Cyperacea* species) will be created.
- 3.4.33. Reedbeds and swamp will occur along approximately 60% of the shoreline of the retained and enhanced lakes located within the Lake Zone, leaving other areas with open water. Individual blocks of reedbeds and swamp will incorporate 20-30% open water habitat and will be managed to ensure different growth stages are present (e.g. rotational cutting of reeds to prevent over dominance by single species).
- 3.4.34. The reedbed areas will contain the following general features:
- Excavation of water bodies around 2m deep with the objective of providing at least a 30cm deep areas and channels of open water year-round. The wet areas will contain shelves near the edges that will be dug at water level to support a raft of marginal and aquatic plants;
 - Scrub will be allowed to naturally re-colonise along with the reedbed vegetation with areas kept clear to encourage a more diverse mosaic habitat; and
 - To aid establishment of the bankside vegetation around the new lake consideration will be given to use of strips of mature turf. The aquatic shelf in the reedbeds will be fitted with pre-established coir tiles supporting mature, native semi-emergent plant species and plug planting will also provide additional vegetation at the water's edge.
- 3.4.35. The translocation of reed rhizomes from on-site reedbeds will be undertaken should detailed assessment confirm this is feasible, to facilitate reedbed creation. Otherwise, reed from commercially available nursery stocks will be used. Reeds will be hand planted during the autumn at a rate of at least 4/m² to ensure rapid coverage. Water levels should be maintained at a maximum of 5cm depth across the planting area during reed planting. Water levels should be maintained at an average of 30cm during the summer beyond year one, and 50cm during the winter period.

Bank/Cliff

- 3.4.36. In selected locations around the new lake environment, vertical/near-vertical banks will be created to form suitable locations for sand martin and kingfisher to excavate nesting burrows. Best practice guidance will be followed to inform the detailed design of such features, such as that published by the Environment Agency. Banks will be of approximate dimensions 10m – 30m long and 1 – 2m high. Bank design will incorporate natural/existing soils as bank material or make use of artificial materials to retain loose friable soil. In association with kingfisher and sand martin nesting habitat, or as separate features around the lake shore, the design of new banks will be undertaken to create steep sloping, areas of partially friable earth. This will create locations for burrowing bees, wasps and other invertebrates. The detailed design of these features will be integrated into the design of the new lake environment.

Islands

- 3.4.37. Small islands will be created in the new lake environment within the Lake Zone which can support nesting/roosting wetland birds. The islands should be designed to remain above the surface of the highest flood levels but also to be disconnected from the shoreline under the normally expected range of water levels, so that land-based predators (e.g. foxes) cannot gain access.

Ponds

- 3.4.38. Nine new ponds will be provided (in clusters of three) within appropriate EEAs (e.g. the Scrub and Open Mosaic Area and the Northern Ecology Area) to provide new habitats for species such as amphibians, aquatic invertebrates and water voles (should they colonise the Site in future). These would also function as a more general enhancement of the aquatic habitats within the Site, post development.
- 3.4.39. A range of pond sizes should be created ranging from 10m x 15m to 5m x 5m. All ponds should have a range of water levels ranging from deep (approximately 1.0 - 2.0m) to shallow water (less than 0.1m). It may be beneficial to allow ponds to vegetate naturally rather than introduce species. Given the proximity of nearby waterbodies there is likely to be a good 'natural' source of aquatic and wetland plant seeds. Ponds should be lined with puddle clay or an artificial liner as appropriate/depending on ground conditions.
- 3.4.40. Where SuDS features are used, they will include swales and attenuation basins, and will be designed to maximise their biodiversity value within any limits posed by their drainage/attenuation requirements, including the planting of reedbeds. Where practicable within the constraints of required hydrological functioning and long-term management, attenuation basins will comprise both open water and marginal vegetation, with banks created using low nutrient soil materials to support the establishment and growth of species-rich habitats.

