Luton Rising
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London Luton Airport Expansion

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5.02 Appendix 8.6 Ecological Mitigation Strategy - Amphibian and Reptile

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5.02 ENVIRONMENTAL STATEMENT APPENDIX 8.6 ECOLOGICAL MITIGATION STRATEGY - AMPHIBIAN AND REPTILE

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1 INTRODUCTION

1.1 Background

1.1.1 This Amphibian and Reptile Mitigation Strategy has been prepared by Luton Rising (a trading name of London Luton Airport Limited ('the Applicant')) to inform the Environmental Impact Assessment (EIA) in support of the application for development consent for the expansion of London Luton Airport, hereby referred to as the Proposed Development.

1.1.2 The Proposed Development seeks to construct a new terminal and associated infrastructure to increase the capacity of the airport. The permitted capacity is currently 18 million passengers per annum (mppa) and consent is being sought to increase this to 32 mppa. A full description of the Proposed Development is detailed within **Chapter 4** of the Environmental Statement (ES) **[TR020001/APP/5.01]**.

1.1.3 The Proposed Development is located at London Luton Airport (the airport), Bedfordshire and adjacent lands, at approximate OS grid reference TL 12478 21377 and shown on **Figure 1** of **Appendix A** of this document.

1.1.4 The Main Application Site (as defined in **Chapter 2** of the ES **[TR020001/APP/5.01]**) covers approximately 428ha which in addition to the airport infrastructure comprises previously undeveloped, predominantly arable land, with hedgerows, trees and shrub-lined margins. Occasional woodland blocks, copses, tree belts, areas of scrub, rough grassland, ruderal vegetation, and arable field margins are also present. Winch Hill Wood County Wildlife Site (CWS) and Local Wildlife Site (LWS) ancient woodland are present to the south east of the Main Application Site.

1.1.5 Wigmore Valley Park lies east of the airport (within the Main Application Site) and comprises outdoor public space with amenity grassland and public facilities to the north, and Wigmore Park CWS to the south, which has developed partly over previous landfill, with neutral and calcareous grassland, hedgerows, scattered scrub and woodland.

1.1.6 The airport is dominated by hardstanding with amenity grassland and scattered small patches of scrub. Dairyborn Scarp District Wildlife Site (DWS) lies to the western side of the airport (within the Main Application Site) which was formerly part of a larger site called Dairyborn Scarp CWS (with additional grassland interest that is no longer present) and comprises a steep chalk scarp dominated by ruderal vegetation and scrub, with a small remnant of ancient woodland to the north of Dairyborn Scarp DWS.

1.1.7 In addition, the Proposed Development also includes Off-site Highway Interventions, Off-site Car Park and Off-site Planting areas outside of the Main Application Site (also defined in **Chapter 2 [TR020001/APP/5.01]** and shown on **Figure 2.2** of the ES **[TR020001/APP/5.03]**). The Off-site Highway Interventions are restricted to within existing highway boundaries with the exception of works at Junction 10 of the M1, where areas of vegetation clearance would be required.

1.1.8 The proposed Off-site Car Parks are located to the west of the airport within brownfield areas, comprising access roads, temporary buildings, area of ephemeral/short perennial vegetation, grassland margins and areas of landscaping predominantly consisting of scrub and trees. However, a small area of car park in this western area overlaps with Luton Parkway Verges DWS, recognised for its calcareous and neutral grassland.

1.1.9 The Off-site Planting areas are located to the north east of the Main Application Site and comprise arable, grassland field margins and hedgerows.

1.1.10 This document sets out the avoidance, mitigation and enhancement measures to be implemented to safeguard common amphibian and reptile species during construction and operation of the Proposed Development. These measures are designed to ensure that the favourable conservation status of amphibian and reptile species are maintained post-development.

1.1.11 This Mitigation Strategy comprises the following sections:

a. **Section 1** - Introduction;
b. **Section 2** - Purpose and conservation objectives;
c. **Section 3** - Summary of current baseline;
d. **Section 4** - Mitigation strategy;
e. **Section 5** - Management and monitoring;
f. **Section 6** - Timetable for implementation; and
g. **Section 7** - Conclusion.

1.1.12 The content of this document should be read in conjunction with relevant sections of the ES including:

a. **Chapter 8**, Biodiversity **[TR020001/APP/5.01]**;
b. **Appendix 8.1** Ecology Baseline Report **[TR020001/APP/5.02]**;
c. **Appendix 8.2** Outline Landscape and Biodiversity Mitigation Plan **[TR020001/APP/5.02]**;
d. **Appendix 8.4** Bird Strike Risk Assessment **[TR020001/APP/5.02]**;
e. **Appendix 8.5** Biodiversity Net Gain (BNG) Report **[TR020001/APP/5.02]**;
f. **Chapter 4**, The Proposed Development **[TR020001/APP/5.01]** which describes the relevant works, the location of which is also shown on **Figures 4.1 to 4.3 [TR020001/APP/5.03]**, and timings associated with each assessment Phase;
g. **Figures 14.11 to 14.13** Landscape Mitigation **[TR020001/APP/5.03]**;
h. site clearance and demolition requirements are described in the Construction Method Statement and Programme Report provided as **Appendix 4.1** to this ES **[TR020001/APP/5.02]**, along with the site clearance drawings; and
i. **Appendix 4.2,** the Code of Construction Practice (CoCP) **[TR020001/APP/5.02]**.

1.2 Legislation and biodiversity context

Amphibian legislation and policy

1.2.1 The four widespread species of amphibian (smooth newt (*Lissotriton vulgaris*), palmate newt (*Lissotriton helveticus*), common frog (*Rana temporaria*) and common toad (*Bufo bufo*)) are protected by Section 9(5) of the Wildlife and Countryside Act 1981 (Ref. 1) (as amended). This section prohibits sale, barter, exchange, transporting for sale and advertising to sell or to buy.

1.2.2 Great crested newt (*Triturus cristatus*) and the sites that they use for breeding or resting are afforded protection through the provisions within Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Species and Habitat Regulations 2017 (as amended) (Ref. 2). It is an offence to deliberately capture, injure or kill a great crested newt; deliberately disturb a great crested newt; or damage or destroy a breeding site or resting place used by a great crested newt.

1.2.3 Deliberate capture or killing is taken to include "accepting the possibility" of such capture or killing. Deliberate disturbance of animals includes in particular any disturbance which is likely:

a. to impair their ability;
    i. to survive, to breed or reproduce, or to rear or nurture their young; or
    ii. in the case of animals of hibernating or migratory species, to hibernate or migrate; or
b. to affect significantly the local distribution or abundance of the species to which they belong.

1.2.4 Licences are available from Natural England to permit activities that would otherwise cause an offence under the legislation, including for the purpose of development. A licence can usually only be granted if the development is in receipt of full planning permission (with relevant conditions discharged). The conditions of an issued licence would include proportional measures to mitigate potential effects as a result of the Proposed Development.

1.2.5 There are four species of amphibian listed on Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 (Ref. 3). These are natterjack toad (*Epidalea calamita*), pool frog (England only) (*Pelophylax lessonae*), common toad and great crested newt. The Act places a duty on public organisations to ‘have regard’ toward the conservation status of those species.

1.2.6 Of the species listed on the NERC Act 2006 or Schedule 2 of the Conservation of Species and Habitat Regulations 2017 (as amended), only two amphibian and reptile species could feasibly be present within the Main Application Site boundary (due to habitat and geographical requirements), great crested newt and common toad. However, great crested newt was found to be likely absent following surveys (Section 11 of the Ecology Baseline Report **Appendix 8.1** of the ES **[TR020001/APP/5.02])**.

1.2.7 These species were previously identified as requiring action in the UK Biodiversity Action Plan (UK BAP) (Ref. 4) and continue to be regarded as conservation priorities in the subsequent UK Post-2010 Biodiversity Framework (Ref. 5) and updates up to and including in 2018 (Ref. 6).

1.2.8 Great crested newts are listed as priority species on both the Bedfordshire Local Biodiversity Action Plan (LBAP) (Ref. 7) and Hertfordshire LBAP (Ref. 8) Furthermore, the following species are referenced in the Hertfordshire LBAP but do not have designated species LBAPs:

a. smooth newt;
b. palmate newt;
c. common frog; and
d. common toad.

Reptile legislation and policy

1.2.9 All native British reptile species are protected against killing and injury under Schedule 9 of the Wildlife and Countryside Act 1981 (Ref.1) (as amended), with the following species listed as Species of Principal Importance under Section 41 of the NERC Act 2006 (Ref. 3), which places a duty on public organisations to 'have regard' to the conservation of these reptiles:

a. adder (*Vipera berus*);
b. common lizard (*Zootoca vivipara*);
c. grass snake (*Natrix helvetica*);
d. sand lizard (*Lacerta agilis*);
e. slow-worm (*Anguis fragilis*); and
f. smooth snake (*Coronella austriaca*).

