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London Luton Airport Expansion

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Orchid and Invertebrate**

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**5.02 ENVIRONMENTAL STATEMENT APPENDIX 8.10 ECOLOGICAL
MITIGATION STRATEGY – ORCHID AND INVERTEBRATE**

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Contents

	Page
1 Introduction	1
1.1 Background	1
2 Purpose and conservation objectives	5
2.1 Purpose of this strategy	5
2.2 Conservation objectives	5
3 Summary of current baseline	7
3.2 Methodology	7
3.3 Summary of key findings and predicted impacts	9
3.4 Predicted impacts	11
4 Mitigation strategy	15
4.1 Purpose and objectives	15
4.2 Further survey prior to commencement of works	15
4.3 Preparatory works	16
4.4 Prior to construction	18
5 Management and monitoring	20
5.2 Management	20
5.3 Monitoring	22
5.4 Reporting	23
6 Timetable for implementation	25
7 Conclusions	28
References	29
Glossary and Abbreviations	30
Appendices	32

Tables

Table 5.1 Translocated Turf Management Schedule

Table 5.2 Monitoring of invertebrate populations

Table 6.1 Details for indicative timings of key activities for orchid and invertebrate mitigation described within this Mitigation Strategy

1 INTRODUCTION

1.1 Background

- 1.1.1 This Orchid and Invertebrate 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 proposed 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 32mppa. 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, along with Winch Hill Wood County Wildlife Site (CWS) and Local Wildlife Site (LWS) ancient woodland 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 such as amenity grassland and public facilities to the north, and Wigmore Park CWS to the south, 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 Parks 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 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 orchid and noted terrestrial invertebrate populations present, along with their associated larval food plants, during construction and operation of the Proposed Development. These measures are designed to ensure that the favourable conservation status of orchids and noted terrestrial invertebrates are maintained.
- 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 of the ES [TR020001/APP/5.01];
 - b. **Appendix 8.1** Ecology Baseline Report of the ES [TR020001/APP/5.02];
 - c. **Appendix 8.2** Outline Landscape and Biodiversity Management Plan (LBMP) of the ES [TR020001/APP/5.02];
 - d. **Appendix 8.4** Bird Strike Risk Assessment of the ES [TR020001/APP/5.02];
 - e. **Appendix 8.5** Biodiversity Net Gain (BNG) Report of the ES [TR020001/APP/5.02];
 - f. **Chapter 4** The Proposed Development of the ES [TR020001/APP/5.01] which describes the 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 of the ES [TR020001/APP/5.03];
 - h. site clearance and demolition requirements which are described in the Construction Method Statement and Programme Report provided as

Appendix 4.1 of the ES [TR020001/APP/5.02], along with the site clearance drawings; and

- i. **Appendix 4.2** Code of Construction Practice (CoCP) [TR020001/APP/5.02].

Legislation and biodiversity context Orchids

- 1.1.13 Whilst the orchid species recorded at Wigmore Valley Park, including bee orchid (*Ophrys apifera*), common spotted orchid (*Dactylorhiza fuchsii*), common twayblade orchid (*Neottia ovata*), and previously recorded (but unconfirmed during surveys) pyramidal orchid (*Anacamptis pyramidalis*), are not rare they are of considerable local interest and form part of the reason for the designation of Wigmore Park CWS.

Roman snail

- 1.1.14 [REDACTED] Roman snail (*Helix pomatia*) Field surveys undertaken [REDACTED] Surveys for the Proposed Development, undertaken between 2018 and 2020 as part of the Environmental Impact Assessment (EIA), did not identify the presence of live Roman snail within the Main Application Site, [REDACTED]. In addition, [REDACTED]. Roman snail are afforded protection via their inclusion on **Schedule 5** of the **Wildlife and Countryside Act 1981** (as amended) (Ref. 1), hence it is illegal to kill, handle or possess the species without a licence from Natural England.

- 1.1.15 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 a licence would include proportional measures to mitigate potential effects as a result of the Proposed Development.

Other terrestrial invertebrates

- 1.1.16 Other terrestrial invertebrates recorded within the Main Application Site include assemblages of 91 species regarded as 'Key Species' (such as those considered rare, scarce, threatened or near threatened conservation status). The assemblage includes the presence of rare species such as the picture-winged fly (*Dorycera graminum*), set-aside downy-back beetle (*Ophonus laticollis*), a leaf-beetle (*Agelastica alni*), a ground beetle (*Scybalicus oblongiusculus*) and dingy skipper butterfly (*Erynnis tages*), all of which are

listed as species of 'principal importance for the purpose of conserving biodiversity' under Section 41 of the Natural Environment and Rural Communities Act (NERC) 2006 (Ref. 2). Overall, the assemblage of invertebrates utilising the habitats within the Proposed Development are considered to be of county value.

- 1.1.17 The dingy skipper butterfly is found in a wide range of habitats in Britain which support its larval foodplant common bird's-foot-trefoil (*Lotus corniculatus*). Colonies tend to be small and very restricted (Ref. 3). Dingy skipper was listed as Vulnerable in Britain (Ref. 4), indicating that on the best available evidence it was facing a high risk of extinction in the wild, however the Butterfly Conservation Report in 2015 (Ref. 5) reported that trends for the dingy skipper are more positive, with a 69% increase in abundance and 21% increase in occurrence.
- 1.1.18 The dingy skipper butterfly was recorded during the 2018-2019 invertebrate survey when a total of five individuals were observed on the southernmost, south facing slope of Wigmore Valley Park. No dingy skipper butterflies were observed during targeted 2021 surveys in Wigmore Valley Park nor in the adjacent fields. However, it should be noted that results from the annual UK Butterfly Monitoring Scheme (UKBMS) led by Butterfly Conservation, the UK Centre for Ecology & Hydrology (UKCEH), British Trust for Ornithology (BTO) and Joint Nature Conservation Committee (JNCC), show that the overall picture for butterflies in 2021 was poor, ranking 33rd out of the 46 years since the UKBMS began (Ref. 6). As such, a precautionary approach has been taken and assumes that the species is still present or may reoccur.