Watercourses

- 3.4.41. The enhancement of existing watercourses will be undertaken along Elstow Brook in the Lake Zone and West Gateway Zone. The Diverted Watercourse along the east boundary of the Core Zone will also feature a series of ecological enhancements. The design of new or enhanced watercourse channels will include features to support the establishment of a species-rich bankside and aquatic flora through consideration of water levels and embankment profiles when planning planting and seeding. A 10m Riparian Zone will be maintained as wildlife habitat and will be allowed to develop as a mosaic of grassland, wet grassland, scrub and scattered trees (e.g. alder, willow and poplar). Consideration will be given to creating ponds/back waters in the Riparian Zone to maximise the diversity of aquatic habitat present. In the Core Zone, the Diverted Watercourse will be created in advance of the destruction of the existing watercourse to enable any protected or important plant and animal species to be relocated in this area.

OPEN MOSAIC HABITAT

- 3.4.42. Areas of OMH and scrub located south and east of the main lake in the Lake Zone will be retained and created within the development proposals where possible. Precise locations and extents will be confirmed through the detailed design process for the Lake Zone. It is not possible to produce a prescriptive habitat creation approach for this habitat until further information is available on potential sources of soil and aggregate on-site and land form in the habitat creation areas to inform the detailed HCEP. In addition, it is necessary to confirm what management approaches will be available (e.g. grazing, cutting etc.).

- 3.4.43. Compensation for the loss of OMH elsewhere on-Site will comprise habitat creation in the Northern Ecology Area and Scrub or Open Mosaic areas as indicated on **Figure 1: Indicative Habitat Creation and Enhancement Plan of Appendix 6.4: Outline Habitat Creation and Enhancement Plan (Volume 3)**. Habitat creation will be guided by the results of detailed habitat and botanical surveys and soil survey work, however, the habitat will be created in-line with the following general principles:
- Creation of bare ground scrapes through mechanical removal of topsoil to reveal the substrate beneath;
 - Creation of piles/mounds of mixed crushed and coarse concrete rubble e.g. salvaged from existing piles, or derived from breaking up existing concrete hardstanding, within the construction footprint;
 - Creation of areas of species-rich grassland and tall herb vegetation; and
 - Creation of mounds and low bunds using material derived from construction works within the Site.

INDIVIDUAL TREES

- 3.4.44. New individual trees will be planted in line with the principles of the habitat creation layout as shown on **Figure 1: Indicative Habitat Creation and Enhancement Plan of Appendix 6.4: Outline Habitat Creation and Enhancement Plan (Volume 3)**.
- 3.4.45. The selected tree species included within the planting palette (to be agreed during detailed design) will include native broadleaved species. Management will aim to promote the appearance of individual trees in guest facing areas whilst also enhancing biodiversity value.
- 3.4.46. Existing individual specimen trees would be retained wherever practicable subject to the detailed design. The veteran tree (a white willow [*Salix alba*]) identified in the West Gateway Zone on the bank of the Elstow Brook corridor would be retained and protected. The **Arboricultural Impact Assessment (Document Reference 6.11.0)** which includes the **Tree Removal and Protection Plan (Document Reference 6.11.0)** specifically detail the trees which will be retained and protected within the Site.

AMENITY AND ORNAMENTAL

- 3.4.47. A range of amenity and ornamental habitats will be created in the Core Zone, in and around the built development of the theme park and ancillary buildings and infrastructure. The composition of this landscaping is yet to be determined but it will comprise trees, shrubs, areas of amenity lawn and areas of ornamental planting. Given the composition of this planting is not yet determined, it is not included in the overall areas of habitat to be delivered on Site.

