The London Resort Development Consent Order

BC080001

Environmental Statement
Volume 2: Appendices

Appendix 12.3 – Ecological Mitigation and Management Framework

Document reference: 6.2.12.3
Revision: 00

December 2020

Planning Act 2008
The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009
Regulation 5(2)(a)
The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017
Regulation 12(1)

[This page is intentionally left blank]

The London Resort

Appendix 12.3: Ecological Mitigation and Management Framework

Prepared by:
The Environmental Dimension Partnership Ltd

On Behalf of:
The London Resort Company Holdings Limited

December 2020
Report Reference
r020_00

Contents

Annexes

Annex EDP 13 Consultation Response Received from Natural England

This page has been left blank intentionally

Executive Summary

S1 This Ecological Mitigation and Management Framework (EMMF) identifies the strategy required to retain, protect and enhance the nature conservation value of the Project Site as a result of Proposed Development to form The London Resort, a world class entertainment resort to be situated in Kent and Essex.

S2 The Project Site supports a range of important ecological features that are likely to be influenced by the Proposed Development. This EMMF demonstrates how the proposals will deliver an innovative and proportionate mitigation strategy, addressing the requirements of the important ecological features during each stage of the Proposed Development.

S3 The EMMF includes the following principles:

- Pre-construction habitat creation and enhancement to ensure habitats are appropriate to accommodate translocated or displaced species/assemblages, such as dormouse, water vole, reptiles, invertebrates, and rare plants;
- Pre-construction protective measures, such as fencing of retained or sensitive habitats, appropriate timing of works and updated surveys, to accommodate the varied requirements of the species/assemblages present;
- Construction-phase protective measures, including controls on disturbing activities such as lighting and noise plus methods of pollution prevention;
- Methods for exclusion, translocation, displacement, and destructive search for protected species using appropriate legal and best practice mechanisms;
- Creation of new habitats both on- and off-site, which are appropriate to the location and context of the Project Site, to mitigate for unavoidable losses;
- Integration of biodiversity features within the design of public realm, to benefit a range of species and to promote environmental education and wellbeing through recreation and access to nature;
- Implementation of a long-term management strategy to achieve the enhancement of condition and function of retained habitats; and
- Details of, and commitment to, long-term monitoring to evaluate the effectiveness of mitigation, ensure management activities are appropriate and provide a mechanism for remedial action, where required.

S4 The implementation of this EMMF, secured as a requirement of the Development Consent Order (DCO), will ensure adherence to all legislative and policy requirements and enable

the creation of a biodiverse and resilient green network, thereby translating the vision and core principles of the Proposed Development into the detailed design of the London Resort.

Section 1
Introduction, Context and Purpose

1.1 This Ecological Mitigation and Management Framework (referred to hereafter as the 'EMMF') has been prepared by The Environmental Dimension Partnership Ltd (EDP) on behalf of The London Resort Company Holdings Limited (hereafter referred to as 'the Applicant') in respect of The London Resort (hereafter referred to as the 'Proposed Development').

1.2 The Project Site, approximately 414 hectares (ha) in size, comprises land on the Swanscombe Peninsula and the Ebbsfleet Valley on the south side of the River Thames (referred to as 'the Kent Project Site'), and land to the east of the A1089 Ferry Road and the Tilbury Ferry Terminal (referred to as 'the Essex Project Site'). Collectively these two parts of the Development Consent Order (DCO) Limits are referred to as 'the Project Site' and comprise a range of habitat types, including woodland and scrub, grasslands of varying quality, salt marsh, intertidal zones, brownfield areas, running and standing water, chalk exposures and developed land. The Project Site areas are illustrated on Figure 12.1 (Document reference 6.3.12.1).

1.3 The EMMF accompanies a DCO application (hereafter referred to as 'the application') submitted to the Secretary of State, for a world class entertainment resort with associated infrastructure, staff accommodation, dedicated access road, public amenity space and habitat creation. The EMMF will be secured as a requirement of the DCO.

1.4 The Proposed Development is illustrated on the 'Illustrative Masterplan' (Document Reference 6.3.3.1), and the Illustrative Landscape Masterplan enclosed within Appendix 11.7: Landscape Strategy (Document Reference 6.2.11.7).

1.5 The application is supported by an Environmental Impact Assessment (EIA). The Ecological Impact Assessment (EcIA) of the Proposed Development, as far as this relates to the terrestrial and freshwater environment, is presented in Chapter 12 of the Environmental Statement (ES) (Chapter 12: Terrestrial and Freshwater Ecology and Biodiversity, Document Reference 6.1.12). Chapter 12 is supported by a number of technical annexes, of which the following documents have been integral to the preparation of this EMMF:

- Appendix 12.1: Ecology Baseline Report (Document Reference 6.2.12.1); and
- Appendix 12.2: Biodiversity Net Gain (BNG) Assessment (Document Reference 6.2.12.2).

1.6 Chapter 12: Terrestrial and Freshwater Ecology and Biodiversity (Document Reference 6.1.12) and this EMMF, should also be read in conjunction with the following documents, which accompany the application:

- Figure 11.15: Illustrative Landscape Masterplan (Document reference 6.3.11.15);

- Appendix 11.7: Landscape Strategy (Document Reference 6.2.11.7); and
- Appendix 11.8: Landscape Management Plan (LMP) (Document Reference 6.2.11.8).

1.7 This EMMF details the overall mitigation strategy required to retain, protect and enhance the nature conservation value of the Project Site over the lifetime of the Proposed Development.

1.8 This EMMF has been prepared in the context of national planning policy which states that: "*Planning policies and decisions should contribute to and enhance the natural and local environment by minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures"* (National Planning Policy Framework[1] (NNPF), Paragraph 170d).

1.9 Furthermore, local planning policies in relation to biodiversity and green infrastructure, as detailed in full within Chapter 12: Terrestrial and Freshwater Ecology and Biodiversity (Document Reference 6.1.12) of the Environmental Statement, have been adhered to during the preparation of this EMMF. In summary, the relevant local policies are:

- **Thurrock Council Local Plan**[2]: Policy CSTP18: Green Infrastructure; Policy CSTP19: Biodiversity;
- **Dartford Borough Local Plan**[3]: Policy CS14: Green Space; and
- **Gravesham Borough Local Plan**: Policy CS12: Green Infrastructure; and draft Policy GI 6: Biodiversity of the emerging Local Plan.

1.10 This EMMF demonstrates compliance with, and the Applicant's commitment to deliver, the relevant local planning policies, where it is possible to do so within the confines of the Project Site.

1.11 The remainder of this document is structured as follows:

- Section 2 describes the scope and overall aims of the EMMF, and the parties responsible for its delivery;
- Section 3 summarises the ecological features within the Project Site and objectives that are the focus of the EMMF;
- Sections 4 to 6 provide an outline of the habitat creation and management principles

1 Ministry of Housing, Communities and Local Government (February, 2019), '*National Planning Policy Framework'*

2 Thurrock Council (Adopted January 2015) *Thurrock Local Development Framework: Core Strategy and Policies for Management of Development (as amended).* Available from: https://www.thurrock.gov.uk/core-strategy-local-plan/about-core-strategy [Accessed: 01/12/2020]

3 Dartford Borough Council (Adopted September 2011) *Dartford Core Strategy. Part of Dartford's Local Development Framework.* Available from https://www.dartford.gov.uk/by-category/environment-and-planning2/new-planning-homepage/planning-policy/adopted-plans

for mitigation and habitat creation, and the subsequent ongoing management required to maintain features on-site;

- Section 7 describes the monitoring requirements to ensure successful delivery and long-term maintenance of biodiversity assets and green infrastructure, in order to achieve the objectives of this EMMF; and

- Section 8 provides an overall summary and conclusions.

This page has been left blank intentionally

Section 2
Scope, Overall Aim and Responsibilities

Scope and Overall Aim

2.1 The vision of the Proposed Development is to develop a world-class entertainment resort founded on sustainable and low carbon principles. The core principles of the Proposed Development are to be innovative, relevant and flexible. The aim and objectives for this EMMF have been developed based on the vision of the Proposed Development, combined with the legislative and policy requirements of the Important Ecological Features (IEFs) present within the Project Site, which form an integral part of the scheme design for the future.

2.2 The Project Site lies partly within three local planning authority areas, namely Dartford Borough and Gravesham Borough for the Kent Project Site, and Thurrock Council for the Essex Project Site. In summary, key local planning policies related to ecology and biodiversity from these three administrations are:

- **Thurrock Council Local Plan**: Policy CSTP18: Green Infrastructure; Policy CSTP19: Biodiversity;
- **Dartford Borough Local Plan**: Policy CS14: Green Space; and
- **Gravesham Borough Local Plan**: Policy CS12: Green Infrastructure; and draft Policy GI 6: Biodiversity of the emerging Local Plan.

2.3 Collectively, these policies require the establishment of ecological networks, connecting development sites to ecological corridors within the surrounding landscape, as well as achieving biodiversity net gain. These requirements have therefore been integrated within the Aim and Objectives of this EMMF.

2.4 The overall aim of this EMMF is to enable the creation of a biodiverse and resilient green network integrated into the landscape of the local area, thereby translating the vision and core principles into the detailed design of the London Resort. In combination with the offsite mitigation, detailed within the *General Principles for Offsite Ecological Mitigation* (Document reference: 6.2.12.10), the EMMF will also provide the strategy by which the Proposed Development will achieve an overall Biodiversity Net Gain in practice.

2.5 This EMMF is intended to provide a strategy for delivering ecological mitigation, management and monitoring. It should be considered as a 'live' document, whereby modifications and updates to the design and implementation of the Proposed Development can be accommodated as the scheme progresses. When updated, this EMMF will be submitted as an addendum to the ES.

2.6 The EMMF details species and habitat specific mitigation strategies for the IEFs identified at the Project Site and within its Ecological Zone of Influence (EZoI) and consolidates ecological mitigation information provided in various documents, including:

- Chapter 12: Terrestrial and Freshwater Ecology and Biodiversity (Document reference 6.1.12);
- Figure 12.44 (Document reference 6.3.12.44) Ecology Mitigation Strategy: Species Measures;
- Figure 12.45 (Document reference 6.3.12.45) Light Mitigation Strategy for Biodiversity;
- Appendix 11.7: Landscape Strategy (Document reference 6.2.11.7);
- Appendix 11.8: Landscape Management Plan (LMP) (Document reference 6.2.11.8);
- Appendix 12.2: Biodiversity Net Gain Assessment (Document reference 6.2.12.2); and
- Annex EDP 1 – 11 of this EMMF, which provide detailed mitigation strategies for all protected and notable species IEFs present at the Project Site.

2.7 This EMMF has been prepared in conjunction with Appendix 11.8: LMP (Document reference 6.2.11.8). In general, this EMMF focusses on ecology-driven mitigation and management measures, whereas the LMP focusses primarily on landscape-led measures. In reality, there is significant cross-over between the two documents and taken together, the EMMF and LMP demonstrate the coherent, holistic approach adopted during the design of the Proposed Development.

2.8 As the Proposed Development is a Nationally Significant Infrastructure Project (NSIP), this EMMF is sufficiently detailed to demonstrate the feasibility of the Proposed Development to deliver an innovative and proportionate mitigation strategy that accords with all planning policy and legislation relevant to the Project Site (as detailed in Chapter 12: Terrestrial and Freshwater Ecology and Biodiversity (Document reference 6.1.12)).

2.9 The EMMF is structured to take into account the construction and post-development stages for each development phase. During the construction stage of any of the development phases, the measures described in this EMMF seek to protect, maintain and manage existing features of ecological value that are to be retained within the Proposed Development. Following completion of each development phase, the measures described in this EMMF also seek to ensure that the ecological features retained/created or enhanced within the Project Site are retained and managed in perpetuity (during the Operational phase of the Proposed Development).

2.10 The EcIA for the Proposed Development took forward a range of IEFs for assessment and it was demonstrated that the Proposed Development is capable of ensuring there is no net loss to biodiversity as a whole. Moreover, as described in Appendix 12.2: Biodiversity Net

Gain Assessment (Document reference 6.2.12.2) accompanying the application and summarised in Section 5, the Proposed Development is capable of achieving a net gain in biodiversity subject to the delivery of off-site mitigation (see *General Principles for Offsite Ecological Mitigation* (Document reference: 6.2.12.10)). This will be achieved through the application of:

- Primary ('intrinsic') mitigation, which has been embedded within the Illustrative Masterplan (Document reference 6.3.3.1) and the Illustrative Landscape Masterplan (Document reference 6.3.11.15) as the design proposals have evolved;

- Secondary mitigation, which addresses all other likely significant negative effects upon all protected species populations/assemblages and other features of less than local value on site have been avoided/minimised; and

- Tertiary mitigation, which considers legislative requirements and standard practices that must be implemented to ensure the scheme is legally compliant.

2.11 The specific mitigation measures within this EMMF will inform future applications for European and nationally protected species licences as required, subject to any revisions/further requirements to meet licensing criteria as agreed with Natural England (NE), the statutory nature conservation organisation in England. This EMMF also therefore provides a sufficient level of information for the Secretary of State to be satisfied that the development is capable of meeting the requirements of the European Protected Species (EPS) mitigation licensing derogation tests[4], to which due consideration must be given when determining planning applications.

2.12 Draft copies of the individual mitigation strategies in respect of breeding and wintering birds (**Annex EDP 1**), bats (**Annex EDP 2**), dormouse (**Annex EDP 3**), water vole (**Annex EDP 4**), otter (**Annex EDP 5**), and invertebrates (**Annex EDP 9**) were sent to Natural England for comment as part of their Discretionary Advice Service. A copy of the correspondence received from Natural England is included as **Annex EDP 13**. Those mitigation strategies referred to, where a response was received, were subsequently updated to address the comments made by Natural England.

Responsibilities

2.13 The responsibility for carrying out the functions of this EMMF are as follows:

- *Construction stage* – the protection of existing ecological interest features being retained, and creation of new habitats will be the responsibility of the Applicant, their Principal Designer and Principal Contractor, supported by specialists where appropriate[5], and are to be continued through to practical completion of construction;

[4] As described in Regulation 53 of the *Conservation of Habitats and Species Regulation 2017* (as amended)

[5] Including Ecological Clerk of Works, arboriculturists and landscape contractors

- *Post-development stage (immediate aftercare/short-term management up to year 5)* – for each development phase, and depending upon construction timings, the responsibility for the immediate establishment and maintenance of retained and newly created habitats/structures will be with the Applicant, as implemented through their Principal Contractor and nominated management/stewardship company. The Applicant would be supported by specialists, where appropriate, until the development phase is completed at which point the Applicant's nominated management/stewardship company would take over management; and

- *Post-development stage (long-term management from year 6 onwards)* – for each development phase, by year 6, it is anticipated that all construction activities will be completed and the management of the retained and newly created habitats/-structures will fall entirely to the Applicant's nominated management/stewardship company.

2.14 Works impacting protected species will only commence once the relevant licence (if applicable[6]) has been granted by NE (whether by low impact class licence, conventional licence route or district licensing as applicable at the time of works), and works must be undertaken in accordance with the Method Statement and conditions accompanying each licence. It will be the responsibility of the Applicant via their nominated Licensee to ensure that the conditions of these licences are met, with support from an Ecological Clerk of Works (ECoW) and/or Named Ecologist/Accredited Agent/Assistant.

[6] Mitigation licences are not required for certain protected species, such as common and widespread reptiles

Section 3
Summary of Ecological Baseline and Feature Objectives

Summary of Baseline

3.1 This EMMF is informed by the comprehensive suite of baseline information described within Chapter 12: Terrestrial and Freshwater Ecology and Biodiversity (Document reference 6.1.12) and detailed in full within Appendix 12.1: Ecology Baseline Report (Document reference 6.2.12.1).

3.2 The following IEFs, that lie within the Project Site, have been scoped into the assessment of effects within Chapter 12: Terrestrial and Freshwater Ecology and Biodiversity (Document reference 6.1.12). They are therefore the subject of this EMMF, and will benefit from the measures described:

Designated Sites

- *Sites of European/international importance*: Thames Estuary and Marshes Special Protection Areas (SPA)/Ramsar; and Medway Estuary and Marshes SPA/Ramsar/ Sites of Special Scientific Interest (SSSI): within the Kent Project Site there are two distinct areas that are functionally linked to the estuary assemblages, providing rest and refuge habitat for small numbers of several target species also using the SPA/Ramsar sites;

- *Sites of national importance*: Darenth Woods SSSI; Inner Thames Marshes SSSI; South Thames Estuary and Marshes SSSI; and West Thurrock Lagoon and Marshes SSSI: present either adjacent to the Project Site or within the EZoI of the Proposed Development;

- *Sites of county importance*: Botany Marshes Local Wildlife Sites (LWS); Ebbsfleet Marshes, Northfleet LWS; Alkerden Lane Pit LWS and Tilbury Marshes LWS, all of which lie within or immediately adjacent to either the Kent or Essex Project Sites.

Habitats

- *Broadleaved semi-natural woodland*: Priority Habitat[7] of local importance covering circa 22 hectares, situated within the Kent Project Site adjacent to the A2 and along the eastern boundary;

- *Scrub*: Extensive mature and colonising scrub forming a corridor between the A2 and the River Thames within the Kent Project Site and is therefore a habitat of local importance;

[7] Priority habitats and species include those habitats and species which are 'of principal importance for the purpose of conserving biodiversity' under Section 41 of the *Natural Environment and Rural Communities Act*, 2006, and are therefore a focus for conservation action in England

- *Semi-improved grassland*: from local up to district level importance, present across the Kent Project Site, including within and around LWS;

- *Coastal/floodplain grazing marsh*: Priority Habitat of district level importance, present within Botany Marshes LWS within the Kent Project Site;

- *Open mosaic habitats on previously developed land*: Priority Habitat of district level importance present within Bamber Pit and along main access track (including tunnel storage area) within the Kent Project Site. Open mosaic habitat, comprising a mix of scrub, grassland, sparsely vegetated and bare ground, is also present a larger spatial scale across much of the Swanscombe Peninsula;

- *Waterbodies (ponds, standing water and ditches)*: the network of ditches connecting the marsh areas (including Botany Marsh LWS) forms a habitat of district level importance within the Kent Project Site;

- *Swamp (reedbed)*: Priority Habitat of county importance forming a large area of the Kent Project Site in close proximity to the River Thames; and

- *River Ebbsfleet*: habitat of local importance present along the eastern boundary of the Kent Project Site.

Species/Species Assemblages

- Wintering waterfowl and wading bird assemblage of international importance: since the Kent Project Site supports many of the species associated with the nearby SPA/Ramsar sites (refer to Annex EDP 1 for further detail);

- Wintering terrestrial bird assemblage of county importance: due to presence of 28 species of conservation concern in low-moderate numbers at the Kent Project Site (refer to Annex EDP 1 for further detail);

- Breeding bird assemblage of regional importance: due to presence of 44 species listed on the amber or red list of Birds of Conservation Concern[8], plus several species listed on Schedule 1[9] of the Wildlife and Countryside Act 1981 (as amended) within the Kent Project Site (refer to Annex EDP 1 for further detail). Pochard (*Aythya farina)* population of national importance;

- Bat assemblage (roosting, and foraging/commuting) of district importance: including presence of at least eight species plus two roosting sites (refer to Annex EDP 2 for further detail);

[8] Eaton MA, Aebischer NJ, Brown AF, Hearn RD, Lock L, Musgrove AJ, Noble DG, Stroud DA and Gregory RD (2015) *Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and Isle of Man*. British Birds 108, 708–746

[9] Species on *Schedule* 1 - Part I of the *Wildlife and Countryside Act* 1981 (as amended). Birds and their young, for which it is an offence to intentionally or recklessly disturb at, on or near an 'active' nest:

- Dormouse population of district importance within the Kent Project Site: using the habitats for dispersal, foraging and breeding (refer to Annex EDP 3 for further detail);

- Water vole population of local up to district importance: likely breeding within the Botany Marsh habitats at the Kent Project Site (refer to Annex EDP 4 for further detail);

- Otter population of local importance present within Black Duck Marsh and assumed presence throughout ditch network and the River Ebbsfleet (refer to Annex EDP 5 for further detail);

- Harvest mouse population of local importance: highly likely to be present within the Kent Project Site (refer to Annex EDP 6 for further detail);

- Amphibian assemblage of local – district importance: due to likely presence of at least five amphibian species within the Kent Project Site (refer to Annex EDP 7 for further detail);

- Reptile assemblage of district importance: due to likely presence of three species including likely exceptional populations of common lizard and slow worm (refer to Annex EDP 8 for further detail);

- Invertebrate assemblage of national importance: associated with open mosaic and wetland habitats, including a large number of scarce and/or declining species (refer to Annex EDP 9 for further detail); and

- Nationally important assemblage of rare plants including nationally scarce species within the Kent Project Site (refer to Annex EDP 10 for further detail).

Feature-specific Objectives

3.3 Using the baseline information summarised above, and the predicted impacts of the Proposed Development set out in Chapter 12: Terrestrial and Freshwater Ecology and Biodiversity (Document Reference 6.1.12), the following feature-specific objectives have been identified as being integral to achieving the overall aim of delivering a biodiverse and resilient green network and BNG. It is considered that adherence to this EMMF, which will be a requirement of the DCO, will ensure that the objectives are achieved.

Wetland

- **Objective 1** – Reinforce existing designated wetland sites through the establishment of a network of ecologically-valuable wetland habitats, including the enhancement of c.7ha of salt marsh habitat and the creation of c.3ha of new salt marsh habitat, along with 17ha of enhanced reedbed and 7.5ha of new reedbed Priority Habitat; and

- **Objective 2** – Within retained and new wetland habitats, ensure the quality and quantity of habitats is such that it will maintain assemblages of wetland species, including birds, otter, water vole and aquatic invertebrates.

Scrub and Grassland Mosaic

- **Objective 3** – Maintain the overall site-wide habitat mosaic, and associated diverse range of microhabitats and niches, foodplants and nectar sources, to meet the needs of the diverse range of invertebrates present on site; and

- **Objective 4** – Enhance the species and structural diversity of the grassland, bare ground and scrub mosaic to support assemblages of rare plants, bats and birds.

Woodland and Scrub

- **Objective 5** – Protect and enhance the structure and species diversity of c.74ha of woodland and dense scrub habitats, to benefit populations of dormouse, bats, invertebrates and birds; and

- **Objective 6** – Maintain ecological connectivity within and around the Project Site and create functional ecological corridors connecting from the Project Site to the wider landscape.

Public Realm

- **Objective 7** – Integrate biodiversity enhancements within public realm; and

- **Objective 8** – Promote opportunities for environmental education and awareness through sustainable and inclusive access to nature.

3.4 The measures required during the construction-stage and post-completion stage of each development phase to achieve the above aim and objectives are provided in Sections 4 to 7.

Measuring Success

3.5 To measure the success of the implementation of mitigation and management strategies presented in this EMMF, the following criteria will be used for assessment during completion of monitoring activities (for further details, see Section 7):

- In relation to habitats, the quantity and quality of habitat will be measured at an appropriate point using Condition assessment criteria for BNG as well as Priority Habitat Criteria (as applicable at the time of assessment);

- In relation to species/assemblages, the following definition will be used when monitoring species populations. The conservation status of a species is defined[10] as "*the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within the territory*". This is considered 'favourable' when;

  - Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats;

  - The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and

  - There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

- Habitat connectivity will be measured following completion of annual monitoring activities as defined in Section 7, to confirm the presence/absence of features and their functionality for the range of protected species present, including lux levels monitoring for dark corridors and surveys to demonstrate use by target species; and

- In relation to public realm objectives, success will be measured following implementation of the public access and soft landscaping strategy for the public realm areas of the Project Site, using annual monitoring activities as defined in Section 7 to confirm the presence/absence of required features.

[10] By Article 1(i) of the EU *Habitats Directive*

This page has been left blank intentionally

Section 4
Framework Ecological Construction Method Statement

4.1 This section sets out the appropriate working practices and safeguards to be deployed throughout the construction stage of each phase of development, including all associated enabling works, to protect the important ecological features of the Project Site as specified in Chapter 12: Terrestrial and Freshwater Ecology and Biodiversity (Document reference 6.1.12) and discussed in Section 3.

4.2 To demonstrate a comprehensive approach to the protection of habitats and species and demonstrate compliance with all relevant legislation and planning policy, this section consolidates the measures detailed within the species-specific method statements appended to the rear of this EMMF. It includes measures such as ecological supervision, the protection of retained habitats, vegetation clearance and pollution prevention/control, along with feature-specific measures.

4.3 Appendix 3.1: Outline Construction Method Statement (CMS) (Document reference 6.2.3.1) and Appendix 3.2: Outline Construction Environmental Management Plan (CEMP) (Document reference 6.2.3.2) have been produced, which include general mitigation measures to reduce environmental impacts for each phase of development. However, in relation to the avoidance/minimisation of effects on IEFs and prevention of any breaches of legislation, specific reference to the specialist protective measures detailed below should be made.

Risk Assessment of Construction Activities with a Potentially Damaging Effect on Ecological Receptors

4.4 A summary of the important ecological features relevant to the Project Site are presented in Table 4-1 below, with potential risks/hazards to each feature during the construction phase identified. Figure 12.1 (Document reference 6.3.12.1) illustrates the Project Site Areas referred to in column 3 of the table. Full details of the impacts on IEFs and the impact significance are provided in Table 12.10 of Chapter 12: Terrestrial and Freshwater Ecology and Biodiversity (Document reference 6.1.12).

Table 4-1: Ecological Risk Assessment.

Feature (Habitat or Species)	Description	Position Relative to Project Site	Potentially Damaging Activities
Statutory and Non-statutory Designated Sites	Thames Estuary and Marshes SPA/Ramsar; and Medway Estuary and Marshes SPA/Ramsar/SSSI; Darenth Woods SSSI; Inner Thames Marshes SSSI; South Thames Estuary and Marshes SSSI; and West Thurrock Lagoon and Marshes SSSI; Botany Marshes LWS; Ebbsfleet Marshes, Northfleet LWS; Alkerden Lane Pit LWS and Tilbury Marshes LWS	Kent Project Site contains functionally linked land; designated sites within or adjacent to Project Site; designated sites share other ecological or hydrological connectivity to Project Site	Habitat damage/harm/loss by construction machinery/activities; disturbance of habitats and species from noise, vibration, increased human activity (including shipping/ferry movements) and artificial lighting; damage/harm to habitats and species from pollution from run off, groundwater discharges, spillages, dust and vehicle movements; introduction/ spread of invasive, non-native species
Broadleaved semi-natural woodland	Patches of Priority Habitat	Within the Kent Project Site north of Tiltman Avenue, adjacent to the A2 and along the eastern boundary	Habitat damage/harm/loss by construction machinery/activities; damage/harm to habitat from pollution from run off, spillages and dust
Scrub	Extensive mature and colonising scrub	Forming a corridor between the A2 and the River Thames	Habitat damage/harm/loss by construction machinery/activities; damage/harm to habitat from pollution from run off, spillages, dust and vehicle movements; introduction/spread of invasive, non-native species
Semi-improved grassland	Grassland of varying botanical diversity across Swanscombe Peninsula, some areas support nationally scarce plant species	Kent Project Site: Botany marsh east and west, Broadness grasslands and former landfill, Black Duck Marsh, west of Black Duck Marsh, Craylands Pit, north of Tiltman Avenue	Habitat damage/harm/loss by construction machinery/activities; damage/harm to habitat from pollution from run off, spillages, dust and vehicle movements; introduction/spread of invasive, non-native species

Feature (Habitat or Species)	Description	Position Relative to Project Site	Potentially Damaging Activities
Coastal/Floodplain Grazing Marsh	Large area of Priority Habitat	Botany Marsh West within Kent Project Site	Habitat damage/harm/loss by construction machinery/activities; damage/harm to habitat from pollution from run off, spillages, dust and vehicle movements; introduction/spread of invasive, non-native species
Open mosaic on previously developed land	Discrete areas of Priority Habitat	Kent Project Site	Habitat damage/harm/loss by construction machinery/activities; damage/harm to habitat from pollution from run off, spillages, dust and vehicle movements; introduction/spread of invasive, non-native species
Waterbodies (ponds, standing water and ditches)	Extensive ditch network around the Swanscombe Peninsula with associated ponds	Kent Project Site: Bamber Pit, main access track (including tunnel storage area) north of Manor Way Industrial Estate	Habitat damage/harm/loss by construction machinery/activities; damage/harm to habitat from pollution from run off, groundwater discharges, spillages, dust and vehicle movements; introduction/ spread of invasive, non-native species
Swamp (reedbed)	Priority Habitat forming a large area of the Project Site in close proximity to the River Thames	Kent Project Site: Black Duck Marsh, Channel Tunnel Rail Link (CTRL) Wetland and Botany Marsh	Habitat damage/harm/loss by construction machinery/activities; damage/harm to habitat from pollution from run off, groundwater discharges, spillages, dust and vehicle movements; introduction/ spread of invasive, non-native species
River Ebbsfleet	Acts as a wildlife corridor and is linked to reed bed and woodland habitats	Along Eastern boundary of Kent Project Site	Habitat damage/harm/loss by construction machinery/activities; damage/harm to habitat from pollution from run off, groundwater discharges, spillages, dust and vehicle movements; introduction/ spread of invasive, non-native species

Feature (Habitat or Species)	Description	Position Relative to Project Site	Potentially Damaging Activities
Rare plants	Nationally important assemblage of nationally scarce species	Present within the Kent Project Site	Habitat damage/harm/loss by construction machinery/activities; loss of species during habitat clearance; accidental damage/harm by construction machinery/activities; damage/harm from pollution from run off, groundwater discharges, spillages, dust and vehicle movements; introduction/spread of invasive, non-native species
Wintering Wading Bird Assemblage	Supports 22 of the species associated with the nearby SPA/Ramsar sites	Kent Project Site: Existing harbour and pier to north of Swanscombe Peninsula, Botany Marsh West and Black Duck Marsh	Habitat damage/harm/loss; disturbance from noise, vibration and increased human activity; pollution of habitat from run off, groundwater discharges, spillages, dust and vehicle movements, introduction/ spread of invasive, non-native species
Wintering terrestrial bird assemblage	28 species of conservation concern recorded by in low to moderate numbers	Across the Swanscombe Peninsula in reedbed, scrub, pasture and wetland plus habitat along the estuary front	Habitat damage/harm/loss; disturbance from noise, vibration and increased human activity; pollution of habitat from run off, spillages, dust and vehicle movements, introduction/spread of invasive, non-native species
Breeding Bird Assemblage	91 species recorded so far of which 44 are of conservation concern	Kent Project Site: Botany Marsh, CTRL Wetland and Black Duck Marsh; Swanscombe Peninsula scrub and chalk pits	Habitat damage/harm/loss; loss/damage/disturbance of active nests; harm/disturbance to birds/eggs; disturbance from noise, vibration and increased human activity; pollution of habitat from run off, groundwater discharges, spillages, dust and vehicle movements, introduction/spread of invasive, non-native species

Feature (Habitat or Species)	Description	Position Relative to Project Site	Potentially Damaging Activities
Bats	Minimum of ten bat species recorded within the Project Site; 20 trees with bat roost potential; 23 buildings with bat roost potential including two with confirmed roosts; ten tunnels with roosting, swarming and/or hibernation potential	Foraging bats widespread throughout Kent Project Site; potential roost trees in woodland north of Tiltman Avenue and Station Quarter South; potential/ confirmed roost buildings generally in Northfleet Ind. Est; tunnels in Craylands Pit	Habitat damage/harm/loss; loss/damage/ disturbance of roosts; harm/disturbance to bats; collision risk from new structures; disturbance from noise, vibration, increased human activity and artificial lighting
Dormouse	Breeding and foraging within woodland and scrub	Kent Project Site: Black Duck Marsh, sportsground, Bamber Pit, former landfill, Station Quarter north and south	Habitat damage/harm/loss/ fragmentation; loss/damage/disturbance of nests; harm/disturbance to dormice; disturbance from noise, vibration, increased human activity and artificial lighting; pollution of habitat from dust and vehicle movements
Water Vole	Breeding and foraging within marsh/reedbed areas and connected ditches	Kent Project Site: Botany Marsh East and West	Habitat damage/harm/loss/ fragmentation; loss/damage/disturbance of burrows; harm/disturbance to individuals; disturbance from noise, vibration, increased human activity and artificial lighting; pollution of habitat from run off, groundwater discharges, spillages, dust and vehicle movements, introduction/ spread of invasive, non-native species
Otter	Confirmed presence within Kent Project Site	Black Duck Marsh, assumed presence within other wetland/aquatic habitats inc. River Ebbsfleet	Habitat damage/harm/loss/ fragmentation; loss/damage/ disturbance of holts; harm/disturbance to individuals; disturbance from noise, vibration, increased human activity and artificial lighting; pollution of habitat from run off, groundwater discharges, spillages, dust and vehicle movements, introduction/ spread of invasive, non-native species

Feature (Habitat or Species)	Description	Position Relative to Project Site	Potentially Damaging Activities
Reptiles	Large populations of common lizard, grass snake and slow worm	Kent Project Site: Black Duck Marsh, Broadness Grassland, SW tip, NE tip, Station Quarter South, Bamber Pit, Craylands Pit and former landfill	Habitat damage/harm/loss/ fragmentation; harm/disturbance to individuals; disturbance from noise, vibration, increased human activity and artificial lighting; pollution of habitat from run off, groundwater discharges, spillages, dust and vehicle movements, introduction/ spread of invasive, non-native species
Harvest mouse	Assumed presence within Kent Project Site	Broadness Grasslands, Black Duck Marsh and Botany Marsh	Habitat damage/harm/loss/ fragmentation; harm to individuals; disturbance from noise, vibration, increased human activity; pollution of habitat from dust and vehicle movements
Amphibians	Assemblage present within wetlands and waterbodies	Kent Project Site: wetlands and waterbodies within Swanscombe Peninsula	Habitat damage/harm/loss/ fragmentation; harm to individuals; disturbance from artificial lighting; pollution of habitat from run off, groundwater discharges, spillages, dust and vehicle movements, introduction/spread of invasive, non-native species
Invertebrates	Assemblage of national importance within terrestrial and aquatic habitats, inc. at least 100 species of conservation concern	Kent Project Site: mosaic of habitats across Swanscombe Peninsula, including brownfield, wetland, grassland and scrub	Habitat damage/harm/loss/ fragmentation; disturbance from artificial lighting; pollution of habitat from run off, groundwater discharges, spillages, dust and vehicle movements, introduction/ spread of invasive, non-native species

Legal/Licensing Considerations

4.5 A summary of the legislation relevant to the above features in relation to development is provided in Chapter 12: Terrestrial and Freshwater Ecology and Biodiversity (Document reference 6.1.12) and within the species-specific annexes to the rear of this EMMF. Where required, the full text of relevant legislation should be referred to.