2 PURPOSE AND CONSERVATION OBJECTIVES

2.1 Purpose of this strategy

2.1.1 This Mitigation Strategy is to outline the avoidance, mitigation and enhancement measures to be delivered as part of the Proposed Development to safeguard orchid and invertebrates 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 orchid species and stated terrestrial invertebrates, taking into account the findings of all survey work undertaken up to the time of writing this Mitigation Strategy (last survey undertaken in May 2021).
- 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 local orchid and invertebrate populations, namely;
 - i. details of the proposed orchid translocation;
 - ii. details of the proposed Roman snail mitigation;
 - iii. details of proposed common bird's-foot-trefoil translocation to support dingy skipper, along with other species for which it provides a food source; and
 - iv. details of the management objectives and prescriptions to be adopted to manage the translocated species.
- c. To provide details regarding the proposed timescale for mitigation works (linked to the delivery of the Proposed Development), and responsibilities for delivery of mitigation measures as far as they are currently known.
- d. To outline monitoring proposals and arrangements for undertaking remedial works, should these be necessary.
- e. To 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 orchids and stated terrestrial invertebrates 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 retains the orchid and stated terrestrial invertebrate populations, by safeguarding, maintaining and/or translocation of:
 - i. bee orchid, common twayblade orchid, and common spotted orchid, and maintaining suitable conditions for pyramidal orchid;
 - ii. common bird's-foot trefoil to support dingy skipper;
 - iii. roman snail; and
 - iv. the quality and value of grassland habitat for the stated invertebrate populations.

3 SUMMARY OF CURRENT BASELINE

3.1.1 This section provides an overview of the surveys that have been undertaken and summary of the current baseline for relevant species within the Main Application Site and wider Study Area (including off-site works where applicable), used to inform the principles of this Mitigation Strategy. Full details of methodologies, surveys undertaken, limitations and results can be found in **Sections 2, 12** and **Appendix Z1** and **BB1** of the Ecology Baseline Report (provided as **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 orchid or invertebrate, 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, 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 was obtained from the Government's Multi-Agency Geographic Information for the Countryside (MAGIC) website (Ref. 7), 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 orchid or invertebrate species of conservation concern and/or subject to the provisions of legislation.

Phase 1 Habitat Survey

3.2.3 An extended Phase 1 Habitat Survey, including an initial protected species assessment, was undertaken during 2018, 2019 and updated in 2020 following standard methods as described in the Guidelines for Preliminary Ecological Appraisal (Ref. 8) and the Phase 1 Habitat Survey Methodology (Ref. 9).

3.2.4 The Phase 1 Habitat Surveys covered areas within the Order Limits, including the Main Application Site and Off-site Planting areas. A site walkover was undertaken at each of the Off-site Highway Intervention locations, however full Phase 1 Habitat Surveys were not undertaken at these locations as the works are restricted to within existing highway boundaries. The only exception is the proposed works at junction 10 of the M1, where vegetation clearance would be required for a temporary construction compound.

- 3.2.5 The surveys of the study area were conducted by two experienced ecologists over six days between 21 May and 29 June 2018 with an additional small area surveyed on 18 May 2019. An updated extended Phase 1 Habitat Survey was conducted on all land within the Main Application Site on four dates between 21 May and 2 June 2020. Additionally, to account for alterations to Proposed Development design incorporating previously un-surveyed areas, extended Phase 1 Habitat Surveys were conducted at the Junction 10 compound site and the Airport Access Road (AAR) area. These surveys were conducted on the 8 August and 16 September 2020 respectively. A walkover survey was also conducted in 2021 and 2022 to verify that the habitats remained as previously recorded, noting and mapping any changes.
- 3.2.6 The survey included:
- Mapping of the habitats present on the Main Application site and recording characteristic plant species, with target notes used to identify particular areas, potentially important or otherwise notable habitats or plant species; and
 - Searches for non-native invasive plant species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) (Ref. 1), and the Invasive Alien Species (Enforcement and Permitting) Order 2019 (Ref. 10).
- 3.2.7 For further details on the survey methodology refer to the Ecology Baseline Report, **Appendix 8.1** of the ES [TR020001/APP/5.02].

Further field surveys

Invertebrate survey

- 3.2.8 A series of invertebrate surveys were conducted over 12 visits between October 2015 and October 2016 (including October 2015, and each of June to October 2016) on appropriate habitats within the Main Application Site. These surveys were updated between April and September 2018 over a total of 14 visits, and in 2019 for a further six visits between April and June. On each visit in 2019, a range of techniques were used, as appropriate, to sample for invertebrates. The surveys focused on relevant locations and suitable habitats within the Order Limits and focused on the Main Application Site.
- 3.2.9 An updated invertebrate survey was conducted on three dates in June 2021 following a scope of the site in May 2021 and is reported in **Appendix BB1** of the Ecology Baseline Report **Appendix 8.1**, of the ES [TR020001/APP/5.02]. These focused on suitable habitats within the Order Limits identified during the scoping visit, including Wigmore Valley Park, Winch Hill Farm and a selection of fields within the Main Application Site. It also included Luton Parkway Verges DWS where an Off-site car park will be located.
- 3.2.10 Where practical, invertebrates were identified in the field but wherever the slightest doubt existed, one or more specimens were collected, or photographs taken, for more detailed scrutiny at a later date.
- 3.2.11 For further details on the survey methodology refer to the Ecology Baseline Report **Appendix 8.1** of the ES [TR020001/APP/5.02].

Roman snail survey

- 3.2.12 Dedicated surveys for Roman snail were undertaken in 2018, 2019 and 2020 to confirm the extent of the species within the Main Application Site.
- 3.2.13 There is currently no standardised or published survey methodology for Roman snail. Based on professional judgement from a licenced roman snail surveyor it is considered that a combination of a daytime hand search and nocturnal torchlight surveys in suitable weather conditions is sufficient to enable an assessment of presence or probable absence of Roman snail at a site. It is considered good practice that nocturnal surveys are undertaken in wet weather or within 24 hours following rainfall.
- 3.2.14 A walkover survey of accessible, potentially suitable habitat within the Main Application Site was carried out on 14 and 15 June 2018. At the same time a daytime hand search was carried out of suitable habitat identified. The tendency for Roman snail to aggregate (Ref. 11) makes hand searching a viable survey technique.
- 3.2.15 Where live snails and/or shells were not encountered during the daytime survey, but habitat was considered suitable, a subsequent torchlight survey was undertaken to determine presence or likely absence. The torchlight survey was carried out on the 11 June 2019.
- 3.2.16 An additional daytime survey of the identified habitats [REDACTED] was completed on 18 June 2019. A daytime survey of [REDACTED] was also undertaken on 16 September 2020. Off-site Highway Intervention locations and Off-site Car Park locations do not include suitable habitats for Roman snail and were therefore scoped out for further surveys.