1.2.10 Smooth snake and sand lizard are also protected under the Conservation of Habitats and Species Regulations 2017 (as amended) (Ref. 2) and receive the same level of protection as great crested newt (as detailed above in paragraphs 1.2.1). However, these species would not be present within the Order Limits as they are restricted to specific habitats and areas of the UK which are not present within the Order Limits.

1.2.11 Adder is listed as a priority species within Bedfordshire and Luton on the Local Biodiversity Action Plan (LBAP) (Ref. 7) and has a specific Species Action Plan (Ref. 9), last updated in July 2010. However, adder would not be expected to be present within the Order Limits as they have a rather patchy distribution in the UK due to habitat requirements, and are generally restricted to specific habitats not found within the Order Limits.

1.2.12 The Hertfordshire LBAP (Ref. 8) does not include any reptile species.

2 PURPOSE AND CONSERVATION OBJECTIVES

2.1 Purpose of this strategy

2.1.1 This Mitigation Strategy sets out the avoidance, mitigation and enhancement measures to be delivered as part of the Proposed Development to safeguard amphibians and reptiles during the course of the works and, moreover, to ensure that the favourable conservation status of these animals is maintained post-development.

2.1.2 The purpose of this Mitigation Strategy is as follows:

a. To summarise the current ecological baseline at the Proposed Development in respect of amphibian and reptile species, taking into account the findings of survey work undertaken up to the time of writing this Mitigation Strategy (last surveys undertaken in May 2020 for amphibians and July 2019 for reptiles).

b. To provide detail of the avoidance, mitigation and enhancement measures, which are outlined within Sections 8.8 and 8.10 of **Chapter 8** Biodiversity of the ES **[TR020001/APP/5.01]**, to be delivered as part of the Proposed Development to appropriately safeguard the local amphibian and reptile populations, namely:

   i. details of further surveys that will be undertaken to ensure continued applicability of proposals set out within this Mitigation Strategy;.
   ii. details of proposed habitat creation and enhancement measures of benefit to amphibian and reptile species;
   iii. details of specific enhancement prescriptions for amphibian and reptile species within the Order Limits of the Proposed Development ;
   iv. details of the management objectives and prescriptions to be adopted to manage habitats within the Order Limits of the Proposed Development for the benefit of amphibian and reptile species;
   v. details regarding the proposed timescale for mitigation works (linked to the delivery of the Proposed Development), and responsibilities for delivery of mitigation and management measures as far as they are currently known;
   vi. outline monitoring proposals and arrangements for undertaking remedial works, should these be necessary; and
   vii. demonstrate that, with the implementation of the measures outlined within this Mitigation Strategy, the Proposed Development will avoid a deterioration in the favourable conservation status of populations of amphibian and reptile species in the local area.

2.2 Conservation objectives

2.2.1 The conservation objectives that underpin this Mitigation Strategy are as follows:

a. To ensure that the Proposed Development avoids deterioration in the favourable conservation status of populations of amphibian and reptile species, by safeguarding, maintaining and/or enhancing:
    i. retained and created aquatic habitats;
    ii. the extent, distribution and connectivity of terrestrial habitats for amphibian and reptile species; and
    iii. the quality and value of suitable terrestrial and aquatic habitats for amphibian and reptile species within the site and local area.

3 SUMMARY OF CURRENT BASELINE

3.1.1 This section provides an overview of the amphibian and reptile surveys that have been undertaken and summary of the current baseline for amphibian and reptile species within the Main Application Site, used to inform the principles of this Mitigation Strategy. The study area of the reptile survey covers land within the Main Application Site. However, with the exception of junction 10 of the M1 which has suitability for small numbers of common species, the Off-site Highway Intervention and Off-site Car Park locations do not include suitable habitats for reptiles and were therefore scoped out of further survey. The study area of the great crested newt (and other amphibians) survey covers waterbodies within 500m of anticipated area of impacts within the Main Application Site boundary. However, with the exception of junction 10 of the M1 where three ponds and a ditch were noted, the Off-site Highway Intervention and Off-site Car Park Locations do not include suitable habitats for reptiles and were therefore scoped out of further survey. Full details of methodologies, surveys that have been undertaken, limitations and results can be found in Sections 10 and 11 of the Ecology Baseline Report **Appendix 8.1** of the ES **[TR020001/APP/5.02]**.

3.2 Methodology

Desk study

3.2.1 Information about non-statutory designated nature conservation sites and protected or otherwise notable species of amphibian or reptile, recorded from within the last 10 years, were obtained from Bedfordshire & Luton Biodiversity Recording & Monitoring Centre (BRMC) and Herts Environmental Records Centre (HERC) in February 2018 and updated in November 2020 for a search area covering a 2km radius from the Main Application Site, which includes the majority of the Off-site Highway Interventions, Off-site Car Parks and Planting. A further updated desk study was undertaken in June 2022 for the Main Application Site, excluding the off-site highway interventions. This is not considered to be a significant limitation given that the majority of Off-site Highway Interventions are restricted to areas of existing hardstanding and those areas highlighted as not being hardstanding such as the M1 compound location have been subject to a walkover survey.

3.2.2 Locations and details of statutory designated nature conservation sites within 2km of the Main Application Site were obtained from the Government's Multi-Agency Geographic Information for the Countryside (MAGIC) website (Ref. 10), in 03 May 2019, 14 September 2021 and 15 August 2022. Maps and aerial photographs were also reviewed to ascertain the location of habitats likely to support amphibian or reptile species.

Amphibians

3.2.3 A desk study exercise was undertaken in February 2018, which incorporated a 'pond scoping' exercise and a biological records search. Ordnance Survey (OS) maps and aerial photographs were reviewed to identify ponds and other relevant waterbodies on and within 500m of the Main Application Site and to

review habitat connectivity between these and the Main Application Site. The majority of the works associated with the Off-site Highway Interventions would occur in habitats within the existing highway boundary that largely comprise areas of hard standing, which do not include suitable habitats for amphibians and therefore were not included in the desk study. The exception to this is the proposed Off-site Highway Interventions at Junction 10 of the M1, where vegetation clearance would be required. With reference to aerial imagery, there are three ponds and a drainage ditch system identified within 500m of Junction 10 and some terrestrial habitat also exists at this location. Off-site Planting areas would be enhanced and not adversely affected for amphibians and so did not require surveys.

3.2.4 This information was used to determine which of these required further survey, on the basis that they could potentially support great crested newt (and other amphibian species) that could potentially be affected by the Proposed Development.

3.2.5 Great crested newt Habitat Suitability Index (HSI) assessments were carried out at all accessible ponds located within 500m of the Main Application Site with the addition of proposed Off-site Highway Intervention works at Junction 10 of the M1, using the simplified HSI methodology (Ref. 11) on 16 April 2018. An additional set of ground truthing and HSI assessments were conducted on 11 November 2019, to capture ponds where access had previously been restricted. The HSI assessments were repeated again in Spring 2020, where access allowed.

3.2.6 In Spring 2018, great crested newt presence/likely absence surveys (using conventional methods) were undertaken on accessible ponds with habitat suitability, located within 500m of the Main Application Site and Junction 10 of the M1. The surveys were undertaken in accordance with the Great Crested Newt Mitigation Guidelines (Ref. 12), in so far as possible. The surveys were repeated in April to May 2020. Limitations for each pond can be found in Section 11.2 of the Ecology Baseline Report **Appendix 8.1** of the ES **[TR020001/APP/5.02].**

3.2.7 Suitable ponds (holding sufficient water) located within 500m of the Main Application Site and Junction 10 of the M1 were subject to a great crested newt presence/absence survey, using eDNA analysis outlined in the Defra Technical Advice Note (Ref. 13) on the 17 and 26 April 2018. An attempt was made to eDNA survey Pond 7 again on 20 May 2019, due to an inconclusive result in 2018, however the pond was found to be dry on the return visit.

3.2.8 Despite the limitations identified, it is considered that an appropriate level of survey effort was deployed at each pond to allow a conclusion of presence or likely absence to be reached. No further surveys were deemed to be required as the population within these ponds to is unlikely to change significantly and pre construction surveys will confirm the situation at the required time. Detailed survey methodologies and limitations can be found within Ecology Baseline Report **Appendix 8.1** of the ES **[TR020001/APP/5.02]**.

Reptiles

3.2.9 Reptile surveys were undertaken in accordance with guidelines produced by Froglife (Ref. 14) and the Herpetofauna Groups of Britain and Ireland (HGBI) (Ref. 15).

3.2.10 A reptile habitat suitability assessment, comprising a systematic walkover of the Main Application Site, was undertaken on 25 April and 09 May 2018. Following this, targeted reptile surveys were undertaken in areas identified as offering suitable habitat to support reptiles. The Off-site Car Park areas were scoped out for further survey as habitats present do not offer suitability for reptiles. Off-site Planting areas would be enhanced and not adversely affected for reptiles and so did not require surveys.