4.6 Bats, dormice and otter are European Protected Species listed on Schedule 2 of The Conservation of Habitats and Species Regulations 2017 (as amended), as well as being fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). The protection extends to their habitats and disturbance of the animals, as well as harming the animals themselves. In the current legislative context, offences relating to these aspects relate to activities which could impair breeding or affect the viability of a population or metapopulation.

4.7 Water vole is fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), which protects the animals themselves from injury/harm or disturbance and their habitat from damage and destruction.

4.8 Several bird species recorded at the Project Site are listed on Schedule 1 of the *Wildlife and Countryside Act* 1981 (as amended), which protects the birds, their eggs, nests and young from injury/harm, damage, destruction and disturbance while nests are active.

4.9 Licensing requirements relevant to each species/group are provided within specific annexes to the rear of this EMMF.

4.10 The three species of reptile found at the Project Site are protected from harm/injury under Schedule 5, Section 9 (1) of the Wildlife and Countryside Act 1981 (as amended), however, the protection afforded to them does not extend to protection of their habitat or disturbance of individual animals.

4.11 A number of non-native invasive plant species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Invasive Alien Species (Enforcement and Permitting) Order 2019 are present within the Project Site. These pieces of legislation state that it is an offence to plant or otherwise causes to grow in the wild any species of plant which are listed on the Schedules. In addition, Japanese knotweed (*Fallopia japonica)* and giant hogweed (*Heracleum mantegazzianum)* are also identified as controlled waste under the *Environmental Protection Act* 1990, whereby plant material and soils likely to contain these species is be disposed as controlled waste, and removal and transport offsite must be undertaken by a licenced carrier and disposed of at a licenced facility.

4.12 Of the other species recognised as IEFs, the Project Site supports several Species of Principal Importance as defined by Section 41 of Natural Environment and Rural Communities (NERC) Act 2006. Whilst this does not equate to strict legal protection of individuals of a species, Section 40 of the NERC Act places a duty on decision-makers such

as public bodies, including local and regional authorities to have regard to the conservation of such species listed on Section 41, when carrying out their normal functions.

Construction Phase Control Measures

4.13 Based on the potentially damaging activities column in Table 4-1 above, the following control measures been identified as applying to multiple IEFs present within the Project Site. Specific detail for each measure and how it applies to each IEF is provided in the species-specific mitigation strategies provided as annexes to this document. The following sections provide a summary of how the requirements of each control measure and the species that must be considered when implementing the control measures.

4.14 Adherence to these details will be secured as this EMMF will be a requirement of the DCO. Furthermore, details of environmental controls and safe working practices will be provided within the CEMP, which will be a requirement of the DCO.

Toolbox Talks and Supervision

4.15 All contractors and personnel working on the Project Site either at the pre-works clearance phase or engaged in construction activities will be given pre-commencement 'toolbox talks' regarding the ecologically sensitive features present within the Project Site and measures required to avoid/minimise impacts. This will form an integral part of the general site induction process for all site personnel, as well as specific briefings to be given in certain sensitive areas where the potential risk of encountering protected species or habitats is higher (such as along the shoreline/harbour areas where wading birds are likely to be present).

4.16 Location- and species-specific 'toolbox talks' will be undertaken where contractors will be made aware of the potential presence of protected and notable species on-site. This will be delivered by a suitably experienced and licenced ecologist ECoW. In all cases, these talks will cover the legal protection and working practices to avoid harming these protected and notable species. The contractors will be informed that if any protected species are found when an ECoW is not in attendance, they must not be handled, works must stop immediately in this area (where safe to do so) and advice must be sought immediately from the ecologist.

4.17 Construction activities affecting key habitats and species to be directly supervised by an ECoW, with a licenced ecologist used when protected species are potentially present.

4.18 All construction activities around retained trees, hedgerows or woodlands to be delivered in accordance with industry standard advice from a suitably experienced arboriculturist, as detailed within an Arboricultural Method Statement (AMS), to be secured as a requirement of the DCO. This may include use of no-dig technologies where Root Protection Areas (RPA) conflict with proposed hard surfaces, such as roads, footpaths and other hard landscaping

Protective Fencing and Buffer Zones

4.19 Ecological Protection Zones (EPZs) will be established around retained habitats, through use of temporary exclusion barriers (such as tree protection and Teflon fencing) and appropriate signage, with all construction activities including incursion from construction vehicles and storage of materials excluded. EPZs will be delineated by protective fencing, with fencing around retained trees to be installed in accordance with BS 5837: 2012 '*Trees in Relation to Design, Demolition and Construction - Recommendations'*, or as prescribed within an AMS to be secured by way of a DCO requirement.

4.20 In relation to retained watercourses within and near to the construction footprint, appropriate buffers as determined by the Environment Agency will be required, to be demarcated using EPZs.

4.21 EPZs will also be required to protect the habitat of the following IEFs: wintering and breeding birds; roosting bats; dormice; water vole; otter; reptiles; harvest mice; amphibians; and invertebrates.

4.22 Protective hoarding will also be required around retained wetland habitats and habitats known to support disturbance-sensitive wintering birds, to minimise visual and aural disturbance and disturbance from artificial lighting. An indication of the layout of protective hoarding is provided on Figure 12.44 (Document reference 6.3.12.44).

4.23 Reptile exclusion fencing must also be installed prior to trapping and translocation of reptiles from within the construction footprint.

4.24 The water vole receptor site will be fenced using water vole-proof fencing, to prevent natural colonisation in advance of translocation.

4.25 Any areas of invasive, non-native plant species listed on Schedule 9 of the *Wildlife and Countryside Act* 1981 (as amended) will also require fencing, to prevent unlawful spread of such species during the construction phase. The desk study and ecological surveys of the Project Site have recorded the presence of several Schedule 9 plant species, including: Japanese knotweed, giant hogweed, Himalayan balsam (*Impatiens glandulifera*) and wall cotoneaster (*Cotoneaster horizontalis*) at various locations within the Project Site. Fencing of giant hogweed is also likely to be required as this presents a health and safety hazard for site personnel. Further details in relation to the control and management of invasive plant species is provided in Annex EDP 11.

Pre-commencement Surveys

4.26 Specific pre-commencement surveys to inform exclusion activities will be required for the following IEFs: wintering and breeding birds; roosting bats; dormice; water vole; otter and harvest mice. Detailed surveys for invasive plant species will also be required, so that activity-specific control and treatment measures can be identified. The details of the timing and frequency of such pre-commencement surveys are provided in the Annex EDP 1 to 11 at the rear of this EMMF.

4.27 Prior to any works commencing on the Project Site, and as a minimum within 6 months (to allow time to receive any additional protected species licences that may be required), a general walkover survey is to be undertaken by a suitably experienced ECoW to ensure that the status of the Project Site for habitats and species has not significantly altered. The ECoW is to review the validity of baseline ecology surveys for the Project Site in accordance with industry guidance, and provide a statement justifying need/scope of update surveys (as appropriate) to inform mitigation.

Sensitive Timing of Works

4.28 Given the range of protected and notable species present within the construction footprint of the Project Site, careful programming of potentially disturbing activities and habitat clearance will be required to maintain animal welfare standards, prevent statutory offences from occurring and avoid delays to the construction schedule. In some cases, highly sensitive periods for a number of species overlap, e.g. avoidance of the winter period for bats, dormice, reptiles and wintering birds. However, in other cases timetables can conflict, e.g. carrying out habitat clearance during the summer period may avoid harm to reptiles but may have a greater impact on nesting birds.

4.29 Annex EDP 12 provides optimal timings for works to be carried out that may affect the habitat of each protected/notable species within the Project Site; however, based on the extent of habitat removal, transitory nature of some species and the ability of some species to be able to colonise new habitat, flexibility and adaptation to changing site conditions will be key to adherence to the programme of works. The regular presence of an ECoW at the site during the habitat clearance phase will be key to managing risk. It will be vital that the ECoW and site management team maintain clear and regular lines of communication during the construction phase to ensure any new ecological constraints are controlled and managed appropriately.

Lighting

4.30 The detailed lighting strategy will be designed in accordance with best practice guidance[11], and will adhere to the following principles, to minimise disturbance to light-sensitive species, including wintering birds and other nocturnal bird species, bats, dormice, otter and invertebrates:

- The use of artificial lighting is to be limited to the essential minimum throughout the Project Site, and any lighting to be used should avoid upward pointing lights, with the spread of light being kept near to or below the horizontal;

- Any illuminated site compounds will be sited away from all features of ecological interest described in this document, namely the retained trees and hedgerows on-site;

[11] Bat Conservation Trust and the Institute of Lighting Proposals, Guidance Note 08/18, *Bats and artificial lighting in the UK*

- Where required, the times which lights are on should be controlled to avoid lights illuminated between, and including, dusk and dawn hours between March and November inclusive, to allow some dark periods for bats, birds and other wildlife; and

- LED lighting should be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability. Directional lighting/shielding of lights with accessories such as hoods, covers, louvers and shields is to be used throughout to avoid excessive light spill.

Noise

4.31 To minimise disturbance to noise-sensitive bird species within wetland habitats, including redshank (the most sensitive species to aural disturbance), construction works will adhere to the following principles[12]:

- Works within 300m of the estuary or other functionally linked habitat (i.e. Black Duck and Botany Marshes) and visible from that habitat or causing in excess of 55dB will be timed to take place during the summer months;

- Redshank were present along the estuary only, therefore the peak noise event limit can be raised to 70dB at the waterbody in the south of Black Duck Marsh;

- Non-essential construction traffic should not pass within 300m of the estuary front; and

- Access by construction workers to the estuary front will be restricted within 500m of visible wetland habitats.

Exclusion, Translocation, Displacement and Destructive Search

4.32 Specific translocation, exclusion and/or displacement activities are required for several IEFs at the Project Site, including roosting bats (Annex EDP 2), dormice (Annex EDP 3), water vole (Annex EDP 4), reptiles (Annex EDP 8), amphibians (Annex EDP 7) and invertebrates (Annex EDP v9). The methods to be adopted for each IEF are provided in the annexes to the rear of this EMMF, with a summary provided below.

Exclusion and Translocation

4.33 Trapping and translocation of water vole, amphibians and reptiles will be required to move individuals away from harm and disturbance during works within the construction footprint. Prior to the programmes of trapping and translocation commencing, appropriate receptor sites will be available to move animals into (either on- or offsite, as detailed within each species-specific appendix). In the case of reptiles, fencing to exclude animals from entering the construction footprint will also be required (as above and within Annex EDP 8).

[12] Cutts, N., Hemingway, K. and Spencer, J. (2013) *Waterbird Disturbance Mitigation Toolkit Informing Estuarine Planning and Construction Projects*. Institute of Estuarine and Coastal Studies (IECS)

4.34 Translocation of rare plants will also be carried out, using removal and relocation of substrate/turves known to support key species, as identified within the relevant annexes to this EMMF. Translocation of invertebrates is not proposed as such, although it is anticipated that relocation of substrate/turves from within the development footprint is likely to result in some transportation of invertebrate eggs, larvae, pupae or adults.

Displacement

4.35 In some instances, it is either not possible to trap and translocate individuals of a species or moving animals away from harm is more effectively and humanely achieved through displacement. For the purposes of this document, displacement is defined as the passive relocation of animals away from potential/confirmed habitat in order to encourage animals to move into adjacent habitat[13], this is also referred to as 'persuasion'[14] for dormice. The key to achieving successful displacement is the presence of suitable habitat connected to that habitat being removed. If this is not present, then trapping and translocation is the only available option. In some cases, due to the presence of widespread habitat within the Project Site for some species (such as water voles and reptiles), displacement will be used in combination with trapping and translocation, to ensure populations do not become isolated.

4.36 Displacement activities will be carried out for wintering birds, breeding birds, roosting bats, dormice, water voles, otter, reptiles, harvest mice and invertebrates.

4.37 Prior to the programmes of trapping and translocation commencing, appropriate receptor sites will be available (either on- or offsite as detailed within each species-specific appendix).

Destructive Search and Habitat Clearance

4.38 After trapping, translocation and/or displacement is completed, a destructive search (see below for further details) and habitat clearance will follow to ensure the habitat is unsuitable and is available for construction works to commence.

4.39 Habitat clearance outside of those areas that require the implementation of specific measures for protected or notable species will be carried out as directed by the ECoW. Vegetation removal for temporary construction access to be limited as far as possible, and any areas to be affected to be agreed, in advance, with the ECoW.

4.40 Should construction in areas of cleared habitat not commence immediately, such areas should be maintained as bare ground, free of vegetation (not allowed to develop into ephemeral/ruderal vegetation) to remove suitable habitat for ground-nesting birds. In addition, measures such as bird scarers and/or temporary installation of reflective tape on sticks, and the stick locations then rotated every week, will be implemented across open

[13] As adapted from the Third Edition of the *Water Vole Conservation Handbook* (2011) by Strachan, R., Moorhouse, T. and Gelling, M.

[14] Bright, P., Morris, P. and Mitchell-Jones, T (2006) *The Dormouse Conservation Handbook, Second Edition.* English Nature, Peterborough

areas from March through to August inclusive to deter ground nesting birds. In addition, the ECoW will walk construction areas prior to work commencing to confirm absence of nests before works proceed.

Pollution Prevention Measures

4.41 The following general pollution prevention measures will be implemented, with specific detailed measures provided within the outline CEMP and outline CMS:

- Dust suppression measures to prevent site-derived dust being deposited on- and off-site; and

- Surface-water run-off prevention measures (for example temporary settlement lagoons and silt traps) to prevent run-off and accidental spillages entering watercourses and waterbodies.

This page has been left blank intentionally

Section 5
Habitat Retention, Enhancement and Creation (Construction Stage)

5.1 This section sets out the habitat creation and enhancement to be completed within the construction phase (up to the first available planting season following completion of construction) to ensure that appropriate measures to provide biodiversity net gain are implemented from the early stages of the scheme.

Designing for Biodiversity and Intrinsic Mitigation

5.2 The design and layout of the Proposed Development has been refined through various iterations to ensure that: potentially significant ecological effects are avoided or minimised; there is a net gain in biodiversity in accordance with local and national planning policy; and the local community's health and wellbeing is promoted by access to nature.

5.3 To achieve this, biodiversity sensitivities have been fed into the design of the scheme from an early stage. The Proposed Development as illustrated by the Illustrative Masterplan (Document reference 6.3.3.1), Illustrative Landscape Masterplan (Document reference 6.3.11.15), Landscape Strategy (Document reference 6.2.11.7), and Ecology Mitigation Strategy: Species Measures (Document reference 6.3.12.44), therefore includes the following intrinsic mitigation measures:

- Retention of the brownfield character of the Kent Project Site through creation of a mosaic of bare ground, scrub and open grassland with varying structure and species composition;
- Creation and enhancement of salt marsh habitats around the perimeter of the Swanscombe Peninsula, connecting inland to the River Ebbsfleet, Botany Marsh and Black Duck Marsh to provide a network of interconnected wetlands;
- Through provision of green infrastructure, ecological connectivity will be maintained, enabling species movement throughout the Kent Project Site in the long term;
- Integration of biodiversity features within the Resort, including brown and green roofs, a native, species-diverse planting palette, rain gardens and extensive tree planting; and
- A drainage strategy which improves water quality through the SuDS treatment, whilst providing opportunities for biodiversity through the creation of new aquatic habitats.

5.4 In doing so, the main broad habitats to be provided across the Project Site post-completion will include the following, as illustrated within the Illustrative Landscape Masterplan (Document reference 6.3.11.15), Landscape Strategy (Document reference 6.2.11.7) and Figure 12.44 (Document reference 6.3.12.44):

- Native broadleaved woodland and mature, dense scrub;
- Salt marsh;
- Reedbed, ditches and open water;
- Open grassland;
- Permanent, semi-permanent and ephemeral waterbodies; and
- Hedgerows.

5.5 Collectively, these habitats will maintain a site-wide mosaic of habitats to the benefit of a wide range of species.

5.6 Indicative locations and planting designs for areas of enhanced and new habitat are provided in Appendix 11.7, Landscape Strategy (Document Reference 6.2.11.7).

Habitat Enhancement

5.7 Further to the above, a suite of measures to enhance retained habitats will be undertaken. Full details are provided within Appendix 11.7: Landscape Strategy (Document reference 6.2.11.7) and Section 6 of this EMMF:

- Existing areas of dense scrub and rank grassland will be brought into active management to replicate the successional nature of brownfield habitats, to benefit the diverse invertebrate assemblage present at the Project Site and a variety of species at the Project Site that are insectivorous;
- Enhancement of mature scrub habitats using infill planting with a diversity of native species of local provenance favourable to dormice and other wildlife, to maximise structural and species diversity;
- Improvements in water quality within retained waterbodies to benefit aquatic and riparian species, including aquatic invertebrates, fish populations, water vole, otter and amphibians; and
- Enhancement of existing grasslands to increase species diversity, provide habitat for rare plant species and create a varied sward structure.

Biodiversity Net Gain Assessment

5.8 To objectively quantify the net balance in biodiversity across the Project Site as a result of the habitat retention, creation and enhancement measures discussed above, coupled with

the unavoidable habitat losses to make way for the Proposed Development, a BNG Assessment has been completed using the Department for the Environment Farming and Rural Affairs' (Defra) Biodiversity Metric 2.0 ('beta test' version, as released for public consultation in July 2019[15]).

5.9 The findings are presented in full within Appendix 12.2: BNG Assessment (Document reference 6.2.12.2) submitted along with the application and summarised within Table 5-1 below.

Table 5-1: Headline results of Biodiversity Net Gain Assessment.

	Habitat Units
Total Net Unit Change	-829.98 (net loss)
Total Net % Change	-24.78% (net loss)

5.10 The calculations demonstrate that on-site mitigation alone will not be sufficient to meet national and local policy requirements, nor London Resort Company Holdings aspirations, for a biodiversity net gain. Therefore, a significant quantum of additional offsite land is being sought to compensate for unavoidable impacts and provide an overall enhancement for protected and notable species populations. Further details are provided in Section 6 of this EMMF, Appendix 12.2: BNG Assessment (Document reference 6.2.12.2) and Appendix 12.10: General Principles for Offsite Ecological Mitigation (Document reference 6.2.12.10).

Public Access

5.11 The London Resort presents a unique opportunity to engage Resort visitors from across the world in environmental awareness and education, through sustainable and inclusive access to nature. However, public access will be managed within certain habitats to prevent disturbance to ecologically sensitive habitats and species. The measures proposed to manage access and recreation are detailed within Appendix 11.8 LMP (Document reference 6.2.11.8) and include the following:

- A network of trails and footpaths are included within areas of Green Infrastructure (GI). The type of trail/path will to some extent determine the amount of recreational activity that can be tolerated within certain areas of GI. For example, mown grass and compacted/hoggin pathways will be used at the periphery of the saltmarsh at the northern tip of the Swanscombe Peninsula to limit access whereas wider hardstanding paths will be used adjacent to the Resort away from sensitive habitats, e.g. Pilgrim's Way;

- New boardwalks and jetties will be built through new wetland habitats, with designed landscape buffers (such as reedbed and wet woodland), to improve public access at the same time as minimising disturbance;

[15] http://publications.naturalengland.org.uk/publication/5850908674228224

- Fencing, screening and creation of other natural features (e.g. ditches) to prevent public access to the most sensitive habitats (e.g. intertidal habitats);

- Viewing platforms, hides and interpretation boards to raise awareness of visitors to the unique landscape and ecology of the Swanscombe Peninsula;

- Environmental education events for Resort visitors, local residents and schools;

- Maintenance of all publicly accessible areas (outside of the Resort), to address potential negative effects of recreation, such as littering, trampling and dog fouling; and

- Regular monitoring of all publicly accessible areas outside the Resort, to ensure recreational activities are being appropriately controlled and managed.

5.12 The quantum of public open space and GI offers sufficient flexibility to provide recreational opportunities for Resort visitors while also retaining, enhancing and creating a network of wildlife rich habitats.

Feature-specific Measures for Species/Assemblages

5.13 In addition to the intrinsic mitigation measures proposed for the IEFs described in paragraph 5.3, additional secondary mitigation measures will be required to address those effects which cannot be avoided or minimised using inherent mitigation alone. Feature-specific measures can include a combination of habitat creation, enhancement and management activities.

5.14 Details of the mitigation measures are provided in Annex EDP 1 to 11 to the rear of this EMMF, Figure 12.44 (Document reference 6.3.12.44), Figure 12.45 (Document reference 6.3.12.45) and Section 6, which provides the landscape management principles, with a summary of these activities provided below.

Rare Plants

5.15 To maintain and enhance the rare plant assemblage within the Kent Project Site in the long-term, the following activities will be carried out:

- As summarised in Section 4, translocation of plant species typical of more stable plant communities through excavation of soil or removal of turves containing rhizome, seed bank and/or mycorrhizal network to receptor sites;

- Management of retained terrestrial habitats to achieve a successional mosaic of habitats ranging from bare or sparsely vegetated ground, through open grassland to dense scrub, to create continuity of suitable conditions for rare plants typical of disturbed habitats;

- Management of wetland habitats to control scrub and reedbed growth, maintain areas of open water, create a diversity of vegetative structure and improve water quality; and

- Regular monitoring to measure success of management actions to ensure rare plant assemblage is maintained and enhanced.

5.16 As described in Section 3 of the Ecological Baseline Report (Document reference 6.2.12.1), no rare plant assemblages are present within the Essex Project Site therefore no feature-specific measures are proposed.

Birds

5.17 To maintain and enhance the wintering, wading and breeding bird assemblages within the Kent Project Site in the long-term, the following activities will be carried out:

- Off-site habitat creation totalling at least 30ha of grazing marsh and 2ha reedbed habitats for wintering waterfowl and waders (see Document reference 6.2.12.10);

- Rotational management of habitats to create a diversity of age classes and structure, primarily important for scrub and wetland features to prevent natural succession;

- Improving water quality within wetland habitats to promote a diversity of invertebrate and fish prey for wetland birds;

- Creation of habitat within public realm to benefit bird species tolerant of urban conditions, including brown/green roofs, soft landscaping using native tree and shrub planting and installation of suitable nesting features, such as dense shrub beds and nest boxes;

- Minimisation/avoidance of use of herbicides and pesticides in maintenance activities outside of the resort;

- Sensitive lighting design around the Resort edges to avoid disturbance of nocturnal and crepuscular species; and

- An appropriate monitoring strategy of retained and created habitat, as well as general monitoring of habitats to ensure they remain optimal.

5.18 As stated in the Ecological Baseline Report (Document reference 6.2.12.1), no important bird assemblages are present within the Essex Project Site therefore no feature-specific measures are proposed.

Bats

5.19 To maintain and enhance the bat assemblage within the Kent Project Site in the long-term, the following activities will be carried out:

- Installation of bat boxes/roosting features in retained habitat and on new buildings and structures, including within the buildings at the edge of the Resort, adjacent to suitable connecting habitat, and within new bird hides;

- Planting of new trees, scrub and woodland, to be managed to allow formation of natural bat roosting features through natural decay processes;

- Management of retained and new habitats to encourage a diversity of vegetative structure and plant species, which will in turn encourage a diversity of invertebrate species for the foraging bat assemblage to prey upon;

- Maintenance and creation of habitat connectivity within and around the Project Site using habitat buffers and landscaped corridors;

- Sensitive lighting design within areas of GI and around the Resort edges, incorporating dark corridors suitable for foraging and commuting bats; and

- Regular monitoring of new roost features and dark corridors, as well as post-construction activity monitoring and general monitoring of habitats to ensure they achieve the required diversity of species and structure.

5.20 As stated in the Ecological Baseline Report (Document reference 6.2.12.1), no important assemblages of bats are present within the Essex Project Site therefore no feature-specific measures are proposed.

Dormouse

5.21 To maintain and enhance the dormouse population within the Kent Project Site in the long-term, the following activities will be carried out:

- Installation of minimum 50 dormouse boxes, to enhance nesting habitat provision within the Kent Project Site and enable future monitoring (approximate location shown on Figure 12.44 (document reference 6.3.12.44);

- Retained habitats to be subject to infill planting to enhance species diversity and structure;

- Retain and strengthen habitat connectivity for dormice within the Kent Project Site and into the wider landscape;

- Appropriate management of retained and new habitat, to maintain year-round habitat availability for dormice;

- Sensitive lighting design to retain dark corridors and prevent disturbance of dormouse habitat from artificial light spill; and

- Appropriate monitoring strategy of dormouse boxes, as well as general monitoring of habitats and dark corridors to ensure conditions are optimal.

5.22 As stated in the Ecological Baseline Report (Document reference 6.2.12.1), dormice are not present within the Essex Project Site therefore no feature-specific measures are proposed.

Water Vole

5.23 In addition to the creation of water vole habitat within the Kent Project Site and the programme of trapping and translocation detailed in Section 5, the following additional mitigation is required to maintain the water vole population at a favourable conservation status in the long-term:

- Appropriate future management of wetland habitats to retain areas of open water, species-rich bankside vegetation for foraging and suitable burrow-forming banks;

- Monitoring and management of the American mink (*Neovison vison*) to prevent predation of water voles;

- A sensitive lighting design to prevent disturbance of water voles by artificial light spill; and

- An appropriate monitoring strategy of retained and created water vole habitat, as well as general monitoring of habitats to ensure they remain optimal.

5.24 As stated in the Ecological Baseline Report (Document reference 6.2.12.1), water voles are not present within the Essex Project Site therefore no feature-specific measures are proposed.

Otter

5.25 The following additional mitigation measures are proposed to retain the otter population within the Kent Project Site at a favourable conservation status:

- Construction of two artificial otter holts within new wetland habitats: one in Botany Marsh East and one in Black Duck Marsh;

- Monitoring of water levels within retained and new habitats to ensure they remain at appropriate levels;

- Enhancement of the river corridor within the Ebbsfleet Valley to improve connectivity and habitat quality;

- A sensitive lighting design, including dark corridors along ditches and the River Ebbsfleet, to minimise disturbance to foraging and commuting otters;

- Improving water quality within retained and newly created wetlands, to promote a sustainable fish population and therefore a supply of prey for otters; and

- Monitoring of holts, habitats and dark corridors to ensure suitability for otters.

5.26 As stated in the Ecological Baseline Report (Document reference 6.2.12.1), otter are not present within the Essex Project Site therefore no feature-specific measures are proposed.

Reptiles

5.27 The following additional mitigation measures are proposed to enable the reptile population to be retained at a favourable conservation status:

- Management of retained and newly created habitats to encourage structural and species diversity, to provide year-round habitat availability for all reptile species present at the Kent Project Site;

- Creation of species-specific features including grass snake breeding piles and hibernacula, in areas where such features may be lost during construction or as a result of management activities (e.g. removal of scrub to provide open habitats may result in a loss of sheltering/resting opportunity);

- Off-site habitat creation and enhancement for reptiles will be incorporated within the BNG strategy, with appropriate long-term management; and

- Monitoring of species-specific features as well as general monitoring of retained and enhanced habitats, both on- and off-site, for their suitability for reptiles.

5.28 As stated in the Ecological Baseline Report (Document reference 6.2.12.1), reptiles are not present within the Essex Project Site therefore no feature-specific measures are proposed.

Harvest Mouse

5.29 In addition to the inclusion of habitats suitable for harvest mice within inherent mitigation, the following measures will be implemented to ensure retention of the harvest mouse population within the Kent Project Site:

- Management of grassland to encourage a rough, tussocky sward, cut on rotation;

- Management of wetland habitats to encourage tall riparian, marginal and reedbed features; and

- General monitoring of habitats to ensure suitability for harvest mouse.

5.30 As stated in the Ecological Baseline Report (Document reference 6.2.12.1), harvest mice are not present within the Essex Project Site therefore no feature-specific measures are proposed.

Amphibians

5.31 Several waterbodies and wetland habitats suitable for amphibians are included within inherent mitigation, with the following additional measures also included:

- Management schemes established for Black Duck Marsh and Botany Marsh to ensure continuation of open water in ditches and ponds and to control scrub encroachment;
- Creation of a network of new ponds throughout the Kent Project Site suitable for amphibians, including across Broadness Grassland and within Bamber Pit;
- Measures to encourage a structurally complex grassland sward in Broadness Grassland, as detailed for reptiles, will also benefit terrestrial amphibians;
- Creation of log/brash piles and hibernacula as detailed for reptiles will also benefit terrestrial amphibians especially where these are located close to water bodies;
- Such areas will be under ongoing management and maintenance sensitive to amphibians on an annual basis; and
- General monitoring of habitats to ensure suitability for amphibians.

5.32 As stated in the Ecological Baseline Report (Document reference 6.2.12.1), no important assemblages of amphibians are present within the Essex Project Site therefore no feature-specific measures are proposed.