INVASIVE NON-NATIVE SPECIES

- 3.4.48. Widespread terrestrial and aquatic invasive species listed on Schedule 9 of the Wildlife and Countryside Act 1981¹¹ (as amended) have been recorded within the Site. These included Japanese Knotweed *Reynoutria japonica* giant knot weed *Fallopia sachalinensis*, hybrid knotweed *Fallopia baldschuanica*, giant hogweed *Heracleum mantegazzianum*, Himalayan balsam *Impatiens glandulifera*, and New Zealand pygmyweed *Crassula helmsii*.
- 3.4.49. Newly created habitats will be monitored to enable early detection of INNS and treatment and disposal of plants by:
- Spraying with chemicals;
 - Pulling or digging out live, dead or dying plants;
 - Cutting back plants to prevent the seeds dispersing;
 - Burying them;
 - Burning them; or
 - Disposing of them off-Site.

3.5 PROTECTED SPECIES-SPECIFIC MEASURES

OVERVIEW

- 3.5.1. An over-arching objective of the OHCEP is the provision of habitats targeted to support wildlife species groups which occur in the locality. Habitat creation and enhancement measures will be designed to improve the value of the Site to the species discussed in this section.
- 3.5.2. Species-specific wildlife mitigation features that will be created on-Site and are covered by this OHCEP are considered below. These features will be included within areas indicated on **Figure 1: Indicative Habitat Creation and Enhancement Plan** of **Appendix 6.4: Outline Habitat Creation and Enhancement Plan (Volume 3)**. Specific locations of features will be determined at the detailed design stage of the Proposed Development.
- 3.5.3. Species specific wildlife mitigation measures and Licensing measures to address construction impacts are outlined in **Appendix 2.3: OCEMP (Volume 3)** including:
- Details of protected species licenses which may need to be obtained to facilitate the development and also other methods that need to be adopted to satisfy requirements relating to species which are subject to legal protection (i.e. those where a licence is not required but constraints still apply);
 - Outline details on donor and receptor areas where it is necessary to translocate species from one part of the Site to another;
 - Ecological protection and clearance techniques to satisfy legislation protecting species and other animal welfare requirements; and

¹¹ HM Government (1981) *Wildlife and Countryside Act 1981*. Available at: <https://www.legislation.gov.uk/ukpga/1981/69> [Accessed: 23 April 2025].

- Outline potential requirements for fish translocation prior to dewatering activities affecting watercourses and waterbodies.

3.5.4. **Appendix 2.3: OCEMP (Volume 3)** also sets out a specification for ecological Site support that may be required to implement the items outlined above.

BATS

- 3.5.5. The habitat creation measures detailed above will provide foraging and roosting habitat for bats and reduce lighting impacts in the long term. Operational lighting will be developed through the detailed design process to reduce lighting impacts upon bat habitats located within EEAs and adjacent habitats, including in neighbouring CWSs, as required by Design Standards CZ5.1, LZ5.1, LZ5.2, LZ5.3 and SW5.5 in the **Design Standards (Document Reference 6.3.0)**, and discussed above in Section 3.1.
- 3.5.6. Bat ‘hop-overs’ following guidance principles¹² will be created using retained mature vegetation and/or transplanted specimen trees. These features will be installed in areas which are likely to require mitigation to facilitate road crossing by bats. Trees should be planted to maintain a flightline of at least 5m above the road height. Gaps between canopies should not exceed 10m. This feature is likely to be located within a dark corridor that will be retained for commuting bats on either side of Manor Road, between the Lake Zone and Core Zone. Bat ‘hop-overs’ will be linked into existing retained and newly proposed hedgerows and new woodlands where these features exist.
- 3.5.7. Bat boxes will be installed on Site to provide additional roosting habitat. The positioning of boxes is to be determined by an ecologist on Site, but typically where there are suitable existing trees to fix them to and where light spill and acoustic disturbance are minimal. A variety of different bat box designs will be installed. Long-lasting woodcrete boxes that are self-cleaning are recommended, so that no continued maintenance is necessary. Bat boxes are to be fixed to trees with the fixings provided with the product, or with aluminium nails. Consideration will be given to installing bat bricks and boxes into structures during detailed design, but this will not be considered as a primary mitigation technique. An indicative target of one bat box per medium or high suitability tree will be adopted. Bat boxes are not to be installed on trees that are confirmed roosts.
- 3.5.8. Suitable tree roost features and bat boxes will be located away from existing external light sources. There should be a designated dark zone of less than 0.5lux within at least 50m in all directions of the tree. Bat boxes should be positioned 3.5-6m above the ground to reduce risk of vandalism and predation, with a clear flight path to the box entry point.
- 3.5.9. Should replacement roost structures be required as mitigation, these would be provided within the grounds of the existing Vine Cottages, in the East Gateway Zone, north of Manor Road. This location provides connectivity with adjacent woodland and wetland habitats to the north and is also adjacent to the majority of buildings (associated with the existing Vine Cottages) that would require demolition as part of the Proposed Development.
- 3.5.10. Veteranisation of retained trees will be used, where practicable, to improve the provision of bat roosting habitat on Site.