3.3 Summary of key findings and predicted impacts

Orchids

- 3.3.1 The data search revealed a range of orchid species within 2km of the Main Application Site. There were 19 records of bee orchid associated with Wigmore Valley Park, three records for Luton Parkway Verges DWS, two records within the airport and five records within the wider areas of Luton, all of which were located within or adjacent to the Main Application Site and connected to the site between 2010-2016. No other orchid species records were provided.
- 3.3.2 During the surveys orchids were found in the following locations, as can be seen in **Appendix B1** and **C1** of the Ecology Baseline Report, **Appendix 8.1** of the ES **[TR020001/APP/5.02]**:
- common spotted orchid within Grassland 5, within a species rich semi-improved neutral grassland;
 - common spotted orchid within Grassland 8, within a semi-improved neutral grassland;

- c. common spotted orchid within Grassland 9, over 140 flowering spikes within a species rich semi-improved neutral grassland;
- d. common spotted orchid within Grassland 10, 80 spikes and a further 11 spikes in a second location within a species rich semi improved neutral grassland;
- e. common twayblade (orchid) Target Note 6, 17 flowering spikes in one location within dense scrub;
- f. bee orchid within Grassland 11, 11 flowering spikes within neutral grassland and a species poor semi-improved grassland; and
- g. common spotted orchid between Grassland 10 and 12, over 200 flowering spikes within rank neutral grassland.

3.3.3 Pyramidal orchid was not found during field surveys but has been previously reported as being present adjacent to bee orchid locations in Grassland 11.

3.3.4 It should be noted that whilst the Phase 1 Habitat survey was updated, these were completed outside of the flowering period for orchids, between June and July, and therefore results on the presence of orchids are taken from the 2018 surveys.

3.3.5 For further details on the survey results refer to the Ecology Baseline Report **Appendix 8.1** of the ES [TR020001/APP/5.02].

Dingy skipper

3.3.6 The dingy skipper butterfly was recorded during the 2018-2019 invertebrate survey. A total of five individuals were observed on the southernmost, south facing slope of Wigmore Valley Park. No dingy skipper were found during the 2021 surveys despite increasingly suitable habitat. However, as stated, it should be noted that results from the annual UKBMS led by Butterfly Conservation, the UKCEH, BTO and JNCC, show that the overall picture for butterflies in 2021 was poor, ranking 33rd out of the 46 years since the UKBMS began (Ref. 6). As such, a precautionary approach has been taken and assumes that the species is still present or may reoccur.

3.3.7 For further details on the survey results refer to the Terrestrial Invertebrate Report, **Appendix BB1** of the Ecology Baseline Report **Appendix 8.1** of the ES [TR020001/APP/5.02].

Other terrestrial invertebrates

3.3.8 Field surveys undertaken in 2015-2016 and 2018-2019 identified an invertebrate assemblage comprising 1,550 species, 91 of which are regarded as 'Key Species' (i.e. with rare, scarce, threatened or near threatened conservation status). Key Species here are defined from a system using a British Red Data Book for insects (Ref. 12) which was amended and supplemented by a series of JNCC Nature Conservation reviews. **Section 3.6** and **Appendix 1** of London Luton Airport Invertebrates Report, **Appendix BB1** of the Ecology Baseline Report (provided as **Appendix 8.1** of the ES [TR020001/APP/5.02]) defines Key Species as Red Data Book and Nationally

Scarce species from version 1 of the British Red Data Book for insects (Ref. 12), Threatened, Near Threatened and Data Deficient species from version 2 (Ref. 13), and Nationally Rare or Nationally Scarce species from version 3 (GB Rarity Status).

- 3.3.9 The assemblage includes the presence of the rare picture-winged fly, set-aside downy-back beetle and dingy skipper butterfly all of which are species of principal importance.
- 3.3.10 Beetles were also particularly prevalent; of the 570 species of beetle recorded, 49 have no previous Bedfordshire record and 11 have no previous Hertfordshire record.
- 3.3.11 The 2021 field surveys recorded 331 species of invertebrate, covering a very wide range of taxonomic groups. Twenty-one species from the species list of 331 are regarded as 'Key Species' (i.e., with rare, scarce, threatened or near threatened conservation status).
- 3.3.12 For further details on the survey results refer to the Terrestrial Invertebrate Report, **Appendix BB1** in the Ecology Baseline Report **Appendix 8.1**, of the ES [TR020001/APP/5.02].

Roman snail

- 3.3.13 The data search results from BRMC and HERC (undertaken in February 2018 and updated in May 2019) [REDACTED] within the past 15 years. The location of both records [REDACTED]. Some additional historic records (between 1948 and 1981) of Roman snail were also returned [REDACTED] (1981). No additional records were returned in the 2022 data search.
- 3.3.14 Field surveys undertaken [REDACTED]
- 3.3.15 Dedicated surveys undertaken in 2018, 2019 and 2020 to confirm the extent of the Roman snail population did not identify Roman snail within the Main Application Site, [REDACTED].
- 3.3.16 For further details on the survey results refer to 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 works and timing at each assessment phase of relevance to orchids and invertebrates 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** of the 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:
- the construction of additional airport stands serving Terminal 1 within the airport complex;
 - localised expansions of Terminal 1;
 - modifications to existing car parks and additional temporary car parks;
 - elements of the AAR and Off-site Highway Interventions; and
 - the provision of open space, through enhancement and replacement of lost open space for Wigmore Valley Park, Habitat Creation Area, 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. The provision of open space would provide replacement and enhancement to areas, including converting a large area of previously arable land into landscaped parkland, areas of woodland, scrub, neutral meadow grassland and amenity grassland. This land has been removed from arable production, with the field accounting for the majority of the space left fallow.
- 3.4.4 There are notable areas of vegetation clearance associated with assessment Phase 1. This will occur later in the phase following the provision of open space resulting from clearance within Wigmore Valley Park.
- 3.4.5 The new temporary surface car parks (P6 and P7) (Work Plans [TR020001/APP/4.04]) 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 Vegetation clearance works in assessment Phase 1 will therefore result in the loss of common spotted orchid from Grassland 10 (Phase 1 Habitat Survey Plan within **Appendix B1** of Ecology Baseline Report **Appendix 8.1** of the ES [TR020001/APP/5.02]), and bee orchids and pyramidal orchids (presumed to be present) from Grassland 11. In addition, common spotted orchids in sections of Grassland 8 and Grassland 9 for landfill remediation works, and common twayblade at target note 6 north west of Grassland 8 will also be lost.
- 3.4.7 Vegetation clearance works in assessment Phase 1 will also result in a loss of habitats supporting a notable assemblage of invertebrates. More specifically, the five individual dingy skipper butterflies identified during the 2019 invertebrate field surveys were located to the south of Wigmore Valley Park, an area of habitat which is being lost during this assessment phase.