Invertebrates

5.33 The retention and enhancement of habitats to benefit a diverse assemblage of invertebrates is included within inherent mitigation, with the following additional measures also implemented:

- Creation of a fine scale mosaic of successional habitats ranging from bare or sparsely vegetated ground, through open grassland to dense scrub to benefit terrestrial invertebrates, as described above for rare plants;
- Creation of a complex microtopography through introduction of rubble piles, chalk bunds and seasonally wet shallow pools;
- Management of existing and new wetland habitats to benefit aquatic invertebrates, including management of scrub and reedbed habitats and improvements to water quality;
- Creation and maintenance of brown roof habitats to replicate some of the existing brownfield habitat;

- Installation of specialist invertebrate habitat features, such as 'bug hotels' within public realm and other GI;

- Minimisation/avoidance of use of herbicides and pesticides in maintenance activities outside of the resort; and

- Appropriate monitoring strategy to ensure management activities are suitable.

5.34 As stated in the Ecological Baseline Report (Document reference 6.2.12.1), no important assemblages of invertebrates are present within the Essex Project Site therefore no feature-specific measures are proposed.

Invasive Plant Species

5.35 The presence of invasive, non-native plant species within retained habitat areas presents a biosecurity risk for future management and maintenance activities, as well as a potential health and safety hazard (in the case of giant hogweed) for contractors, surveyors and visitors.

5.36 Ongoing control, management and monitoring of invasive plant species populations within retained habitats (as detailed within Annex EDP 11) will be required to ensure they are not allowed to spread within the Project Site post-construction or are eradicated. Management and monitoring will also account for the introduction of invasive plant species into new areas of the Project Site through a variety of pathways (such as wind and water transmission).

5.37 As stated in the Ecological Baseline Report (Document reference 6.2.12.1), invasive, non-native plant species are not present within the Essex Project Site therefore no feature-specific measures are proposed.

Section 6
Habitat Creation and Management Principles

6.1 This section summarises the management that will be undertaken for the retained and created habitat and landscape features to achieve each of the objectives identified in Section 3 of this EMMF, which should be read in conjunction with Appendix 11.7: Landscape Strategy (Document reference 6.2.11.7), Appendix 11.8: Landscape Management Plan (Document reference 6.2.11.8) and Figures 12.44 and 12.45 (Document reference 6.3.12.44 and 6.3.12.45). Full details of the precise management and maintenance prescriptions within the establishment phase will be provided within the LMP for each development phase, which can be secured through a DCO requirement. However, it is intended that the below will provide a framework to guide future LMPs.

6.2 The following habitats will be enhanced or created as part of the Proposed Development:

- Native hedgerows;
- Woodland and dense scrub;
- Scattered scrub and rank grassland;
- Open grassland and sparse vegetation;
- Bare/disturbed substrate and hardstanding;
- Saltmarsh;
- Reedbed/marsh;
- Permanent, semi-permanent and ephemeral waterbodies;
- Existing watercourses/wet ditches;
- Proposed watercourses/wet ditches;
- Buildings with green roofs;
- Buildings with brown roofs;
- Shrubs and herbaceous planting;
- Lawns;
- Pictoral meadow planting; and

- Swales, rain gardens and other water features.

6.3 In addition, the species-specific measures to be created include:

- Bird nesting boxes;
- Bat roosting boxes and other roosting features;
- Dormouse boxes;
- Grass snake breeding piles;
- Reptile and amphibian hibernacula; and
- Invertebrate features, including rubble piles and chalk bunds in open mosaic habitats, brown roofs using substrate removed from the Project Site, and 'bug hotels' within public realm areas.

6.4 Except where species-specific habitat creation is required prior to commencement of habitat clearance at the Project Site (for example for water voles, rare plants and invertebrates), the establishment and management regime will begin within each phase in the first planting season following commencement of construction within that phase (Year 1), and will require subsequent monitoring and review of all operations as required.

Habitat Specific Principles and Outline Prescriptions

6.5 Appendix 11.7: Landscape Strategy (Document reference 6.2.11.7) for the Project Site divides the landscape into defined Zones, some of which consist nearly entirely of existing ecologically valuable habitats to be retained, whilst others contain both existing and new landscapes, and some contain only new landscapes being created as part of the core of the Resort.

6.6 The following zones are primarily ecologically valuable habitats or contain both retained habitats and new landscape/amenity habitats:

- Black Duck Marsh;
- Broadness Marsh;
- Salt Marsh Extension;
- Botany Marsh;
- Ferry Terminal and Wharf Area;

- Ingress Park Gateway Area;
- A2 Corridor;
- Central Ebbsfleet Area;
- Sports Ground Pit and Bamber Pit; and
- Staff Accommodation Area, Training Facility and Visitor Centre.

6.7 For those habitats to be retained, the habitat specific principles and outline prescriptions provided below are to be applied. For new features designed primarily for landscape/amenity benefits, management and maintenance prescriptions are provided in Appendix 11.8: Landscape Management Plan (Document reference 6.2.11.8).

Hedgerow and Woodland Belt Planting

6.8 New woodland planting covering c.3.67ha and c. 3.2km of (double) hedgerow planting will augment the existing boundary vegetation, as well as creating new linear habitat features along the east, south and west boundaries. Such linear features will provide foraging and commuting corridors for bats and dormouse, as well as nesting and foraging habitat for birds. The use of a variety of native plant species including fruiting and flowering species will encourage a diversity of invertebrates.

6.9 The hedgerow and woodland belt planting will address the following objectives:

- Visual, noise and light filtering of the Resort;
- Increase the quantity and quality of native tree and hedgerow planting within the Project Site; and
- Improve habitat connectivity and availability for wildlife within and around the Project Site.

Hedgerows

6.10 New hedgerow planting will utilise native tree and shrub species of local provenance with a bias towards nut and fruit-bearing species and will aim to maximise species diversity. A diverse ground flora will also be encouraged, to be managed as part of the hedgerow feature.

6.11 Management of hedgerows will seek to achieve a bushy structure whilst maintaining maximum heights of 3m and widths of at least 2m. Management will include the cutting of hedgerows on a two to three year rotation cycle during which a maximum of 30% of the hedgerow resource will be cut at any one time (i.e. enabling a minimum of 30% left to grow for seven to ten years), thereby ensuring that a proportion of cut versus uncut hedgerows exists onsite so as to be sympathetic to the annual lifecycle of fauna which use them.

6.12 Management will also include the implementation of rotational coppicing or traditional laying regimes on a 10 to 20-year cycle where appropriate, so as to further encourage the formation of a dense and continuous hedgerow resource, which is not excessively tall or wide.

Woodland Belts

6.13 Woodland belt planting will utilise species appropriate to the ground conditions present. For example, belt planting around wetland/marshy habitats will utilise a water-tolerant planting palette, including a range of willow (*Salix)* varieties. Belt planting for the purpose of noise/light screening and for providing dark corridors for nocturnal species will comprise of a range of species that provide a diversity of structure and height.

6.14 Appropriate management measures will include the maintenance of canopy and understorey connectivity within woodland areas, including sensitive levels of coppicing and thinning to ensure good light levels reach the woodland floor. Trees will be managed to ensure natural bat roosting/bird/dormouse nesting features develop over time, such as dead and decaying wood, cracked/split branches and cavities. Such trees/woodland will be positioned away from areas with public access to ensure they do not become hazardous to the public.

6.15 Disturbance will be minimised within newly planted areas through the installation of permanent fencing around the peripheries of habitat to be created.

Dense and Scattered Scrub

6.16 The scrub habitats at the Project Site are of importance for populations of bats, dormouse, birds and invertebrates, as well as providing shelter and refuge habitats for reptiles and amphibians present within adjoining open habitats.

6.17 Management of scrub habitats will be targeted to achieve a variety of age and structure, with infill planting carried out to improve species diversity. Appropriate infill plant species are provided in Annex EDP 3 regarding dormouse mitigation.

6.18 Approximately 23.46ha of existing scrub habitats will be retained, plus approximately 19.27ha will be enhanced along with c.8.42ha of new scrub planting, to form a dense band of mature scrub wrapping around the Resort edge to provide habitat connectivity, with patches of scattered scrub maintained within the open mosaic habitats and along the sea wall.

6.19 As part of the proposals to create a nature reserve within Bamber Pit, the scrub habitats will become actively managed to enhance structure and species diversity. In the neighbouring Sports Ground Pit where the new infrastructure hub is proposed, scrub and woodland habitats will be retained around the periphery of the pit.

6.20 Dense scrub habitats will be managed rotationally to create a range of age classes and structure, whilst maintaining the overall extent of scrub habitat within retained habitats. To

maintain suitability for early successional species, such as nightingale, scrub will be cut at 10-15 year intervals, with no more than 10% of scrub to be cut in any one year, cut in distinct patches in line with guidance set out by the British Trust for Ornithology (BTO)[16]. Scrub patches should have a clear and gradual progression from grassland to mature scrub and a dense ground layer of bramble or hawthorn should be encouraged.

6.21 In order to avoid conflict with the dormouse mitigation strategy, aerial connectivity between scrub parcels will be maintained throughout scrub management works.

6.22 Some scattered scrub will be allowed to remain within more open habitats in order to encourage grasshopper warblers and other scrubland species, such as linnet, reed bunting etc.

Open Mosaic Habitats

6.23 The Project Site contains a complex of habitats offering a diverse array of different micro-habitats and, accordingly, it supports a diverse range of terrestrial and aquatic invertebrate species. These invertebrate populations are also key components of the food chain thereby supporting the diversity of birds, bats and other insectivorous species present within the Project Site.

6.24 Rather than one particular habitat being of key importance, the value of the Project Site to invertebrates lies in its complex mosaic of habitats in which a range of different successional stages and are represented and in which other environmental conditions such as water/moisture levels and salinity vary significantly.

6.25 Therefore, as detailed within Annex EDP 9, existing Open Mosaic Habitats (OMH) in Broadness Saltmarsh will be enhanced in advance of construction works using the following principles:

- Creation of bare ground scrapes through mechanical removal of topsoil to reveal the substrate beneath, which should comprise approximately 5% of the OMH habitat area;

- Creation of at least 20 shallow pools of varying depth and ranging from 10 to 50m^2 in size, which are lined/capped with impermeable material to hold water throughout most if not all of the year and should comprise approximately 5% of the OMH habitat area;

- Creation of at least 20 piles/mounds of mixed crushed and coarse concrete rubble e.g. salvaged from existing piles, or derived from breaking up existing concrete hardstanding, within the construction footprint; and

[16] Conservation Advice No.1 - Managing Scrub for Nightingales: A BTO Guide for Land Managers and Conservation Practitioners (2015) BTO – accessed 29 September 2019 (https://www.bto.org/sites/default/files/shared_documents/publications/conservation-advice-notes/2015/conservation-advice-notes-001-nightingalesb.pdf)

- Creation of at least 20 mounds and low bunds using chalk ballast material derived from construction works or tunnelling activities within the disused chalk pits.

6.26 Following the advanced enhancement of the retained OMH described above, the aim of ongoing management and maintenance will be to achieve and maintain the overall mosaic of habitat in the following approximate proportions:

- Bare ground and shallow pools:- 10%;
- Sparsely vegetated ground (less than 20% cover):- 10%;
- Sparsely vegetated ground (20- 60% cover):- 10%;
- Open species-rich grassland (more than 60% cover):- 25%;
- Species-rich grassland with scattered scrub:- 20%; and
- Dense scrub:- 25%.

6.27 In addition to the above, 20% of each rubble pile created in the OMH areas will be mechanically disturbed/turned over every c.5 years, on rotation (frequency to be determined by monitoring of vegetative colonisation rates), to create a range of different stages of colonisation to maximise the diversity of microhabitats.

Saltmarsh

6.28 New saltmarsh will be created within the Kent Project Site through managed realignment. This will increase areas of mud flat, salt marsh, small pools, rocks and shingle areas, with reeds, sedges and grasses transitioning into scrub vegetation. The approximate location can be found on Figure 12.43 (Document reference 6.3.12.43).

6.29 The new saltmarsh habitats will benefit populations of birds, reptiles, invertebrates and rare plants.

6.30 Coastal saltmarsh is a Priority Habitat and the BNG Assessment is targeting creation of c.3.01 ha of saltmarsh habitat in moderate condition.

6.31 New saltmarsh will be created through managed realignment of the existing flood defences, creating a new sea wall inland from the existing defences and allowing natural establishment of saltmarsh vegetation in the area between the old and new walls. Establishment of saltmarsh habitat will require clearance of the existing species-poor grassland and bramble scrub to allow saltmarsh species to colonise.

6.32 It is estimated that c.3.01ha of saltmarsh habitat will be achievable.

6.33 New saltmarsh habitats will be subject to natural colonisation of pioneer, lower, middle and upper saltmarsh zones by species present within surrounding saltmarsh habitats.

6.34 New and existing retained saltmarsh habitats will be managed through monitoring and control of invasive species. Annual management will be carried out using a late hay cut to promote species diversity, with arisings removed off-site or used for creation of habitat piles for reptiles (as described later in this section).

Reedbed/Marsh

6.35 Approximately 11.23ha of distinct reedbed habitat and a further 11.95ha of Floodplain Wetland Mosaic habitats within Black Duck Marsh and Botany Marsh East will be retained and enhanced, alongside extensive new reedbed creation (in addition to saltmarsh creation) covering an estimated 5.69ha of reedbed (0.38ha of which will be within Floodplain Wetland Mosaic) and 8.0km of linear ditch/open water/bankside habitat. Reedbed is a Priority Habitat and the BNG Assessment is targeting creation of 5.69ha of reedbed habitat in moderate condition.

6.36 The water courses will have varying depth profiles, be planted with a range of suitable native bankside and water plants and be bordered with wetland/marsh habitat to promote a diverse and heterogeneous habitat mosaic. The reedbed and marsh habitats will also play a key role in retaining functional connectivity of habitats around the Proposed Development.

6.37 The retained and new reedbed/marsh habitats will be targeted to achieve Priority habitat status in the long-term.

6.38 Full details of the works required to create the new wetland habitats are provided in Annex EDP 4 relating to water voles. In summary, the measures include:

- Excavation of a series of water courses around 2m deep with the aim of providing at least a 30cm deep channel of open water year-round. The wet channel should be around 1-2m wide with a shelf cut at water level to support a raft of marginal and aquatic plants at the toe of the bank;

- Scrub will be allowed to naturally re-colonise between the channels along with the reedbed vegetation though sections of the channel should be kept clear to encourage a more diverse mosaic habitat;

- To aid establishment of the bankside vegetation both banks of the receptor habitat will be covered with strips of mature turf; and

- The aquatic shelf in the channel will be fitted with pre-established coir tiles supporting mature, native semi-emergent plant species. Plug planting at the toe of the opposite bank will provide an additional fringe of vegetation at the water's edge.

6.39 Retained and created wetland habitat will be managed in the long-term using the following measures:

- Rotational management of scrub to maintain a continuity of supply but prevent excessive regrowth/encroachment;

- Rotational cutting of reed vegetation to create a variety in age and structure as well as retain areas of open water; and

- Improvements to water quality in retained habitats though removal of or separation from contaminants through a surface water management strategy including a sustainable urban drainage system (SuDS) and associated treatment train.

Species-rich Grassland

6.40 Species-rich and tussock grassland covering an area of c.21.74 ha will be created across the Project Site to provide a sward that is botanically diverse and will afford a range of opportunities for invertebrates, reptiles, birds and bats.

6.41 Within Broadness Grassland, measures to encourage a structurally complex grassland sward will be implemented. The sward will include a substantial 'litter layer', areas of bare ground, areas of short sward, areas of longer sward areas and a high diversity of plant species. This will be achieved through;

- Cutting and harrowing areas;

- Sowing with an appropriate wildflower mix; and

- Rotational cutting of different areas to ensure different sward heights.

6.42 Such areas will be under on-going management and maintenance on an annual basis including the following:

- Grassland areas cut in late summer to a height of approximately 150mm, on a 3-year rotation (i.e. no more than one third of a grassland compartment cut in any one year);

- All arisings to be removed unless used for habitat piles; and

- Areas of developing/ encroaching scrub (most likely to occur within cleared glades) to be managed according to the section relating to 'Scrub'.

Buildings with Green and Brown Roofs

6.43 Biodiverse green and brown roofs will be installed on several buildings within the Resort, as illustrated within Appendix 11.7: Landscape Strategy (Document reference 6.2.11.7). The green and brown roofs will be established to the following specification:

Brown Roofs

- Cover approximately 1.33ha;

- Constructed of crushed concrete and chalk substrates taken from within the development footprint;

- No plant seeds or sedum etc. applied, but instead the bare substrate is allowed to colonise naturally by plant seeds blown by the wind or introduced by birds; and

- Over time a range of locally occurring invertebrates associated with open mosaic habitats are expected to colonise these habitats to the benefit of the overall invertebrate population but also birds and bats.

Green Roofs

- Cover approximately 2.06ha;

- Designed as biodiverse extensive green roofs;

- Designed with minimal maintenance requirement, to reduce disturbance;

- Minimum depth of substrate of 80mm, with topography varied across green roofs between 80 – 150mm; and

- Plant species palette able to withstand rooftop microclimates, with varying temperature, moisture and wind conditions, with the design varied depending on the design characteristics of each building (e.g. sun and shade conditions).

6.44 Once established, maintenance of brown and green roofs will primarily involve specialist maintenance with respect to root barrier and waterproofing membranes in accordance with the manufacturer's specifications. Periodic removal of self-sown saplings and young shrubs will be required, since the roots of which (if allowed to mature) could damage the waterproof membrane or other key components. Green roof maintenance will also include:

- Removal of invasive plant or undesirable plant species and excess leaf litter;

- Application of nutrients if required; and

- Checking water regulation systems, such as gutters.

Public Realm

6.45 Within the public realm of the Resort, extensive soft landscaping will be created to integrate biodiversity enhancements into the Scheme design. Further details on the management and maintenance for new landscape/amenity features within the following Landscape Strategy Zones are provided in Appendix 11.8: Landscape Management Plan (Document reference 6.2.11.8):

- Ferry Terminal and Wharf Area;

- Ingress Park Gateway Area;

- A2 Corridor;
- Central Ebbsfleet Area;
- Sports Ground Pit and Bamber Pit;
- Staff Accommodation Area, Training Facility and Visitor Centre;
- Arrival Area;
- Main Plaza and Steps;
- Conferention, E-Sports and Central Hub;
- Hotel Landscapes;
- The London Resort Passenger Terminal (T1);
- Back of House (Gates 1 and 2);
- Tilbury Terminal; and
- Resort Gates 1 and 2.

6.46 In summary, the habitat features within these Zones will include:

- Shrubs and herbaceous planting;
- Lawns;
- Pictoral meadow planting; and
- Swales, rain gardens and other water features.

6.47 The planting palette for features within public realm will include a diversity of species with wildlife benefits, including flowering and fruiting varieties.

6.48 In line with growing evidence that access to nature promotes human health and wellbeing, the Project Site will also provide opportunities to promote environmental education and wellbeing through recreation and education.

6.49 The public access strategy for the Project Site includes access improvements for several areas with ecologically sensitive habitats and species. Measures to manage and control recreational activity will be implemented, including interpretation signs and fencing.

Protected Species

6.50 The habitat creation and management measures described above will provide benefits for a range of wildlife known to occur onsite, including invertebrates, reptiles, bats, birds and water vole.

6.51 To further enhance opportunities for wildlife, dormouse, bird and bat boxes will be erected and tree, hedge and dense scrub planting will be carried out to provide future nesting and roosting opportunities. Grass snake breeding piles and reptile hibernacula will be installed. Invertebrate nesting and egg-laying features, such as 'bug hotels' will also be installed. The indicative location of these features is provided in Figure 12.44 (Document reference 6.3.12.44).

Dormouse Boxes

6.52 50 dormouse boxes will be mounted onto trees/scrub within retained dormouse habitat, to further enhance the existing carrying capacity of such habitats for dormouse, whilst enabling future population monitoring. Monitoring will be undertaken by a suitably experienced and licenced Ecologist.

Bat Boxes

6.53 New roosting features suitable for the assemblage of bats present at the Project Site will include the installation of bat boxes of a range of designs to benefit several species recorded at the Project Site throughout the year. Such features will provide roosting continuity over the short-term whilst semi-natural roosting features (described above) develop.

6.54 Artificial bat roosting features will also be incorporated into the two bird watching tower structures, to provide roosting opportunities not currently present within the marsh habitats. Roost features will also be included in new buildings within appropriate locations, such as at the edge of the Resort where there will be lower levels of disturbance from light/noise, strategically positioned close to areas of retained and new habitat with connectivity to the wider landscape. Where possible, such features will be designed with sustainability in mind. Incorporating bat roost features within areas of public realm will contribute towards achieving environmental awareness/education objectives.

6.55 A total of 90 bat boxes are to be installed as shown on Figure 12.44 (Document reference 6.3.12.44), comprising crevice-style boxes, chosen based on the species assemblage present at the Site, comprising the following models:

- 10 Schwegler model 2F;
- 10 Schwegler model 2FN;
- 20 Schwegler model 1FF;

- 10 Schwegler model 1FW;
- 10 Schwegler model 1FS;
- 10 Schwegler model 2FS; and
- 20 Schwegler model 1FR.

6.56 Boxes will be mounted following manufacturer's specifications facing in all directions, to provide a range of temperature and humidity conditions, on trees or buildings that provide some cover from surrounding vegetation with a clear flight line to/from the entrance.

Bird Boxes

6.57 A variety of bird boxes have been chosen to suit those species confirmed as present within the Project Site as well as urban species that will likely be present within the Project Site during the operational phase. A total of 181 bird boxes will be installed as shown on Figure 12.44 (Document reference 6.3.12.44), comprising the following models:

- 20 general purpose bird boxes with 26mm hole;
- 20 general purpose bird boxes with 32mm hole;
- 20 starling nest boxes (i.e. box with 45mm hole);
- 30 robin/open fronted nest boxes;
- 20 bearded tit boxes installed in reedbed habitats;
- 10 sparrow terraces;
- 15 swift boxes;
- 20 swallow cups;
- 20 house martin cups;
- 2 kestrel boxes;
- 2 peregrine nest boxes; and
- 2 barn owl nest boxes on poles.

6.58 Boxes will be mounted following manufacturer's specifications, out of direct sunlight on aspects of trees or buildings that provide some cover from surrounding vegetation to offer shelter to birds but with a clear flight line to/from the entrance (uncluttered).

Reptile Features

6.59 10 grass snake breeding piles and 20 reptile hibernacula will be created within Broadness Grasslands prior to commencement of trapping and translocation, to ensure reptile habitat is available.

Invertebrate Features

6.60 20 invertebrate nesting and sheltering features will be installed within key areas of the Project Site. This will include 'bug hotels' to accommodate solitary bees, butterflies, lacewings and ladybirds.

6.61 The provision of these features in certain key/prominent locations within the Resort will also provide an opportunity to raise the profile of invertebrate and biodiversity conservation, when accompanied by suitable educational material such as interpretation boards or signs.

Management and Maintenance

6.62 Bat, bird and dormouse boxes installed within the Project Site should be visually assessed from ground level annually and repaired/replaced where necessary (by an appropriately licensed ecologist due to potential for roosting bats/dormice/Schedule 1 protected birds to be present).

6.63 Generalist bird boxes installed within the Project Site should be visually assessed from ground level annually and repaired/replaced where necessary. Dense shrub, tree and hedgerow planting will provide long-term nesting provision for birds and roosting habitat for bats once matured.

6.64 Reptile hibernacula, grass snake breeding piles and invertebrate features will be checked annually to ensure they remain present and constructed to specification and repaired/replaced, as necessary.

Offsite Habitat Creation/Enhancement Principles

6.65 As detailed within the BNG Assessment, the calculations indicate that on-site mitigation alone will not be sufficient to meet national and local policy requirements, nor London Resort Company Holding aspirations, for a biodiversity net gain. Similarly, the loss of parts of the Kent Project Site which is considered functionally linked to Thames and Medway Estuary SPA/Ramsar Sites, as well as the quantum of habitats lost for a range of other protected and notable species, cannot be compensated for within the Project Site.

6.66 Therefore, a mitigation package including the enhancement of offsite land potentially in combination with a financial contribution towards an existing or developing ecological enhancement project is being negotiated to compensate for this shortfall, as described within the following documents:

- Appendix 12.2: Biodiversity Net Gain Assessment (Document reference 6.2.12.2);

- Appendix 12.4: Shadow Habitats Regulations Assessment (Document reference 6.2.12.4); and

- Appendix 12.10: General Principles for Offsite Ecological Mitigation (Document reference 6.2.12.10).

6.67 The offsite land will be enhanced and managed for the benefit of wildlife, to address unavoidable impacts and provide an overall enhancement for protected and notable species populations including water vole, reptiles, invertebrates and wading and wintering birds.

6.68 The effects of any enhancements to off-site land will also be fully assessed and consulted on with Natural England, using up to date survey information, as described in *General Principles for Offsite Ecological Mitigation* (Document reference 6.2.12.10).

Section 7
Monitoring

7.1 The aim of post-development monitoring activities is to evaluate the effectiveness of habitat- and species-specific mitigation measures (as summarised later in this section and detailed in Annex EDP 1 – 11 of this EMMF), as well as the management and function of retained and newly created habitats as identified above. Monitoring will also address any issues relating to biophysical changes to habitats as a result of recreational pressure and impacts from construction activities within later phases of development (where required).

7.2 Periodic monitoring visits/site inspections will be vital to ensure that any remedial measures are identified to ensure that the broad objectives of the EMMF and the future LMP(s) are being met. These would need to be more frequent in the first few years for each phase and can be reduced as time progresses and features become established. The monitoring visits will include a 'snagging' inspection to identify any plant failures or issues affecting the successful establishment of habitats as intended by the LMP. The specific frequency of these inspections will be specified in the LMP(s), but is expected to be as follows:

- Quarterly walkover in years 1 and 2 (key establishment phase); and
- Annual walkover from year 3 onwards.

7.3 It is envisaged that detailed management and maintenance tasks within the future LMP(s) will be formally reviewed at Year 5 of the first development phase with any necessary changes required incorporated into a revised LMP(s). After Year 5, detailed monitoring activities will be completed as required, with any necessary changes incorporated into a revised LMP, until 25 years after completion of the Proposed Development. The final review of the LMP at Year 25 will identify if and where habitats have not achieved their desired status (as defined by this EMMF, the BNG Assessment and future LMP(s)). Future management and monitoring measures from year 26 onwards will be determined in consultation with Applicant and relevant LPA, with a new LMP written and approved, as necessary.

7.4 It is anticipated that monitoring visits will be completed by suitably experienced operatives, with input from a suitably experienced/licenced/accredited Ecologist and Arboriculturist as required.

7.5 Following completion of monitoring activities, an annual monitoring report will be produced and submitted to the relevant authority, with any necessary changes incorporated into a revised LMP to be approved by the authority.

7.6 Any remedial measures identified during monitoring would need to be implemented within the recommended timeframe following completion of the monitoring visit, to be advised by the Ecologist, Arboriculturist or other relevant professional carrying out the monitoring.

Hedgerow, Woodland Belt and Scrub

7.7 Annual monitoring of trees, woodland and hedgerow habitats will be carried out by an appropriately qualified and experienced person, to check for the following effects and ensure the quality and future viability of any existing and created habitats:

- Littering, erosion and damage;
- Implementation of appropriate management techniques and frequency;
- Presence of disease, pests or invasive species;
- Terrestrial succession and scrub encroachment; and
- Damage or deterioration of habitats caused by an increase in recreational activity, such as damage to vegetation and nutrient enrichment from dog waste.

7.8 Scrub and woodland will be key habitats for bird, dormouse and bat populations; therefore, monitoring of these habitats will include the requirements of the relevant Mitigation Strategies within the Annexes of this EMMF, as summarised later in this section.

Open Mosaic Habitats

7.9 The OMH will be monitored as per the requirements of the Invertebrate Mitigation Strategy detailed at Annex EDP 9, as summarised later in this section, to ensure species and structural composition is appropriate and management activities are being carried out to the required standards.

Reedbed, Marsh and Saltmarsh

7.10 The reedbed and marsh habitats will be monitored on an annual basis from Year 2 onwards (following establishment) to ensure species composition is appropriate and management activities are being carried out to approved standards. Monitoring visits will be carried out by an experienced Ecologist/Botanist during the peak growing season (between May and August).

7.11 During each monitoring visit, the following general items will be checked:

- Presence of invasive, non-native species of both flora and fauna;
- Overshading of wetland habitats by dense/overgrown vegetation;
- Presence of pollution or litter; and

- Damage or deterioration of habitats caused by an increase in recreational activity, such as damage to vegetation or erosion of bankside habitats.

7.12 Any remedial measures required will be reported to the Management Company and will be implemented within recommended timescales.

7.13 The retained and created wetlands will be key habitats for a variety of protected and notable species populations; therefore, monitoring of these habitats will include the requirements of the relevant Mitigation Strategies included within the Annexes of this EMMF, as summarised later in this section.

Species Rich Grassland

7.14 Grassland habitats will be monitored on an annual basis in combination with monitoring of scrub habitats and OMH to ensure species and structural composition is appropriate and management activities are being carried out to approved standards. Monitoring visits will be carried out during the summer months. Monitoring of grassland habitats will check for the same effects as described above for hedgerows, woodland belt and scrub habitats.

Buildings with Green and Brown Roofs

7.15 Green and brown roofs will require regular monitoring to ensure they continue to support the desired species and structural composition.

7.16 Brown roofs will be maintained as bare or sparsely vegetated substrate, with removal of any plant species that may encourage a succession to a more vegetated composition. Monitoring will also check for the presence of damage to root barrier and waterproofing membranes.

7.17 Monitoring of green roofs will include checking for invasive or dominant plant species, such as mosses, to ensure that the chosen species composition is able to flourish and to check for any signs of unsuitable environmental conditions.

Public Realm

7.18 The aim of monitoring of soft landscaped features within Public Realm will be to confirm that they are fulfilling their ecological, landscape and visual amenity purposes. Further details are provided in Appendix 11.8: Landscape Management Plan (Document reference 6.2.11.8). In summary, during each monitoring visit the following general items will be checked:

- Presence of invasive species of both flora and fauna;

- Presence of diseased or damaged trees, shrubs and other vegetation;

- Ensure the correct functioning of water features/rain gardens;
- Presence of pollution or litter; and
- Damage or deterioration of habitats caused by recreational activity, such as damage to vegetation through creation of desire lines.

Bird, Bat, Dormouse and Invertebrate Boxes

7.19 As summarised below in Table 7-1, a suitably experienced and licensed Ecologist will inspect any boxes installed as part of the Proposed Development on an annual basis for a period of five years after their installation, to determine if the boxes are being used by their target species.

Reptile and Amphibian Hibernacula and Breeding Piles

7.20 As summarised below in Table 7-1, reptile hibernacula will be checked annually to ensure they are still present and functional, with no signs of collapse, disturbance or damage.

Dark Corridors

7.21 As summarised below in Table 7-1, post-construction monitoring in years 1, 5 and 10 will ensure that the 'dark corridors' along the boundaries of the Project Site, as illustrated on Figure 12.45 (Document reference 6.3.12.45), remain as such and continue to provide cohesive green corridors for bats, dormice and other species. Monitoring will involve monitoring with the use of automated static bat detectors and reading night-time lux levels at several points along these boundaries to ensure they remain within approved levels or at levels stated within best practice guidance[17] [18].

Protected Species Monitoring

7.22 As detailed within Annex EDP 1 – 11 of this EMMF, detailed monitoring strategies will be implemented to ensure protected, notable and invasive species populations are maintained at a Favourable Conservation Status (FCS), as defined in Section 3 and as required by the protected species licensing process. The detail of the frequency and type of monitoring is provided is Annex EDP 1 – 11, with a summary provided overleaf in Table 7-1.