3.2.11 Artificial refugia were distributed in areas of suitable habitat and, after being left to 'bed in' for one week, were checked for the presence of reptiles on 18 occasions between 15 May and 04 October 2018. Due to a prolonged period of sub-optimal survey conditions associated with a heatwave during Summer 2018, further surveys were undertaken in 2019 in more suitable conditions. Artificial refugia were re-deployed, within the same locations as the 2018 surveys and seven checks were conducted between 26 April and 15 July 2019. No further surveys were deemed to be required as the population within the habitats present is unlikely to change significantly and pre construction surveys will confirm the situation at the required time.

3.2.12 To evaluate the results, guidance on population size estimates from Froglife (Ref. 16) were utilised to assign an indication of reptile population size class.

3.2.13 Detailed survey methodologies and limitations can be found within the Ecology Baseline Report **Appendix 8.1** of the ES **[TR020001/APP/5.02]**.

3.3 Summary of key findings

Amphibians

3.3.1 The desk-based pond scoping exercise identified 19 ponds within 500m of the Main Application Site and Junction 10 of the M1 as shown on the Pond Location Plan in **Appendix X1** of the Ecology Baseline Report **Appendix 8.1** of the ES **[TR020001/APP/5.02]** and **Figure 1, Appendix A** of this document.

3.3.2 The results of the most recent 2020 HSI assessments identified ten of the ponds as having 'poor' or 'below average' suitability for great crested newt. Three of the ponds were identified as having 'average' suitability for great crested newt. Six of the ponds were dry and one was not accessible.

3.3.3 No evidence of great crested newt presence was recorded during the great crested newt presence/likely absence surveys (using conventional survey methods and eDNA analysis). It is therefore considered that this species is likely absent within the Main Application Site and 500m survey area, and relevant Off-site Highway Intervention areas, in this case only Junction 10 of the M1 . Additionally, no records were returned during the desk study to indicate that great crested newt are locally present.

3.3.4 Ponds 1, 5, 6, 8,12,13,14,16 and 19 (see **Appendix X1** of the Ecology Baseline Report **Appendix 8.1** of the ES **[TR020001/APP/5.02]** and **Figure 1** of **Appendix A** of this document) were found to support mainly low numbers of smooth newts (less than 10 on peak count).

3.3.5 Other amphibian species identified in low numbers (less than 10 on peak count) during the great crested newt surveys were common frog and common toad. Low numbers of common toad were also found during the reptile surveys undertaken in 2019, using terrestrial habitats, most notably the areas of long grassland to the periphery of Wigmore Valley Park and allotments.

3.3.6 BRMC provided 24 records of three amphibian species within the 2km search distance from the Main Application Site including 23 records of common frog, and one record of smooth newt, none of which were located within the Main Application Site. HERC provided one record of common toad, also located outside of the Main Application Site.

3.3.7 Full and detailed survey results can be found within the Ecology Baseline Report **Appendix 8.1** of the ES **[TR020001/APP/5.02]**.

Reptiles

3.3.8 The Main Application Site includes grassland, scrub, hedgerows and waterbodies suitable for reptile foraging, dispersal and shelter. Reptile surveys undertaken in 2018 and 2019 identified two low slow-worm populations (less than 5 peak count and low density/ha) within grassland margins adjacent to Wigmore Valley Park allotments, and within a small area of unmanaged calcareous grassland to the east of Wigmore Valley Park; both of which are within the Main Application Site. An additional nine surveyed areas yielded negative results i.e. no reptiles present.

3.3.9 The data search results from BRMC and HERC returned one record of slow-worm from the 2km area surrounding the Main Application Site within the past 10 years. Some additional historic records (between 1973 and 2007) of common lizard, grass snake and slow-worm were also returned.

3.3.10 Given the habitats present within the Main Application Site it is also considered possible that grass snake are present in low numbers. Full and detailed survey results can be found within the Ecology Baseline Report **Appendix 8.1** of the ES **[TR020001/APP/5.02]**.

3.4 Predicted impacts

3.4.1 This section briefly summarises the works and timing at each assessment phase of relevance to amphibians and reptiles and the predicted impacts of the Proposed Development. Site clearance and demolition requirements for each assessment phase are described in the Construction Method Statement and Programme Report provided as **Appendix 4.1** to this ES **[TR020001/APP/5.02]**, along with the site clearance drawings.

Assessment Phase 1

3.4.2 Initial works are anticipated to begin in 2025, lasting until 2027. Key works assumed to be delivered in this assessment phase are:

a. the construction of additional airport stands serving Terminal 1 within the airport complex;
b. localised expansions of Terminal 1;
c. modifications to existing car parks, and additional temporary car parks;
d. elements of the Airport Access Road (AAR) and Off-site Highway Interventions; and
e. the provision of open space, through enhancement and replacement of lost open space for Wigmore Valley Park, Habitat Creation Areas, and Off-site Planting (hedgerow restoration and screening).

3.4.3 As a policy requirement accounting for the loss of public open space in Wigmore Valley Park, the provision of open space must be delivered prior to the loss of the existing public open space assessment Phase 1. The provision of open space would provide replacement and enhancement to areas, including converting a large area of previously arable land into a landscape of low intensity grazed neutral grassland, neutral meadow grassland, with woodland blocks connected by restored hedgerows.

3.4.4 Given the diversity of habitats to be created from low biodiversity value arable land, it is considered to offer long-term benefits to reptiles and amphibians, enhancing the biodiversity value of environments in the immediate vicinity of the Proposed Development.

3.4.5 The reallocation of the new temporary surface car parks (P6 and P7) will result in notable permanent loss of parkland and scrub from the western area of Wigmore Valley Park, and sections of the linear woodland north of the runway. In addition to permanent loss of these habitats, disturbance to adjacent habitats is also liable to increase during construction and subsequent operation.

3.4.6 The areas in which slow worm populations have been identified would not be lost as part of the construction as these are retained in the area of provision of open space, with the creation of one path through one of these areas. However, vegetation clearance is being undertaken in close proximity to the low-density slow worm population. In addition to this, these works will result in the loss of suitable habitat for reptile species at Wigmore Valley Park, notably to this scheme, slow worm and grass snake.

3.4.7 Vegetation clearance to the north of the runway will result in the loss of Pond 12 (see **Appendix X1** of the Ecology Baseline Report **Appendix 8.1** of the ES **[TR020001/APP/5.02]** and **Figure 1** of **Appendix A** of this document). Pond 12 is 70m from the boundary of Wigmore Valley Park, neighbouring the current long stay carpark at the airport. It sporadically holds water following high rainfall events. Common toad tadpoles and smooth newts have been recorded in pond 12.

Assessment Phase 2a

3.4.8 Assessment Phase 2a is anticipated to be constructed from 2033 through to 2036. There would be considerable loss of habitat during construction of assessment Phase 2a, resulting from major earthworks, the construction of Terminal 2, additional carparks, as well as supporting infrastructure.

3.4.9 The majority of land impacted is centred to the north of the runway, consisting primarily of the area occupied by establishing grassland (previously arable land), as well as sections of the linear woodland bordering the runway. Land to the south east of the airport that would be impacted to create the required supporting infrastructure during construction of assessment Phase 2a, is primarily still, or was, within arable production, as well as associated areas of agricultural set aside.

3.4.10 The loss of vegetation associated with assessment Phase 2a includes the loss of habitat that is suitable for reptiles and the terrestrial life stage of amphibians. This will further decrease the area of suitable habitat for reptile species at Wigmore Valley Park and surrounding arable land.

3.4.11 As a result of construction activities in assessment Phase 2b pond 8 will be lost (**Figure 1** of **Appendix A** of this document). Pond 8 is an airfield drainage pond and supports smooth newts, common toads and common frogs.

3.4.12 Assessment Phase 2a vegetation clearance is also accompanied by the removal of soakaways within the airport boundary. As a result, ponds 13, 14 and 15 are scheduled for removal. Ponds 13 and 14 both support smooth newts and common toads. No amphibians were recorded at pond 15 (**Figure 1** of **Appendix A** of this document).

Assessment Phase 2b

3.4.13 Assessment Phase 2b would involve further vegetation clearance, earthworks and subsequent development to further increase capacity to 32 mppa, anticipated to be constructed from 2037 to 2041. Relevant works include provision of additional aircraft stands, extension of Terminal 2 and further car parking areas. However, the vast majority of these works occur within the footprint of assessment Phase 2a, when the majority of habitat losses occur.

3.4.14 Additional clearance to the north of the runway will result in the potential loss of ponds 5 and 6 (**Figure 1** of **Appendix A** of this document). Ponds 5 and 6 are fire training pool which support smooth newts, common toads and pond 6 also supports the common frog.

3.4.15 Areas at the east of the Main Application Site utilised for the construction of supporting infrastructure throughout assessment Phase 2a are to be converted largely to calcareous grassland, and act as an extension to the already established Habitat Creation Area, introduced below.