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 assessment Phase 2a, resulting from earthworks, the construction of Terminal 2 and creation of additional car parks 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 the linear woodland bordering the runway. Land to the south east of the Main Application Site that would be impacted to create the required supporting infrastructure during assessment Phase 2a, is primarily still, or was, within arable production, as well as associated areas of agricultural set aside.
- 3.4.10 Vegetation clearance associated with assessment Phase 2a will result in the loss of common spotted orchids from the remaining areas of Grassland 8 and Grassland 9, and any remaining common twayblade orchids in this vicinity. It will also result in the loss of suitable habitat still supporting a notable assemblage of invertebrates, including the dingy skipper butterfly.
- 3.4.11 Vegetation clearance [REDACTED] during this assessment phase will result in a loss of suitable habitat for Roman snail and also create a risk of killing and/or injuring the species for which mitigation is therefore required.

Assessment Phase 2b

- 3.4.12 Assessment Phase 2b would involve further 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, where the majority of habitat losses occur.
- 3.4.13 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 mitigation area. Calcareous grasslands can provide suitable habitat for a notable assemblage of terrestrial invertebrates, including the dingy skipper butterfly, which would benefit should foodplants such as bird's-foot trefoil and horseshoe vetch (*Hippocrepis comosa*) be present.
- 3.4.14 Vegetation clearance [REDACTED] during this assessment phase will result in a loss of suitable habitat for Roman snail and also impose a risk of killing and/or injuring the species for which mitigation is therefore required.

Habitat enhancement and creation

- 3.4.15 As part of assessment Phase 1, a 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** of **Appendix A** of this strategy, and for each

assessment phase are found within **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].

- 3.4.16 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.
- 3.4.17 During assessment Phase 2a, further arable land directly to the south of this area will also be converted to low intensity grazed neutral grassland, whilst south of Winch Hill at the south eastern extent of the Main Application Site an area will be converted to calcareous grassland. These created grassland areas will integrate with and increase the area covered by the wider Habitat Creation Area.
- 3.4.18 Finally, following the completion of construction works associated with supporting infrastructure in assessment Phase 2a, another section of arable land will be converted into calcareous grassland and again will be integrated with the wider Habitat Creation Area to the east, and area of provision of open space to the north.
- 3.4.19 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 orchid and invertebrate populations. Further details are provided in the following sections of this Mitigation Strategy which outlines the specific role of these areas in mitigating and subsequently enhancing the Proposed Development for orchid and invertebrate populations.

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 the orchid and stated terrestrial invertebrate populations identified that 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 orchid and invertebrate populations.
- 4.1.2 In order to safeguard and allow for the long-term continuity and expansion of the populations of bee orchid, common spotted orchid, pyramidal orchid, common twayblade, terrestrial invertebrates including the dingy skipper and Roman snail, a translocation exercise would be undertaken. This will involve the translocation of the named orchid species, and bird's-foot-trefoil (as the support plant for dingy skipper). At present, it is not anticipated that Roman snail are present within the construction area, and therefore would not require translocation. Appropriate management of the habitat between [REDACTED] and the construction areas will be maintained, and therefore continue to deter this species moving into construction areas.
- 4.1.3 Common bird's-foot-trefoil will be translocated as a Mitigation Strategy for the dingy skipper butterfly as it is a key larval foodplant. Ideal conditions for the dingy skipper butterfly occur where there is a good population of the host plant, growing in a sparse sward in a sheltered microclimate.

4.2 Further survey prior to commencement of works

- 4.2.1 The Mitigation Strategy outlined below is based on all survey work undertaken to date (May 2021). It is noted that the time period between writing of this Mitigation Strategy and commencement of construction is considerable, in particular for assessment Phases 2a and 2b, and therefore additional surveys and review of the strategy may be required.
- 4.2.2 Updated botanical and invertebrate surveys will be undertaken, both prior to and throughout the development period. These will include:
- a. orchid surveys in 2024 the year prior to assessment Phase 1, where the areas of rosettes of the orchids will be marked with small sticks or other means of identification, in order to aid future location;
 - b. dingy skipper surveys in 2024 and 2032 as the years prior to assessment Phase 1 and 2a, comprising walked transects to update baseline; and
 - c. roman snail surveys in June the year prior to assessment Phase 2a in 2032, comprising daytime hand search and nocturnal torchlight surveys in suitable weather conditions [REDACTED].
- 4.2.3 These updated surveys would largely follow the same methodology as those used to inform the baseline reports, though additional habitat areas surveyed will be required in order to account for notable land use changes throughout the

construction period, such as habitats in the Habitat Creation Area and area of provision of open space that were previously not suitable for invertebrates.

4.2.4 A reasonable timeline considered for commencement of these resurveys are in 2023/2024, ensuring relevant information is captured prior to the start of construction of assessment Phase 1 in 2023. Hereafter, it is recommended that updates are made to these survey the year prior to each of the subsequent assessment Phases.

4.2.5 In addition to this, it is recommended that soil surveys are undertaken at the receptor sites outlined below, to determine whether the soil profiles are adequate. This will indicate whether additional preparation compared to that below is required before translocation of the turves of flora.

4.3 Preparatory works

Conditions of the donor site

4.3.1 Please refer to **Figures 14.11 to 14.13** of the Landscape Mitigations Plans in the ES [TR020001/APP/5.03], with proposed areas for habitat restoration, enhancement and creation.

4.3.2 A translocation exercise will be required in order to conserve the population of the common spotted orchid, bee orchid and pyramidal orchid, and the dingy skipper butterfly's larval foodplant.

4.3.3 Data on the topsoil and subsoil of Wigmore Valley Park, the donor site, is not available, so assumptions have been made that the soil type will be similar to the adjacent area of Wigmore Valley Park that has undergone a soil survey. Further details on the soil survey results can be seen in the Outline Soil Management Plan **Appendix 6.6** of the ES [TR020001/APP/5.02], and the Soil Resource Survey **Appendix 6.5** of the ES [TR020001/APP/5.02].

4.3.4 The topsoil type of the donor site (within Wigmore Valley Park) is likely to be classified as Topsoil 3- Parkland (Soil Management Plan **Appendix 6.6** of the ES [TR020001/APP/5.02]). This is described as a compacted medium to heavy clay loam with restricted permeability. The pH is slightly acid to alkaline (non-calcareous) with moderately high levels of organic matter, total nitrogen. Extractable phosphorous and potassium levels are relatively low. The fertility status of the soil is infertile to intermediate. The average topsoil depth is 310mm (Soil Management Plan **Appendix 6.6** of the ES [TR020001/APP/5.02]).