[17] Gunnell, K., Grant, G. and Williams, C. (2012) *Landscape and urban design for bats and biodiversity*. Bat Conservation Trust, London

[18] Bat Conservation Trust (03/06/2014) Artificial lighting and wildlife: Interim Guidance: Recommendations to help minimise the impact artificial lighting. Bat Conservation Trust, London

Table 7-1: Summary Table of Protected/Notable Species Monitoring Actions.

Species	Monitoring Action	Frequency/Timing	Reporting
Birds	Site visits/checks by the Project Ecologist/ECoW to ensure implementation of works in accordance with the mitigation strategy	Prior to, at key stages during (at least monthly), and at the end of: 1. The advanced habitat enhancement phase(s); 2. The construction phase(s); and 3. The post-construction landscaping phase(s).	Regular feedback to Project Ecologist and Site Management Team
	Updated breeding and wintering bird surveys, to assess changes to breeding and winter bird assemblages	In years 3, 5 and 10 following completion of the development	Results included in Project Site Annual Monitoring Report
	Updated habitat surveys using a standard protocol to assess the success of the habitat enhancement, creation and management works	In years 3, 5 and 10 following completion of the development	
Bats	Compliance checks of replacement roost features	Immediately upon completion of installation of features	Licence return to NE
	Updated bat activity surveys, to assess changes to bat assemblage	In years 3, 5 and 10 following completion of the development	Results included in Project Site Annual Monitoring Report
	Monitoring of dark corridors for bats, using lux levels and bat activity surveys	In years 1, 5 and 10 following completion of the development	Results included in Project Site Annual Monitoring Report
	Monitoring of habitats suitable for bats to ensure management and maintenance activities are appropriate	Annually as part of habitat monitoring	Results included in Project Site Annual Monitoring Report
	Inspection of replacement and enhancement bat boxes/roost features	Annually	Results included in Project Site Annual Monitoring Report
Dormouse	Minimum of two checks of installed dormouse boxes	During each monitoring year between May and November, between the 19th and 25th of the nominated month	Annual report to Peoples Trust for Endangered Species (PTES) and NE
	Condition assessment of enhanced and created habitats	Years 1, 3 and 5 following completion of planting works	Results included in Project Site Annual Monitoring Report
Water vole	Initial monitoring of the released water vole population	In the August following the release via a mark, release, recapture exercise	Licence return to NE

Species	Monitoring Action	Frequency/Timing	Reporting
	Monitoring of the receptor habitat using field sign surveys	Annually for 3 years following the release of the trapped water vole population, in August/September	Licence return to NE. Results also included in Project Site Annual Monitoring Report
	Monitoring of water levels within retained and created habitat	Annually as part of habitat monitoring	Results included in Project Site Annual Monitoring Report
Otter	Incidental signs of otter will be recorded during the water vole monitoring surveys, including checks for signs of recent activity around the artificial holts	As water vole timings above	Results included in Project Site Annual Monitoring Report
	Monitoring of water levels within retained and created habitat	Annually as part of habitat monitoring	Results included in Project Site Annual Monitoring Report
Harvest mouse	Monitoring of habitats suitable for harvest mouse to ensure management and maintenance activities are appropriate	Annually as part of habitat monitoring	Results included in Project Site Annual Monitoring Report
Amphibian assemblage	Monitoring of habitat condition within the enhanced and created wetland habitats	Annually as part of habitat monitoring	Results included in Project Site Annual Monitoring Report
Reptile assemblage	Updated reptile surveys, to assess changes to reptile assemblage	In years 3, 5 and 10 following completion of the development	Results included in Project Site Annual Monitoring Report
Invertebrate assemblage	Site visits/checks by the Project Ecologist/ECoW to ensure implementation of works in accordance with the mitigation strategy	Prior to, at key stages during (at least monthly), and at the end of: 1. The advanced habitat enhancement phase(s); 2. The construction phase(s); and 3. The post-construction landscaping phase(s).	Regular feedback to Project Ecologist and Site Management Team
	Updated invertebrate surveys and analysis using Pantheon, using a standard protocol, to assess target habitats/assemblages	In years 3, 5 and 10 following completion of the development	Results included in Project Site Annual Monitoring Report
	Updated habitat surveys using a standard protocol to assess the success of the habitat enhancement, creation and management works	In years 3, 5 and 10 following completion of the development	

Species	Monitoring Action	Frequency/Timing	Reporting
Rare plant assemblage	Site visits/checks by the Project Ecologist/ECoW to ensure implementation of works in accordance with the mitigation strategy	Prior to, at key stages during (at least monthly), and at the end of: 1. The advanced habitat enhancement phase(s); 2. The construction phase(s); and 3. The post-construction landscaping phase(s).	Regular feedback to Project Ecologist and Site Management Team
	Update habitat surveys using a standard protocol to assess the success of the habitat enhancement, creation and management works	In years 3, 5 and 10 following completion of the development	Results included in Project Site Annual Monitoring Report
Invasive plant species	Updated surveys to confirm success of treatment/eradication/control measures	Annually as part of habitat monitoring	For species that pose a potential health and safety risk (e.g. giant hogweed), regular feedback to Project Ecologist and Site Management Team. Results included in Project Site Annual Monitoring Report

This page has been left blank intentionally

Section 8
Summary and Conclusions

8.1 This Ecological Mitigation and Management Framework (EMMF) has been produced to provide the outline and structure of the principles for ecological mitigation at the Project Site.

8.2 The land use proposals include important measures to avoid, mitigate or compensate for ecological impacts as well as other measures designed to provide long-term ecological enhancements.

8.3 The EMMF provides sufficient detail commensurate with the project's stage in DCO process and therefore contains broad principles, parameters and areas for ecological mitigation and management of the various habitats and species of interest on the Project Site.

8.4 This EMMF provides a sufficient level of information for the Secretary of State to be satisfied that the Proposed Development is capable of meeting the requirements of the 'Favourable Conservation Status' 'licensing test' associated with European Protected Species mitigation licensing, and one of the material considerations to which it has regard when determining DCO applications. The FCS criterion has also been applied to nationally protected species, such as water vole.

8.5 This document provides the framework for ensuring that the Proposed Development delivers a net biodiversity gain, in combination with off-site mitigation, as demonstrated by net gain calculations undertaken for the Proposed Development (Document reference 6.2.12.2) and the General Principles for Offsite Ecological Mitigation (Document reference 6.2.12.10), thereby ensuring compliance with national planning policy. The EMMF forms a proportionate and appropriate basis for the development of detailed LMP(s), or similar documents for the Project Site.

This page has been left blank intentionally

Annex EDP 1
Breeding and Wintering Bird Mitigation Strategy

This page has been left blank intentionally

Revisions

Revision	Description	Issued by	Date	Approved by
r028_00	Issue for DCO Submission	WC/ET	24/12/2020	EDP/LRCH

The Environmental Dimension Partnership Ltd
Tithe Barn
Barnsley Park Estate
Barnsley
Cirencester
Gloucestershire
GL7 5EG

[This page is intentionally left blank]

Contents

[This page is intentionally left blank]

List of Tables

[This page is intentionally left blank]

List of Figures

[This page is intentionally left blank]

Chapter One ◆ INTRODUCTION, SITE CONTEXT AND PURPOSE

INTRODUCTION

1.1. This Breeding and Wintering Bird Mitigation Strategy has been prepared by the Environmental Dimension Partnership Ltd (EDP) on behalf of London Resort Company Holdings Limited. It considers the likely impacts of the Proposed Development on the bird population within the Project Site and identifies the avoidance, mitigation, compensation and enhancement measures required to enable the Proposed Development to meet legislative and/or planning policy requirements and result in an overall biodiversity net gain. A brief overview of the baseline situation is also provided along with a review of legislative and policy requirements.

1.2. The land within the Project Site will be subject to a Development Consent Order (DCO) application for a world class destination entertainment resort with associated infrastructure, staff accommodation, dedicated access road, public amenity space and habitat creation. The application will be supported by an Environmental Impact Assessment (EIA), with this report provided as part of an overall Ecological Mitigation and Monitoring Framework report (Document reference 6.2.12.3) which is an appendix to the Terrestrial and Freshwater Ecology and Biodiversity chapter of the Environmental Statement (ES) (Document reference 6.1.12).

1.3. Detailed information on baseline conditions and survey methods employed is provided within the Ecology Baseline Report (Document reference 6.2.12.1) and the Winter Bird Baseline Report, which forms an annex of the Ecology Baseline Report. Detailed consideration of the likely significant effects of the Proposed Development is provided within Chapter 12 of the Environmental Statement (Document reference 6.1.12) and, in relation to both the Thames Estuary & Marshes Special Protection Area (SPA)/Ramsar and Medway Estuary & Marshes SPA/Ramsar, within the Shadow Habitats Regulations Assessment (Document reference 6.2.12.4).

SITE CONTEXT

1.4. The Project Site comprises two parts including the 'Kent Project Site', which includes land on the Swanscombe Peninsula and the Ebbsfleet Valley on the south side of the River Thames, and is centred approximately at Ordnance Survey Grid Reference (OSGR) TQ 606 758, and the 'Essex Project Site', which includes land to the east of the A1089 Ferry Road and the Tilbury Ferry Terminal and is centred approximately at OSGR TQ 643 752. The Project Site lies partly within three local planning authority areas (Dartford Borough and Gravesham Borough for the Kent Project Site, and Thurrock Council for the Essex Project Site). Collectively these two parts of the entire DCO Order Limits are referred to as 'the Project Site'.

1.5. The Kent Project Site comprises a range of habitat types including woodland and scrub, grasslands of varying quality, salt marsh, intertidal zones, brownfield areas, running and standing water, chalk exposures and developed land.

PURPOSE

1.6. As described in the Ecology Baseline Report (Document Reference 6.2.12.1), no surveys were conducted on the Essex Project Site due to the lack of suitable habitat.

1.7. Surveys undertaken across the Kent Project Site in 2012, 2019 and 2020 have confirmed the presence of a Nationally significant breeding bird assemblage, a terrestrial wintering bird assemblage significant at the County level and a wetland bird assemblage important at the International level due to its status as a constituent part of the wider meta-population associated with international designations within the Thames Estuary. Each habitat type on the Kent Project Site (i.e. reedbed/freshwater, estuary and scrubland) supports distinct assemblages, which will need to be considered individually in order to conserve their existing value as part of the bird population within the Project Site and the wider area.

1.8. The Kent Project Site supports a wide range of Species of Principal Importance as defined by Section 41 of NERC Act 2006, which places a duty on decision-makers such as public bodies, including local and regional authorities, to have regard to the conservation of such species when carrying out their normal functions. Additionally, the Kent Project Site supports a range of species listed within the Birds of Conservation Concern Red and Amber lists[1], birds listed under Schedule 1 of the Wildlife & Countryside Act (1981, as amended), and birds associated with nearby nationally and internationally designated sites. With reference to local and national policies requiring development to deliver a net gain in biodiversity, the presence a wide range of Section 41 species, together with a significant number of other declining, rare or nationally scarce species, confirm that the bird populations present during winter and the breeding season form a major and important component of the Kent Project Site biodiversity.

1.9. In the absence of appropriate compensation and mitigation measures, the Proposed Development is considered likely to result in the destruction of, and disturbance to, important habitat within the DCO Limits and significant impacts upon designated sites to which on-site habitats are functionally linked.

1.10. This strategy therefore sets out the recommended advanced mitigation measures to be implemented during the pre-construction and construction phases of the Proposed Development to maintain the overall range of habitat niches, breeding, roosting and refuge opportunities and prey populations.

[1] Eaton MA, Aebischer NJ, Brown AF, Hearn RD, Lock L, Musgrove AJ, Noble DG, Stroud DA and Gregory RD (2015) Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and Isle of Man. British Birds 108, 708–746.

1.11. This strategy also sets out the recommended compensation, mitigation and enhancement measures to be implemented as part of the proposals, to reduce development impacts and create further opportunities for birds within the Kent Project Site and on off-site land.

1.12. A draft of this mitigation strategy was submitted to Natural England on 05 October 2020 as part of a suite of draft mitigation reports submitted via Natural England's Discretionary Advice Service ahead of the Development Consent Order (DCO) application being submitted. At the time of making the DCO application, no comments on the document have been received from Natural England.

[This page is intentionally left blank]

Chapter Two ◆ SURVEY FINDINGS

OVERVIEW AND SURVEY RESULTS

2.1 This section of the mitigation strategy should be read in conjunction with Figures 12.1, 12.8-12.11 and 12.30-12.41 (Document References 6.3.12.1, 6.3.12.8-6.3.12.11 and 6.3.12.30-6.3.12.41).

2.2 The Kent Project Site is a mosaic of habitats offering extensive pockets of wetland and scrubland within a largely urbanised setting immediately adjacent to the Thames Estuary. The combination of predominantly unmanaged habitat of such types in this location, along with the abundance of invertebrate prey, means that the Kent Project Site is able to support a diverse assemblage of birds throughout the year.

2.3 As previously noted, it is possible to split the species assemblage within the Kent Project Site into three distinct groupings: those predominantly associated with scrubland habitats; those associated with freshwater habitats; and those associated with the estuary. These distinctions are not always clear and some species are reliant on multiple habitats or the interface between them. The key attributes of importance to each species grouping are outlined in **Table 2-1** below.

Table 2-1: Important Habitat Features by Species Grouping

Species Grouping	Important Habitats/Features	Key/Notable Species
Breeding		
Scrubland Breeding Birds	Dense scrub	Grasshopper warbler, nightingale, cuckoo, song thrush, dunnock, linnet, Cetti's warbler, reed bunting.
	Grassland/scrub mosaic	
	Invertebrate assemblage	
	Wetland/scrub interface	Grasshopper warbler, cuckoo, Cetti's warbler, reed bunting, marsh harrier.
Freshwater Breeding Birds	Reedbed	Marsh harrier, bearded tit, grey heron, water rail, spotted crake, Cetti's warbler.
	Open water	Pochard, mallard, shelduck, greylag, gadwall, teal, shoveler, little grebe, mute swan.
	Coastal/floodplain grazing marsh	Greylag, shelduck.

Species Grouping	Important Habitats/Features	Key/Notable Species
Estuary Breeding Birds	Open water	Shelduck, greylag, gadwall, mallard.
Winter		
Scrubland Winter Birds	Dense scrub	Cetti's warbler, linnet, meadow pipit, fieldfare, redwing, song thrush.
	Grassland/scrub mosaic	
	Invertebrate assemblage	
	Berries/fruits	
	Wetland/scrub interface	Cetti's warbler, reed bunting, marsh harrier.
Freshwater Winter Birds	Reedbed	Marsh harrier, water rail, little grebe, bearded tit, shoveler, pochard, Cetti's warbler, teal.
	Open water	Greylag, shelduck, shoveler, pochard, mallard, teal, mute swan.
	Grazing marsh	Snipe, shelduck, greylag, lapwing.
Estuary Winter Birds	Open water	Wigeon, teal, mallard, shelduck, gadwall.
	Intertidal zone	Redshank, curlew, turnstone, green sandpiper, lapwing, avocet, oystercatcher, gulls, skylark, meadow pipit, snipe, dunlin, black-tailed godwit.

2.4 As shown above, the value of the Kent Project Site to birds lies in its complex mosaic of habitats in which a range of different successional stages are represented and in which other environmental conditions such as water/moisture levels and salinity vary significantly, thereby creating a range of available niches. These conditions are in large part of the result of a long history of modification and disturbance by industrial activity, which continues in some form on the site to the present day, and abandonment across large swathes of grassland habitat, leading to extensive scrub habitat. Much of the freshwater wetland habitat across the peninsula is a result of an increased water table over the past 20-30 years. It appears, from freely available historic satellite imagery (Google Earth), that since 1960, Black Duck Marsh has evolved from amenity grassland, through agricultural grassland (possibly hay production) in 1990, before being gradually encroached by common reed (*Phragmites australis*) in the 2000s and becoming significantly wetter in the 2010s, causing the formation of the large waterbody at its southern edge.

2.5 Similarly, the scrubland habitat has changed significantly over the past 30 years. As recently as 2013, much of Broadness was characterised by scattered scrub, where now scrub blocks are dense and dominate the landscape, albeit with glades and meadows

interspersed throughout. It is likely that without intervention that the scrub would close over and begin the formation of a young woodland.

Breeding Birds Assemblage

2.6 The breeding bird surveys conducted during spring and summer 2020 recorded a total of 99 species across 5 survey visits, 33 of which were confirmed to be breeding, 26 probably breeding and 18 possibly breeding within the Kent Project Site. The remaining 22 species are considered to be non-breeding within the Kent Project Site due to a lack of suitable habitat, being recorded just outside of the DCO limits or no breeding behaviour having been recorded.

2.7 Notably, pochard, which are listed as Vulnerable (decreasing) globally on the International Union for Conservation of Nature (IUCN) Red List, were recorded as probably breeding within Black Duck Marsh. Other notable species include the species listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended; W&CA), summarised below in **Table 2-2**, 17 species listed on the Birds of Conservation Concern (BoCC4[2]) Red List, including cuckoo, song and mistle thrush, nightingale and grasshopper warbler, and 29 listed on the Amber List.

Winter Bird Assemblage

2.8 The winter bird surveys of the Kent Project Site during 2019/2020 recorded a total of 81 species across 5 survey visits, of which 40 are considered to be of conservation concern (16 are listed on the Red list and 24 are on the Amber List (BoCC4)). In addition, bearded tit, Cetti's warbler and Dartford warbler, which are no longer considered to be of conservation concern due to population increases, benefit from legal protection under Schedule 1 of the W&CA.

2.9 Vantage point surveys identified important night-time duck and greylag roost sites within the coastal/floodplain grazing marsh and waterbodies at Botany Marsh and on the open water at Black Duck Marsh, as well as a marsh harrier roost within scattered scrub on Black Duck Marsh. Due to their supporting Medway Estuary & Marshes SPA/Ramsar citation species, these habitats are considered to be functionally linked to that designated site.

2.10 High and low tide core count surveys identified important roost and refuge zones along the shoreline, particularly at Bell's Wharf and Broadness Point. During these surveys, 42 species were recorded, including 9 species cited as qualifying or interest species for both the Thames Estuary & Marshes and Medway Estuary & Marshes SPA/Ramsar sites.

[2] Eaton MA, Aebischer NJ, Brown AF, Hearn RD, Lock L, Musgrove AJ, Noble DG, Stroud DA and Gregory RD (2015) Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and Isle of Man. British Birds 108, 708–746

SUMMARY OF RELEVANT LEGISLATION AND REQUIREMENT FOR LICENSING

2.11 All bird species in the United Kingdom are protected under the Wildlife and Countryside Act (W&CA) (1981), which makes it an offence to:

- Intentionally kill, injure or take any wild bird;
- Intentionally take, damage or destroy the nest of any wild bird while it is in use or being built;
- Intentionally take or destroy the egg of any wild bird;
- Possess any wild bird, dead or alive, or any part of a wild bird, which has been taken in contravention of the Act or the Protection of Birds Act (1954);
- Have in one's possession or control any egg or part of an egg which has been taken in contravention of the Act or the Protection of Birds Act 1954;
- Use traps to kill, injure or take wild birds;
- Have in one's possession or control any bird of a species occurring on Schedule 4 of the Act unless registered, and in most cases ringed, in accordance with the Secretary of State's regulations (see Schedules); or,
- Intentionally or recklessly disturb any wild bird listed on Schedule 1 while it is nest building, or at a nest containing eggs or young, or disturb the dependent young of such a bird.

2.12 The Kent Project Site supports a number of species protected under Schedule 1 of the W&CA. A list of Schedule 1 species considered to be breeding, possibly breeding or probably breeding within the Kent Project Site is given in **Table 2-2** below, along with breeding habitat requirements.

Table 2-2: Schedule 1 (W&CA) Birds Breeding (or Possibly/probably Breeding) within the Kent Project Site

Species	Breeding Requirements
Spotted crake	Wetland/wet grassland
Little ringed plover	Rocky ground/gravel near water
Marsh harrier	Reedbed
Barn owl	Rough grassland, hollow tree/open building/artificial box
Kingfisher	Water with bank
Peregrine	Tall building or cliffs
Bearded tit	Reedbed
Cetti's warbler	Reedbed and scrub
Black redstart	Vertical features within brownfield

2.13 There is no licencing process in order to permit disturbance of schedule 1 species to facilitate development. Therefore, disturbance must be limited via sensitive and timed clearance and other such mitigation measures.

2.14 As noted above, the Kent Project Site also supports several Species of Principal Importance as defined by Section 41 of NERC Act 2006. Whilst this does not equate to strict legal protection of individuals of a species, section 40 of the NERC Act places a duty on decision-makers such as public bodies, including local and regional authorities, to have regard to the conservation of such species when carrying out their normal functions.

[This page is intentionally left blank]

Chapter Three ◆ IMPACT ASSESSMENT IN ABSENCE OF MITIGATION OR COMPENSATION

3.1 The following information provides a summary of the anticipated significant positive and negative effects on the bird population within the Kent Project Site. The assessment takes into consideration the role of inherent mitigation embedded within the design of the Proposed Development. Additional avoidance, mitigation, compensation and enhancement measures required to address residual effects (additional to that provided by inherent mitigation alone) is provided in the subsequent section.

CONSTRUCTION PHASE

3.2 The following construction phase effects are anticipated in relation to birds:

- Direct habitat loss, damage or degradation (including functionally linked land):
  - Dense scrub, grassland/scrub mosaic and rough grassland – c.84.94 hectares (ha);
  - Reedbed – c.12.21 ha;
  - Coastal/floodplain grazing marsh – c.13.74 ha;
  - Woodland – c.4.97 ha;
  - Standing water – c.2.26 ha;
  - Saltmarsh – c.1.04 ha; and
  - Ditches – c.4.7 km.
- Habitat fragmentation, loss of flight paths and dispersal routes;
- Disturbance (visual and aural);
- Light pollution;
- Hydrological effects, including changes to water quality/quantity; and
- Creation of specific habitats with greater biodiversity value than existing habitats.

OPERATIONAL PHASE

3.3 The following operational phase effects are anticipated in relation to birds:

- Increased lighting, noise and traffic leading to disturbance of species within retained

and newly created habitats;

- Increased risk of collision from new structures;
- Use of herbicides and/or pesticides, e.g. within the formal landscaping in the main resort, resulting in a reduction of invertebrate prey;
- Hydrological effects, including changes to water quality/quantity (mainly affecting aquatic invertebrates); and
- Potential positive effects for certain species through and the implementation of appropriate management of retained and newly created habitats to maximise their suitability for the bird species present.

3.4 In addition to the negative effects identified above, the provision/creation and then subsequent management of both new and retained habitats as part of the overall Landscape Strategy (Document Reference 6.2.11.7) constitutes a positive effect during the operation of the development. Further details of the proposed mitigation and enhancement measures are provided in Chapter Four below.

Chapter Four ◆ MITIGATION AND COMPENSATION

4.1 The overall aim in respect of the bird population is to maintain the overall site-wide habitat mosaic, and associated diverse range of niches and food sources, to meet the needs of the diverse range of birds present on site, whilst limiting construction and operational disturbance to birds using retained habitats.

4.2 The following should be read in conjunction with the Landscape Masterplan (Figure 6.3.11.15) along with Figures 12.44 and 12.55 (Document References 6.3.12.22 and 6.3.12.55), which illustrate the overall vision with respect to habitat provision for birds and a range of other wildlife species.

SUMMARY OF INHERENT MITIGATION

4.3 The following important habitats are to be retained, enhanced and maintained throughout the construction and operational phases of development:

- Approximately 96.82 ha of scrub, grassland/scrub mosaic and grassland;
- Approximately 20.72 ha of woodland;
- Approximately 2.07 ha of standing water;
- Approximately 17.27 ha of swamp/reedbed;
- Approximately 7.20 ha saltmarsh; and
- 4.1 km of ditches.

4.4 The key areas of habitat to be retained (and enhanced where possible) are:

- Saltmarsh on the north-west and north-east fringes of the Swanscombe Peninsula;
- Grassland/scrub mosaic on the former Broadness Saltmarsh;
- Black Duck Marsh (reedbed and open water) on the western side of Swanscombe Peninsula; and
- Botany Marsh East (reedbed, grassland and scrub) on the eastern site of Swanscombe Peninsula.

SUMMARY OF ADDITIONAL MITIGATION (ON-SITE)

4.5 The quantum of previously developed land on the Swanscombe Peninsula will be unavoidably reduced to make way for the Proposed Development, which in turn will reduce the total extent of habitat available to birds, particularly areas of scrub/grassland

mosaic, as well as areas of grazing marsh and reedbed. In order to partially compensate for this overall loss of habitat, areas of retained habitat will be enhanced through sensitive restoration and management in order to maintain the diversity and abundance of species within the Kent Project Site. This will involve management of scrub to maintain a varied age structure and mosaic of open and woody habitats and prevent encroachment into wetland areas, as well as measures to retain populations of invertebrate prey such as enhancing retained Open Mosaic Habitat (OMH).

4.6 In addition to enhancing the retained habitats summarised above, 8.0km of new ditches will be created, along with 5.69 ha of new reedbed habitat. The amount of saltmarsh habitat will be increased through a c.3.03 ha managed retreat on the northern and eastern edge of Swanscombe Peninsula to the benefit of the invertebrates associated with this habitat and therefore the species which prey upon them.

SUMMARY OF COMPENSATION (OFF-SITE)

4.7 Biodiversity Net Gain (BNG) calculations using the DEFRA Biodiversity Metric 2.0 have indicated that some off-site mitigation will be necessary in order to achieve a net gain to biodiversity across the Project Site. Despite significant planned enhancement of existing on-site habitats, it is not considered possible to offset impacts fully the Order Limits. At the time of writing, as a Nationally Significant Infrastructure Project (NSIP), the DCO application will be exempt from forthcoming requirements set out within the Environment Bill for a net gain of 10%. However, this does not exempt the development from existing policy and legal requirements around biodiversity net gain, including paragraph 170(d) of the National Planning Policy Framework (NPPF):

'Planning policies and decisions should contribute to and enhance the natural and local environment by: … d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures'

4.8 Notably, the DCO application includes the loss of an area of reedbed and coastal/floodplain grazing marsh, which has been identified as an important area for over-wintering wildfowl and waders and will result in the net loss of scrubland habitat. It is not considered possible to compensate for these losses within the Project Site due to spatial and topographical constraints.

4.9 No agreement has so far been reached to secure off-site land. A set of *General Principles for Offsite Ecological Mitigation* (Document reference 6.2.12.10) is submitted along with the application for development consent to inform the scope of off-site mitigation to be secured through the Development Consent Order (DCO) examination. For example, the land will be situated within the Greater Thames Marshes Nature Improvement Area (NIA), and as close to the Project Site and the Thames Estuary and Marshes SPA/Ramsar and Medway Estuary and Marshes SPA/Ramsar.

4.10 Off-site land will be enhanced, creating habitat totalling at least 29.1ha of grazing marsh and 1.86 ha of reedbed habitats in order to directly offset losses of functionally linked

habitats within the Kent Project Site at a 2:1 ratio. The provision of this land will provide important wetland habitat for wintering waterfowl and waders and is intended to mitigate against likely significant effects to the SPA/Ramsar sites, as detailed in the *Shadow Habitats Regulations Assessment* (Document reference 6.2.12.4).

4.11 In addition to the above, the off-site mitigation land will include additional land area, forming new habitats sufficient to achieve a biodiversity net gain and provide suitable mitigation for impacts upon other protected species, although the magnitude of the gain will not be known until an agreement is secured. Further information with regard to BNG can be found within the *Biodiversity Net Gain Assessment* (Document reference 6.2.12.2) and a summary of the aims for off-site land can be found within the *General Principles for Offsite Ecological Mitigation* (Document reference 6.2.12.10).

ADDITIONAL MITIGATION (ON-SITE)

Construction Phase

4.12 The following mitigation measures will be secured through an Ecological Construction Method Statement (ECMS), to be included within a Construction Environmental Management Plan secured as a requirement of the DCO.

Sensitive Habitat Clearance

4.13 Given the diversity of the bird assemblage using the Kent Project Site, and the year-round presence of birds, the sensitivities of individual bird species mean that disturbance effects are likely throughout most of the year. As a result, clearance of non-retained habitats and construction works close to sensitive receptors will need to be carried out at specific times of year depending on those species deemed most likely to be present.

Scrub and Woodland Habitats

4.14 Therefore, scrub and woodland clearance works should take place outside of the peak bird breeding season where possible, which occurs from approximately March to September inclusive. However, given the value of the Kent Project Site to breeding birds and the presence of early breeding species, such as thrushes, nesting activity is possible as early in the year as February. Therefore, if clearance is not possible during October-January, a suitably qualified ecologist should carry out a check of all suitable habitat for nesting activity immediately prior to any works taking place.

4.15 If clearance works are carried out using machine-mounted flails, clearance of scrub should be undertaken in stages, only removing scrub that is visible and allowing for a thorough inspection of each section before clearance under supervision of a suitably qualified ecologist.

4.16 If a nest is discovered at any time of year, the nest should be observed by a suitably qualified ecologist to ensure it is not in use before continuation of works. If the nest is in use, a 10m buffer zone should be formed around the nest, in which no further works should occur until the nest ceases to be occupied.

4.17 All woody vegetation removed should be removed from the construction zone to discourage nest building within cut vegetation piles.

4.18 Areas cleared of vegetation should be kept bare and disturbed regularly throughout the breeding season to discourage colonisation by ground nesting species, such as ringed plover.

Clearance of Reedbed

4.19 Due to the presence of a number of species of conservation concern within on-site reedbeds, such as the IUCN vulnerable pochard and Schedule 1 (WC&A) species including spotted crake, Cetti's warbler, bearded tit and marsh harrier, clearance of reedbed must be undertaken once nesting activity has ceased, i.e. between September and February inclusive. Due to hydrological constraints, September/October are considered optimal months for the clearance of on-site reedbed.

4.20 If nesting activity is observed during clearance, all works should cease and a suitably qualified ecologist contacted for guidance. Work must only recommence once the nesting activity has completely ceased within that area of reedbed. A buffer system cannot be implemented around the nest until it ceases to be active in the case of Schedule 1 birds, due to the additional protection afforded to them from disturbance.

Clearance to Enable Creation of Saltmarsh Habitat

4.21 The 'managed retreat' along the peninsula's north-eastern and north-western shores to allow the formation of saltmarsh will necessitate the clearance of species-poor grasslands and bramble scrub present there currently.

4.22 In order to limit disturbance effects upon species listed within the SPA/Ramsar citations, which are present within the Kent Project Site and adjoining estuarine habitats during winter (late-October to March inclusive), this work should be undertaken during the summer months, i.e. April to September inclusive. Because this work is necessary during the peak breeding season for birds, all suitable habitat must be checked thoroughly immediately prior to clearance, as outlined above.

Advanced Mitigation Measures

4.23 As a general principle, habitat enhancement and creation works will take place in advance of construction works (and associated habitat losses) to maintain the availability of food resources and roost/refuge opportunities within the development footprint throughout the construction phase.