Habitat enhancement and creation

3.4.16 As part of assessment Phase 1, a proposed Habitat Creation Area would be created to the east of the area of provision of open space. Plans showing the

broad areas covered by each of the habitat creation and enhancement proposals described are found within **Figure 2, Appendix A** of this document, and for each assessment phase in **Appendix 8.2** Outline Landscape and Biodiversity Management Plan (LBMP) of the ES **[TR020001/APP/5.02]**, and **Appendix 8.5** BNG Report of the ES **[TR020001/APP/5.02]**.

3.4.17 Establishment of this Area will involve the conversion of largely arable land into a mosaic of neutral grassland maintained by low intensity grazing, neutral meadows, planted woodland blocks and a cluster of small wildlife ponds. The Habitat Creation Area would integrate existing habitats of higher biodiversity value within this landscape, such as woodland, with newly created habitats, increasing connectivity using hedgerow restoration to establish a coherent ecological network.

3.4.18 Additionally, in assessment Phase 1, Off-site Planting (hedgerow restoration and screening) would be implemented in the wider arable environment to the north and east of the Main Application Site. This offers further long-term benefits to reptile and amphibian populations within environments in the immediate vicinity of the Proposed Development, directly integrating with retained and created habitats within the Habitat Creation Areas.

3.4.19 During Stage 2a, further arable land directly to the south of this Area would also be converted to low intensity grazed neutral grassland, whilst south of Winch Hill at the south eastern extent of the Main Application Site would be converted to calcareous grassland. These created grassland areas will integrate with and increase the area covered by the wider Habitat Creation Area.

3.4.20 Finally, following the completion of construction works associated with supporting infrastructure in assessment Phase 2b, another section of arable land would be converted into calcareous grassland, again integrating with the wider Habitat Creation Area to the east, and area of provision of open space to the north.

3.4.21 The proposed Habitat Creation Area will help to ensure the Proposed Development achieves a 10% BNG target. This, in conjunction with the area of provision of open space, Off-site Planting (hedgerow restoration and screening), the diversity of habitats to be created from low biodiversity value arable land and integration of more valuable habitats, will ensure these areas offer long-term benefit to reptiles and amphibians.

3.4.22 Further details are provided in the following sections of this Mitigation Strategy, outlining the specific role of these areas in mitigating and subsequently enhancing the area surrounding the Proposed Development for reptiles and amphibians.

4 MITIGATION STRATEGY

4.1 Purpose and objectives

4.1.1 The purpose of this Mitigation Strategy is to outline the avoidance, mitigation and enhancement measures to safeguard amphibians and reptiles that may be present within the Order Limits and could be adversely impacted by the Proposed Development. In addition specific management prescriptions are set out for habitats created and enhanced as part of the Proposed Development that will be of long-term benefit to amphibians and reptiles.

4.2 Further survey prior to commencement of works

Updated reptile and amphibian survey visits

4.2.1 The Mitigation Strategy outlined below is based on all survey work undertaken up to the time of writing this Mitigation Strategy (last survey May 2020 for amphibians and July 2019 for reptiles). It is noted that the time period between writing of this Mitigation Strategy and commencement of construction is considerable, in particular for the later assessment phases. Therefore, as reptile and amphibian population distributions can change over time additional surveys and a review of the strategy will be required.

4.2.2 Given these factors, updated surveys will be conducted for both reptiles and amphibians, both prior to and throughout the assessment Phases. These updated surveys would largely follow the same methodologies as those used to inform the baseline reports, though alterations to the ponds and habitat areas surveyed may be required in order to account for notable land use changes throughout construction. Amphibian surveys would be conducted on the ponds to be lost prior to each assessment Phase, and of those ponds remaining, and the newly created wildlife ponds prior to assessment Phases 2a and 2b.

4.2.3 A reasonable timeline considered for commencement of these resurveys are:

a. amphibians:
    i. Assessment Phase 1: Spring 2024 for amphibians of all ponds previously surveyed;
    ii. Assessment Phase 2a: Spring 2032 for amphibians of the remaining ponds and the new wildlife ponds; and
    iii. Assessment Phase 2b: Spring 2036 for amphibians of the remaining ponds and the new wildlife ponds.

b. reptiles:
    i. Assessment Phase 1: Spring to autumn 2024 for reptiles of key suitable habitats to be lost;
    ii. Assessment Phase 2a: Spring to autumn 2032 for reptiles of key suitable habitats to be lost; and
    iii. Assessment Phase 2b: Spring to autumn 2036 for reptiles of key suitable habitats to be lost.

4.3 Habitat creation

4.3.1 For specific details of proposed areas for habitat restoration, enhancement and creation, reference should be made to the Outline LBMP **Appendix 8.2** of this ES **[TR020001/APP/5.02],** BNG Report provided as **Appendix 8.5** of the ES **[TR020001/APP/5.02],** and the Landscape Mitigation Plans **Figures 14.9** and **14.10** of the ES **[TR020001/APP/5.03]**.

Creation of wildlife ponds

4.3.2 As outlined above, all phases of the works will result in the loss of ponds 5, 6, 8,12,13,14 and 15 (shown on **Figure 1, Appendix A** of this document), which were found to support small populations of smooth newt, common toad and common frog. A cluster of new, small wildlife ponds will be created, as shown in **Figure 1, Appendix A** and the Landscape Mitigation Plans **Figures 14.9** and **14.10** of the ES **[TR020001/APP/5.03]**, which will provide suitable replacement habitat for amphibians. Through careful design and suitable ongoing management (as detailed within the **Appendix 8.2** Outline LBMP of the ES **[TR020001/APP/5.02]**), these wildlife ponds will provide an improved environment to the ponds lost for supporting amphibians, which largely comprise drainage and fire training ponds associated with the airport infrastructure.

4.3.3 The wildlife ponds will be created following guidance within **section 8.3** of the Great Crested Newt Mitigation Guidelines (Ref. 12) and will be created at the start of construction of assessment Phase 1. This is to allow time for the ponds to establish prior to being used for translocation of amphibian species from ponds lost.

4.3.4 The ponds will be fully designed at the detailed design stage and will take into account the topography and soil type of each exact location. A specialist contractor would be appointed for the construction of the ponds to help ensure their success. The ponds will be designed to be small and not attractive to large waterfowl likely to present bird strike hazard, as per the Bird Strike Risk Assessment in **Appendix 8.4** of the ES **[TR020001/APP/5.02]**.

4.3.5 The ponds will measure approximately 250m^2 in surface area (total), with at least one point being at least 3m in depth if practicable. By establishing a depth of 3m it reduces the risk of the pond drying out. The ponds will be created with a range of depths. As a guide, up to 50% of the pond should be less than 20cm deep, before sloping in an undulating fashion to reach the full depth of 3m.

4.3.6 The excavated material from the ponds will be used where possible, to create small bunds near to the ponds, with exposed earth and grassland and herb rich cover, that would be beneficial for use by invertebrates, and reptiles where they include south facing banks.

4.3.7 Artificial lining may be required for the construction of the pond, depending on the clay content of the soil at that location. This would be determined at detailed design stage in conjunction with the specialist contractor. The ponds will be left to fill up with rainwater or filled from a rainwater source if water levels fall too low, or remain too low, when amphibian translocation is required to this feature.

4.3.8 Species currently present within the marshy grassland habitats within the Order Limits include water mint (*Mentha aquatica*), spiked sedge (*Carex spicata*) and galingale (*Cyperus longus*). Marginal vegetation was very poorly represented within the waterbodies and was limited to a mint species (*Mentha sp.)*, common figwort (*Scrophularia nodosa*) and woody nightshade (*Solanum dulcamara*), therefore natural colonisation of the wildlife ponds may be limited.

4.3.9 Planting will be used to ensure that cover is established relatively quickly within and around the new wildlife ponds. The plants chosen to populate the ponds will be native marginal, floating and submerged vegetation (of local provenance), with some areas of open water. Floating vegetation could include white waterlily (*Nymphaea alba*) and water soldier (*Stratiotes aloides*). Submerged vegetation should include, but not be limited to, common hornwort (*Ceratophyllum demersum*), and may also include species such as curled pondweed (*Potamogeton crispus*) or willow moss (*Fontinalis antipyretica*). Marginal vegetation should include water mint, common figwort and woody nightshade as these species are currently present within waterbodies within the Proposed Development. Water forget-me not (*Myosotis scorpioides*) and sweet or flote grasses (*Glyceria spp.*) will also be planted as these species a preferential for the egg laying of newts. Care will be taken to ensure that alien plant species are not inadvertently introduced into the pond.

Terrestrial habitat provision

4.3.10 Native trees and scrub will be planted, as part of the wider management strategy (as detailed within the **Appendix 8.2** Outline LBMP of the ES **[TR020001/APP/5.02]**), to the west and north west of the wildlife ponds to create areas of broadleaved woodland. The delivery of scrub and tree planting at these locations will deliver enhancements in terms of terrestrial habitat for amphibians in the immediate vicinity of the pond, and reptiles across the broader landscape. Broadleaved woodland and scrub provides adequate refuge from hot and dry conditions. Additional shelter, in the form of log piles will be provided from deadwood within the woodland that has been moved from other parts of the Site. Woodland edges can also provide suitable habitat for basking reptiles and tree stumps and roots can provide suitable hibernation sites.