4.3.5 The subsoil of the donor site is likely brittle non-calcareous heavy clay loam to clay with a moderately developed structure Outline Soil Management Plan **Appendix 6.6** of the ES [TR020001/APP/5.02], and the Soil Resource Survey **Appendix 6.5** of the ES [TR020001/APP/5.02].

Conditions of receptor sites

4.3.6 There are two receptor sites for the orchid translocation. The location of both receptor sites can be seen on **Figure 2** in **Appendix A** of this document. Preparation of the receptor sites must be undertaken prior to the construction of each assessment Phase.

- 4.3.7 These receptor sites will be defined and protected by fencing (where not within the area of provision of open space) and/or information boards to prevent trampling. In addition any pathways will be designed to direct people away from these areas.

Receptor Site 1

- 4.3.8 Receptor Site 1 is an area adjacent to Wigmore Valley Park that is comprised of semi-improved neutral grassland. This area currently supports a scattered and localised population of common spotted orchid and thus is considered a suitable site for orchid translocation.
- 4.3.9 The soil survey undertaken recorded the topsoil of Receptor Site 1 as Topsoil 1- Agricultural Soils. Key differences to the donor site are that there are higher levels of phosphorous and the fertility status of the soil is fertile in respect to the habitat creation process. However, as this area supports a population of common spotted orchid it can be concluded that the habitat conditions are suitable for the translocation of orchid species and suited to the persistence of fungi. This is important because orchids are mycorrhizal species whereby they form a mutual symbiotic association with the fungi colonising the host plants root tissues.
- 4.3.10 The subsoil is recorded as having the same subsoil properties as the donor site.
- 4.3.11 An excavator will remove the topsoil of Receptor Site 1 to a depth of around 300mm (exact depths possible for each area will require investigation due to the underlying landfill). This will be stored on site and used for landscaping of the Proposed Development. The average depth of Topsoil 1 across the Proposed Development is 260mm.
- 4.3.12 The subsoil will be decompacted (ripped) to a minimum depth of 300mm (exact depths possible for each area will require investigation due to the underlying landfill) to break up the compaction and to provide a 'key' for the topsoil layer. On the larger areas a wing-tined subsoiler mounted on either a tracked dozer or large tractor should be used. A suitably-sized tracked excavator fitted with a single rigid tine should be used to loosen the subsoil in smaller inaccessible areas, such as field boundaries and corners of the site.
- 4.3.13 As the soil types of Receptor Site 1 are considered suitable to support the populations of orchid and bird's foot trefoil it is not considered that further preparation of the site will be necessary.

Receptor Site 2

- 4.3.14 Receptor Site 2 is an area that is currently cultivated/disturbed arable land.
- 4.3.15 The soil survey undertaken records the topsoil of Receptor Site 2 as Topsoil 2- Agricultural Soils (calcareous). Soil profile 2 is characterised by its calcareous nature. Key differences beyond this are that Topsoil 2 possesses a lower clay loam content, higher pH, and higher levels of extractable phosphorous. Additionally, this topsoil is fertile with respect to habitat creation purposes.
- 4.3.16 The subsoil is calcareous heavy clay loam to clay with a blocky structure.

- 4.3.17 Both the topsoil and subsoil of Receptor Site 2 differ from the donor site. However, orchids are typically found on calcareous, chalky soils and therefore this receptor site is considered to provide appropriate conditions for orchid translocation. In addition to this, calcareous grasslands can provide suitable habitat to support populations of the dingy skipper butterfly due to the presence of birds foot trefoil and other nectar sources.
- 4.3.18 In order to prepare the receptor site for turve translocation an excavator will remove the topsoil of Receptor Site 2 to a depth of around 300mm (exact depths possible for each area will require investigation due to the underlying landfill). This will be stored on site and used for landscaping of the Proposed Development.
- 4.3.19 The subsoil should be treated as per Receptor Site 1 in **paragraph 4.3.12** above.
- 4.3.20 As the soil types of Receptor Site 2 are considered suitable to support the populations of orchid and bird's foot trefoil it is not considered that further preparation of the site will be necessary.

4.4 Prior to construction

Translocation of orchid species and birds-foot trefoil

- 4.4.1 Turves will be excavated to minimise disruption and maximise the conservation of the floral pollinators and fungal associates. The turves containing the target species will be excavated to a minimum of 300mm in depth (exact depths possible for each area will require investigation due to the underlying landfill). The surface area of the turves will be a minimum of 1000mm by 500mm. For orchids in particular this is essential to ensure that the maximum volume of soil is accompanying the rooted plant so that the fungal soil mycorrhiza on which the plant depends are transported with the plant to the new site.
- 4.4.2 The placement of the turves will commence at the furthest point of the receptor site working back from that point to avoid machinery traveling on the translocated habitat. The turves are to be abutted tightly to each other without gaps to improve cohesion. Where the presence of gaps is unavoidable subsoil from the donor site should be used to fill the gaps. All turves must be in full contact with the subsoil surface beneath.
- 4.4.3 Transportation and placement of the turves is to be undertaken either directly by the excavator or placed on a flatbed trailer to transport and be placed by a telehandler fitted with a wide bucket. Where possible an excavator with a modified bucket is preferred as this minimises handling disturbance.
- 4.4.4 The turves must be cut and installed on the same day to minimise the risk of the turves dying out and disintegrating.

Roman snails

- 4.4.5 Grassland habitats [REDACTED] will continue to be managed at a short sward height to avoid the establishment of rough grassland

and scrub. This should discourage encroachment of Roman snail [REDACTED]
[REDACTED]
away from active areas of the Proposed Development.

Translocation - if required

- 4.4.6 If translocation is required, fencing will be erected [REDACTED]
[REDACTED] s per the Roman Snail Survey Plan (**Appendix Z1** of the Ecology Baseline Report **Appendix 8.1** of the ES [TR020001/APP/5.02] plus 30m either side. The area [REDACTED] will also be fenced.
- 4.4.7 Fencing will be erected around the works areas between August and September and should be constructed 1m from any perimeter fence. This fencing will be designed to deter Roman snails from re-entering the works area.
- 4.4.8 The fencing will consist of standard great crested newt (GCN) fencing with the addition of copper tape along the middle to deter the Roman snails. This fence can be polyethylene with stakes at regular intervals of approximately 1.5m for support. An easement should be created either side of the fencing and should be covered in a membrane to limit vegetation growth. The bottom of the fence will need to be buried and the easement must be created first with the fence erected down the centre. The fencing must be robust and not susceptible to damage by ultraviolet light.
- 4.4.9 The [REDACTED] [REDACTED] will be hand searched for Roman snails and any individuals found will be moved to the suitable habitat [REDACTED]. This will be carried out by a suitably qualified ecologist who is licensed to handle Roman snails. This will take place in September, outside of the hibernation period (October-March).