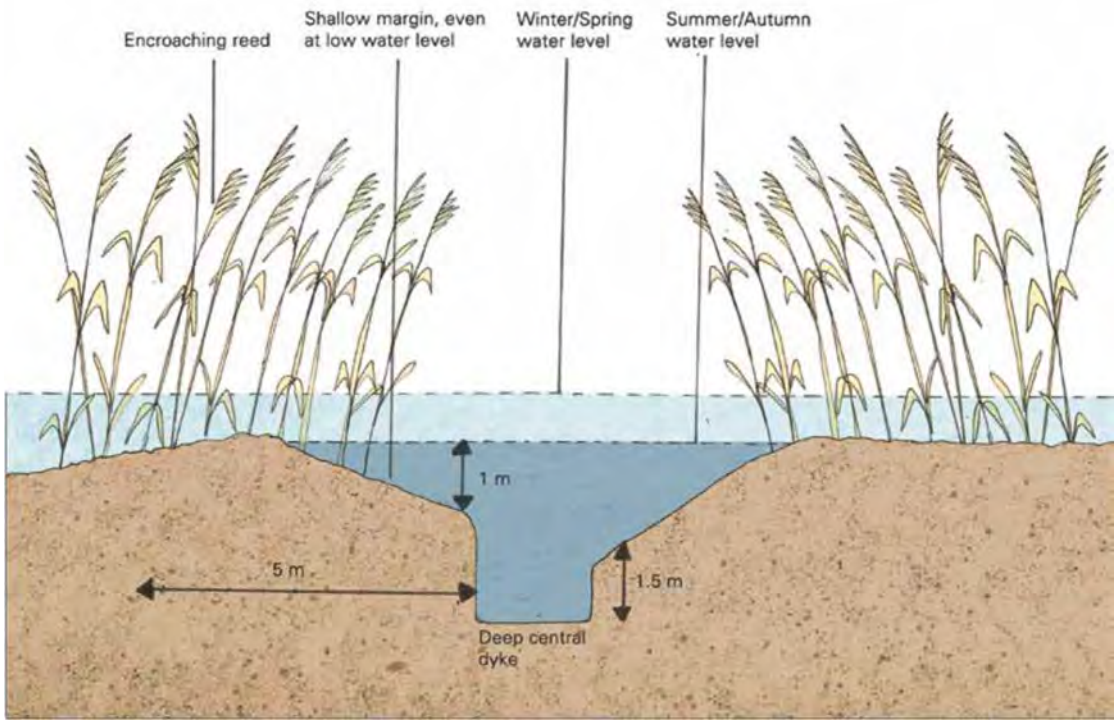
Wetland Habitat

4.24 During the construction works within wetland habitats in the development footprint, the following measures will be undertaken to maintain the quality of the retained wetland habitat on the western and eastern sides of the Swanscombe Peninsula for wildfowl:

- Reduction of scrub encroachment e.g. in Botany Marsh and Black Duck Marsh in particular;
- Selected conversion of simple trapezoidal cross-sectional ditches (such as those typically observed on Botany Marsh) to a more complex profile through the creation of a step in the bank profile beneath the water level (see **Figure 4-1** below for an example); and
- Mechanical excavation of parts of Black Duck Marsh to create additional scrapes/deep areas and variety in depth profile across the reedbed, providing additional refuge areas for wildfowl.

4.25 All works to reedbed should be undertaken in line with the advice given above under '*Clearance of Reedbed'*.

Figure 4-1: More complex ditch profile to increase variation and value to invertebrate prey.



Physical Protection Measures

4.26 An Ecological Protection Zone (EPZ) will be established to protect retained habitat outside of the resort area throughout the construction phase. An EPZ with a 5m buffer will also be established around all retained wetland habitats throughout the construction phase. The EPZs can be delivered through co-ordination with protective measures for other ecological and arboricultural features, combined with temporary protective fencing and signage, as detailed within the main body of the EMMF (Document Reference 6.2.12.3).

4.27 An EPZ will be established along the estuary and Black Duck Marsh based upon evidence presented within the "Waterbird Disturbance Mitigation Toolkit Informing Estuarine Planning and Construction Projects"[3]. As detailed within this toolkit, for species present within functionally linked habitat on-site, the peak distance necessary to cause a visual disturbance effect (and therefore worst case) is 300m for construction vehicles. The most sensitive species to aural disturbance (redshank) will be disturbed by a noise event breaching 55dB at the bird.

4.28 Therefore, in order to minimise disturbance of species listed on SPA/Ramsar citations, works within 300m of the estuary or other functionally linked habitat (i.e. Black Duck and Botany Marshes) and visible from that habitat or causing in excess of 55dB of noise at the estuary, should be timed to take place during the summer months, where possible. This primarily relates to works at Bell's Wharf and the Gate 2 area of the Proposed Development. Redshank were present along the estuary only, and the peak noise event limit can be raised to 70dB at the waterbody in the south of Black Duck Marsh. Non-essential construction traffic should not pass within 300m of the estuary front.

4.29 The estuary and retained marshland habitats will be protected from visual, and to some extent aural, disturbance through the erection of hoardings around areas of construction.

4.30 In addition to the above, where possible, access by construction workers to the estuary front should be restricted within 500m of visible wetland habitats.

Sensitive or Restricted Lighting

4.31 The use of artificial lighting is to be limited to the essential minimum throughout the site, and any lighting to be used should avoid upward pointing lights, with the spread of light being kept near to or below the horizontal.

Pollution Prevention Measures

4.32 Measures to prevent pollution incidents will follow the recommendations set out in the Environment Agency's Pollution Prevention Guidelines (PPGs), or other best practice guidance available at the time of works.

[3] Cutts, N., Hemingway, K. and Spencer, J. (2013) Waterbird Disturbance Mitigation Toolkit Informing Estuarine Planning and Construction Projects. Institute of Estuarine and Coastal Studies (IECS)

4.33 Detailed pollution prevention measures are provided in the main body of this report. However, in summary these will include:

- Measures to be implemented to prevent and deal with pollution incidents;
- Security to prevent vandalism-related pollution incidents;
- Drip trays and bunds around fuel storage and refuelling areas;
- Appropriate wheel washing facilities and road cleaning regime; and
- Silt fencing and settlement lagoons/soakaways to prevent silt runoff.

OPERATIONAL PHASE

Habitat Enhancement

4.34 The principles of management activities to maintain or enhance all of the retained and new habitats within the Kent Project Site is provided in **Section 6** of the main EMMF (Document reference 6.2.12.3), with a monitoring strategy to ensure delivery of habitat enhancement and creation in **Section 7** of the EMMF. The management objectives in relation to important bird habitats are summarised below.

Scrub Habitats

4.35 Scrub habitats will be managed rotationally to create a range of age classes and structure, whilst maintaining the overall extent of scrub habitat within retained habitats. To maintain suitability for early successional species, such as nightingale, shrub will be cut at 10-15 year intervals, with no more than 10% of scrub to be cut in any one year, cut in distinct patches in line with guidance set out by the BTO[4]. Scrub patches should have a clear and gradual progression from grassland to mature scrub and a dense ground layer of bramble or hawthorn should be encouraged.

4.36 In order to avoid conflict with the dormouse mitigation strategy, aerial connectivity between scrub parcels will be maintained throughout scrub management works.

4.37 Some scattered scrub will be allowed to remain within more open habitats in order to encourage grasshopper warblers and other scrubland species, such as linnet, reed bunting, etc.

4 Conservation Advice No.1 - Managing Scrub for Nightingales: A BTO Guide for Land Managers and Conservation Practitioners (2015) BTO – accessed 29 September 2019 (https://www.bto.org/sites/default/files/shared_documents/publications/conservation-advice-notes/2015/conservation-advice-notes-001-nightingalesb.pdf)

Wetland Habitat

4.38 Retained wetland habitat will be enhanced to the benefit of birds through the following measures:

- Rotational management of scrub to maintain a continuity of supply but prevent excessive regrowth/encroachment;
- Rotational cutting of reed vegetation to create a variety in age and structure; and
- Improve water quality in retained habitats though removal of or separation from contaminants through a surface water management strategy including a sustainable urban drainage system (SuDS) and associated treatment train.

Habitat Creation (On site)

Biodiverse Brown Roofs

4.39 New OMH will be created in the form of biodiverse brown roofs on a number of buildings within the new development.

4.40 1.3ha of biodiverse brown roofs are to be created across several buildings as shown on the Landscape Masterplan (Figure 6.3.11.15). The key features of these habitats are as follows:

- To be primarily constructed of crushed concrete and chalk substrates taken from within the development footprint to create similar OMH conditions to parts of the existing Kent Project Site; and
- No plant seeds or sedum, etc., applied but instead the bare substrate is allowed to colonise naturally by plant seeds blown by the wind or introduced by birds.

4.41 These habitats will provide potential habitat for ground or cliff nesting species, such as ringed plover, skylark, black redstart and gulls.

4.42 All roof top habitats will require specialist maintenance with respect to their root barrier and waterproofing membranes in accordance with the manufacturer's specifications. For example, these areas will require periodic removal of self-sown saplings and young shrubs, the roots of which (if allowed to mature) could damage the waterproof membrane or other key components.

Saltmarsh

4.43 As shown on the Landscape Strategy (Document reference 6.2.11.7), mentioned above, the existing saltmarsh habitat on the north-eastern edge of Swanscombe Peninsula is to be extended through managed retreat, to cover an additional 3.03 ha.

4.44 This will involve 'retiring' the flood defence through the creation of a naturalised sloping bank to increase areas of mud flat, saltmarsh, small pools, rocks and shingle areas and reeds, sedges and grasses transitioning into scrub vegetation.

4.45 It is anticipated that saltmarsh vegetation will naturally colonise the area over time once the intertidal conditions are created.

Wetland Habitat

4.46 Maintenance of connectivity across the Peninsula is key to ensure that wetland birds can continue to disperse and colonise areas of suitable habitat. This connectivity between Botany Marsh East and Black Duck Marsh will be maintained through the inclusion of a chain of water courses and water bodies wrapping around the side of the Proposed Development footprint. These water courses will have varying depth profiles, be planted with a range of suitable native bankside and water plants and be bordered with wetland/marsh habitat to promote a diverse and heterogeneous habitat mosaic.

4.47 Approximately 5.69ha of reedbed habitat, and 8.0km of linear ditch/open water habitat, is to be created as part of enhancement of retained Floodplain Wetland Mosaic at Botany Marsh East, and linking Botany and Black Duck Marshes through Broadness.

Other Habitats

4.48 Further habitat of value to birds will be provided within the amenity greenspaces within the resort itself, including:

- Native tree and shrub planting;
- Measures to benefit invertebrate prey, such as wildflower strips rich in nectar sources and bug hotels;
- Green roofs and walls on buildings; and
- A variety of bird nesting boxes.

4.49 The provision of these features in certain key/prominent locations within the resort will also provide an opportunity to raise the profile of biodiversity conservation, when accompanied by suitable educational material such as interpretation boards or signs. The indicative location of features such as bird boxes is provided in Figure 12.44 (Document Reference 6.3.12.44).

Control of Chemical Usage

4.50 The management and maintenance schedules for the formal landscaping and amenity spaces within the main resort area will include measures to minimise, or avoid altogether, the use of herbicides and pesticides which could be harmful to the invertebrate and plant populations, and thereby the bird populations which rely upon them as a food source.

4.51 Should it not be feasible to avoid chemical use altogether, any usage/application of herbicides and pesticides will be undertaken a minimum of 50 m from the natural habitats retained/enhanced/created outside of the main resort area.

Management of Disturbance Impacts

4.52 The anticipated increase in recreational disturbance through increased residential accommodation will be managed through the Landscape Strategy (Document reference 6.2.11.7). This will involve the deployment of informational boards, restricted areas within retained habitats, and controlled viewpoints over the estuary and retained wetland using bird hides and walkways.

Habitat Creation (Off-site)

4.53 The details of off-site habitat creation are yet to be decided. A summary of the aims for off-site land can be found within the General Principles for Offsite Ecological Mitigation (Document reference 6.2.12.10).

Chapter Five ◆ MONITORING WORKS AND SCHEDULE

5.1 Key monitoring actions to measure the success of the mitigation strategy for birds are as follows:

1. Site visits/checks by the Project Ecologist/Ecological Clerk of Works (ECoW) prior to, at key stages during (at least monthly), and at the end of the advanced habitat enhancement phase(s) to ensure these works have been implemented in accordance with the proposed mitigation strategy;

2. Site visits/checks by the Project Ecologist/ECoW prior to, at key stages during (at least monthly), and at the end of the construction phase(s) to ensure measures to protect retained habitat from physical damage and/or pollution are implemented and maintained;

3. Site visits/checks by the Project Ecologist/ECoW prior to, at key stages during (at least monthly), and at the end of the post-construction landscaping phase(s) to ensure measures to create new habitats or enhance existing habitats have been implemented in accordance with the proposed mitigation strategy;

4. Updated bird surveys, following methodology set out within the Ecological Baseline and Winter Bird Baseline contained within it (Document reference 6.2.12.1), to assess changes to breeding and winter bird assemblages in years 3, 5 and 10 following completion of the development; and

5. Update habitat surveys using a standard protocol to assess the success of the habitat enhancement, creation and management works in creating and maintaining the overall mosaic and mix of target habitat types in the desired proportions, in years 3, 5 and 10 following completion of the development.

5.2 Actions 1 to 3 above will include regular feedback loops to ensure that significant deviation from the desired outcome is corrected in a timely fashion.

5.3 Actions 4 and 5 above will be cross-referenced to identify trends in habitat proportions and the conservation status of the bird assemblage, and the information used to review the ongoing habitat management and maintenance regime.

5.4 The results of any monitoring activity will be provided within the Annual Report described in the main body of the EMMF (Document Reference 6.2.12.3).

[This page is intentionally left blank]

Chapter Six ◆ SUMMARY AND CONCLUSIONS

6.1 The Kent Project Site contains a large complex of habitats and, accordingly, it supports a diverse range of wintering and breeding bird species. The bird population present forms a major and important component of the Kent Project Site's biodiversity.

6.2 The habitat mosaics of particular importance include:

- Scrubland habitats (rough grassland and dense or scattered scrub); and
- Fresh water and brackish wetland habitats predominantly comprising saltmarsh reedbed, and grazing marsh but including open water (ponds, ditches and streams).

6.3 Potential or actual adverse effects on the bird population anticipated as a result of the Proposed Development include loss, degradation and fragmentation of habitat during construction, visual and aural disturbance during both construction and operational phases, and light and chemical pollution during the operational phase.

6.4 The overall aim in respect of the bird population is to maintain and enhance the existing scrub and wetland habitat mosaic, and associated diverse range of refuge and feeding opportunities, to meet the needs of the diverse range of birds present on or adjacent to the Kent Project Site.

6.5 The commencement of a maintenance and management regime to maintain the existing range of rough grassland, scrub and wetland habitats is key to the continued presence of both wintering and breeding bird assemblages within the Kent Project Site.

6.6 The quantum of saltmarsh habitat will be increased through managed retreat on the northern and eastern edge of Swanscombe Peninsula, and a range of measures are proposed to mitigate the effects of loss of wetland habitat from within the development footprint, aimed at improving water quality, habitat diversity and complexity within the retained wetlands and the creation of new species-rich wetland habitat.

6.7 The execution of an off-site mitigation scheme is essential to reduce impacts upon interest/qualifying features of the nearby SPA/Ramsar sites, given the net loss of important wetland features within the Kent Project Site. This scheme will also provide opportunities to increase scrub, woodland and species-rich grassland habitats elsewhere in North Kent. The details of off-site mitigation are to be decided upon acquirement of suitable land.

6.8 Further habitat of value to birds will be provided within the amenity greenspaces within the resort itself, including native tree and shrub planting, wildflower strips, green roofs and walls on buildings and nesting boxes.

6.9 Measures are to be put in place to protect retained and new habitats from damage, disturbance or pollution during the construction and operational phases of the Proposed Development.

6.10 Subject to the development of this mitigation strategy in further detail, and its subsequent implementation in full throughout the delivery of the Proposed Development, there will be no significant impacts on: the Internationally significant wildfowl population, the County significant winter bird population and the regionally significant breeding bird population present at the Kent Project Site.

Annex EDP 2
Bat Mitigation Strategy

This page has been left blank intentionally

Revisions

Revision	Description	Issued by	Date	Approved by
r027_00	Issue for DCO Submission	JS/FD	24/12/2020	EDP/LRCH

The Environmental Dimension Partnership Ltd
Tithe Barn
Barnsley Park Estate
Barnsley
Cirencester
Gloucestershire
GL7 5EG

[This page is intentionally left blank]

Contents

[This page is intentionally left blank]

List of Tables

[This page is intentionally left blank]

List of Figures

[This page is intentionally left blank]

Chapter One ◆ INTRODUCTION, SITE CONTEXT AND PURPOSE

INTRODUCTION

1.1 This Bat Mitigation Strategy has been prepared by the Environmental Dimension Partnership Ltd (EDP) on behalf of London Resort Company Holdings Limited (LRCH). It considers the likely impacts of the Proposed Development on the bat population within the Project Site and identifies the avoidance, mitigation, compensation and enhancement measures required to enable the Proposed Development to meet legislative and/or planning policy requirements and result in an overall biodiversity net gain. A brief overview of the baseline situation is also provided along with a review of legislative and policy requirements.

1.2 The land within the Project Site will be subject to a Development Consent Order (DCO) application for a proposed world class destination entertainment resort with associated infrastructure, staff accommodation, dedicated access road, public amenity space and habitat creation. The application will be supported by an Environmental Impact Assessment (EIA), with this report provided as part of an overall Ecological Mitigation and Monitoring Framework report (Document reference 6.2.12.3) which is an appendix to the Environmental Statement (ES).

1.3 Detailed information on baseline conditions and survey methods employed is provided within the Ecology Baseline Report (Document reference 6.2.12.1). Detailed consideration of the likely significant effects of the Proposed Development is provided within Chapter 12: *Terrestrial and Freshwater Ecology and Biodiversity* of the ES (Document reference 6.1.12).

SITE CONEXT

1.4 The Project Site comprises two parts including the 'Kent Project Site', which includes land on the Swanscombe Peninsula, and the Ebbsfleet Valley, on the south side of the River Thames and is centred approximately at Ordnance Survey Grid Reference (OSGR) TQ 606 758, and the 'Essex Project Site', which includes land to the east of the A1089 Ferry Road and the Tilbury Ferry Terminal and is centred approximately at OSGR TQ 643 752. The Project Site lies partly within three local planning authority areas (LPAs); Dartford Borough and Gravesham Borough for the Kent Project Site, and Thurrock Council for the Essex Project Site. Collectively these two parts of the entire DCO boundary are referred to as 'the Project Site'.

1.5 The Project Site comprises a range of habitat types including woodland and scrub, grasslands of varying quality, salt marsh, intertidal zones, brownfield areas, running and standing water, chalk exposures and developed land.

1.6 Figure 12.1 (Document reference 6.3.12.1) shows the Project Site Areas as they are referred to in this report.

PURPOSE

1.7 As described in detail in the Ecology Baseline Report (Document Reference 6.2.12.1), bat activity and roosting surveys were undertaken by EDP across the Kent Project Site in 2020. No activity surveys were conducted at the Essex Project Site due to the paucity of suitable foraging habitat, although bat roost surveys were undertaken on a number of buildings.

1.8 The 2020 surveys have confirmed the presence of a soprano pipistrelle (*Pipistrellus pygmaeus)* roost within building B67, a common pipistrelle (*Pipistrellus pipistrellus)* roost in building B32, on the Kent Project Site, and a foraging/commuting bat assemblage of local value.

1.9 All species of bat in the UK are listed as a European Protected Species (EPS) on Schedule 2 of the Conservation Regulations (Annex IV(a) to the Habitats Directive), affording them protection under the Conservation of Habitats and Species Regulations 2017 (as amended).

1.10 In the absence of appropriate compensation and mitigation measures, the Proposed Development is considered likely to result in the destruction of, and disturbance to, bat foraging/commuting habitat within the DCO Limits, and the destruction of the confirmed soprano pipistrelle and common pipistrelle bat roosts and potential killing/ injury of any individuals present. Additionally, the potential for disturbance of individuals could also arise during the pre-construction and construction phases. Should the Proposed Development be consented, given the risk of causing an offence under the Conservation Regulations, due to the loss of the confirmed bat roost, a European Protected Species Mitigation Licence (EPSML) from Natural England (NE) will be necessary prior to the commencement of any demolition works to buildings B67 and B32.

1.11 This strategy therefore sets out the recommended sensitive working methodologies to be implemented during the pre-construction and construction phases of the Proposed Development. The methodologies devised are based upon the findings of the bat surveys completed to date by EDP during 2020 and Corylus Ecology in 2015, as detailed within the Ecology Baseline Report (Document reference 6.2.12.1) and as summarised below. This strategy also sets out the recommended mitigation, enhancement, and compensation measures to be implemented as part of the Proposed Development, to ensure no significant negative effects will arise upon the favourable conservation status of the local bat population. Such measures are secured via this EMMF, which will be a requirement of the DCO. As such, it is considered that this strategy could form the basis of the Method Statement template comprising any future EPSML application submission to NE going forward.

1.12 The mitigation strategy has been prepared following consultation with Natural England via their Discretionary Advice Service, as discussed during a meeting held on 16 October 2020. A copy of the consultation response received from Natural England is enclosed as

Annex EDP 13 to the Ecological Mitigation and Management Framework (EMMF) (Document Reference 6.2.12.3).

[This page is intentionally left blank]

Chapter Two ◆ SURVEY FINDINGS

2.1 Full details of the methods and results of bat surveys carried out at the Project Site are provided within the EDP Ecology Baseline Report (Document reference 6.2.12.1) which includes the reports of previous surveys in 2015 as annexes to the report. A summary of the results is provided below to provide the relevant context to this Bat Mitigation Strategy.

PREVIOUS SURVEYS

2.2 In 2015, a total of nine species were recorded within the Kent Project Site: common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle (*Pipistrellus nathusi*i), noctule (*Nyctalus noctula*), Leisler's (*Nyctalus leisleri*), natterer's (*Myotis nattereri*), Daubenton's (*Myotis daubentonii*), serotine (*Eptesicus serotinus*) and long-eared bat (*Plecotus* sp.). Unidentified Myotis bats were recorded in all areas but at Station Quarter South, two species were confirmed, natterer's and Daubenton's. The results of the bat surveys revealed a bat assemblage in the Peninsula, Craylands Pit, Bamber Pit and Station Quarter South of at least 'Local Importance', and within Northfleet Landfill of 'Neighbourhood Importance'.

2.3 A soprano pipistrelle bat tree roost was identified in the Station Quarter South survey area and two further likely tree roosts for common pipistrelle and soprano pipistrelle bats were also found[1].

2.4 In 2015, 13 buildings along Manor Way and Craylands Lane, on the Kent Project Site, were assessed for their potential to support bat roosts. Two buildings were identified as being of low potential, albeit with that potential reduced due to high levels of artificial lighting. One building had potential to support a night roost or feeding perch. The remaining buildings had no or negligible potential for roosting.

2.5 Tunnels within Craylands Pit were assessed for their potential to support day roosting, swarming and hibernating bats. The assessment concluded that no swarming occurred and that those tunnels included in the detailed surveys did not support suitable environmental conditions for hibernating bats however they may support features suitable for resting or night roosting.

DESK STUDY

2.6 During collation of the baseline survey information for the Project Site in 2020, Kent & Medway Biological Records Centre (KMBRC) and Essex Field Club (EFC) were consulted to provide existing records (outside of those collected as part of previous surveys of the

[1] London Paramount Entertainment Resort, *Bat Activity Report 2015*, Corylus Ecology (on behalf of Chris Blandford Associates), June 2016.

Project Site commissioned by LRCH) for Annex II[2] bats within a 6km radius of the DCO boundary, and other bat species within a 2km radius. A Freedom of Information (FoI) request was submitted to NE on 15 September 2020 regarding granted EPSML for bats within the local vicinity of the Project Site, as shown on the Multi-Agency Geographic Information for the Countryside (MAGIC) website.

2.7 Records provided by Kent Bat Group (as part of the desk study performed by KMBRC) included 390 records of bats within 2km, of which 169 related to roosting; Daubenton's bat (57), natterer's bat (37) and brown long eared bat (*Plecotus auritus*) (36). Other species roosting were serotine, Brandt's (*Myotis brandtii*), Leisler's, noctule, common pipistrelle and soprano pipistrelle. Only Nathusius' pipistrelle had been recorded without any roosts. No roost records came from within the Project Site itself.

2.8 During the 2020 desk study, EFC provided records of nine species within a 2km radius of the Essex Project Site, five of which were recorded as hibernating or roosting; Daubenton's, natterer's bat, *Myotis* sp., pipistrelle species and brown long eared bat. Hibernation records are from Chafford Tunnels, Grays Tunnels and bunkers and a maternity roost was found in Stifford St Mary's church. No roost or hibernation records were returned from within the Project Site.

2.9 The FoI request provided information on two EPSML, as summarised below:

- Licence EPSM 2009-1165: NE confirmed that they no longer hold the information therefore exception 12(4)(a) – Information Not Held – under the Environmental Information Regulations 2004 was applied; and

- Licence 2016-21327-EPS-MIT: OSGR TQ 6201 7449, one resting place for common pipistrelle bat will be lost as a result of demolition of the former Scout Hut, with disturbance, capture and transport of up to five bats allowed. Licence start date: 01 March 2016; licence end date: 18 February 2021.

BAT ROOSTING - TREES

2.10 There are no trees with bat roosting potential within the Essex Project Site.

2.11 A visual assessment of trees across the Kent Project Site for their bat roost potential has been completed in 2020, along with a series of climbing surveys to inspect potential roosting features of those trees proposed to be lost to the Proposed Development. A total of 20 trees have been found to provide potential roost features, comprising nine trees with high potential, five with moderate potential and six with low potential. The features on each tree with roosting potential are detailed in Table 2-1 and the location of each tree is shown on Figure 6.3.12.12. One of the trees marked 'wasp' in the table below contained a wasps nest and could not be safely inspected without harm to the surveyor.

[2] Bat species listed in Annex II of the *EC Habitats Directive*, namely greater horseshoe (*Rhinolophus ferrumequinum)*, lesser horseshoe (*R. hipposideros)*, barbastelle (*Barbastella barbastellus)* and Bechstein's (*Myotis bechsteinii).*

Table 2-1: Results of Roost Assessment of Trees

Tree ID	Species	Features Identified	Bat Roost Potential from PRA	Bat Roost Potential from Aerial Inspection
W16a	Sycamore	Multiple limb cavities on north aspect of semi-mature tree in poor condition	High	N/A - wasp
W16b	Ash	Woodpecker hole on north aspect at 8m. Bees present and top part of tree has snapped off opening hollow to the air. Unlikely to be suitable	High	Moderate
W16c	Beech	Dead tree with four woodpecker holes	High	Low
G120a	Cherry	Hollow stem with multiple cavities, woodpecker holes and flaking bark on north aspect. Most woodpecker holes are test holes and do not lead anywhere	High	Moderate
G120b	Cherry	Multi-stemmed tree with woodpecker holes on various aspects	High	High
G120c	Cherry	Multi-stemmed tree with woodpecker holes on west aspect	High	High
G120d	Willow	Hazard beam on vertical limb at 2m	Low	N/A
G120e	Willow	Three potential roost features – cavity, woodpecker hole and knot hole	High	Low
G120f	Willow	Woodpecker hole on west aspect at 3m	High	High
G120g	Willow	Woodpecker holes on various aspects	High	Moderate
G120h	Oak	Woodpecker holes on various aspects	High	High
G120i	Oak	Woodpecker holes on various aspects	High	High
G120j	Oak	Hollow trunk with cavity leading in at 1m on west aspect. Two potential roost features – a tear out and a stem cavity	Moderate	High
G120k	Elder	Semi-mature tree in poor condition, with hollow stem at 0.5m, and split limbs with flaking bark on multiple aspects. Lots of hollowing and cavities	Moderate	High
G120l	Beech	Fallen tree with split in stem	Low	N/A
G120m	Blackthorn	Three woodpecker holes on west aspect at varying heights	High	High
G120n	Willow sp.	Woodpeckers holes on eastern side of stem	N/A	Moderate
G121a	Silver birch	Hollow stem with multiple cavities on various aspects	High	Low
G121b	Goat willow	Woodpecker hole on west aspect at 5m	High	Moderate
G121c	Poplar	Two woodpecker holes on west aspect at 3m and 4m	High	Low

2.12 No evidence of any bat roosts has been found in any of the trees surveyed.

BAT ROOSTING - BUILDINGS

2.13 A total of 150 buildings were initially identified within the DCO boundary. Of these, 101 buildings were assessed as having negligible potential to support roosting bats due to their construction or are no longer present. These buildings were therefore not subject to any further level of survey.

2.14 A total of 23 buildings were found to have potential to support roosting bats during the assessment, with 10 assessed as having Low potential, 10 assessed as having Moderate potential and three assessed as having High potential. There are 26 buildings (16% of the total) that could not be adequately assessed due to access restrictions. Locations and gradings of the buildings are shown on Figure 6.3.12.13 with details of potential roosting features in the 23 buildings provided in Table 2-2.

2.15 For those 26 buildings that could not be surveyed a precautionary approach to the assessment of effects upon these buildings is provided within Chapter 12: Terrestrial and freshwater ecology and biodiversity (Document reference 6.1.12) of the Environmental Statement. Furthermore, in the unlikely event that roosting bats are present (considered unlikely based on the overwhelming majority of buildings being of negligible bat roost potential and the relative lack of confirmed roosts), precautionary mitigation measures are detailed within this Bat Mitigation Strategy. The use of a precautionary approach where there is lack of information/ confidence in survey results was advised by Natural England in their Discretionary Advice Service letter of 9th October 2020 (copy of which is enclosed as Annex EDP 13 to the EMMF (Document reference: 6.2.12.3)).

Table 2-2: Description of Buildings with Bat Roost Potential

Building number	Potential Roost Features	Bat Roost Potential
B67	Gaps around roof joists, sarking board with areas missing, gaps in mortar between blockwork.	High
B265	Tilbury Riverside Arts Activity Centre, missing roof tiles and gaps at eaves. Potential access into roof void. No internal assessment of roof void undertaken.	High
B266	London International Cruise Terminal, original early 20th century station buildings enclosed by new roof structure; access possible through broken external windows around incomplete boarding. Further surveys undertaken using static detectors overnight on two occasions as no suitable locations for surveyors externally.	High
B32	Southern Water building. Gaps beneath tiles and around eaves.	Moderate
B46	Industrial building in use occasionally as workshop. Windows sealed with blocks, with gaps around edges, access around doors. No internal access to confirm internal roosting opportunities.	Moderate

Building number	Potential Roost Features	Bat Roost Potential
B71	Gaps beneath roof tiles and within soffit boxes. Potential access into roof void. No internal assessment of roof void undertaken.	Moderate
B79	Workshop building with cracks in mortar and gaps beneath ridge and at the eaves. Rapid assessment from public highway only.	Moderate
B80	Workshop building with cracks in mortar and gaps beneath ridge tiles and at the eaves. Rapid assessment from public highway only.	Moderate
B85	Workshop building with cracks in mortar and gaps beneath ridge. Rapid assessment from public highway only.	Moderate
B102	Disused industrial building with boarded windows and gaps in brickwork Rapid assessment from public highway only. No access for further surveys.	Moderate
B136	Workshop building with boarded windows, gaps in brickwork, beneath ridge tiles and at the eaves.	Moderate
B146	George and Dragon Pub Disused pub with gaps beneath tiles to the rear of the building and potential gaps around fascia boards. Rapid assessment from public highway only.	Moderate
B220	Residential house with gaps at eaves and lifted tiles on roof. Potential access into roof void. No internal assessment of roof void undertaken.	Moderate
B22	Disused structure on the peninsular with crack in brickwork	Low
B45	Aces's café Gaps beneath corrugated roof sheets and fascia boards.	Low
B52	Electrical substation with open front. Rapid assessment from public highway only.	Low
B53	Electrical substation with cracks in brickwork. Rapid assessment from public highway only.	Low
B78	Brick gable ends of in use industrial buildings with cracks in brickwork. No suitable positions for further surveys, endoscope inspection required prior to demolition.	Low
B84	Disused industrial building with potential access to internal voids. Internal assessment found roosting potential limited to a small portion of eaves storage and beneath corrugated roof sheets.	Low
B135	Modern commercial units, Multiple roof structures with fascia boards and soffit boxes. Rapid assessment from public highway only. Access refused for further surveys.	Low

Building number	Potential Roost Features	Bat Roost Potential
B137	Modern commercial units, Multiple roof structures with fascia boards and soffit boxes. Rapid assessment from public highway only. Access refused for further surveys.	Low
B138	Modern commercial units, Multiple roof structures with fascia boards and soffit boxes. Rapid assessment from public highway only. Access refused for further surveys.	Low
B140	Modern commercial units, Multiple roof structures with fascia boards and soffit boxes. Rapid assessment from public highway only. Access refused for further surveys.	Low

2.16 Two buildings (B67 and B32) located within the Manor Way Business Park on the Swanscombe Peninsula (see Figure 2-1 and Figure 2-2), supporting day roosts for individual soprano pipistrelle and common pipistrelle bat have been recorded within the Kent Project Site. The buildings are proposed to be demolished to accommodate the Proposed Development.