¹² Chartered Institute of Ecology and Environmental Management (2023) *UK Bat Mitigation Guidelines: a guide to impact assessment, mitigation and compensation for developments affecting bats*. Version 1.1. Ampfield: Chartered Institute of Ecology and Environmental Management. Available at: <https://cieem.net/wp-content/uploads/2023/09/Bat-Mitigation-Guidelines-2023-V1.1.pdf> [Accessed: 23 April 2025].

- 3.5.11. Mitigation measures will be employed to reduce the effects of operational noise, where possible. Achievement of maximum noise limits at Receptor Control Locations on Manor Road and Broadmead Farm will also reduce noise impacts on ecological receptors. Furthermore, areas of tree, scrub and shrub planting within the EEA and associated with wider landscaping for the Proposed Development would provide a degree of noise and visual disturbance mitigation, due to their inherent attenuating properties.
- 3.5.12. The crossing of Elstow Brook in the West Gateway Zone will consist of a clear span bridge as set out in Design Standard WG7.1 in the **Design Standards (Document Reference 6.3.0)**, to support the use of the Elstow Brook corridor by bats.

BADGERS

- 3.5.13. An artificial badger sett will be constructed prior to the closure of setts within the Lake Zone. This artificial sett will be located within the Lake Zone. The specific location, and specification of this feature will be determined as part of the Natural England licence application and the HCEP at the detailed design stage of the Proposed Development, it is currently proposed to be constructed in the Northern Ecology Area (see **Figure 1: Indicative Habitat Creation and Enhancement Plan of Appendix 6.4: Outline Habitat Creation and Enhancement Plan (Volume 3)**).
- 3.5.14. Proposed landscaping around the perimeter of the Proposed Development would include predominantly native woodland, scrub and grassland habitat creation that would also benefit badgers by providing additional foraging and commuting habitat. These habitats would be managed in the long term pursuant to **Appendix 6.5: Outline Landscape and Ecology Management Plan (Volume 3)**.
- 3.5.15. One or more wildlife crossing structures (e.g. enlarged culvert or other features incorporated into road design) will be installed between the Northern Ecology Area and the habitat around the new lake to be created in the Lake Zone. Furthermore, a 'clear span' bridge as set out in Design Standard WG7.1 in the Design Standards (**Document Reference 6.3.0**) will allow movement by badger along the Elstow Brook and riparian corridor through the West Gateway Zone. These features will provide linkages for badger and other species to move between EEAs and across the local area.

WATER VOLE

- 3.5.16. Surveys in 2024 have confirmed the likely absence of water voles at the Site (see **Appendix 6.11: Otter and Water Vole Survey Report (Volume 3)**). The measures detailed below would increase the suitability of the Site to support water vole and therefore represent an enhancement compared to baseline conditions at the Site.
- 3.5.17. The following sites with suitable habitat conditions for water voles will be created/enhanced as shown on **Figure 1: Indicative Habitat Creation and Enhancement Plan of Appendix 6.4: Outline Habitat Creation and Enhancement Plan (Volume 3)**. These include:
- The Diverted Watercourse along the eastern boundary of the Core Zone;
 - Elstow Brook; and
 - Areas of bankside habitats and fringing marginal and emergent vegetation provided by the retained and managed lakes within the Lake Zone.
- 3.5.18. The specific location of these features will be determined as part of the detailed HCEP.