5 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].

5.2 Management

Translocated turves

5.2.1 The translocated grassland turves will be cut once per year during September – March (Ref. 14) to a height of 100mm. This should be undertaken for five years commencing one year following translocation.

5.2.2 Details of cutting times for different orchid species are given in the following paragraphs. In general, it is important to allow plants to flower and to set seed before cutting takes place. However, some species of orchid are winter green i.e. they produce leaves in autumn as part of the following year's plant. If cutting is carried out too late it can result in damage or removal of these leaves, reducing plant vigour or causing death. Leaving the cuttings may destroy the orchids by causing rotting and depriving them of light.

5.2.3 Common spotted-orchids are winter dormant, flower in June and July and scatter seed about six weeks later. They can be cut safely from September to early March.

5.2.4 Bee orchids are typically found in grassland where there is a short sward where there is less competition from more vigorous species. These orchids are winter green, flower in June and July and scatter seed about six weeks later: they produce leaves from late September onwards. The best time to cut grasslands containing this species is early September: subsequently the grasslands may be cut safely until the end of March.

5.2.5 Pyramidal orchids are winter green, flower in late June and July and scatter seed about six weeks later: they produce leaves from October onwards. The best time to cut verges containing this species is early September. Cuts later than this will damage leaves.

5.2.6 After each grassland cut the arisings will be removed to reduce the build-up of nutrients in soil from decomposing vegetation. Orchids and common bird's-foot-trefoil grow well where there is low nutrient availability thus will benefit by this management practice.

5.2.7 A year after translocation, localised weed control may be undertaken between August and September. This is to be carried out annually for a period of five years and will be spot treated or weed-wiped whenever they occur in significant numbers as appropriate through the active growing season to avoid other

species being out-competed. Retention of some thistles and docks in smaller numbers is of benefit as pollinator nectar sources for invertebrates. Hand pulling will be deployed as a potential method of eradication.

Table 5.1 Translocated Turf Management Schedule

Year post establishment	All	0	1	2	3	4	5
Prescription							
Annual monitoring of turf establishment	X	X	X	X	X	X	X
Annual cutting of turf to 100mm			X	X	X	X	X
Weed Control			X	X	X	X	X
Review of management and monitoring strategy							X

Roman snail

5.2.8 Grassland habitats [redacted] will continue to be managed at a short sward height to avoid the establishment of rough grassland and scrub. This should continue to discourage encroachment of species such as Roman snail [redacted] away from active areas of the Proposed Development where they are not currently found in active populations.

Field margin vegetation

- 5.2.9 In addition, as part of the management of the Habitat Creation Areas, arable margins will be retained along maintained woodland belts and hedgerows where possible. These margins will be managed to encourage retention and proliferation of other notable arable plant species and invertebrates that have been identified within the survey area, refer to the Outline LBMP **Appendix 8.2** of the ES [TR020001/APP/5.02].
- 5.2.10 Existing rough grass margins would be cut once every three years at a height between 7.5cm to 15cm. Cutting should be undertaken between 15 July and 30 September, to allow mature tussocks to develop and insect populations to build up, and on a rotation so that there are a number of uncut margins every year.
- 5.2.11 No fertiliser, manure or pesticides/herbicides are to be applied to existing margins, as these can encourage weeds and remove beneficial plants and associated insects.

Semi-improved neutral grassland

- 5.2.12 Semi-improved neutral grassland is to be retained and enhanced in various locations across the Proposed Development as per **Figures 14.11 to 14.13** of the Landscape Mitigation Plans of the ES [TR020001/APP/5.03].
- 5.2.13 Retained semi-improved neutral grassland areas will be mown between late-July and mid-August (although the timing of this will remain flexible to ensure cutting does not take place before desirable plant species set seed).
- 5.2.14 Cuttings will be left to lie and then removed between one and two days after an area has been cut, to help conserve invertebrates and to ensure the seeds are dispersed on site and not removed with the arisings.
- 5.2.15 The grass cutting height of the mower will be varied across different sections of the grassland to improve insect diversity and abundance.

Woodlands

- 5.2.16 Deadwood from clearance activities within the Proposed Development, will be moved into woodland creation areas to provide a habitat for saproxylic invertebrates.
- 5.2.17 Where possible monoliths (standing deadwood) should also be created to provide a diversity of structure within the new woodland. Large sections of felled trunks will be reinstalled vertically in the ground within the Habitat Creation Areas, which will encourage the deadwood to decay in a similar way to how it would naturally as standing deadwood in-situ.

5.3 Monitoring

Dingy skipper

- 5.3.1 Monitoring for the dingy skipper butterfly will be undertaken in June. The survey methodology will follow that of the previous surveys whereby direct observations/ counts of adult butterflies are recorded during targeted 30 minute site walkovers. All fieldwork is to be carried out in suitable weather conditions, at the right time of day and during the adult flight season, and so the absence of any dingy skipper sightings may be taken as rather strong evidence for the absence of the butterfly. The presence of dingy skipper eggs will confirm that breeding is occurring.

Orchids

- 5.3.2 Monitoring for the translocated orchid populations will be undertaken between mid-June and early-July when leaf rosettes of orchids will be visible and species likely to be in flower. This will involve direct counts of individual orchid spikes and plotting of distribution, in particular but not limited to the two receptor sites. These rosettes of orchid will be marked with small sticks or other means of identification, in order to aid future location. Monitoring will continue annually for a period of five years.

Roman snail

5.3.3 Roman snail populations will be monitored to ensure they remain outside of the [redacted]. This will be a dedicated survey in [redacted] following the survey methodology described in **Section 3.2** of this strategy, and part of a visual assessment during the other terrestrial invertebrate monitoring for other areas.

Other terrestrial invertebrates

5.3.4 Monitoring for other invertebrates will also be carried out between April and September following the previous sampling methods i.e., beating, sweeping, sieving and ground searching with particular focus being on the previously recorded rarer 'Key Species'.

Monitoring schedule

Table 5.2 Monitoring of invertebrate populations

Year post establishment	All	0	1	2	3	4	5
Prescription							
Monitoring for the Dingy Skipper butterfly (years post assessment Phase 1)			X	X	X	X	X
Monitoring of orchids (years post assessment Phase 1)			X	X	X	X	X
Monitoring of general terrestrial invertebrates including visual check for Roman snails (years post assessment Phase 2a)				X			X
Monitoring of translocated (if required) Roman snail population [redacted] (years post assessment Phase 2a)				X			X

5.3.5 After five years a review of the management and monitoring strategy will be undertaken to inform these strategies moving forwards to ensure long term viability of the translocated populations.