4.3.11 As stated above, the excavated material from the ponds will be used to create small bunds with exposed earth and grassland and herb rich cover, which would be beneficial for use by invertebrates, amphibians, and reptiles where they include south facing banks.

4.3.12 The immediate area surrounding the pond (approximate 50m radius) will be seeded and managed as species-diverse meadow grassland. The remaining areas to be created will predominantly comprise neutral grassland, which will be managed using low intensity grazing. These grassland areas will provide suitable habitat for foraging and dispersing amphibians and reptiles. Small scale variations in topography will be created when creating the new grassland areas, to include the presence of south facing slopes, suitable for basking reptiles. Hedgerow enhancement is to take place in the wider environment to the north and east of the Main Application Site. The restoration of the hedgerow network

will provide foraging, dispersal and shelter opportunities for amphibians and reptiles.

4.3.13 This mosaic of habitats works towards creating habitat heterogeneity which is important for the success of this Mitigation Strategy.

4.4 Translocation of amphibians

4.4.1 Once the new wildlife ponds have filled with water and vegetation has begun to establish, it will be necessary to translocate smooth newts and any other encountered amphibians from pond 12 prior to the loss of this pond in assessment Phase 1. This exercise will need to be repeated for each pond being lost. By this time, 2033 for assessment Phase 2a, the created wildlife ponds will be well established.

4.4.2 Prior to the loss of each pond, the ponds will require to be trapped out to clear any amphibians present in order to prevent harm during subsequent destruction of the ponds. This will be undertaken in Spring (April to June) of the appropriate year, assumed to be 2025 for assessment Phase 1.

4.4.3 The first method to be used to translocate newts is live capture bottle trapping, which will be undertaken by a suitably experienced ecologist. This method will involve setting bottle traps around the pond margin and leaving the traps set overnight. The traps will not be left for more than 17 hours and will be checked between 06:00-11:00. This method will only to be undertaken when night-time air temperature are >5°C. Any captured newts (or other amphibians) will be placed in a suitable container with air holes and damp vegetation and will be released in suitable habitat near the wildlife ponds.

4.4.4 Following this, each pond will be drained down under an ecological watching brief. Screens with a fine mesh (<1.5mm) should be fitted to pumps used for draining down, to prevent any remaining amphibians (or other wildlife) from being drawn through the pump. Any remaining newts (and other amphibians) are to be placed in a suitable container with air holes and damp vegetation and will be released in suitable habitat near to the wildlife ponds. Any remaining amphibians will be caught by netting as draining takes place, and by hand searching through plants, debris and silt when the pond is dewatered. Care will also be taken to search for any other species such as grass snake that could be using the pond.

Any potential hibernation sites (such as log, brash or rubble piles) within the Order Limits will also be carefully dismantled under an ecological watching brief during the active period for reptiles and amphibians (late March to early October inclusive) and will be completed in air temperatures exceeding 10°C to ensure that reptiles are likely to be active.

4.5 Mitigation during habitat clearance

4.5.1 In order to avoid the potential harm to reptiles and terrestrial amphibians during site clearance works, a precautionary displacement approach will be employed for the clearance of all suitable habitats within the Proposed Development. This will include all areas of grassland, and tall ruderal vegetation.

4.5.2 The displacement approach will involve the systematic clearance of suitable habitats in accordance with the following method:

a. Immediately prior to vegetation clearance, hand searches of suitable habitat will be undertaken by an appropriately experienced ecologist.

b. Subsequently, suitable habitats will be subject to staged clearance of vegetation to gradually lower heights. Depending on the vegetation to be removed, this will typically entail a first cut of vegetation to a height of 150mm and final cut to ground level. Machinery will be operated by a trained operative, and under the watching brief of a suitably qualified ecologist.

c. Between cuts, where needed, arisings will be removed from the area cleared to encourage the displacement of reptiles and terrestrial amphibians. Should reptiles or terrestrial amphibians be encountered they will be captured by the ecologist and moved to suitable retained habitats.

d. Once all vegetation has been removed to ground level, an excavator (or equivalent) will be used to remove approximately 100mm of topsoil in these areas of suitable habitat ('destructive search'), with works again overseen by a suitably qualified and experienced ecologist.

e. Any potential hibernation sites, refuges or basking areas (such as log, brash or rubble piles) within the construction working areas will also be carefully dismantled under an ecological watching brief.

f. Works affecting suitable reptile habitats will be undertaken during the active period for reptiles and amphibians (late March to early October inclusive) and will be completed in air temperatures exceeding 10°C to ensure that reptiles are likely to be active.

4.5.3 Habitat clearance will be undertaken in the direction of retained habitat in order to encourage both reptiles and terrestrial amphibians to move towards the retained habitat. This should be commenced from the habitat closest to the airport and towards the area of provision of open space and Habitat Creation Areas. This will ensure that any reptiles or terrestrial amphibians present would be displaced to suitable adjoining habitats and would not become 'trapped' in a pocket of habitat within the proposed footprint.

4.6 Translocation of reptiles

4.6.1 It is not anticipated that translocation of reptiles will be required other than moving those found during hand searches of suitable refugia and hibernacula during the site clearance. Only low populations of slow worm were found within the Order Limits, and these were located within areas of habitat to be retained within the area of provision of open space. Limited records of grass snake were the only other reptiles noted to be present. The mitigation described above for the clearance of vegetation is considered sufficient to safely encourage reptiles to move away from the working areas and into retained and enhanced habitats. This will be done after the establishment of the area of provision of open space and the assessment Phase 1 areas of the Habitat Creation Area (**Figure 2, Appendix A** of this document). Any reptiles found during the vegetation and

site clearance, such as within earth banks, rubble piles etc, will be carefully placed in a suitable container with air holes and vegetation for cover, and will be released in suitable retained or created habitat.

4.6.2 Consideration will be given to trapping and translocating reptiles should the pre-construction surveys prior to each assessment Phase show a larger than low population of reptiles, in particular in areas of habitat to be lost in the subsequent phases of works.

4.7 Enhancement measures

Hibernation sites

4.7.1 Spoil and material that is produced from digging the wildlife ponds and other onsite works can be used to create hibernacula. As a minimum, hibernacula should be created to 2m length x 1m width x 1m height, as can be seen in Figure 3: Suggested hibernaculum design, in the Great Crested Newt Mitigation Guidelines (Ref. 12). Debris from the site clearance works, such as logs, sleepers and brick rubble can be used to fill the excavated depression in the ground. Loose topsoil will be deposited on top of the debris with the margins exposed to allow access. These are to be positioned in suitable locations within the Habitat Creation Area, both close to the wildlife ponds and within the wider areas of suitable reptile habitat.

4.7.2 Other refuges will be created close to the pond using piles of logs and brash created during tree and vegetation clearance. Maintenance of the log piles will be undertaken using replacement logs resulting from ongoing management of the Habitat Creation Area and area of provision of open space.

Egg laying compost heaps

4.7.3 As grass snakes need access to decomposing material in which to lay their eggs, compost heaps are to be created in suitable undisturbed locations. Egg-laying heaps must be sited in sun or partial sun. The egg-laying heaps are to be constructed by piling vegetation (meadow cuttings) on top of a base, or framework, of brash. Brash within the heap will allow easy access to nesting females and increase aeration which aids the decomposition of the organic material. Cuttings from vegetation clearance, as well as ongoing management will be used to create and maintain the compost heaps. If necessary, containers will be used to increase the structural stability of the compost heap.

5 MANAGEMENT AND MONITORING

5.1 Habitat management and monitoring

5.1.1 All habitats created or enhanced as part of the Proposed Development will be managed by the Applicant or their nominated agent for 50 years.

5.1.2 Plans showing the broad areas covered by each of the habitat creation and enhancement proposals are found within **Figure 2** of **Appendix A** of this document, and within the Outline LBMP **Appendix 8.2** of the ES **[TR020001/APP/5.02]**, and the BNG Report **Appendix 8.5** of the ES **[TR020001/APP/5.02]**.

Wildlife pond management

Establishment

5.1.3 During the first year of establishment the ponds will be monitored by a suitably qualified ecologist, on a bi-monthly basis to check water levels and determine if additional measures need to be implemented (to ensure that the ponds retain water) and monitor the establishment of aquatic planting, recommending remedial action as needed including replanting of any failed plants and/or additional water inputs.

Management/maintenance

5.1.4 Following establishment, water levels will be checked annually to ensure that the ponds retain water; with remedial action taken as needed, as directed by the appointed ecologist. Aquatic planting will also be monitored annually, and replanting will occur as necessary. Emergent, submerged or floating aquatic vegetation (excluding duckweed) should cover at least 50% of the pond area. Visual checks will also be undertaken to determine the water quality is suitable and that the pond is not being choked by filamentous algae or duckweed.