OTTER

- 3.5.19. The Elstow Brook provides suitable habitat for otter and the lakes within the Lake Zone and the Site and within the adjacent land provide additional opportunities for foraging, with surrounding earth banks, woodland, scrub and ditches providing potential for holt creation.
- 3.5.20. Otter fencing would be installed to limit the risk of road collision where deemed necessary as part of detailed design of fencing around roads and watercourses/water bodies. Underpasses and other structures would be used to enable otter and other species to pass under roads where these are bisected by watercourses.
- 3.5.21. A '*clear span*' bridge as set out in Design Standard WG7.1 in the **Design Standards (Document Reference 6.3.0)** will allow the riparian corridor along the Elstow Brook through the West Gateway Zone to remain connected, allowing transient otters and other species to commute along watercourse corridor. This will negate the requirement for a ledge mounted on the underside of the bridge, which is often recommended in circumstances where otters cannot pass under a bridge unimpeded.

BIRDS

- 3.5.22. Bird boxes will be installed in suitable locations within the Proposed Development to enhance potential nesting opportunities across the Site. Bird box designs should be of long-lasting woodcrete and reflect the nesting requirements of species known to be present within the local area and that are local conservation priorities, as well as common and widespread farmland and woodland species.
- 3.5.23. Bird boxes should be installed on mature trees 2-4m high and placed to avoid strong sunlight and the wettest winds (usually north to east, depending on the shade level), and the entrance should face slightly downwards to protect from the rain. Boxes should have a clear flight path on the approach and be relatively undisturbed.
- 3.5.24. Indicative designs to be included in the mitigation include:
 - 1B Schwegler Nest Box – cavity nest box;
 - 2H Schwegler Robin Box – open fronted box;
 - CedarPlus Triple Sparrow House– for sparrow species; and
 - 3S Schwegler Starling Nest Box– for use by starling and other cavity nesters.
- 3.5.25. Installed bird boxes would be checked to ensure clear flight paths. In the event that obstructions are identified steps would be taken to remove these obstructions. This is to ensure that no birds are harmed, and no active nests or dependent young are at risk.
- 3.5.26. In the enhanced lake in the Lake Zone the following bird nesting structures will be installed:
 - A sand martin bank or tower; and
 - A kingfisher nesting bank.
- 3.5.27. Designs for both structures will be based on good practice guidelines¹³.

¹³ Hopkins, L. (2001) *Best Practice Guidelines: Artificial Bank Creation for Sand Martins and Kingfishers*. UK: Environment Agency.

- 3.5.28. Where necessary, close to open water habitats, measures to encourage birds to fly higher across the Theme Park area of the Site will be installed, i.e. bird flight diverters. These measures will be considered in combination with increased planting around areas where flocks of waterbirds may be present (Kempston Hardwick Pit and Coronation Pit CWSs). The requirement for such features and their design will be evaluated and confirmed in the detailed HCEP.