5.4 Reporting

5.4.1 Reports of works conducted under the licence, and any relevant monitoring Roman snail surveys, will be reported to Natural England under the requirements of the licence granted for the Proposed Development.

5.4.2 In addition, 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 appointed 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 appointed Contractor.

6 TIMETABLE FOR IMPLEMENTATION

6.1.1 This section outlines a proposed timetable for implementation of avoidance, mitigation and enhancement works for orchid species and stated terrestrial invertebrates as outlined in this strategy. The key activities that comprise the various elements of this Mitigation Strategy are detailed within **Table 6.1**.

6.1.2 Turf translocation exercises will take place during the month of September, meeting the requirements for optimum success for translocated habitats, as the soils are warm and moist and new root growth is possible before winter (Ref. 15). The translocation itself will be undertaken during dry weather conditions with the turves sufficiently damp to reduce the risk of disintegration during lifting and translocation.

6.1.3 Artificial watering from a bowser of the translocated turves might be necessary if rainfall does not follow the translocation to help ensure successful establishment.

6.1.4 Translocation of Roman snails if required will take place between April/May – September, prior to the hibernation period.

6.1.5 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 orchid and invertebrate mitigation described within this Mitigation Strategy

Works/Activity	Timing	Description/Requirement
Dingy Skipper butterfly survey	Mid-June for years prior to the construction of assessment Phase 1 and 2a (years 2024 and 2032).	Walkover transect surveys to update baseline.
Orchid and bird's foot trefoil	Between mid-June and early-July the year prior to construction of assessment Phase 1 (2024).	Botanical survey to update baseline and locations of these plants prior to translocation.
Soil surveys	2022/23 prior to translocation of the orchids.	Soil surveys at the orchid receptor sites to establish suitability of receptor sites and inform additional requirements.
Roman snails	June the year prior to construction of assessment Phase 2a (2032).	Daytime hand search and nocturnal torchlight surveys in suitable weather conditions in [REDACTED]

Works/Activity	Timing	Description/Requirement
Appointment of Ecological Clerk of Works (ECoW)	July the year prior to construction of assessment Phase 1 - July 2024	Requires a suitably qualified ecologist who is licensed to handle Roman snails.
Installation of fencing around orchid receptor site 2 (within Habitat Creation Area only)	August of the first year of construction of assessment Phase 1 - August 2025	Standard stock proof fencing.
Preparation of receptor sites	Between August – September of the first year of construction of assessment Phase 1 (after fencing has been installed and immediately prior to turf translocation) 2025.	<p>An excavator will remove the topsoil of Receptor Site 1 to a depth of 250-300mm around 300mm (exact depths possible for each area will require investigation due to the underlying landfill). This will be stored on site and used for landscaping of the Proposed Development.</p> <p>The subsoil will should be decompacted (ripped) to a minimum depth of 300mm (exact depths possible for each area will require investigation due to the underlying landfill) to break up the compaction and to provide a 'key' for the topsoil layer.</p>
Translocation of Turves	September of the first year of construction of assessment Phase 1 - September 2025	<p>Cutting of turves around the target species to a depth of at least 300mm (exact depths possible for each area will require investigation due to the underlying landfill).</p> <p>Undertaken during dry weather, but turf remaining sufficiently damp, with additional watering on hand.</p>
Installation of fencing for Roman snails.	The first year prior to construction of assessment	Standard GCN fencing with the addition of copper tape along the middle.

Works/Activity	Timing	Description/Requirement
	Phase 2a - Between August – September 2032.	
Hand-search Dairyborn Scarp and translocate to suitable habitat [REDACTED]	The first year prior to construction of assessment Phase 2a - Between August – September (after fencing has been installed) 2032.	Requires a suitably qualified ecologist who is licensed to handle Roman snails.

7 CONCLUSIONS

- 7.1.1 With the adoption of the measures set out in this Mitigation Strategy, it is considered that the Proposed Development would allow for the long-term continuity and, ideally, the expansion of the orchid and stated terrestrial invertebrates populations. It is anticipated that an overall positive impact on the populations would be achieved beyond construction.

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GLOSSARY AND ABBREVIATIONS

Term	Definition
AAR	Airport Access Road
BNG	Biodiversity Net Gain
BRMC	Bedfordshire & Luton Biodiversity Recording & Monitoring Centre
BTO	British Trust for Ornithology
CoCP	Code of Construction Practice
CWS	County Wildlife Site
DART	Direct Air-Rail Transit
DWS	District Wildlife Site
ECoW	Ecological Clerk of Works
EIA	Environmental Impact Assessment
EMS	Environmental Management Systems
ES	Environmental Statement
GCN	Great Crested Newt
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.
ha	Hectare
HERC	Herts Environmental Records Centre
JNCC	Joint Nature Conservation Committee
km	Kilometre
LBMP	Outline Landscape and Biodiversity Management Plan
LWS	Local Wildlife Site
m	metre
MAGIC	Multi-Agency Geographic Information for the Countryside
mm	millimetre
mppa	million passengers per annum
NE	Natural England
NERC	Natural Environment and Rural Communities
OS	Ordnance Survey

Term	Definition
UK BAP	UK Biodiversity Action Plan
UKBMS	UK Butterfly Monitoring Scheme
UKCEH	UK Centre for Ecology & Hydrology

APPENDICES

Figure 1 - Roman Snail, Orchid and Birds-Foot Trefoil Survey Results

Figure 2 - Orchid and Bird's-Foot Trefoil Translocation Map



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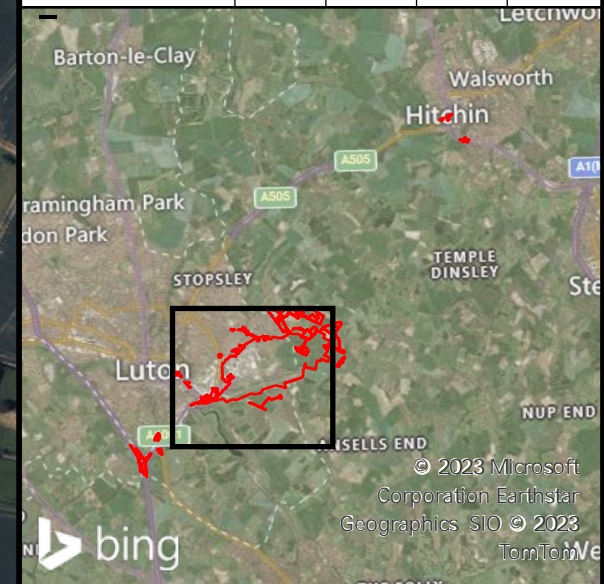
All structure positions are indicative. The proposed works will be subject to detailed design development. The changes will be within limits of deviation specified in the Development Consent Order.