5.1.5 Any necessary aquatic vegetation clearance will be carried out annually, in September, between years two to five, with a review to be undertaken on requirements beyond this. This is to ensure that no vegetation removal is undertaken during the newt breeding season, when newts are active in the pond and vegetation may have eggs laid on it. It also falls within the period of most abundant aquatic vegetation to ensure that the vegetation removal is most effective.

5.1.6 The vegetation removal will be carried out by hand, under the direction of a suitably qualified ecologist. Any removed plant material will be hand sorted, by the ecologist, to remove any newts or other amphibians that have been caught up in the vegetation.

5.1.7 At the same time the pond shall be assessed for the following commonly encountered problems:

a. introduction of fish;
b. accumulation of leaf litter;

c. introduction of invasive non-native species;
d. dumping of rubbish on site;
e. acute pollution or other major damage; and
f. damage of fencing.

5.1.8 Maintenance and remedial action will be undertaken by the Applicant and their lead contractor to remedy any of the above.

Grassland management

5.1.9 The grassland areas will be managed using a suitable cutting or grazing regime, the methods for both options are set out below.

Grassland management - cutting

5.1.10 Areas of meadow and neutral grassland within the Order Limits will be subject to an annual summer/autumn cut; a second cut in late-September can be undertaken if needed. Whilst not appropriate for all areas within areas designated as open space, the mowing regime will vary sward height within different sections where possible, aiming to encourage structural heterogeneity to the grassland for the benefit of species including those of amphibians and reptiles.

5.1.11 Areas of long grassland will be maintained to further aid the provision of a mosaic of habitats, provide shelter from the elements and enable escape of both amphibians and reptiles from predators.

Grassland management - grazing

5.1.12 Grazing is to be utilised as part of the wider habitat management plan in appropriate areas and can be used to mimic natural process or to replicate traditional agricultural regimes, with the aim of sustaining particular plant and animal communities. A conservation grazier (to be appointed by the Applicant and their lead contractor under a farm tenancy agreement at an appropriate future stage) will be consulted to confirm an appropriate grazing regime; this will comprise a summer cut with aftermath (subsequent) grazing. The regime aims to create a mosaic of grassland of varying sward height, to provide a range of habitats for different species.

5.1.13 Grazing has the potential for positive effects on reptile populations including:

a. limiting the development of scrub, thus preventing a site from becoming too shaded;
b. creating areas of short vegetation amongst denser habitat, where reptiles can bask close to cover; and
c. increasing the diversity in vegetation structure.

5.1.14 It should be noted that grazing can also sometimes be detrimental to reptile populations by:

a. creating a very low sward, hostile to reptile occupancy;

b. reducing prey abundance through poor habitat condition;
c. selectively removing key elements of vegetation structure; and
d. creating a uniform vegetation structure unsuitable for reptile activity.

5.1.15 Therefore, monitoring of the vegetation structure will be necessary to assess the impact of grazing.

Scrub and tree management

5.1.16 Scrub and tree management will be necessary to maintain some mid-successional stage habitats. Grass margins of these areas will be cut once every three years at a height between 7.5cm to 15cm, between mid-July and the end of September, to allow mature tussocks to develop and insect populations to build up and will be cut on a rotation so that there are plenty of uncut margins every year.

5.1.17 Ongoing tree and scrub management will provide the additional material required to maintain the log and brash piles, by adding the additional material as the piles decompose.

5.2 Species monitoring

Amphibians

5.2.1 A monitoring strategy is required to assess whether the smooth newt, common toad and common frog populations, including those translocated, have responded favourably to the mitigation, and to inform ongoing management.

5.2.2 Monitoring of the amphibian population will be carried out in year two and year five post-construction of the new wildlife ponds in assessment Phase 1. Consistent methods will be used between pre- and post-development to allow for a comparison in population size, limitations of which and details of the methods proposed can be found in the Ecology Baseline Report **Appendix 8.1** of the ES **[TR020001/APP/5.02]**. All monitoring surveys will be undertaken within the core survey periods for amphibians in line with best practice guidelines (Ref. 12). Four surveys are required to confirm the presence or absence of newts. Bottle trapping will not be used as this risks damage to the wildlife ponds if they are artificially lined. Visual searching, torching, refugia searching and egg searching would therefore be the main survey techniques.

5.2.3 Survey methods will be deployed, as described below:

a. Visual search: during the daytime, the perimeter and surrounding terrestrial habitat of each pond will be walked looking for spawn (clumps for frogs and strings for toads) during March – April, amphibians in the water (including tadpoles and newt efts).
b. Torch survey: the perimeter of the pond will be surveyed for newts (and other amphibians) after dark using a high-powered torch (1 million Candle Power). Animals observed will be identified to species, sex and life stage where possible.

c. Refugia search: suitable natural and artificial refugia within proximity to ponds will be searched by hand for the presence of newts (and another amphibians). Such refugia may take the form of log piles, rubble, wooden planks and other such detritus within the terrestrial habitats. Any amphibians found will be identified to species and gender.

d. Egg search (for newts): the perimeter of the pond will be searched for newt eggs by searching for folded leaves, and gently opening them to check for eggs. Only the minimum number of leaves will be unwrapped to confirm species presence.

Reptiles and terrestrial amphibians

5.2.4 Monitoring of suitable reptile and terrestrial amphibian habitats will enable the following:

a. to determine if a given species is present;

b. to establish which areas of the site are currently of high value for reptiles; and

c. to assess the impacts of habitat management by monitoring reptile habitat use, breeding success, population size and/or habitat condition.

5.2.5 Monitoring of the reptile and terrestrial amphibian population will be carried out in year two and year five post-construction of each assessment Phase. Consistent methods will be used between pre- and post-development to allow for a comparison in population. The survey work will be undertaken in accordance with guidelines produce by Froglife (Ref. 14) and the Herpetofauna Groups of Britain and Ireland (HGBI) (Ref. 15).

5.2.6 A systematic walkover of the retained habitat, area of provision of open space and Habitat Creation Area will be undertaken in order to assess habitats for their suitability to support reptiles. This will inform the areas for further, more targeted surveys. This will include a visual inspection of the log piles and hibernacula created.

5.2.7 To identify reptile populations within the retained habitat, area of provision of open space and Habitat Creation Area (including receptor sites if used), targeted surveys comprising the placement and subsequent survey of artificial refugia will be undertaken by experienced ecologists. A minimum of seven visits will occur within the key active period between May and October during suitable weather conditions.

5.2.8 Artificial refugia comprising squares (minimum size 0.5m x 0.5m) of bitumen roofing felt, corrugated metal sheeting and onduline will be distributed across key habitat areas within the retained habitat, area of provision of open space and Habitat Creation Area (including receptor sites if used). The artificial refugia heat up during the day at a faster rate than the surrounding environment, thus making them attractive to cold-blooded reptiles for basking and shelter.

5.2.9 Refuges will be left to ‘bed in’ for a minimum of one week before surveys commence. The bedding-in period for these artificial refugia allows for species to become accustomed to their presence and begin making use of them.

Remedial measures

5.2.10 Remedial measures required to be undertaken to ensure that the habitats created and enhanced are progressing as designed, are outlined within the Outline LBMP, **Appendix 8.2** of the ES **[TR020001/APP/5.02]**. These include for the wildlife ponds, replanting of any failed aquatic plants and additional water inputs to maintain an appropriate level of water until fully established. Maintenance such as removal of litter, excessive leaf litter and non-native invasive species will also be implemented.

5.3 Reporting

5.3.1 An annual monitoring report will be compiled to summarise the results of all biodiversity monitoring visits across the site, to be submitted to the Applicant in December each year as part of the lead contractor's Environmental Management Systems (EMS) and contract requirements and outlined within the Outline LBMP, **Appendix 8.2** of the ES **[TR020001/APP/5.02]**. This annual monitoring report will record any corrective actions taken and monitor the condition of habitats against that prescribed within the ES **[TR020001/APP/5.01]**. A five year summary report, including a review of proposed subsequent review periods will also be completed by the Applicant and their lead contractor.

6 TIMETABLE FOR IMPLEMENTATION

6.1.1 This section sets out the proposed timetable for implementation of avoidance, mitigation and enhancement works for amphibians and reptiles as outlined above. The key activities that comprise the various elements of this Mitigation Strategy are detailed within **Table 6.1**.

6.1.2 It should be noted that where these relate to assessment phases, the timing of the delivery of key features should be taken as a guide, as the precise phasing and dates for delivery would be confirmed during detailed design and implementation.

Table 6.1: Details for indicative timings of key activities for amphibians and reptiles mitigation described within this Mitigation Strategy.