REPTILES

- 3.5.29. Hibernacula will be constructed in accordance with the guidance provided in the *Great Crested Newt Conservation Handbook*¹⁴ and the *Reptile Habitat Management Handbook*¹⁵, and in accordance with Standard Details that will be produced at the detailed design stage of the Proposed Development.
- 3.5.30. Hibernacula/refugia will be created with brash piles and logs arising from the construction and maintenance of the Site which would be placed within relevant EEAs. This should take account of assumed future shading, waterlogging, and maintenance requirements.
- 3.5.31. Hibernacula should also be constructed using surplus soil/stone won from Site, where available, and will measure approximately 4m x 2m x 1m in dimension.
- 3.5.32. The following methodology should be adopted for construction of each hibernaculum:
- Hibernacula to be located on free-draining substrates or above ground to avoid flooding; within grassland or rough vegetation, not in shade, with one long side south facing;
 - Turf or topsoil to be removed from the footprint of the hibernaculum and set aside;
 - Core materials to include timber, brash, tree roots, hard-core, bricks, rocks, or building rubble;
 - Materials that will decompose should not be placed beneath heavy components such as bricks or rocks, to reduce the risk of collapse;
 - Larger spaces within the core materials to be packed with wood chippings, loose topsoil or spoil;
 - Each hibernaculum will be covered with the turf/topsoil removed from the footprint; and
 - Rocks and timber should protrude from the edges, creating crevices and access for reptiles and amphibians.
- 3.5.33. The location and design of hibernacula and log piles are to be agreed with the ecologist and installed by the contractor (or appointed specialist landscape contractor). Installation of these features will be overseen by the ecologist.
- 3.5.34. Compost heaps for reptile egg-laying sites will be included in the design to improve the provision of reptile egg-laying habitat across the Site. Compost heaps should be at least 1m², and these features are to include materials such as grass clippings, manure, compost, sawdust, garden waste or cut reeds. Where available vegetation clearance material should be used.

¹⁴ Froglife (2001) *Great Crested Newt Conservation Handbook*. Halesworth: Froglife. Available at: https://www.froglife.org/wp-content/uploads/2013/06/GCN-Conservation-Handbook_compressed.pdf [Accessed: 23 April 2025].

¹⁵ Amphibian and Reptile Conservation (2010) *Reptile Habitat Management Handbook*. Bournemouth: Amphibian and Reptile Conservation. Available at: <https://www.arc-trust.org/Handlers/Download.ashx?IDMF=ca8c7414-fb47-4a9a-8883-8ae97268d261> [Accessed: 23 April 2025].

- 3.5.35. Reptile basking banks will also be included within the design of the Northern Ecology Area subject to advice of a Suitably Qualified Ecologist. Basking banks will measure up to approximately 30m (length) x 2m (width) x 1m (height) in dimension. Basking banks will be constructed similarly to the hibernacula although will not include any digging down.
- 3.5.36. Reptile basking banks shall be maintained to 1m height, with 100% grassland cover on top and holes for access around the base. Vegetation shall be managed to prevent these features becoming 'overrun' with tall rank grassland and scrub.
- 3.5.37. The translocation of reptiles will require a receptor area for reptiles to be moved to. It is proposed that this area will be contained in the Lake Zone within existing grassland habitat and/or within the newly created Northern Ecology Area.
- 3.5.38. Wildlife crossing structures between the Northern Ecology Area and the habitat around the new lake in the Lake Zone will be designed to support movement of reptiles between the two areas.

AMPHIBIANS

- 3.5.39. No specific habitat compensation for Great Crested Newt (GCN) is proposed within the Site given that the Proposed Development will adopt a District Level Licence (DLL) approach. DLL is an alternative approach to mitigation licensing for development sites which will impact GCN. District level licensing aims to increase the number of GCNs in a local authority or wider area by providing new or better habitats in targeted areas to benefit the wider population. These habitats are not required within the development sites, enabling on-Site mitigation to be avoided.
- 3.5.40. The creation and enhancement of new wetland, grassland, scrub, and woodland habitat within the EEA presented on **Figure 1: Indicative Habitat Creation and Enhancement Plan** of **Appendix 6.4: Outline Habitat Creation and Enhancement Plan (Volume 3)** would provide breeding, foraging and sheltering habitat for common frog and common toad, and incidentally also for GCNs.
- 3.5.41. Hibernacula will be constructed in accordance with the guidance provided in the *Great Crested Newt Conservation Handbook*¹⁴ and the *Reptile Habitat Management Handbook*¹⁵, and in accordance with Standard Details that will be produced at the detailed design stage of the Proposed Development.
- 3.5.42. Wildlife crossing structures between the Northern Ecology Area and the habitat around the new lake to be created in the Lake Zone will be designed to facilitate movement of amphibians between the EEAs and wider Site (and off-Site areas).