Figure 2-1: Figure showing location of building B67

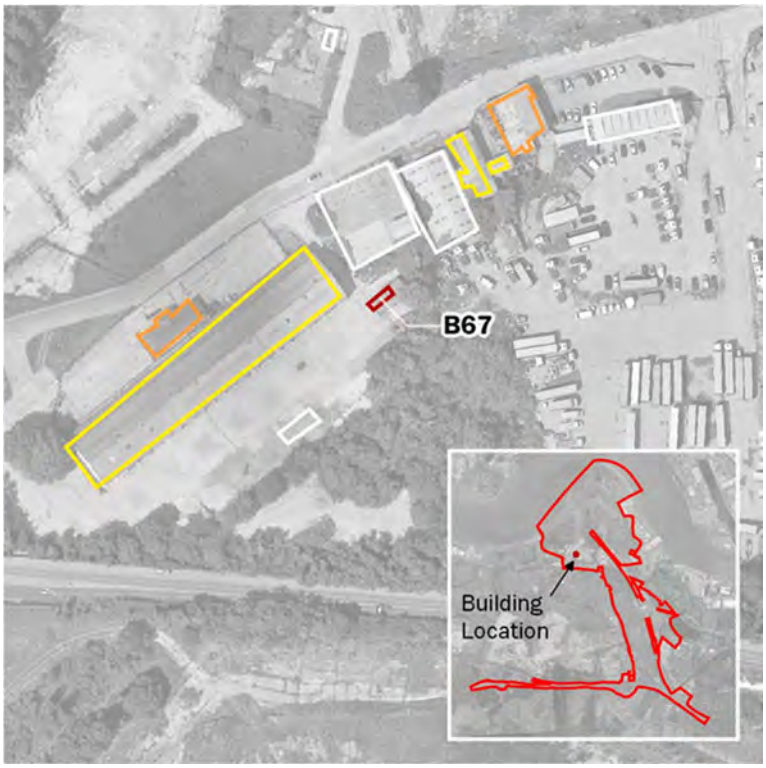
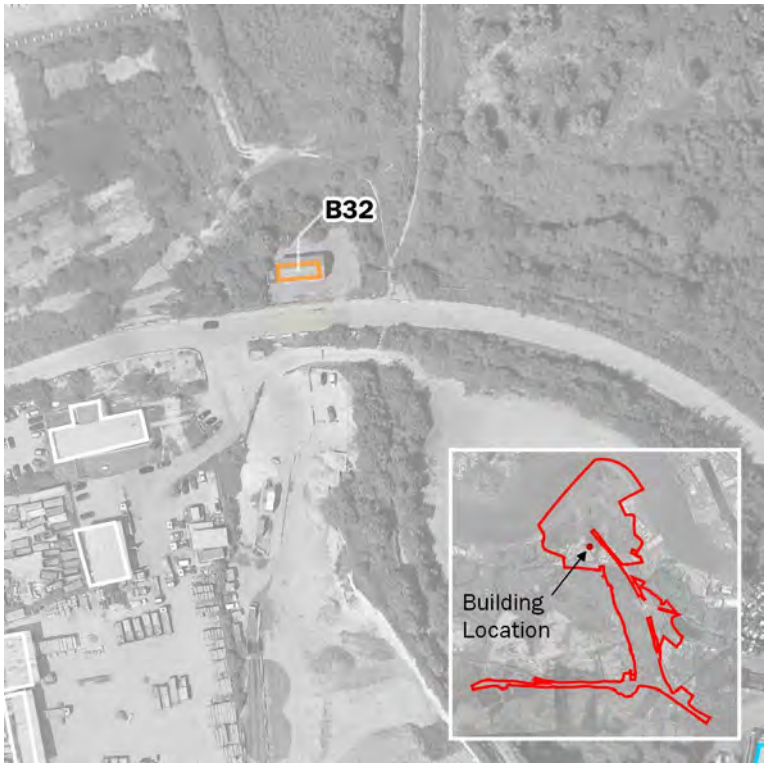


Figure 2-2: Figure showing location of building B32



BAT ROOSTING - TUNNELS

2.17 The assessment of roosting potential was undertaken by EDP in August 2020 and noted suitability for roosting, swarming and hibernating bats. With regard to their potential to support winter bats, an update assessment was carried out in December 2020. In some instances, full internal inspection has not been possible for health and safety reasons surrounding accessing confined spaces and due to structural instability. Where full internal access has not been possible, the assessment has been undertaken at the tunnel entrance(s) and a precautionary assessment undertaken.

2.18 Full details of the tunnels and their suitability are included in Table 2-3. The location of the tunnels is provided on Figure 6.3.12.13.

Table 2-3: Features of the Tunnels with Bat Roost Potential

Tunnel No.	Potential Roost Features	Potential for summer roosting	Potential for autumn roosting	Potential for hibernation
TU/007	Deep cracks in the brickwork around the eastern entrance. Several cracks that extended both up and down, suitable for crevice-dwelling bat species.	Moderate	Moderate	Moderate

Tunnel No.	Potential Roost Features	Potential for summer roosting	Potential for autumn roosting	Potential for hibernation
	Several hibernating butterflies and butterfly remains			
TU/011	No features observed from tunnel entrance, precautionary assessment.	Low	Moderate	Low
TU/012	Large room with potential for hanging bats. Very few crevices.	Low	Moderate	Low
TU/013	No features observed from tunnel entrance, precautionary assessment.	Low	Moderate	Low
TU/013A	No features observed from tunnel entrance, precautionary assessment.	Low	Low	Low
TU/014	No features observed from tunnel entrance, precautionary assessment.	Low	Low	Low
TU/014A	No features observed from tunnel entrance, precautionary assessment. Inspected ¾ of the tunnel due to health and safety issues. Collapsed at one end with several crevices and a few crevices that aren't too deep throughout the tunnel.	Low	Low	Low
TU/015	No features observed from tunnel entrance, precautionary assessment. Open at both ends, unstable environment for hibernation.	Low	Low	Negligible
TU/016	Large cracks in brickwork around entrance. No other features observed, precautionary assessment. Unstable environment for hibernation.	Moderate	Moderate	Negligible, except for single crack at entrance with low potential
TU/018	No features observed from tunnel entrance, precautionary assessment.	Low	Negligible	Low

Summer Roosting Surveys

2.19 No emergences or re-entries were recording during the surveys in 2020.

Autumn Swarming Surveys

2.20 Static detectors deployed at the entrance of the tunnels in August, September and October 2020 recorded low levels of bat activity. Due to access constraints for health and safety reasons it was not always possible to position the detectors so that recordings were solely from within the tunnels themselves. As such, it is difficult to determine absolutely whether behaviour can be attributed to autumn swarming or general foraging. The acoustic surveys undertaken were aiming to identify repeated peaks of activity between 2-5 hours after sunset indicative of swarming behaviour.

2.21 A number of the tunnels returned no records of bats or low numbers of recordings of an assemblage typical of the area including common pipistrelle, soprano pipistrelle, noctule, long-eared bat and *Myotis* bats. Tunnel T7 and tunnel T16 recorded above average numbers of *Myotis* sp. calls (when compared to levels of *Myotis* bat activity recorded during other surveys): there were 14 *Myotis* recordings made between 00:00 and 01:00 on 25 September at tunnel T7.

2.22 There were 42 *Myotis* recordings made between 22:00 and 00:00 on 01 September, made at the south end of T16. Conversely, there were no *Myotis* calls recorded at T16 during this time.

2.23 The results do not indicate autumn swarming behaviour by any species at the tunnels surveyed.

Winter hibernation Surveys

2.24 The preliminary roost assessment of tunnels has identified that 1 of the tunnels has moderate potential to support hibernating bats, 7 tunnels have low potential and 1 has negligible potential. A further tunnel, TU/016, has negligible potential with the exception of a single large crack at the tunnel entrance which was considered to offer low potential.

2.25 The Proposed Development will not result in any direct impacts upon any of the tunnels with the exception of tunnels TU/016 (negligible/low potential) and TU/018 (low potential) which will be used for access between the transport interchange and staff accommodation.

BAT ACTIVITY

2.26 Overall, the habitat was assessed as being of moderate suitability for foraging bats[3], since there are continuous areas of suitable foraging habitat within the Project Site however such areas of foraging habitat are relatively patchy within the wider landscape, with limited connectivity due to the presence of urban habitat and dispersal barriers (such as major transport infrastructure and high artificial lighting).

[3] Collins, J (ed) (2016) *Bat Surveys for professional ecologists: Good Practice Guidelines*. (3rd edn) Bat Conservation Trust, London.

2.27 Based upon this assessment, one transect was completed each month between May and September 2020, with two automated detectors deployed per transect route for five nights in each of the same months. The transect routes and static detector locations are illustrated on Figure 12.14 (Document reference 6.3.12.14) of the EDP Ecology Baseline Report (Document reference 6.2.12.1).

2.28 In addition to those bats recorded roosting within the Kent Project Site, the bat activity surveys have recorded activity by a minimum of eight species of bat, comprising: common pipistrelle; soprano pipistrelle; Leisler's; long-eared (*Plecotus)* species; *Myotis* sp.; Nathusius' pipistrelle; noctule; and serotine.

2.29 Since it is not possible to accurately determine the species of *Myotis* bats at the Project Site from the bat detector recordings, it is assumed that since there are records for Daubenton's, natterer's and Brandt's bat at the Kent Project Site or within the surrounding 2km, that these species are also present. Similarly, for species in the *Plecotus* genus, since there are records for brown long-eared bat within 2km, this species can be assumed to be present. Therefore, the minimum number of bat species present at the Kent Project Site is ten.

2.30 Analysis of the results of the automated bat activity surveys reveal the habitats of importance to foraging and commuting bats are primarily located on the Swanscombe peninsula of the Kent Project Site, centred around Black Duck Marsh, Botany Marsh and the scrub, woodland and open mosaic habitats between and bordering these areas (NE/SW tips and Channel tunnel Rail Link (CTRL) wetland). The woodland south of Black Duck Marsh/north of Tiltman Avenue appears to hold some significance for *Myotis* species, Leisler's and long-eared species. The chalk grassland and scattered scrub areas of Craylands Pit, Bamber Pit and sportsground south of the A226 have also been found to support foraging bats.

2.31 Of the more commonly recorded species (common pipistrelle, soprano pipistrelle and noctule), common pipistrelle bat activity was widespread across the Kent Project Site although significantly higher levels of activity were associated with the marshes and dense and scattered scrub, dry reedbed and open mosaic scrub/grassland habitat of the NE/SW tips and CTRL wetland. Soprano pipistrelle activity was less widespread across the Kent Project Site but again primarily associated with the habitats around NE/SW tips and CTRL wetland. Noctule activity appeared to be more frequently associated with Black Duck Marsh plus the chalk grassland and scattered scrub areas of Craylands Pit, Bamber Pit and sportsground south of the A226.

2.32 The next most frequently recorded activity was from bats within the *Myotis* genera, which were recorded more frequently within the woodland to the south of Black Duck Marsh/north of Tiltman Avenue and within the scrub, reedbed and mosaic habitat around the NE/SW tips and CTRL wetland. Serotine activity was recorded at a similar rate to *Myotis* sp. and was centred around the NE/SW tips and CTRL wetland and Craylands Pit although serotine activity was recorded at low levels widely across the Kent Project Site.

2.33 Leisler's bat activity levels varied during the recording periods with low levels recorded widely across the Kent Project Site, with a higher number of calls recorded within the woodland south of Black Duck Marsh/north of Tiltman Avenue during one recording period.

2.34 Long-eared bat activity was similarly widespread across the Kent Project Site although at very low levels but with a higher number of calls again within the woodland south of Black Duck Marsh/north of Tiltman Avenue. Since bats within the *Plecotus* genus are subject to much lower detectability due to their quiet echolocation calls, it is concluded that brown long-eared bat is likely widespread but under-recorded within suitable habitats at the Kent Project Site, which primarily comprise woodland and scrub, where there are also low levels of artificial light.

2.35 As with Leisler's and long-eared bat activity, Nathusius' pipistrelle activity was widespread across the Kent Project Site but at very low levels, with an increased number of calls recorded within the sportsground south of the A226.

2.36 As described in Appendix 12.1: Ecology Baseline Report (Document reference 6.2.12.1), winter foraging surveys were not considered necessary to inform the Environmental Statement and were not requested by consultees during the Environmental Information Assessment (EIA) Scoping Opinion received in July 2020 or through the Preliminary Environmental Information Report (PEIR) consultation in July 2020. Nevertheless, the Kent Project Site is considered to offer some potential to support winter foraging bats on warm nights and, on a precautionary basis, the potential adverse effects of the Proposed Development and any mitigation considered necessary is included.

EVALUATION OF BAT ASSEMBLAGE

2.37 A summary of the conservation status and distribution of those bats recorded at the Kent Project Site is given in Table 2-4. It includes the status and distribution for long-eared (*Plecotus)* species and *Myotis* species that have either been recorded at the Project Site during earlier surveys or during the desk study.

Table 2-4: Summary of Conservation Status and Distribution of Bat Species

Species	UK Conservation Status[4]	UK Distribution[5]	Local (Kent) Status[6]
Common pipistrelle	Favourable	Common	Common
Soprano pipistrelle	Favourable	Common	Common
Nathusius' pipistrelle	Unknown	Rare	Scarce, often migrant

[4] Joint Nature Conservation Committee (2019) *Article 17 Habitats Directive Report 2019: Species Conservation Status Assessments 2019*. Available at: https://jncc.gov.uk/our-work/article-17-habitats-directive-report-2019-species/ [Accessed: 26/08/2020]

[5] Battersby. J. (Ed) & Tracking Mammals Partnership. (2005) *UK Mammals Species Status and Population Trends. First Report by the Tracking Mammals Partnership*. JNCC/Tracking Mammals Partnership, Peterborough.

[6] Kent Bat Group (2018) *Bats in Kent*. Available from: http://www.kentbatgroup.org.uk/bats-in-kent/ [Accessed: 26/08/2020]

Species	UK Conservation Status[4]	UK Distribution[5]	Local (Kent) Status[6]
Noctule	Favourable	Generally uncommon	Generally uncommon, declining
Leisler's	Favourable	Widespread but scarce	Scarce, may be under-recorded
Serotine	Favourable	Widespread in southern Britain	Widespread but declining
Daubenton's	Favourable	Common throughout much of UK	Common near water
Natterer's	Favourable	Fairly common throughout much of UK	Scarce
Brandt's	Favourable	Common in west and north England, rare or absent elsewhere	Rare and elusive
Brown long-eared	Favourable	Common	Common

2.38 The abundance and diversity of bat species reflects the diversity of habitats present within the Kent Project Site and assemblage of bats present within the county and region. Common and widespread generalist species such as common pipistrelle bats accounted for the vast majority of foraging and commuting activity, in addition to a number of rarer bat species, including Nathusius' pipistrelle and serotine bats. Species of *Myotis bats* including Daubenton's, natterer's and Brandt's bat can also be assumed as present since they have been recorded during previous surveys or are present within 2km according to desk study records.

2.39 Using the technique for valuing bats described by Wray *et al*[7], the results of the surveys and assessment of the conservation status of the bat species present, the roosting bat assemblage is considered to be of Local level importance and the foraging bat assemblage is considered to be of District level importance.

2.40 The conservation significance[8] of the bat roosts is low, comprising roosts for individual bats of common species.

[7] Wray, S. *et al* (2010) *Valuing Bats in Ecological Impact Assessment.* In Practice, 70, 23 - 25
[8] Mitchell-Jones, A. J. (2004) *Bat Mitigation Guidelines.* English Nature, Peterborough

Chapter Three ◆ LEGISLATIVE CONTEXT

3.1 All UK bat species receive strict legal protection which is mainly derived from the legal protection provided through the EU Habitats Directive, transposed in the UK through the Conservation of Habitats and Species Regulations 2017 (as amended). The legal context of the Directive and Regulations as it applies to bats is set out below.

EU HABITATS DIRECTIVE

3.2 Articles 12 and 16 of the Habitats Directive require the establishment and implementation of a strict protection regime for animal species, listed in Annex IV(a) of the Habitats Directive.

3.3 Article 12(1) of the Habitats Directive requires Member States to:

"*Establish a system of strict protection for the animal species listed in Annex IV (a) in their natural range, prohibiting:*

a) All forms of deliberate capture or killing of specimens of these species in the wild;

b) Deliberate disturbance of these species, particularly during the period of breeding, rearing, hibernation and migration;

c) Deliberate destruction or taking of eggs from the wild; and

d) *Deterioration or destruction of breeding sites or resting places*".

3.4 'Microchiroptera', which includes all UK bat species, is included at Annex IV(a) of the Directive.

3.5 Article 16(1) of the Habitats Directive states that:

"*provided that there is no satisfactory alternative and the derogation is not detrimental to the maintenance of the populations of the species concerned at a favourable conservation status in their natural range, Member States may derogate from the provisions of Article 12:*

a) In the interest of protecting wild fauna and flora and conserving natural habitats;

b) To prevent serious damage, in particular to crops, livestock, forests, fisheries and water and other types of property;

c) In the interests of public health and public safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment;

d) For the purpose of research and education, of repopulating and re-introducing these species and for the breeding operations necessary for these purposes, including the artificial propagation of plants; and

e) *To allow, under strictly supervised conditions, on a selective basis and to a limited extent, the taking or keeping of certain specimens of the species listed in Annex IV in limited numbers specified by the competent national authorities*".

3.6 'Favourable Conservation Status' (FCS) is defined by the EU Habitats Directive by Article 1(i) of the Directive. The conservation status of a species is defined as "*the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within the territory*". This is considered 'favourable' when:

(i) Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats;

(ii) The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and

(iii) There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

THE CONSERVATION OF HABITATS AND SPECIES REGULATIONS 2017

3.7 Articles 12 and 16 of the EU Habitats Directive are transposed into UK law through the provisions of The Conservation of Habitats and Species Regulations 2017.

3.8 Regulation 40 states that Schedule 2 of the Regulations lists those species of animals listed in Annex IV(a) to the Habitats Directive which have a natural range, which includes any area in Great Britain. The species listed are considered EPS and include all UK bat species.

3.9 Regulation 41(1) states that it is against the law to:

a) Deliberately capture, injure or kill any wild animal of a European protected species;

b) Deliberately disturb wild animals of any such species;

c) Deliberately take or destroy the eggs of such an animal, or

d) Damage or destroy a breeding site or resting place of such an animal.

3.10 Regulation 41(2) further states that with respect to 'disturbance' this 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 a hibernating or migratory species, to hibernate or migrate.

b) *To affect significantly the local distribution or abundance of the species to which they belong"*.

3.11 The protection afforded under Regulation 41 can be derogated through a licensing process under the requirements of Regulation 53 under certain circumstance, including the preservation of public health and public safety or other imperative reasons of overriding public need including those of a social nature, subject to there being no satisfactory alternative, and that the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in its natural range.

ADDITIONAL PROTECTION

3.12 Additional protection for bats is also afforded under the Wildlife and Countryside Act 1981 (as amended), making it an offence to intentionally or recklessly disturb dormice whilst they are occupying a structure or place that is used for shelter or protection, or to obstruct access to this structure or place.

[This page is intentionally left blank]

Chapter Four ◆ IMPACT ASSESSMENT IN ABSENCE OF MITIGATION OR COMPENSATION

4.1 The following information provides a summary of the anticipated positive and negative effects on the bat population within the Project Site, in the absence of mitigation or compensation. The assessment has been carried out with reference to best practice guidelines[9] and takes into consideration the role of inherent mitigation embedded within the design of the Proposed Development. Additional avoidance, mitigation, compensation and enhancement measures required to address residual effects (additional to that provided by inherent mitigation alone) is provided in the subsequent section. A full impact assessment is provided in Chapter 12: Terrestrial and Freshwater Ecology and Biodiversity of the Environmental Statement (Document reference: 6.1.12).

CONSTRUCTION PHASE

4.2 The following construction phase impacts are anticipated:

- Killing, injuring and disturbance of roosting bats during site clearance;
- Loss of roosts of low conservation significance used by common and soprano pipistrelle bats during demolition of buildings B32 and B67;
- Loss of trees, buildings and structures with potential roosting features, including those not fully surveyed, and therefore a reduction in the overall availability of roosting habitat within the Project Site;
- Loss, damage and degradation of c. 95 hectare (ha) of bat foraging habitat of moderate suitability within the construction footprint;
- Habitat fragmentation, loss of flight paths and dispersal routes. Although foraging and commuting habitat will be retained within Black Duck Marsh, Broadness Grasslands and Botany Marsh around the construction footprint, there will be a short-term fragmentation of connectivity between the east and west sections of the Kent Project Site during construction; and
- Increased noise, vibration, visual and light disturbance from construction activities.

4.3 In an absence of mitigation, the effect of killing or injury or individual common and soprano pipistrelle bats will be a reduction in the population of bats. The number of roosting bats is very low (two individuals) and both species have a favourable conservation status both nationally and locally. Therefore, in an absence of mitigation, there would be

[9] CIEEM (2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland: terrestrial, freshwater, coastal and marine.* Chartered Institute of Ecology and Environmental Management, Winchester.

a permanent, reversible negative effect which would not be significant, since it is unlikely to affect the conservation status of the bat population. Since bats are protected under European and national legislation, there is also potential for a breach of relevant legislation.

4.4 In an absence of mitigation, the effect of the loss of roosts is that there is potential for a decrease in the roosting bat population within the Kent Project Site, since the actual and potential availability of potential roosts will be lost. This may mean that bats will need to find alternative roosts within the local area. There are a very low number of roosts or potential roosts recorded in trees, buildings and structures, when compared to the geographic size of the Project Site. In addition, there are alternative roosts for common and soprano pipistrelle bats within buildings and trees in the local area. The roosting bat assemblage has been assessed as being of Local value. Therefore in the absence of mitigation, there will be a permanent, adverse effect at the Local level but is unlikely to extend at a greater geographic scale. Since bat roosts are protected under European and national legislation, there is also potential for a breach of relevant legislation.

4.5 In an absence of mitigation, the combined effect of the loss, damage and degradation of habitat and fragmentation of foraging and commuting habitat will be a reduction in the use of the Project Site by foraging and commuting bats. It is also likely there will be a cumulative effect as a result of the impacts of increased disturbance within retained habitat on the boundary of the construction footprint, including the River Thames. Bats will subsequently be reliant on retained habitat within the Project Site along with other available habitat within the wider environment. The magnitude of the effect will vary depending on the tolerance of each bat species/group to the impacts; for example, common pipistrelle bat has a greater tolerance to human activity and artificial lighting than *Myotis* bat species. In addition, common pipistrelle bat has a more favourable distribution and local conservation status than Brandt's bat. Therefore, in an absence of mitigation, there will be a permanent, negative effect that would be irreversible and significant at the District level for those species that have a less favourable distribution/status and/or are less tolerant to disturbance (Nathusius' pipistrelle, serotine, Daubenton's, natterer's, Brandt's and brown long-eared). For those species with a more favourable status/distribution and/or are more tolerant to disturbance (common pipistrelle, soprano pipistrelle, noctule and Leisler's) there will be a permanent, negative effect that would be reversible and significant at the local level.

OPERATIONAL PHASE

4.6 The following operational phase impacts are anticipated:

- Habitat fragmentation, loss of flight paths and dispersal routes as a result of increased artificial lighting and resort infrastructure. Although east-west ecological connectivity between Black Duck Marsh and Broadness grasslands/Botany Marsh is maintained through the use of Green Infrastructure (inherent mitigation) along the River Thames, other boundaries of the Resort and to an extent, within the Resort areas, it is likely any corridors will be subject to disturbance from lighting and human activity;

- Increased lighting, noise and traffic leading to disturbance of species within retained and newly created habitats;
- Increased collision risk from new structures; and
- Potential positive effects/benefits through provision of habitats with greater biodiversity value than those currently present, and implementation of appropriate management of the retained and created habitats to maximise their biodiversity potential.

4.7 In an absence of mitigation, the effect of habitat fragmentation will be a polarisation of the bat population, with species using either the east or west sections of the Project Site, with limited ability of particular species to disperse around or within the Project Site when the Proposed Development is operational. This is likely to have a greater magnitude effect on those species that have a restricted distribution/status and/or are less tolerant of human activity and artificial lighting, including Daubenton's, natterer's, Brandt's and brown long-eared bats. The magnitude of the effect is likely to be reduced for the remaining species, including common, soprano and Nathusius' pipistrelle bats, noctule, Leisler's and serotine bats. Therefore, in an absence of mitigation, there will be a permanent, negative effect that would be irreversible and significant at the local level for those species that have a less favourable distribution/status and/or are less tolerant to disturbance. For those species that are more resilient and therefore better able to adapt to the altered conditions within the Project Site, there will be a permanent, negative effect that would be reversible and significant at the site level.

4.8 When considering the effect of the impact of new structures on bats, the vulnerability of different species populations to collision risk has been adapted from guidance on bats and onshore wind turbines[10]. Table 4-1 provides an assessment of population vulnerability of the species recorded or likely to be present at the Project Site.

Table 4-1: Summary of Collision Risk and Population Vulnerability of Bat Species

Relative Abundance	Collision Risk		
	Low Collision Risk	Medium Collision Risk	High Collision Risk
Common Species	Brown long-eared		Common pipistrelle
			Soprano pipistrelle
Rarer Species	Daubenton's	Serotine	Nathusius' pipistrelle
	Natterer's		Noctule
	Brandt's		Leisler's

Yellow = low population vulnerability
Orange = medium population vulnerability

[10] Scottish Natural Heritage, Natural England, Natural Resources Wales, RenewableUK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter and the Bat Conservation Trust (2019) *Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation*. Available from: https://www.nature.scot/bats-and-onshore-wind-turbines-survey-assessment-and-mitigation [Accessed: 22/10/2020]

Red = high population vulnerability

4.9 Since specific details of the Proposed Development including the specification of new structures, is not available at the time of writing, a precautionary approach has been applied when assessing the effect of collision on species populations.

4.10 Based on *Table 3a: Stage 1 – initial site risk assessment* in *Bats and Onshore Wind Turbines*[10], the project size is small[11] and habitat risk is moderate[12]. Therefore, the site risk is assessed as low. When combined with collision risk data and population vulnerability as detailed in Table 4-1, it is possible to see that for those species with a low population vulnerability, the overall risk[13] presented is also low. For those species with a moderate or high population vulnerability, the overall risk is medium.

4.11 Therefore, in an absence of mitigation, there will be a permanent, negative effect that would not be significant for those species that have a low overall risk (brown long-eared, Daubenton's, natterer's, Brandt's). For those species' populations with a medium overall risk (serotine, common, soprano and Nathusius' pipistrelle, noctule, Leisler's), there will be a permanent, negative effect that would be significant at the site level.

4.12 Inherent mitigation has resulted in the retention of c. 94ha of existing habitat of moderate suitability for foraging bats within the peninsula. Habitat enhancement of these retained habitats would result in a likely permanent, positive effect that would be significant at the site level.

[11] It is assumed that the number of structures posing a collision risk would be less than 10 and that such structures would be less than 50m in height

[12] Buildings, trees or other structures with moderate-high potential as roost sites on or near the site; habitat could be used extensively by foraging bats; site is connected to the wider landscape by linear features such as scrub, tree lines and streams

[13] As described in Table 3b: Stage 2 - Overall risk assessment of Bats and Onshore Wind Turbines[10]

Chapter Five ◆ MITIGATION AND COMPENSATION

5.1 The overall aim in respect of the bat population is to ensure the Project Site continues to support/provide a range of habitats capable of supporting a diverse assemblage of bat species that can forage, commute and roost within the Project Site. The impact assessment provided in Section 4 identified significant negative effects during both the construction phase and operational phases of the Proposed Development. The objectives of the Bat Mitigation Strategy are therefore focussed on addressing these negative effects and preventing potential breaches of legislation and planning policy:

- Objective 1: Implementation of a construction-phase mitigation strategy to:
  - Prevent killing or injury of bats;
  - Ensure continuity of roost provision during construction phase;
  - Protection of retained roosting, foraging and commuting habitats;
  - Minimise fragmentation effects on foraging and commuting bats; and
  - Minimise disturbance to foraging and commuting bats.
- Objective 2: Implementation of a long-term management strategy to:
  - Maintain habitat connectivity within the Project Site through creation of dark-flight corridors within and around the Project Site;
  - Minimise disturbance of bats through implementation of a sensitive lighting strategy;
  - Minimise collision risk for species with a moderate or high population vulnerability through appropriate landscape design; and
  - Implement appropriate management principles to ensure habitat enhancement benefits to the diversity of bat species present.
- Objective 3: Implementation of an appropriate bat monitoring strategy to:
  - Ensure compliance with any approved EPS Mitigation Licence;
  - Assess changes to bat assemblage;
  - Ensure habitat management activities are appropriate to bats;
  - Monitor effectiveness of dark-flight corridors; and

- Ensure adherence to sensitive lighting strategy.

5.2 The following should be read in conjunction with the Landscape Masterplan (Figure 6.3.11.15) and Figures 6.3.12.44 and 6.3.12.45 and the Ecological Mitigation and Management Framework (EMMF) to which this report is appended (Document reference 6.2.12.3). These documents illustrate the overall vision with respect to habitat and species protection and provision within the Proposed Development throughout all phases.

SUMMARY OF INHERENT MITIGATION

5.3 Inherent mitigation has been incorporated into the Landscape Masterplan (Document Reference 6.3.11.15) included within the Landscape Strategy (Document Reference 6.2.11.7), which will be secured as a requirement of the DCO.

5.4 The key inherent mitigation measures relevant to bats include:

- Retention of areas used by foraging bats including Black Duck Marsh, Botany Marsh East Local Wildlife Site (LWS), Broadness grasslands and saltmarsh, Bamber Pit and areas of semi-natural habitat throughout the Ebbsfleet Valley;

- Retention of the River Thames and the associated large areas of saltmarsh and inter-tidal mudflats around the edge of the Swanscombe Peninsula likely to be of value to foraging bats; and

- Provision of a large area of retained and enhanced habitat managed primarily for biodiversity including Black Duck Marsh, Broadness grassland and Botany Marsh East LWS, as well as the creation of new habitats comprising a mixture of reedbed, open species-rich wildflower grassland, scrub, ditches, ponds and wetland/SuDS features.

ADDITIONAL MITIGATION (ON-SITE)

Construction Phase

Pre-commencement Surveys

5.5 The criteria for determining the type and extent of pre-commencement surveys will be based upon best practice guidance available at the time of works.

5.6 Since trees are a dynamic habitat, with new roosting features becoming available as trees age and decay, an updated ground-level assessment of any trees to be felled will be carried out prior to any felling or tree surgery operations, with appropriate further surveys (aerial inspection of potential roost features by climbing or other access equipment) carried out within the appropriate survey season. The type and number of surveys will be determined based on the level of roost potential of each tree, as detailed within relevant best practice guidance available at the time of works. At the time of writing of this Mitigation Strategy, the following guidelines apply:

- For trees with moderate or high roost suitability or where evidence of bats is found,

an aerial inspection will be carried out where the tree is safe to access. If the tree is not safe to access, presence/absence/roost characterisation surveys will be carried out (further detail provided in paragraph 5.7; and

- For trees with low roost suitability, further surveys are not necessary however, precautionary measures will be implemented during felling, as determined by an appropriately experienced and licensed ecologist.