Works/Activity	Indicative Timing	Description/Requirement
Habitat Creation and Enhancement – including the cluster of small wildlife ponds.	At commencement of assessment Phase 1 in 2025.	Habitat creation and enhancement works associated with the area of provision of open space, proposed Habitat Creation Area and Off-site Planting areas. To be maintained and managed by the Applicant or nominated agent for 50 years.
Creation of calcareous grassland.	Following construction of assessment Phases 2a and 2b.	Creation of calcareous grassland to extend the Habitat Creation Areas following use of the land for construction. To be maintained and managed by the Applicant or nominated agent for 50 years.
Amphibian surveys of ponds to be lost.	Within the core period of mid-April to mid-June for the year prior to each assessment Phase (years 2024, 2032 and 2036). Will confirm the requirement for a licence for great crested newts (considered highly unlikely), and will inform need and scope of translocations of other amphibian species during loss of ponds.	Four surveys or six surveys if confirmed to be present. To mirror previous surveys to allow for comparison. Using torch surveys and refugia searches.

Works/Activity	Indicative Timing	Description/Requirement
Reptile surveys within key suitable habitats to be lost and proposed receptor sites.	Key active period between May and October for each year prior to each assessment Phase (years 2024, 2032 and 2036).	Survey using artificial refugia placed and checked on at least seven occasions of appropriate weather.
Translocation of amphibian and other species (grass snake if found) from within ponds prior to loss of ponds.	Undertaking during spring (April to June) 2025 (first year of construction of assessment Phase 1) will capture higher numbers than at other times of year as they would be present in the pond.	Trapping out and hand searching of ponds prior to and during draw down of the water.
Translocation of reptiles as found during staged vegetation clearance and hand searching.	Within the active season (March to October) 2025 (first year of construction of assessment Phase 1) for reptiles to encourage them to move outside of the area during vegetation clearance. Hibernation period (November to February – temperature dependent) to be avoided as they would not be active enough to move away.	Watching brief and handsearching before, during and after vegetation removal done in staged clearance to encourage reptiles away from the area of works. Those which do not move themselves, or found during searching refugia such as log piles will be moved to the Habitat Creation Area.
Amphibian monitoring of remaining and new ponds.	Within the core survey periods for amphibians for year two and five post construction of assessment Phase 1 (years 2029 and 2032).	Four surveys using methods to mirror previous surveys, allowing for comparison. Using visual searching, torch surveys, egg searches and refugia searches.
Pond assessments.	Within the appropriate season of April to September annually for five years post construction of the ponds within assessment Phase 1 (years 2026 to 2030).	Assessment of condition and flora of remaining ponds and new ponds.
Monitoring of suitable reptile and terrestrial amphibian habitats.	Within the core period of mid-April to mid-May for year two and five post construction of each assessment Phase (years	Systematic walkover of the retained habitat, area of provision of open space and Habitat Creation Area, to assess habitats for their

Works/Activity	Indicative Timing	Description/Requirement
	2029 and 2032, 2038 and 2041, and 2045 and 2048).	suitability to support reptiles and inform targeted areas for further surveys.
Reptile surveys in appropriate habitats including receptor sites if used for translocation.	Key active period between May and October for year two and five post construction of each assessment Phase (years 2029 and 2032, 2038 and 2041, and 2045 and 2048).	Survey using artificial refugia placed and checked on at least seven occasions of appropriate weather.

7 CONCLUSION

7.1.1 With the adoption of the measures set out in this Mitigation Strategy, it is considered that the Proposed Development would not compromise the local conservation status of amphibian and reptile species, and that an overall positive impact on the amphibian and reptile populations will be achieved

7.1.2 All proposals within this Strategy have been designed to ensure that the Proposed Development mitigates for potential effects on amphibian and reptile, taking due regard of guidance and best practice (Ref.12, Ref.15).

REFERENCES

Ref 1. HMSO (1981) Wildlife and Countryside Act 1981. Available at: http://www.legislation.gov.uk/ukpga/1981/69/introduction
Ref 2. The Conservation of Habitats and Species Regulations 2017 (as amended). Available at: https://www.legislation.gov.uk/uksi/2017/1012/contents%20pdf
Ref. 3 Natural Environment and Rural Communities (NERC) Act (2006). Natural Environment and Rural Communities Act 2006, Chapter 16. Her Majesty's Stationary Office, London
Ref 4. HMSO (1994). UK Biodiversity Action Plan
Ref 5. JNCC and Defra (on behalf of the Four Countries' Biodiversity Group (4CBG)) (2012). UK Post-2010 Biodiversity Framework. July 2012. Available from: http://jncc.defra.gov.uk/page-6189
Ref 6. JNCC and Defra on behalf of 4CBG (2018). UK Post-2010 Biodiversity Framework: Revised Implementation Plan (2018–2020).
Ref 7. Bedfordshire and Luton Wildlife Working Group, Biodiversity Action Plan. Available at: https://www.bedscape.org.uk/BRMC/newsite/index.php?c=bedslife_bap
Ref 8. Biodiversity Partnership (2006) A 50-year vision for the wildlife and natural habitats of Hertfordshire, A Local Biodiversity Action Plan
Ref 9. Bedfordshire and Luton Species Action Plan: Adder, July 2010. Available at: https://www.bedscape.org.uk/BRMC/newsite/docs/bedslife/bap%20plans/SAP%202010%20adder.pdf
Ref 10. MAGIC website. For locations of Statutory Nature Conservation Sites and Habitats of Principal Importance. Available at www.magic.defra.gov.uk.
Ref 11. Amphibian and Reptile Group UK (2010). Advice Note 5: Great Crested Newt Habitat Suitability Index
Ref 12. English Nature (2001). Great Crested Newt Mitigation Guidelines. English Nature, Peterborough.
Ref 13. Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F (2014). Natural England advice: Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (*Triturus cristatus*) environmental DNA. Freshwater Habitats Trust, Oxford
Ref 14. Froglife. (2016). Surveying for reptiles
Ref 15. Gent,T. & Gibson, S. (eds). (2003) Herpetofauna Workers' Manual (revised reprint). Peterborough: JNCC
Ref 16. Froglife (1999). Reptile Survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife Advice Sheet 10. Froglife, Halesworth.

GLOSSARY AND ABBREVIATIONS

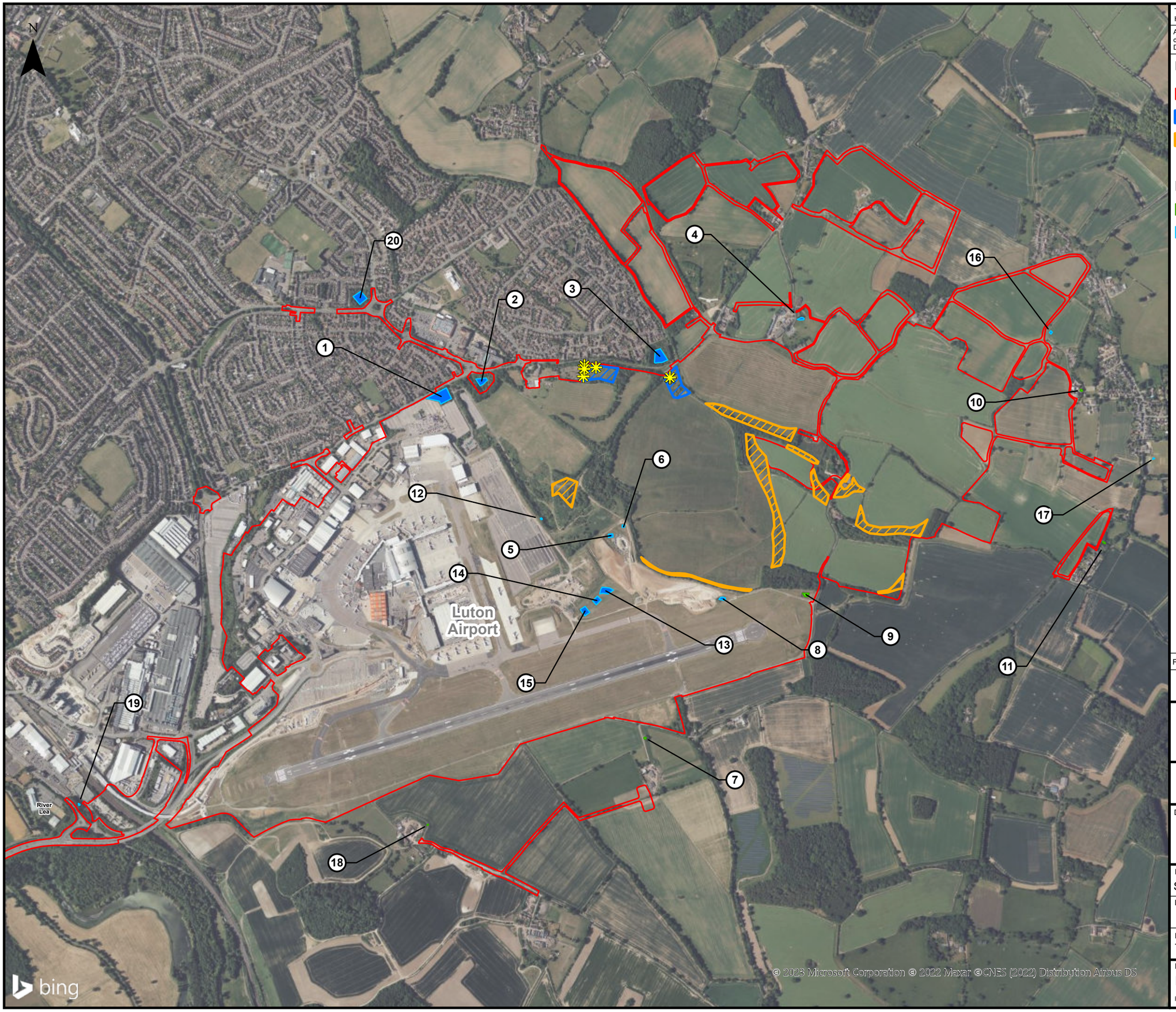
Term	Definition
AAR	Airport Access Road
BAP	BAP
BNG	Biodiversity Net Gain
BRMC	Bedfordshire & Luton Biodiversity Recording & Monitoring Centre
cm	Centimetre
CoCP	Code of Construction Practice
CWS	County Wildlife Site
DCO	Development Consent Order
DWS	District Wildlife Site
eDNA	Environmental DNA
EIA	Environmental Impact Assessment
EMS	Environmental Management Systems
ES	Environmental Statement
GCN	Great crested newt
ha	Hectares
Habitat Creation Area	The Habitat Creation Area comprises an area to the east of the Main Application Site of existing arable land owned by the Applicant, which will be converted to create an area of improved habitat value including broadleaved woodland, neutral meadow grassland, and hedgerows with trees, to mitigate for loss of habitats as part of the Proposed Development and secured as part of the Proposed Development.
HERC	Herts Environmental Records Centre
HGBI	Herpetofauna Groups of Britain and Ireland
HSI	Habitat Suitability Index
km	Kilometre
LBAP	Local Biodiversity Action Plan
Outline LBMP	Outline Landscape and Biodiversity Management Plan
LWS	Local Wildlife Site
m	Metre
mm	Millimetre
mppa	Million passengers per annum