Legend

- Order Limits
- ! Target Notes
- OS Grid Square 100m
- Dingy skipper area
- Dairyborn Scarp District Wildlife Site (DWS)
- Wigmore Park County Wildlife Site (CWS)

Note: Roman snail locations are shown on confidential version submitted to the Planning Inspectorate

Amended following section 51 advice	AB	NL	CS	04/04/23	P02
First Issue	AB	NL	CS	22/02/23	P01
Revision History	Drawn	Checked	Approved	Date	Rev.



Luton Rising
 Our airport. Our community. Our planet.
 London Rising
 Hart House Business Centre
 Kimpton Road, Luton, LU2 0LA
 www.lutonrising.org.uk

**London Luton Airport Expansion
 Development Consent Order**

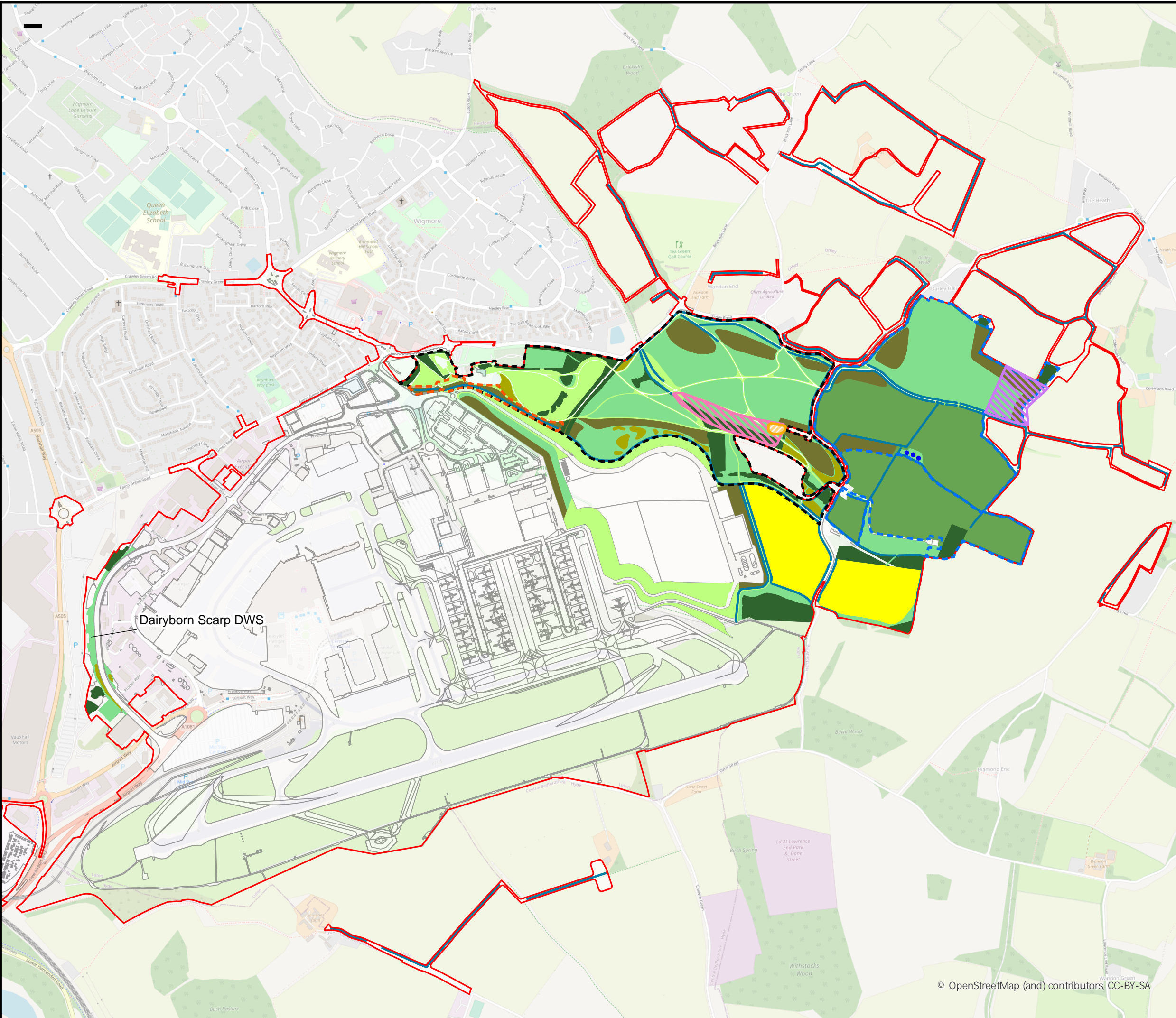
Drawing Title
 Figure 1 Survey results plan

Purpose of issue Additional submissions (amended following section 51 advice)				Suitability S2		
Drawn	Checked	Approved	Date	Scale	Size	
AB	NL	CS	04/04/23	1:15,000	A3	

DCO Application Ref. TR020001	APFP Regulation APFP 5(2)(a)	DCO Document Ref. TR020001/APP/5.03
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Drawing Number LLADCO-3C-ARP-0000-DR-YE-0262	Revision P02
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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

- Orchid areas**
- Existing area of orchids
 - Receptor Site 1
 - Receptor Site 2
 - 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 1: Roman snail locations are shown on confidential version submitted to the Planning Inspectorate

Note 2: 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

Amended following section 51 advice	AB	NL	CS	04/04/23	P02
First Issue	AB	NL	CS	22/03/23	P01
Revision History	Drawn	Checked	Approved	Date	Rev.

Luton Rising Our airport. Our community. Our planet.

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**London Luton Airport Expansion
Development Consent Order**

Drawing Title

Figure 2 Mitigation Plan

Purpose of issue Additional submissions (amended following section 51 advice)				Suitability S2	
Drawn	Checked	Approved	Date	Scale	Size
AB	NL	CS	04/04/23	1:12,500	A3

DCO Application Ref. TR020001	APFP Regulation APFP 5(2)(a)	DCO Document Ref. TR020001/APP/5.03
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Drawing Number LLADCO-3C-ARP-0000-DR-YE-0263	Revision P02
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