5.7 A pre-commencement survey to comprise a daytime inspection of all buildings and trees within the Project Site will be carried out within the three months preceding commencement of demolition/felling, to check for potential changes to the bat roost suitability.

5.8 Pre-commencement surveys of any buildings or other structures with bat roost potential will be completed if works have not commenced within one year of the most recent bat survey. For those 26 buildings not surveyed prior to the application for development consent being submitted, as described within Appendix 12.1: Ecology Baseline Report (Document reference: 6.2.12.1), pre-commencement surveys will be undertaken between May and August prior to their demolition. Pre-commencement surveys will include daytime inspections and follow-up emergence/re-entry surveys as required. At the time of writing of this Mitigation Strategy, the following guidelines apply:

- For buildings with low roost suitability, one emergence or re-entry survey will be carried out between May and August.;

- For buildings with moderate roost suitability, one emergence and one re-entry survey will be carried out between May and September, with at least two weeks between each survey and at least one survey completed between May and August; and

- For buildings with high bat roost potential, three emergence or re-entry surveys will be carried out between May and September, with at least two weeks between each survey and at least one survey completed between May and August.

Licensing

5.9 An NE EPS Mitigation Licence (EPSML) for bats, or site registration with NE under the Bat Mitigation Class Licensing (BMCL) scheme, will be required for any building, structure or tree with a confirmed presence of roosting bats prior to works commencing. Thereafter, any works affecting bat roosts will need to be completed in line with a mitigation strategy approved through the licensing process. Unless updated surveys reveal the presence of additional roosts within the Project Site, the mitigation strategy will be based on roosts of low conservation significance as defined by the Bat Mitigation Guidelines8, (i.e. small numbers of common species, not a maternity site), which state:

"Flexibility over provision of batboxes, access to new buildings etc. No conditions about timing or monitoring."

5.10 Based on the findings of bat roost surveys completed to date, and subject to any further surveys still to be completed, the only licence required will be for the demolition of buildings B67 and B32 where pipistrelle bat day roosts have been identified.

Translocation/Exclusion

5.11 If no direct evidence of roosting bats is found during pre-commencement surveys but a tree is still considered to have potential to support bats, further tree-specific mitigation measures may be advised at the time of works, such as soft felling techniques under ecological supervision.

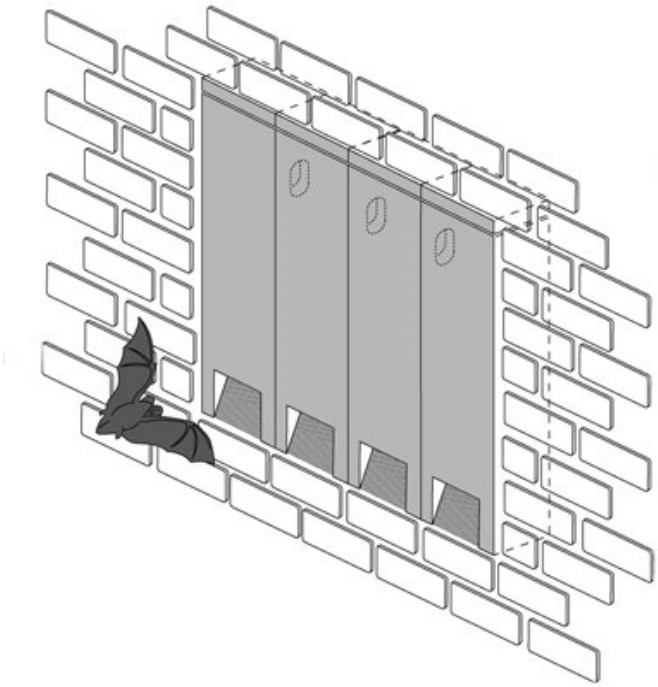
5.12 In relation to buildings/structures with bat roosting potential or confirmed bat roost presence (B67 has a confirmed soprano pipistrelle bat roost and building B32 has a confirmed common pipistrelle bat roost), interim and permanent replacement roosting provision and a precautionary method of working during demolition will be required. The specific details of replacement roosting provision and precautionary methods for confirmed bat roost features will be approved via the EPS licensing process. However, the process in relation to both confirmed and potential roost features will include the following elements.

Replacement Roosting Provision

5.13 To provide interim mitigation for the loss of confirmed roosts for common and soprano pipistrelle bats and to ensure continuity of roosting provision within the Project Site during construction-phase works, three Schwegler 1FF bat boxes (or similar approved) will be installed on retained trees or on telegraph posts within retained habitat. Bat boxes will be installed facing in a variety of directions to provide a variety of environmental conditions and according to the manufacturer's specification. The boxes will be retained throughout the period of works to bat roost buildings.

5.14 To provide permanent replacement roosting provision, two Schwegler 1FR integrated bat tubes (as Figure 5 1) will be installed according to the manufacturer's instructions within new Resort buildings on the edge of the Resort (i.e. facing onto retained habitat). This will be in addition to long-term bat roost features installed as part of the habitat enhancement strategy described later in this section, Figure 12.44 (Document reference 6.3.12.44) and within the EMMF (Document reference 6.2.12.3).

Figure 5-1: Example of Schwegler 1FR Bat Tubes Integrated within a Building



Sensitive Timing of Works

5.15 Unless agreed with Natural England through the EPS licensing process, the following sensitive timing of works will be adhered to:

- <u>For confirmed bat roost features:</u>

  - If a maternity roost is identified, works will not be carried out during the summer maternity period, running from May to August;

  - If a hibernation or winter roost is identified, works will avoid the winter period or cold weather conditions when bats may be torpid or hibernating (i.e. temperatures below 8°C, periods of prolonged rain or strong wind), running from November to February (depending on weather conditions during that winter season, this may extend into March); and

  - If a non-breeding roost is identified, works can be carried out at any time during the bat active period from March to October (depending on weather conditions during spring/autumn, only carried out during favourable weather conditions when bats are unlikely to be torpid, namely temperatures above a minimum of 8°C for four consecutive nights prior to commencement of works, no rain or strong wind).

- <u>For buildings/structures/trees with low – high bat roost potential (without confirmed bat roost features):</u>

- If a building/structure/tree contains features suitable for hibernation or winter roosting, works will avoid the winter period or cold weather conditions when bats may be torpid or hibernating (i.e. temperatures below 8°C, periods of prolonged rain or strong wind), running from November to February (depending on weather conditions during that winter season, this may extend into March); and

- If a building/structure/tree does not contain any features suitable for hibernation/winter roosting, works can be carried out at any time.

5.16 If a building/structure/tree is confirmed to be of negligible bat roost potential, no timing constraints will apply to demolition (but will be subject to other protected species timing constraints e.g. nesting birds).

Precautionary Method of Working

5.17 Ecological watching briefs/supervision for buildings/structures/trees/features with low – high bat roost potential or confirmed bat roosts will be carried out. Works to remove features of bat roost potential will be carried out by hand/using hand tools by contractors under direct supervision of, and as deemed necessary by, a suitably experienced and licensed bat Ecologist (or their Accredited Agents/Assistants) acting as an Ecological Clerk of Works. Once all potential/confirmed bat roost features have been removed, buildings can be demolished. Prior to commencement of works, all contractors will be briefed and provided a 'toolbox talk' as discussed below.

5.18 In the unlikely event bats are found during works to buildings/structures/trees with low – high bat roost potential, all works will cease and a bat licenced ecologist contacted immediately. An EPS Mitigation licence from Natural England will likely be required to enable works to recommence.

Toolbox Talk and Site Staff Briefing

5.19 As part of the site briefing/induction process, details of the potential presence of protected bat species within the Project Site will be provided to all Site Management staff and contractors.

5.20 In addition, where specific works are being carried out that will directly affect bats and their habitat, a species-specific briefing/toolbox talk will be provided by the Ecological Clerk of Works (ECoW). A tool-box talk will be given to contractors by the ECoW prior to commencement, with respect to the legal protection afforded to bats, the working methodologies to be employed and procedures to be followed should bats or any evidence of bats be encountered during the works.

Physical Protection Measures

5.21 Any retained habitat suitable for bats will be protected during the construction phase through implementation of Ecological Protection Zones (EPZs). The EPZs can be delivered through co-ordination with protective measures for other ecological and arboricultural features, combined with temporary protective fencing and signage, as detailed within the main body of the EMMF (Document reference 6.2.12.3).

Lighting

5.22 Since all habitat within the construction footprint will be lost during construction, lighting controls will be restricted to retained habitats and those habitats bordering the construction footprint of each phase of development, whereby the construction phase lighting design will be designed with reference to best practice guidance available at the time of preparation, which at present14 includes the following specific requirements for bats:

- LED sources are preferable; metal halide and fluorescent sources should not be used;
- Emitted light should not include UV wavelengths;
- A warm white spectrum, ideally <2700 Kelvin, should be used to reduce blue light;
- Peak wavelengths of luminaires should be higher than 550nm;
- Luminaires should always be mounted at the horizontal with no upward light spill;
- Column heights should be carefully considered to minimise light spill;
- Timers and dimming regimes should be incorporated where appropriate; and
- Baffles, hoods and louvers should be used as a last resort to reduce light spill.

5.23 During construction any illuminated site compounds will be sited away from all retained habitat suitable for foraging or commuting bats. Overnight working in areas used by foraging or commuting bats will be controlled through the use of method statements, including measures to minimise any potential negative effects, as defined above. A *Light Mitigation Strategy for Biodiversity* is provided as Figure 12.45 (Document reference 6.3.12.45).

Pollution Prevention Measures

5.24 Standard pollution prevention and dust suppression measures will be implemented to minimise harm and damage to retained bat habitat. Such measures are detailed within the main body of the EMMF and within the Construction Environmental Management Plan (CEMP), to be secured as a requirement of the DCO.

Operational Phase

Habitat Enhancement

5.25 The principles for habitat enhancement are included in the EMMF Document reference: 6.2.12.3), the Landscape Strategy (Document reference 6.2.11.7), the Landscape Masterplan (Document reference 6.3.11.15), the BNG Assessment (Document reference

14 Bat Conservation Trust and Institution of Lighting Professionals (2018) *Guidance Note 08/18: Bats and Artificial Lighting in the UK: Bats and the Built Environment Series.* Bat Conservation Trust, London

6.2.12.2), and illustrated on Figure 12.44 *Ecology Mitigation Strategy: Species Measures* (Document reference: 6.3.12.44).

5.26 In summary, this includes the following measures:

- Installation of bat boxes within new buildings and structures, including within the buildings at the edge of the Proposed Development, adjacent to suitable connecting habitat, and within new bird hides;
- Management of retained and new habitats to encourage a diversity of vegetative structure and plant species, which will in turn encourage a diversity of invertebrate species for the foraging bat assemblage to prey upon;
    - Black Duck Marsh and Botany Marsh: Habitat enhancement will cover c. 17ha of reedbed and c. 2.3km linear ditch habitat. This will be achieved by improved management regimes to include scrub removal, creation of new ditches, channels, swales and pools and enhanced planting with native wetland species, improvements to water quality;
    - Saltmarsh: Approximately 7ha of saltmarsh will be enhanced through introduction of a favourable management regime; and
    - Grassland: Approximately 16ha of grassland will be enhanced through introduction of favourable management and targeted scrub removal; and
    - Scrub mosaic: The open character of the scrub/grassland mosaic will be enhanced across c. 28ha through introduction of a favourable management regime, to retain the mosaic character and prevent.
- Maintenance and creation of habitat connectivity within and around the Project Site using habitat buffers and landscaped corridors;
- Design of soft landscaping to minimise collision risk to bats;
- Sensitive lighting design within areas of GI and around the Resort edges, incorporating dark corridors suitable for foraging and commuting bats; and
- Regular monitoring of new roost features and dark corridors, as well as general monitoring of habitats to ensure they achieve the required diversity of species and structure.

5.27 The retention of key areas of existing habitat of value to foraging bats will maintain flight routes and foraging areas for bats. Maintaining the variation in structure of the scrub mosaic and edge habitats will ensure a diversity of invertebrate prey for bats, which is key to maintaining a diverse bat assemblage.

Habitat Creation (On site)

5.28 The principles for habitat creation are included in the EMMF (Document reference 6.2.12.3), and the Landscape Strategy (Document reference: 6.2.11.17), with management and maintenance prescriptions provided in the Landscape Management Plan (Document reference: 6.2.11.8).

5.29 New strategic habitat creation within the Kent Project Site will include the creation of reedbed and drainage ditches, along with new saltmarsh habitats, wet woodland, scrub, and species-rich grassland. Wetland habitats will benefit the assemblage of bats present at the Project Site, including several rarer species such as serotine and Leisler's bats, which have been demonstrated to use such habitats for foraging and commuting. The following habitats of benefit to bats will be created:

- Approximately 4 ha of new woodland and hedgerow planting will augment the existing boundary vegetation, as well as creating new linear habitat features along the east, south and west boundaries. Such linear features will provide foraging and commuting corridors as well as future roosting habitat. The use of a variety of native plant species including fruiting and flowering species will encourage a diversity of invertebrates, of benefit to insectivorous bats;

- Approximately 8 ha of new scrub planting will augment retained scrub to form a dense band of mature scrub wrapping around the Resort edge to provide habitat connectivity. Management of scrub habitats will be targeted to achieve a variety of age and structure, with infill planting carried out to improve species diversity;

- Approximately 3 ha of new saltmarsh will be created within the Kent Project Site through managed realignment. This will increase areas of mud flat, salt marsh, small pools, rocks and shingle areas, with reeds, sedges and grasses transitioning into scrub vegetation, which provide high quality foraging habitat for bats;

- Extensive new reedbed will be created covering an estimated c. 7.5 ha of reedbed and c. 5.7 km of linear ditch/bankside habitat. The water courses will have varying depth profiles, be planted with a range of suitable native bankside and aquatic plants and be bordered with wetland/marsh habitat, which will provide high quality habitat for a wide range of foraging bat species. The reedbed and marsh habitats will also play a key role in retaining functional connectivity of habitats around the Proposed Development for foraging and commuting bats; and

- Species-rich and tussock grassland covering an area of c. 14 ha will be created within Broadness Grassland to provide a sward that is botanically diverse and will afford a range of opportunities for invertebrates and therefore foraging bats.

5.30 Within the resort, habitat creation of benefit to bats will include the planting of amenity grassland, c. 1.3ha of brown roof, c. 2ha of green roof, SuDS features including raingardens, along with new tree planting. Such habitat creation will be designed to maintain elements of habitat connectivity for bats (both north – south and east – west),

to minimise the combined effects of fragmentation and an increase in disturbance from artificial light and noise. Soft landscaping proposals will be designed to maximise the potential of all new semi-natural habitats for a diverse assemblage of invertebrates, since this in turn will provide a diverse supply of prey for foraging bats. As such, planting specifications will include a wide variety of fruiting and flowering species integrated into both formal and informal public realm.

5.31 However, the soft landscaping design within the Resort will minimise the risk of foraging and commuting bats being at risk of collision. For example, there will be no linear habitat corridors within 50m of any Resort features likely to present a collision risk.

5.32 New roosting features suitable for the assemblage of bats present at the Project Site will include the installation of bat boxes of a range of designs to benefit several species recorded at the Project Site throughout the year. Such features will provide roosting continuity over the short-term whilst semi-natural roosting features (described below) develop and will result in a significant increase in the availability of roosting features within the Project Site. A total of 90 bat boxes are to be installed within the indicative locations illustrated on Figure 12.44 (Document reference 6.3.12.44), comprising crevice-style boxes, chosen based on the species assemblage present at the Site, comprising the following models:

- 10 Schwegler model 2F;
- 10 Schwegler model 2FN;
- 20 Schwegler model 1FF;
- 10 Schwegler model 1FW;
- 10 Schwegler model 1FS;
- 10 Schwegler model 2FS; and
- 20 Schwegler model 1FR.

5.33 Boxes will be mounted following manufacturer's specifications facing in all directions, to provide a range of temperature and humidity conditions, on trees or buildings that provide some cover from surrounding vegetation with a clear flight line to/from the entrance.

5.34 Artificial bat roosting features will also be incorporated into the two bird watching tower structures, to provide roosting opportunities not currently present within the marsh habitats. Roost features will also be included in new buildings, incorporating a variety of features, designs and materials (with examples shown in Figure 5-1 above and Figure 5-2 and Figure 5-3 below). Such features will be installed within appropriate locations, such as at the edge of the resort where there will be lower levels of disturbance from light/noise, strategically positioned close to areas of retained and new habitat with connectivity to the wider landscape. Where possible, such features will be designed with sustainability in

mind. Incorporating bat roost features within areas of public realm will contribute towards achieving environmental awareness/education objectives.

Figure 5-2: Example of a Bat Roost Integrated within a Building Design

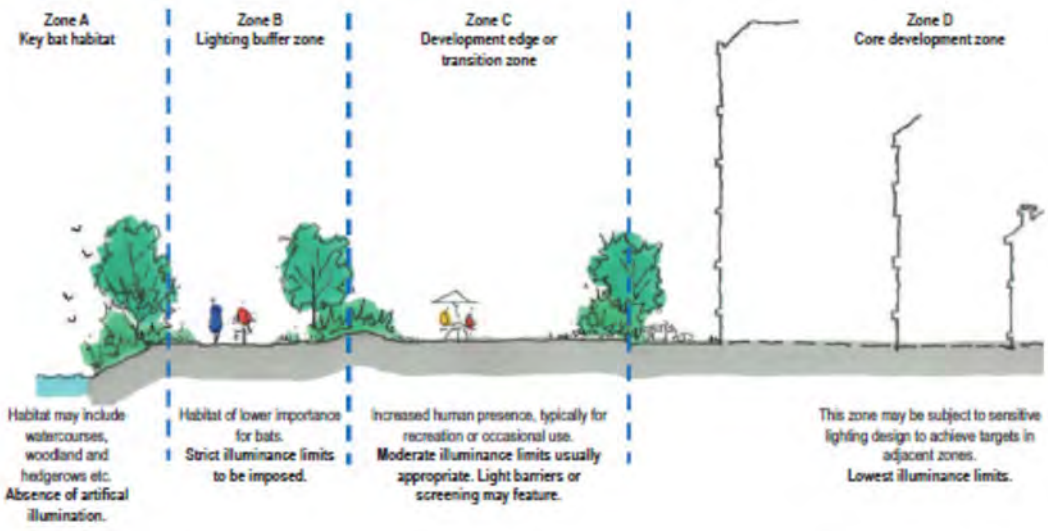
Figure 5-3: Example of a Bat Roost Building: Bat House at Carlyon Bay

5.35 In the longer term, new bat roosting opportunities will be created through the planting of new trees/woodland/scrub, which will be managed to ensure natural roosting features develop over time, such as dead and decaying wood, cracked/split branches and cavities. Such trees/woodland will be positioned away from areas used for recreation to ensure they do not become hazardous to the public.

Lighting Design

5.36 Whilst areas of bat foraging and commuting habitats will be retained and enhanced, the retained habitats within the Project Site may be subject to increased light levels during the operational phases of the Proposed Development which could impact foraging bats, particularly those species of bat that are less tolerant of artificial lighting (brown long-eared and *Myotis* species). Therefore, the avoidance or minimisation of light spill where development is in close proximity to retained foraging habitats is required. Dark flight corridors will be created in retained habitat outside of the Resort boundary (including the River Thames) using a combination of sensitive lighting design, screening and buffer zones, whereby 'very low' levels of light (<0.5 lux)[14] will occur. Figure 5-4 provides an example of illuminance limit zonation[14]. The location and extent of dark flight areas and corresponding buffers are illustrated on Figure 12.45 (Document reference 6.3.12.45). Lux contour plans will be provided at the detailed design stage to demonstrate the ability of the Lighting Strategy to comply with best practice guidance.

Figure 5-4: Example of Illuminance Limit Zonation



5.37 The lighting design for the habitats adjacent to and outside the Resort will be designed with reference to best practice guidance available at the time of preparation, which at present includes the following specific requirements for bats:

- LED sources are preferable; metal halide and fluorescent sources should not be used;
- Emitted light should not include UV wavelengths;

- A warm white spectrum, ideally <2700 Kelvin, should be used to reduce blue light;
- Peak wavelengths of luminaires should be higher than 550nm;
- Luminaires should always be mounted at the horizontal with no upward light spill;
- Column heights should be carefully considered to minimise light spill;
- Timers and dimming regimes should be incorporated where appropriate; and
- Baffles, hoods and louvers should be used as a last resort to reduce light spill.

5.38 Where new buildings are situated close to retained habitat or dark flight corridors, the use of tinted glazing will be implemented to minimise light spill from inside buildings.

SUMMARY OF MITIGATION (OFF-SITE)

5.39 Land acquisition is still underway, however, the primary aim of creating new wetland, grazing marsh and ditch habitats presents an opportunity to provide additional valuable bat foraging/commuting habitat. The following principles will be adopted within the management strategy for offsite land to ensure it provides mitigation for loss of bat foraging habitat within the Project Site:

- Creation of habitat totalling at least 40ha of grazing marsh and reedbed habitats, with a micro-topography designed and enhanced to provide a range of micro-habitats to benefit invertebrate populations and therefore benefit insectivorous bat species;
- Enhancement of grassland and scrub habitats, including:
  - Measures to encourage structurally complex grassland sward; and
  - Measures to create open 'glade' areas or scalloped edges within existing woodland and scrub.

5.40 In summary, the implementation of appropriate impact avoidance and mitigation measures as described above and within the EMMF (Document reference 6.2.12.3), with success monitored as per Chapter 6 of this Strategy, will result in no overall significant effects on the roosting and foraging bat assemblages present within the Project Site, with positive effects expected as a result of the on- and off-site habitat enhancement strategy.

[This page is intentionally left blank]

Chapter Six ◆ MONITORING AND WORKS SCHEDULE

MONITORING ACTIONS

6.1 This chapter provides the key monitoring actions to measure the success of the mitigation strategy and ensure Objectives 1 – 3 (as detailed in Section 5) are achieved. Further details of the site-wide monitoring strategy are provided in the EMMF (document reference 6.2.12.3), which will be secured as a requirement of the DCO.

6.2 Compliance checks during the construction period will be carried out as per any EPSML granted. This will be supplemented by regular walkover checks by an ECoW and regular liaison with site staff/management to ensure works within confirmed or potential bat roosting habitat are properly planned and coordinated.

6.3 Should unplanned or unexpected works be required in areas suitable for roosting bats, update surveys will be carried out as deemed appropriate by the Project Ecologist/ECoW and a licence modification be applied for as necessary.

Bat Activity Monitoring

6.4 A programme of bat activity surveys will be carried out in years 3, 5 and 10 following completion of the Proposed Development, to assess any changes in the bat assemblage present at the Project Site. The surveys will be carried out with reference to best practice guidance available at the time of monitoring, which at present would require a combination of manual transect surveys and automated detector surveys between May and September.

6.5 The results of the bat monitoring will be included in the Project Site Annual Monitoring Report for those year, to be submitted to the relevant authority.

Habitat Monitoring

6.6 Habitat monitoring of all retained and created habitats (both on- and off-site) will be carried out on an annual basis, to ensure management and maintenance activities are appropriate to the bat assemblage present. The results of the habitat monitoring will be included in the Project Site Annual Monitoring Report to be submitted to the relevant authority.

Replacement and Enhancement Bat Roost Features

6.7 Interim roosting features required as part of the EPS Mitigation licence will be inspected by the Named Ecologist prior to commencement of works to confirmed bat roost buildings to ensure they are installed correctly. Once demolition and construction works are complete, the Named Ecologist will carry out an inspection of permanent replacement roost features to ensure compliance with the EPS Mitigation licence. The results of this monitoring will be included in the Licence Return report to be submitted to NE.

6.8 A suitably experienced and licensed ecologist will inspect any bat boxes/bat roosting features installed as part of the Proposed Development on an annual basis, to ensure they remain present, in good condition and available for use by roosting bats.

Dark Corridors for Bats

6.9 Post-construction monitoring will ensure that any 'dark corridors' within the Project Site remain as such and continue to provide cohesive green corridors for bats and other species. Monitoring will be carried out in years 1, 5 and 10 (to allow buffer planting/screening to mature) and will involve checking the provision of luminaires within the Project Site and reading night-time lux levels at several points along the boundaries and within dark corridors. Monitoring surveys will aim to ensure compliance with the approved lighting strategy and ensure dark corridors are able to function correctly.

6.10 Monitoring will also involve deployment of automated bat detectors within dark corridors once per month between May and September in years 1, 5 and 10 to confirm use by target species of bats.

6.11 Specific sampling/monitoring locations are not specified at this stage and will remain unknown until the details of the lighting strategy are available at a later stage in the planning process.

REMEDIAL ACTIONS

6.12 Should remedial actions to address unforeseen effects be identified within the Annual Monitoring Report, such actions will be implemented by LRCH within the time-frame specified in the report.

WORKS SCHEDULE

6.13 The schedule in Table 6-1 provides an indication of the proposed timings for different phases of the work as detailed in this Bat Mitigation Strategy and the EMMF (Document reference 6.2.12.3).

Table 6-1: Initial Timetable of Proposed Works

Date	Action
Autumn/Winter 2020/2021	Completion of bat swarming and hibernation surveys of tunnels
2021	On- and off-site advanced habitat creation and enhancement (as detailed within EMMF)
2022 onwards	Updated surveys if construction has not commenced within one year of completion of baseline surveys
Three months prior to commencement of works	Updated daytime assessment of buildings and trees to be affected by works

Date	Action
Three months prior to commencement of works	Application for EPS Mitigation Licence or registration of Project Site under Bat Mitigation Class Licence
Prior to commencement of demolition of confirmed bat roost buildings	Installation of interim bat roost provision on retained trees or poles
Prior to commencement of demolition of confirmed bat roost buildings	Bat exclusion/destructive search under licence, supervised by Named Ecologist/Accredited Agent
Prior to commencement of clearance of buildings and trees with bat roost potential	Installation of bat boxes within retained habitat
Prior to commencement of habitat clearance	Installation of protective fencing around retained habitat. Toolbox talks and inductions to site staff/contractors
During tree felling and building demolition (for trees and buildings with bat roost potential but not confirmed roosts)	Implementation of supervised destructive search and soft felling techniques, as required. Carried out in line with sensitive timings for works
During construction phase	Regular site walkovers by ECoW and Site Management to ensure compliance with protective measures included in EMMF, CEMP and other relevant documents, such as lighting strategy
During construction phase	Construction of bat roost features within bird hides and Resort buildings
Year 1 following completion of construction	Check for presence and condition of bat boxes/other new bat roost features provided as part of EPS Mitigation Licence/Bat Mitigation Class Licence process
Annually after completion of construction phase	Check for presence and condition of bat boxes/other new bat roost features
Annually after completion of construction phase	Habitat monitoring of retained and created habitats
Years 1, 5 and 10	Monitoring of dark corridors
Years 3, 5 and 10	Bat activity surveys of retained and created habitats
Annually after completion of construction phase	Production and submission of annual monitoring report

[This page is intentionally left blank]

Chapter Seven ◆ SUMMARY AND CONCLUSIONS

7.1 The Kent Project Site contains a large complex of habitats which provide foraging, commuting and roosting opportunities for the local bat assemblage. The Essex Project Site supports buildings with bat roost potential, but foraging opportunities are negligible due to the dominance of hardstanding and built development.

7.2 Soprano pipistrelle and common pipistrelle day roosts have been confirmed within two buildings (B67 and B32) located within the Manor Way Business Park. The buildings are proposed to be demolished and therefore demolition works will require an EPSML to be granted by Natural England prior to works commencing to avoid infringement of the strict legal protection afforded to bats through the Conservation of Habitats and Species Regulations 2017 (as amended).

7.3 In addition to the direct loss of roosting habitat, and the potential killing/ injuring of any roosting bats present, the potential or actual adverse effects on the bat population anticipated as a result of the Proposed Development, in the absence of mitigation, include loss, damage, degradation, fragmentation and/or disturbance of foraging/dispersing habitat during construction, and habitat fragmentation, disturbance (light, visual and aural) during the operational phase.

7.4 The overall aim in respect of the bat population is to ensure the Project Site continues to support/provide a range of habitats capable of supporting a diverse assemblage of bat species that can forage, commute and roost within the site.

7.5 The Proposed Development includes inherent mitigation measures within the scheme's design including the retention of key foraging areas such as Black Duck Marsh, Botany Marsh East LWS, Broadness grasslands and saltmarsh, Bamber Pit and areas of semi-natural habitat throughout the Ebbsfleet Valley.

7.6 The bat mitigation strategy includes a range of mitigation measures to be implemented during the construction period including pre-commencement surveys, European Protected Species mitigation licensing where necessary, precautionary methods of working and sensitive timing of works, toolbox talks and site briefings, sensitive lighting, physical habitat protection, and pollution prevention measures.

7.7 Throughout the operational phase the range of habitats retained, created or enhanced on the Kent Project Site will be subject to an appropriate management regime to ensure they continue to support adequate resources for the local bat population.

7.8 Off-site mitigation land still to be secured presents an opportunity to provide additional valuable bat foraging/commuting habitat.

7.9 Subject to the development of this mitigation strategy in further detail, and its subsequent implementation in full throughout the delivery of the Proposed Development, it is

considered that the locally important bat population present at the Project Site can be safeguarded in the long-term and no significant long-term residual effects are anticipated.

Annex EDP 3
Dormouse Mitigation Strategy

This page has been left blank intentionally

Revisions

Revision	Description	Issued by	Date	Approved by
r025_00	Issue for DCO Submission	JB/CL	24/12/2020	EDP/LRCH

The Environmental Dimension Partnership Ltd
Tithe Barn
Barnsley Park Estate
Barnsley
Cirencester
Gloucestershire
GL7 5EG

[This page is intentionally left blank]

Contents

[This page is intentionally left blank]

List of Tables

[This page is intentionally left blank]

List of Figures

[This page is intentionally left blank]

Chapter One ◆ INTRODUCTION, SITE CONTEXT AND PURPOSE

INTRODUCTION

1.1 This dormouse mitigation strategy has been prepared by The Environmental Dimension Partnership Ltd (EDP) on behalf of The London Resort Company Holdings Limited. It considers the likely impacts of the Proposed Development on the dormouse (*Muscardinus avellanarius*) population within the Project Site and identifies the avoidance, mitigation, compensation and enhancement measures required to enable the Proposed Development to meet legislative and/or planning policy requirements and result in an overall biodiversity net gain. A brief overview of the baseline situation is also provided along with a review of legislative and policy requirements.

1.2 The land within the Project Site will be subject to a Development Consent Order (DCO) application for a world class destination entertainment resort with associated infrastructure, staff accommodation, dedicated access road, public amenity space and habitat creation. The application will be supported by an Environmental Impact Assessment (EIA), with this report provided as part of an overall Ecological Mitigation and Monitoring Framework report which is an appendix to the Environmental Statement (ES).

1.3 Detailed information on baseline conditions and survey methods employed is provided within the Ecology Baseline Report (Document Reference 6.2.12.1). Detailed consideration of the likely significant effects of the Proposed Development is provided within Chapter 12: *Terrestrial and freshwater ecology and biodiversity* (Document Reference 6.1.12) of the Environmental Statement.

SITE CONTEXT

1.4 The Project Site comprises two parts including the 'Kent Project Site', which includes land on the Swanscombe Peninsula and the Ebbsfleet Valley on the south side of the River Thames centred approximately at Ordnance Survey Grid Reference (OSGR) TQ 606 758, and the 'Essex Project Site', which includes land to the east of the A1089 Ferry Road and the Tilbury Ferry Terminal centred approximately at OSGR TQ 643 752. The Project Site lies partly within three local planning authority areas: Dartford Borough and Gravesham Borough for the Kent Project Site; and Thurrock Council for the Essex Project Site. Collectively these two parts of the entire DCO boundary are referred to as 'the Project Site'.