Term	Definition
NERC	Natural Environment and Rural Communities
OS	Ordnance Survey
PEIR	Preliminary Environmental Information Report
UK BAP	UK Biodiversity Action Plan
°C	Degree Celsius

APPENDIX A

Figure 1 – Amphibian and Reptile survey results plan

Figure 2 – Amphibian and Reptile mitigation plan



All structure positions are indicative. The proposed works will be subject to detailed design development. The changes will be within limits of deviation specified in the Development Consent Order.

Legend

- Order Limits
- Low Density Slow-worm Population
- No Reptiles Identified
- Reptiles (slow worms)

Ponds

- Dry
- Wet

Revision History	Drawn	Checked / Approved	Date	Rev.
First Issue	AB	NL / CS	22/02/23	P01

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Drawing Title

Figure 1 Survey results plan

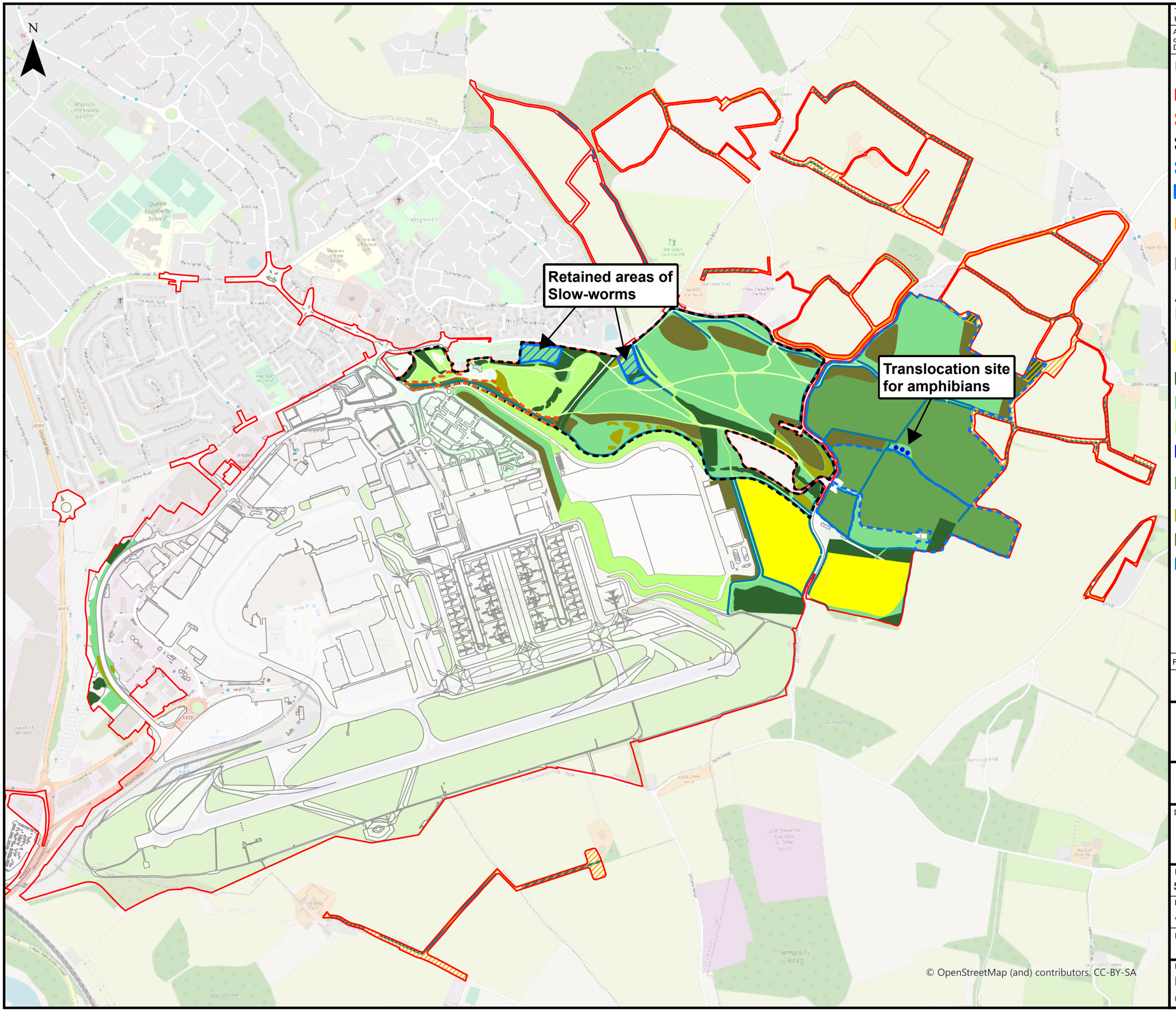
Purpose of issue	Suitability
SUITABLE FOR INFORMATION	S2

Drawn	Checked	Approved	Date	Scale	Size
AB	NL	CS	22/02/23	1:15,000	A3

DCO Application Ref.	APFP Regulation	DCO Document Ref.
TR020001	APFP 5(2)(a)	TR020001/APP/5.02

Drawing Number	Revision
LLADCO-3C-ARP-00-00-DR-YE-0264	P01

Project - Phase - Originator - Asset/Zone - Sub Asset - Type- Discp. - Number



All structure positions are indicative. The proposed works will be subject to detailed design development. The changes will be within limits of deviation specified in the Development Consent Order.

Legend

- Order Limits
- Landscape Earth Bund
- Replacement Open Space
- Habitat Creation Area
- Low Density Slow-worm Population
- Off-site Hedgerow Restoration and Screening
- Airport Infrastructure Layout - Assessment Phase 2b

Assessment Phase 2b Landscape Mitigation

- Calcareous grassland – low intensity grazing
- Existing vegetation
- Neutral meadow grassland
- Amenity grassland
- Wildlife ponds
- Neutral grassland – low intensity grazing
- Proposed scrub
- Proposed woodland
- Hedgerow restoration

Note: Bunds and hibernacula will be created from excavated earth including near to wildlife ponds; Log piles will be created from trees removed and added to locations such as retained and created woodland edges within the Habitat Creation Area

Revision History	Drawn	Checked / Approved	Date	Rev.
First Issue	AB	NL / CS	22/02/23	P01

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Drawing Title

Figure 2 Mitigation Plan

Purpose of issue	Suitability
SUITABLE FOR INFORMATION	S2

Drawn	Checked	Approved	Date	Scale	Size
AB	NL	CS	22/02/23	1:12,500	A3

DCO Application Ref.	APFP Regulation	DCO Document Ref.
TR020001	APFP 5(2)(a)	TR020001/APP/5.02

Drawing Number	Revision
LLADCO-3C-ARP-00-00-DR-YE-0265	P01

Project - Phase - Originator - Asset/Zone - Sub Asset - Type- Discp. - Number