INVERTEBRATES

- 3.5.43. The Site contains a mosaic of habitats that have the potential to accommodate a range of rare invertebrate species. Invertebrate habitat measures have been developed with reference to Hardman *et al.* (2012)¹⁶, Hawke and Jose (1996)¹⁷ and Kirby (2001)¹⁸.

16 Hardman C.J., Harris, D.B., Sears, J. and Droy, N. (2012) 'Habitat associations of invertebrates in reedbeds, with implications for management', *Aquatic Conservation: Marine and Freshwater Ecosystems*, 22(6), pp. 813-826. Available at: <https://onlinelibrary.wiley.com/doi/abs/10.1002/aqc.2282> [Accessed: 23 April 2025].

17 Hawke, C. J. and Jose, P. V. (1996) *Reedbed Management for Commercial and Wildlife Interests*. Sandy: RSPB.

18 Kirby, P. (2001) *Habitat Management for Invertebrates: A Practical Handbook*. Sandy: RSPB.

- 3.5.44. Log piles will be created on Site to serve as invertebrate habitat. These would be placed within sunny positions in grassland, open mosaic, and scrub habitats. Logs should be stacked in a criss-cross pattern up to a height of 1m. Brash and woody material can be used to fill gaps between layers of logs.
- 3.5.45. Purpose built invertebrate ‘hotels’ will be installed in landscaped areas to provide refuge for specific taxonomic groups, i.e., the provision of nesting habitat for solitary bees. The proposed cliff/bank habitat provision in the east of the Lake Zone EEA would also provide suitable habitat conditions for this and other species groups. Invertebrate hotels can be built from recycled materials, with the main structure typically comprising discarded pallets. Other materials can include broken bricks and tiles, stone chippings and dry leaves.
- 3.5.46. In the Scrub and Open Mosaic areas of the Lake Zone EEA consideration will be given to re-use of low nutrient, friable soils and sands excavated from elsewhere on Site during the construction process. These will be used to create low banks of approximate dimensions 1 – 1.5m high and 5 - 15m long which will provide habitats for burrowing bees, wasps, ants and other species.

FISH

- 3.5.47. Watercourses will be enhanced to support fish communities and include the following:
- Enhancement works in-channel to provide morphological diversity (e.g. incorporation of riffle and pool features);
 - Riparian tree planting and planting of an appropriate riparian vegetation assemblage; and
 - Where watercourses are re-aligned, habitat enhancements should include specific fish habitat enhancements, such as the creation of riffles and pools, and the presence in-channel woody debris and an appropriate in-channel macrophyte community.
- 3.5.48. European bullhead *Cottus gobio*, recorded on Site, require morphological and habitat diversity for various stages of its life-cycle, including coarse substrates for spawning and sheltered sections of watercourse created by woody debris, tree roots, and leaf litter for feeding and refuge outside of the spawning period.
- 3.5.49. Spined loach *Cottus taenia*, previously recorded by the Environment Agency in Elstow Brook, require finer sediment substrate, particularly sand, due to its specialised feeding mechanism, and the presence of a diverse in-channel macrophyte community to provide refuge habitat from predators.

AQUATIC MACROINVERTEBRATES AND MACROPHYTES

- 3.5.50. The diverted watercourse along the eastern boundary of the Core Zone will be designed with habitat to support aquatic macroinvertebrates and macrophytes. Habitat design and enhancement should provide morphological and flow diversity through the incorporation of varied habitats such as riffle and pool features, woody debris, and leaf litter. Areas of open water with limited riparian shading should be provided to promote in-channel macrophyte growth.
- 3.5.51. A visitor pressure, public interpretation and site wardening protocol will be developed to regulate the impact of visual disturbance from people and vehicles on wildlife.



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