1.5 The Kent Project Site comprises a range of habitat types including woodland and scrub, grasslands of varying quality, salt marsh, intertidal zones, brownfield areas, running and standing water, chalk exposures and developed land. As described in further detail later

in this report, the Kent Project Site supports suitable dormouse habitat and was subject to survey by EDP throughout 2020.

1.6 The Essex Project Site comprises predominantly existing built development, and there is no suitable dormouse habitat present.

PURPOSE

1.7 As described in further detail below, nest tube surveys undertaken by EDP across the Kent Project Site in 2020 have confirmed the presence of dormouse within areas of suitable scrub habitat.

1.8 The hazel dormouse is listed as a European Protected Species (EPS) on Schedule 2 of the Conservation Regulations (Annex IV(a) to the Habitats Directive), affording it protection under the Conservation of Habitats and Species Regulations 2017 (as amended).

1.9 In the absence of appropriate compensation and mitigation measures, the Proposed Development is considered likely to result in the destruction of, and disturbance to, dormouse habitat within the DCO Limits. Additionally, the potential for disturbance, injury and killing of individuals could also arise during the pre-construction and construction phases. Should the Proposed Development be consented, given the risk of causing an offence under the Conservation Regulations, a European Protected Species Mitigation Licence (EPSML) from Natural England will be necessary prior to any commencement of works.

1.10 This strategy therefore sets out the recommended sensitive working methodologies to be implemented during the pre-construction and construction phases of the Proposed Development. The methodologies devised are based upon the findings of the dormouse surveys completed to date by EDP during 2020, as detailed within the Ecology Baseline Report (Document Reference 6.2.12.1), as summarised below. This strategy also sets out the recommended compensation, mitigation and enhancement measures to be implemented as part of the proposals, to ensure no significant negative effects will arise upon the favourable conservation status of the local dormouse population. As such, it is considered that this strategy could form the basis of the Method Statement template comprising any future EPSML application submission to Natural England going forward.

1.11 This dormouse mitigation strategy has been prepared following consultation with Natural England via their Discretionary Advice Service, as discussed during a meeting held on 20 October 2020. A copy of the consultation response received from Natural England is enclosed as Annex EDP 13 to the Ecological Mitigation and Management Framework (EMMF) (Document Reference 6.2.12.3).

Chapter Two ◆ SURVEY FINDINGS

DESK STUDY

Relationship with Other Nearby Development and Cumulative Impacts

2.1 A search on Multi-Agency Geographic Information for the Countryside (MAGIC) confirms the following EPSMLs in respect of dormouse have been granted within the local vicinity of the Project Site within the past 5 years. The locations of these mitigation licences are shown in Figure 12.46 (Document Reference 6.3.12.46) and relevant information on the licences as provided by the MAGIC website and/or obtained via a Freedom of Information Request submitted to Natural England, is detailed below:

- **Case reference number: 2017-31542-EPS-MIT**

  Approximate site location: TQ59707380

  Licence start date: 23/10/2017. Licence end date: 31/12/2017

  Does licence impact on a breeding site? Yes

  Does licence allow damage of breeding site? No

  Does licence allow damage of a resting place? No

  Does licence allow destruction of breeding site? Yes

  Does licence allow destruction of a resting place? Yes

  Does licence impact on a hibernation site? Unknown

- **Case reference number: 2016-21265-EPS-MIT**

  Approximate site location: TQ61017338

  Licence start date: 21/03/2016. Licence end date: 01/01/2020

  Does licence impact on a breeding site? No

  Does licence allow damage of breeding site? No

  Does licence allow damage of a resting place? Yes

  Does licence allow destruction of breeding site? No

  Does licence allow destruction of a resting place? Yes

Does licence impact on a hibernation site? Unknown

The following modifications have been granted for this licence:

- **Case reference number: 2016-21265-EPS-MIT-1**

  Licence start date: 21/03/2016. Licence end date: 01/01/2020

- **Case reference number: 2015-17789-EPS-MIT.**

  Approximate site location: TQ60807297

  Licence start date: 15/12/2015. Licence end date: 31/12/2025

  Does licence impact on a breeding site? No

  Does licence allow damage of breeding site? No

  Does licence allow damage of a resting place? Yes

  Does licence allow destruction of breeding site? No

  Does licence allow destruction of a resting place? Yes

  Does licence impact on a hibernation site? Unknown

  The following modifications have been granted for the above licence:

  - **Case reference number: 2015-17789-EPS-MIT-1**

    Licence start date: 29/02/2016. Licence end date: 01/12/2025

  - **Case reference number: 2015-17789-EPS-MIT-2**

    Licence start date: 29/09/2016. Licence end date: 31/12/2025

  - **Case reference number: 2015-17789-EPS-MIT-3**

    Licence start date: 15/02/2017. Licence end date: 01/12/2025

- **Case reference number: 2020-49147-EPS-MIT**

  Approximate site location: TQ581726

  Licence start date: 15/09/2020. Licence end date: 31/01/2027

  Does licence impact on a breeding site? Yes

  Does licence allow damage of breeding site? Yes

Does licence allow damage of a resting place? Yes

Does licence allow destruction of breeding site? Yes

Does licence allow destruction of a resting place? Yes

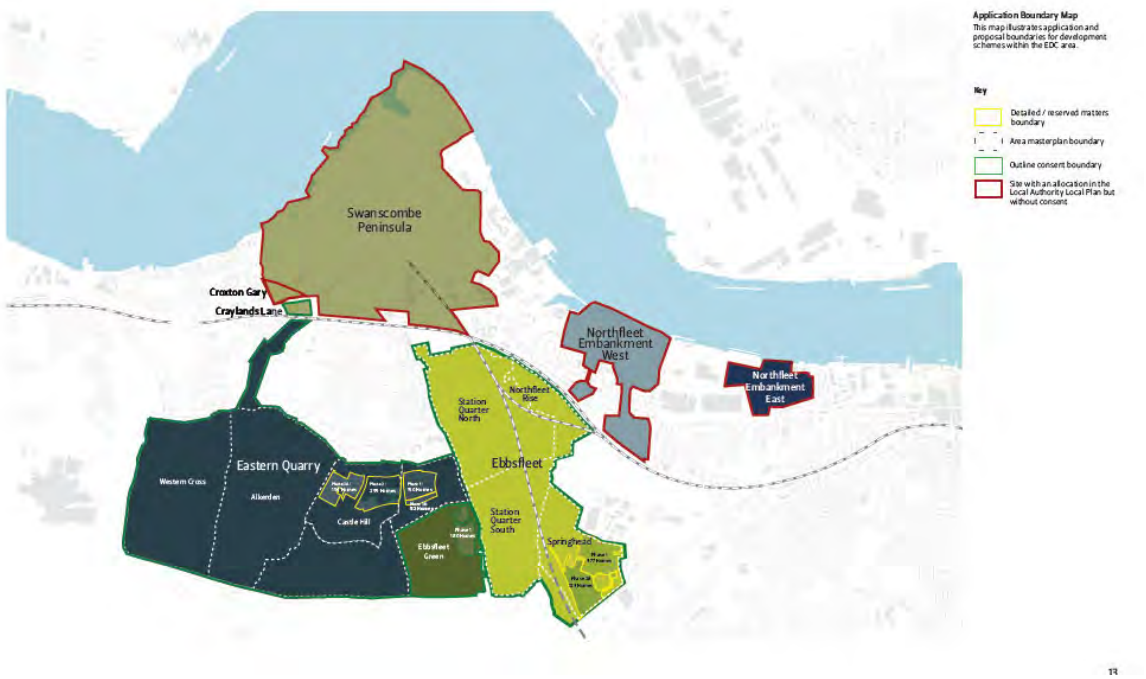
Does licence impact on a hibernation site? Unknown

2.2 Based on their proximity to the Kent Project Site and the presence of suitable connecting dormouse habitat it is considered that the dormouse population to which these licences relate to form part of a much larger meta-population occurring throughout the Kent Project Site and the immediate surroundings. Given the number of dormouse records within the local vicinity of the Kent Project Site, despite the increasing extent of habitat loss to accommodate development, it is evident that dormice populations are sustaining in sub-optimal, fragmented habitats.

2.3 In addition to the above, a review of local planning applications in the vicinity of the Kent Project Site has been undertaken to ascertain any past or future developments which may have significantly impacted on the same dormouse meta-population to which this mitigation strategy relates. The Kent Project Site lies within the Ebbsfleet Development Corporation (EDC) Urban Regeneration Area (URA), which comprises a number of development schemes as shown on Figure 2-1 (extracted from the 'Ebbsfleet Implementation Framework'), at various stages of planning or implementation. Those EPSMLs described above are in relation to the Eastern Quarry developments shown in Figure 2-1. To inform this dormouse mitigation strategy, the potential impact of the Lower Thames Crossing project was reviewed, however at the time of submission of this application, the application had been withdrawn.

2.4 Finally, an email request has been sent to the Senior Biodiversity Officer at Kent County Council on 14 September 2020 to obtain information on any local dormouse mitigation projects and/or local survey, monitoring or conservation projects. The final dormouse mitigation strategy, to inform an EPSML application, will be updated as the above information is received.

Figure 2-1: Application and Proposal Boundaries for Development Schemes within the EDC Area



Local Records

2.5 An ecological desk study completed in April 2020 involved obtaining records of protected species, including dormice, from a 2km search radius around the Project Site. Records were obtained from Kent and Medway Biological Records Centre (KMBRC), Essex Wildlife Trust and Biological Records Centre and Essex Field Club (EFC). Some dormouse records were also provided in the Dormouse Report produced by Corylus Ecology in 2016.

2.6 KMBRC returned 12 records of dormouse; three of the records dated from 2017 from near the Bluewater Shopping Centre. The closest of these was 250m west of the Kent Project Site. Another record from 2011 originated from a similar area between the Bluewater Shopping Centre and the A296. The other records were all over ten years old, none of which originated within the Project Site.

2.7 EFC returned one 2009 record from Tilbury Marshes, located c.1.5km east of the Essex Project Site.

2.8 The 2016 Dormouse report by Corylus Ecology showed off-site dormouse records to the immediate south of the Kent Project Site, including from the woodland running east-west just to the north of the A2 and within Darenth Woods Site of Special Scientific Interest (SSSI) (an ancient semi-natural woodland).

Previous Survey Results

2.9 Despite the records close to the Kent Project Site, the 2015 Dormouse Report prepared by Corylus Ecology concluded that dormice are highly unlikely to be present and carried out no presence/absence surveys. The report concluded that:

"*The habitats within the Springhead Site have been assessed for their potential to support dormice. Whilst the scrub and woodland habitats are developing into habitats sufficiently large and diverse enough to support dormice, they are still considered to be isolated and fragmentary, and separated from more favourable habitats where dormice are known to be present, such as along the A2 corridor. The historic use of the Springhead Site since the 1990s results in an assessment concluding that dormice would not be present on the Site.*"

2.10 There is therefore no dormouse survey information before 2020 for the Project Site.

HABITAT DESCRIPTION

2.11 The Essex Project Site comprises predominantly hardstanding, being occupied by a large area used for vehicle storage, and buildings associated with Tilbury Ferry Terminal. It supports a small linear strip of scrub adjacent to seasonally wet ditches, which is isolated, and not considered suitable to support dormice. EFC returned one 2009 record from Tilbury Marshes, located c.1.5km east of the Essex Project Site.

2.12 The Kent Project Site covers an area of approximately 440hectares (ha) and comprises open, low-lying land with extensive former cement kiln dust (CKD) tips and other brownfield former industrial land. The land has succeeded to support a range of habitats as described in full detail in the Ecology Baseline Report (Document Reference 6.2.12.1).

2.13 The range of habitats present across the Project Site, in particular those considered suitable dormouse habitat, are illustrated in Figure 12.47 (Document Reference 6.3.12.47). Parts of the Project Site referred to in this report are illustrated on Figure 12.1 (Document Reference 6.3.12.1).

2.14 In summary, the habitats present include broad-leaved semi-natural woodland, plantation woodland, scrub, grassland of varying degrees of quality and improvement, grazing marsh, swamp (reedbed), open mosaic on previously developed land, a number of waterbodies (including ponds, standing water and ditches), the river Ebbsfleet and a large industrial estate.

2.15 The quantity and likely suitability of dormouse habitat present within the Kent Project Site is as follows:

- Broadleaved semi-natural woodland = c.21.78ha:
  - *High to moderate quality dormouse habitat*, comprising woodland located primarily along the A2, within the 'Northfleet' area to the east of Ebbsfleet International, the woodland south of Blackduck Marsh and within the south-west corner of the former sportsground;

- Broadleaved plantation woodland = c.3.91ha:

  - *Moderate to low quality dormouse habitat*, comprising semi-mature woodland plantation primarily located around areas of built development, such as around the Ebbsfleet International station and car parks and along the A2, and small area to the south of the Channel Tunnel Rail Link (CTRL) wetlands; and

- Dense/continuous scrub = c. 83.41ha:

  - *Moderate quality dormouse habitat* located throughout the Kent Project Site, and comprising large, unmanaged dense, continuous concentrations on Swanscombe Peninsula, offering a suitable foraging resource throughout the dormouse active season;

- Scattered scrub over poor semi-improved grassland = 12.56ha (based on estimated 50% scrub cover within total grassland area):

  - *Low quality dormouse habitat* consisting of scattered patches of scrub dominated by common hawthorn (*Crataegus monogyna*) and bramble, of varying density, extending over areas of rough species poor tussocky grassland and semi-improved calcareous grassland. Scrub cover varies across the total grassland area, but overall is considered approximately 50% coverage.

2.16 Photographs of suitable dormouse habitats within the Kent Project Site are provided in Appendix 1.0.

2.17 Of the above habitats, those which lie on the Swanscombe Peninsula north of the Manor Way Industrial Estate are considered to be of value to foraging/dispersing dormice throughout their active season. Across the peninsula common hawthorn is the dominant species within the scrub, followed by common dogwood (*Cornus sanguinea*). Other species present include silver birch (*Betula pendula*), willow (*Salix spp.*), holm oak (*Quercus ilex*), buddleia, rose (*Rosa spp.),* sycamore (*Acer pseudoplatanus*), bramble (*Rubus fruticosus*), ash (*Fraxinus excelsior*), blackthorn (*Prunus spinosa*), elm (*Ulmus spp*.), and old man's beard (*Clematis vitalba*). The successional nature of such habitats coupled with those species present provide suitable foraging opportunities throughout the dormouse active season.

2.18 Opportunities for hibernation and breeding are, however, considered to be limited on the Swanscombe Peninsula, being generally sub-optimal and likely confined to woodland/woodland edge habitats such as the woodland south of Blackduck Marsh. Such habitats are dominated by sycamore and comprise tall canopy woodland with no real understorey, and ground flora limited to bindweed (*Convolvulus spp*). In addition, areas of dense, continuous hawthorn-dominated scrub within Bamber Pit and the former sportsground may also offer some, albeit limited, opportunities for breeding/hibernating dormice.

Off-site Habitats

2.19 To the north, east and west of the Swanscombe Peninsula on the Kent Project Site is the River Thames. The Kent Project Site is also surrounded by high density residential or industrial land with no suitable dormouse habitat present. The Kent Project Site is connected to the wider landscape to the south and west via semi-natural habitats within the Ebbsfleet Valley, via the wooded embankments of the north Kent railway line and via a green wooded corridor through the Swanscombe Heritage Park and Alkerden Lane Pit Local Wildlife Site. The wider landscape to the south comprises intensively managed agricultural land, but to the south-west (near the Bean junction of the A2) are large areas of high-quality woodland, including ancient woodland at Darenth Woods SSSI, where there are a number of dormouse records. Darenth Woods SSSI is considered to provide high quality hibernation and breeding habitat for the local dormouse population(s), which are connected to the Kent Project Site via woodland/scrub along the A2 and B255.

DORMOUSE PRESENCE/ABSENCE SURVEY

2.20 Full details of the dormouse presence/absence survey are provided within the Ecology Baseline Report (Document Reference 6.2.12.1).

Methodology

2.21 A total of 284 nest tubes, each comprising a wooden tray and nesting tube made from plastic tree guard material, were deployed at approximately 20m intervals within the woodland and scrub habitats with the most potential across the Kent Project Site on 08 April 2020. The tubes were then checked five times between May and November 2020, as detailed in Table 2-1.

Table 2-1: Dates of Dormouse Surveys

Survey Number	Date
1	19.05.20
2	20.08.20
3	24.09.20
4	22.10.20
5	24.11.20

Results

2.22 The distribution of dormouse nests and individuals recorded to date across the Kent Project Site is shown in Figure 12.20 (Document Reference 6.3.12.20). The findings from each survey month are described in detail below.

April 2020

2.23 During the deployment of the nest tubes in April 2020, three dormouse individuals were found in old nest tubes within immature plantation woodland in the south-east corner of the former landfill. The nest tubes had remained on the Kent Project Site from previous surveys.

May 2020

2.24 Thereafter the May survey visit recorded 6 individuals within the former landfill, including: two individuals within the same nest tube and one adjacent in the south-east corner; a further two individuals along the southern boundary; and an individual dormouse towards the southern end of the western boundary. A small number of dormouse nests were also found along the former landfill land's northern, western and south-western boundary. Within Bamber Pit a single adult dormouse was found, along with a dormouse nest in a separate tube. Finally, a single adult dormouse was also recorded on the northern edge of Black Duck Marsh. A total of eight dormice were found across the Kent Project Site on the May visit.

August 2020

2.25 During the August survey visit, an adult dormouse was recorded in a nest tube, and an adult dormouse and six juveniles in a nest tube, within the former sportsground. Furthermore, 2 adult dormice were found within woody habitats around the former landfill, and an adult dormouse and 3 juveniles in a tube on the northern boundary. A number of dormouse nests were found within the former landfill, sportsground, Station Quarter North, Station Quarter South and within scrub habitats around the edge of Black Duck Marsh.

September 2020

2.26 Within the September survey, eleven adults (including a lactating female, one with 3 pinks and one with a juvenile) were found in the former landfill as well as one juvenile. In Bamber Pit, seven adult dormice (including one with a juvenile) were found. In the sportsground, one adult with a single juvenile and another juvenile were found. On the eastern edge of Black Duck Marsh, one adult was found. In Station Quarter South, four adults (including one with a juvenile and one with seven juveniles) were found. Multiple dormouse nests were recorded. One adult dormouse was found in Broadness grassland and one adult on the eastern edge of Botany Marsh.

2.27 Therefore, in September across all tubes, a total of 26 adult and 15 juvenile dormice were found across the Kent Project Site along with 39 nests.

October 2020

2.28 During the October survey, on the northern half of the Kent Project Site, three adult dormice and three nests were found on Broadness grasslands on the Swanscombe

Peninsula. One adult and four nests were found on the eastern edge of Black Duck Marsh and two adults and two nests were found on the eastern edge of Botany Marsh.

2.29 On the southern half of the Kent Project Site, in the sports ground, two adults and eight nests were found. In Bamber Pit, one adult and five juveniles in separate tubes were found. In addition, an adult with four juveniles was found in a tube, and another tube with an adult and a juvenile was found. A further 10 nests were also found here. In the former landfill, five adults in separate tubes were found, as well as a juvenile in a tube, and another tube with an adult and a juvenile in. 19 nests were also found here. Two nests were found in Station Quarter North and five nests were found in addition to 2 adults in separate tubes in Station Quarter South.

2.30 A dormouse nest was also found along Pilgrim's Way, which provides a habitat link between the foraging areas in the north of the Kent Project Site and the breeding and foraging areas in the south of the Kent Project Site.

November 2020

2.31 During the November surveys, on the northern half of the Kent Project Site, one adult dormouse and two nests were found on Broadness grasslands on the Swanscombe peninsula. Six nests were found on the eastern edge of Black Duck Marsh; one adult and four nests were found in the eastern edge of Botany Marsh; and a nest was found on the main access track.

2.32 On the southern half of the Kent Project Site, in the former sports ground, 10 nests were found. In Bamber Pit, 15 nests were found. In the former landfill, two adults in separate tubes were found (one torpid) as well as a juvenile in a tube and another tube with an adult and a juvenile in; 23 nests were also found here. Two nests were found in Station Quarter North and three nests were found in addition to one adult in a separate tube in Station Quarter South.

2.33 The nest remained along Pilgrim's Way as recorded in October 2020.

Interpretation/Evaluation of Survey Findings

2.34 Based on the surveys completed in 2020 dormouse activity is greatest within the former landfill with the majority of nests, adults and juveniles found there. Dormouse are confirmed breeding/considered very likely breeding within the southern half of the Kent Project Site in Station Quarter South, former landfill, Bamber Pit and the Sports ground.

2.35 In addition, individuals are dispersing across to the Swanscombe peninsula (taken to be the land north of Tiltman Avenue, London Road and Galley Hill Road) for foraging purposes throughout the summer months. Within the areas of Botany Marsh, Black Duck Marsh, north-east Tip and Broadness grassland, only adults and nests have been found, with no evidence of breeding.

2.36 More generally an abundance of high-quality woodland habitat exists off-site to the immediate south-west of the Kent Project Site, considered likely to offer suitable breeding

and hibernation opportunities necessary to support a local dormouse population. Given that Kent is known to be one of the strongholds for dormouse in the UK, such populations as thus considered likely to exploit sub-optimal habitats to a greater degree, particularly in respect of foraging habitat.

2.37 As such, it is considered that the Kent Project Site supports suitable foraging habitat for dormouse across the Swanscombe Peninsula, alongside some, albeit sub-optimal breeding/hibernation habitat within Station Quarter South, the former landfill, Bamber Pit and the sportsground. The dormouse population present within the Kent Project Site is considered of importance at the District level.

Chapter Three ◆ LEGISLATIVE CONTEXT

3.1 Dormouse receive strict legal protection which is mainly derived from the legal protection provided through the EU Habitats Directive, transposed in the UK through the Conservation of Habitats and Species Regulations 2017 (as amended). The legal context of the Directive and Regulations as it applies to dormouse is set out below.

EU HABITATS DIRECTIVE

3.2 Articles 12 and 16 of the Habitats Directive require the establishment and implementation of a strict protection regime for animal species listed in Annex IV(a) of the Habitats Directive.

3.3 Article 12(1) of the Habitats Directive requires Member States to:

"Establish a system of strict protection for the animal species listed in Annex IV (a) in their natural range, prohibiting:

a) All forms of deliberate capture or killing of specimens of these species in the wild;

b) Deliberate disturbance of these species, particularly during the period of breeding, rearing, hibernation and migration;

c) Deliberate destruction or taking of eggs from the wild; and

d) Deterioration or destruction of breeding sites or resting places".

3.4 Dormouse is included at Annex IV(a) of the Directive.

3.5 Article 16(1) of the Habitats Directive states that:

"provided that there is no satisfactory alternative and the derogation is not detrimental to the maintenance of the populations of the species concerned at a favourable conservation status in their natural range, Member States may derogate from the provisions of Article 12:

a) In the interest of protecting wild fauna and flora and conserving natural habitats;

b) To prevent serious damage, in particular to crops, livestock, forests, fisheries and water and other types of property;

c) In the interests of public health and public safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment;

d) For the purpose of research and education, of repopulating and re-introducing these species and for the breeding operations necessary for these purposes, including the artificial propagation of plants; and

e) To allow, under strictly supervised conditions, on a selective basis and to a limited extent, the taking or keeping of certain specimens of the species listed in Annex IV in limited numbers specified by the competent national authorities".

3.6 'Favourable Conservation Status' (FCS) is defined by the EU Habitats Directive by Article 1(i) of the Directive. The conservation status of a species is defined as "*the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within the territory*". This is considered 'favourable' when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats;
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

THE CONSERVATION OF HABITATS AND SPECIES REGULATIONS 2017

3.7 Articles 12 and 16 of the EU Habitats Directive are transposed into UK law through the provisions of The Conservation of Habitats and Species Regulations 2017.

3.8 Regulation 40 states that Schedule 2 of the Regulations lists those species of animals listed in Annex IV(a) to the Habitats Directive which have a natural range, which includes any area in Great Britain. The species listed are considered EPS and include dormouse.

3.9 Regulation 41(1) states that it is against the law to:

- Deliberately capture, injure or kill any wild animal of a EPS;
- Deliberately disturb wild animals of any such species;
- Deliberately take or destroy the eggs of such an animal, or
- Damage or destroy a breeding site or resting place of such an animal.

3.10 Regulation 41(2) further states that with respect to 'disturbance' this 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 a 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".

3.11 The protection afforded under Regulation 41 can be derogated through a licensing process under the requirements of Regulation 53 under certain circumstance, including the preservation of public health and public safety or other imperative reasons of overriding public need including those of a social nature, subject to there being no satisfactory alternative, and that the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in its natural range.

ADDITIONAL PROTECTION

3.12 Additional protection for dormice is also afforded under the Wildlife and Countryside Act 1981 (as amended), making it an offence to intentionally or recklessly disturb dormouse whilst they are occupying a structure or place which is used for shelter or protection, or to obstruct access to this structure or place.

[This page is intentionally left blank]

Chapter Four ◆ IMPACT ASSESSMENT IN ABSENCE OF MITIGATION OR COMPENSATION

4.1 The following information provides a summary of the anticipated significant positive and negative effects on the dormouse population within the Project Site. The assessment takes into consideration the role of inherent mitigation embedded within the design of the Proposed Development. Additional avoidance, mitigation, compensation and enhancement measures required to address residual effects (additional to that provided by inherent mitigation alone) is provided in the subsequent section.

4.2 The following should be read in conjunction with the 'Dormouse Habitat Impacts Plan', included as Figure 12.48 (Document Reference 6.3.12.48).

CONSTRUCTION PHASE

4.3 The following construction phase effects are anticipated:

- Direct habitat loss, damage or degradation:
  - The Proposed Development will result in the loss of approximately 51.13ha of suitable dormouse habitat, comprising:
    - 4.42ha of broadleaved semi-natural woodland from a total of 21.78ha existing (c.20.29% of the existing total). 17.36ha retained. Habitats considered to be of *high to moderate quality for dormouse*. Lost habitat primarily relates to the woodland south of Black Duck marsh, and woodland within former sportsground;
    - 0.55ha of broadleaved plantation woodland from a total of 3.91ha existing (c.14% of the existing total). 3.36ha retained. Habitats considered to be of *moderate to low quality for dormouse*. Lost habitat includes a small area to the south of the CTRL wetlands, and a small area lost to facilitate new resort road off A2;
    - 38.72ha of dense/continuous scrub from a total of 83.41ha existing (c.46.42% of the existing total). 44.69ha retained. Lost habitat relates to dense/continuous scrub of *moderate quality for dormice* south and east of Black Duck Marsh and within the north-east Tip and south-west Tip; and
    - 7.44ha of scattered scrub over poor semi-improved grassland from a total of 12.56ha existing (59.22% of the existing total). 5.12ha retained. Lost habitat relates to *low quality dormouse habitat* of scattered scrub patches over rough tussocky grassland within Swanscombe Peninsula and Station Quarter South and Station Quarter North.

- Habitat fragmentation/loss of dispersal routes;
- Habitat disturbance;
- Killing, injuring and disturbance of dormice; and
- Increased dust, and noise, vibration, visual and light disturbance.

OPERATIONAL PHASE

4.4 The following operational phase effects are anticipated:

- Habitat fragmentation/loss of dispersal routes;
- Increased lighting, noise and traffic leading to disturbance of dormice within retained and newly created habitats;
- Damage or degradation to habitats and disturbance of dormice through increased recreational activity, or hydrology or air quality changes; and
- Potential positive effects/benefits through provision of habitats with greater biodiversity value and connectivity than those currently present, and implementation of appropriate management of the retained and created habitats to maximise their potential suitability for dormice.

4.5 In regard to the above predicted impacts, the potential for habitat fragmentation and isolation of dormice from the wider meta-population is considered the primary impact of greatest significance, with dormouse habitats supported within the Kent Project Site contributing to foraging opportunities and the dispersal of this species across the wider landscape. Addressing this impact is therefore considered the primary focus of this dormouse mitigation strategy to ensure the maintenance of the favourable conservation status of the local dormouse population.

4.6 Whilst direct loss of dormouse habitat will also arise, the majority of suitable habitats are to be retained (see Paragraph 4.3 above), with opportunities for future enhancement and long-term management. Such habitats are also predominantly successional, with future deterioration likely in absence of active management. Coupled with the abundance of suitable dormouse habitat within the wider landscape therefore, direct habitat loss is considered secondary relative to the predicted impacts of habitat fragmentation and isolation in absence of mitigation.

CONSIDERATION OF ALTERNATIVES

4.7 In regards to the extent of habitat loss and the consideration of alternative plans for the Proposed Development, which would have a lesser impact on dormice, full consideration of alternative sites was undertaken, as described further in Chapter Four: *Project development and alternatives* of the Environmental Impact Assessment (EIA) (Document reference 6.1.4). The Project Site was selected as the preferred location following review

of a number of criteria including (in no order of priority): land availability; land use; planning and environmental constraints; proximity to and connectivity with central London; transport and accessibility; regeneration and economic benefit; and micro-climate.

4.8 Having determined the best location of the entertainment resort, the development layout for the site was appraised with consideration of a number of variables including (but not limited to): existing land use; land ownership; ground conditions; drainage; land contamination; local terrain; and transport requirements.

4.9 From an ecological perspective, the development layout has been situated to avoid impacts on the most (intrinsically) sensitive habitats where possible, and retains areas of habitat within Black Duck Marsh, Botany Marsh Local Wildlife Site and Broadness grassland, as well as areas of semi-natural habitat within Bamber Pit and through the Ebbsfleet Valley, and the majority of the existing saltmarsh and inter-tidal mudflats around the edge of Swanscombe Peninsula. Furthermore, the land take from the Proposed Development mostly includes existing development or formerly developed land and landfill sites, where secondary scrub habitats have developed over time. In order to deliver a viable entertainment resort, the site needs to be large enough to accommodate the entertainment resort, including a theme park, attendant visitor attractions and amenities, hotels and transport facilities. Given the presence of scrub across the Swanscombe peninsula loss of suitable dormouse habitat is therefore unavoidable.

4.10 Positioning the resort further west within the Swanscombe Peninsula would have resulted in the loss of wetland habitats within Black Duck Marsh which is considered to be 'functionally linked' to nearby statutory designated sites, including the Thames Estuary and Marshes Ramsar/Special Protection Area (SPA)/SSSI and the Medway Estuary and Marshes Ramsar/SPA/SSSI, as it supports various waterfowl species over winter. Furthermore, it also supports a diverse breeding bird assemblage not associated with the aforementioned designated sites, including small populations of breeding pochard (*Aythya ferina*), bearded tit (*Panurus biarmicus*) and Cetti's warbler (*Cettia cettia*). On balance it is considered that situating the resort further west on the peninsula would have greater ecological impact.

4.11 Owing to their location within the DCO Limits, and the surrounding built development, the loss of scrub habitat within the former sportsground area, Bamber Pit and the former landfill is unavoidable to accommodate the new access road required to bring visitors to the resort.

[This page is intentionally left blank]

Chapter Five ◆ MITIGATION AND COMPENSATION

5.1 The overall aims in respect of the local dormouse population is to: ensure that habitats within the Swanscombe Peninsula do not become isolated from the wider dormouse meta-population; that the Project Site supports a range of woody habitats of varying ages, structure and species to ensure that foraging resources remain available to the local dormouse population throughout the active season; and that the Project Site provides suitable habitat for breeding and hibernation.

5.2 The following should be read in conjunction with the Landscape Masterplan (Document Reference 6.3.11.15), which illustrates the overall vision with respect to habitat provision for dormice and a range of other wildlife species.

MITIGATION PRINCIPLES

5.3 Key mitigation measures relevant to dormice, as reflected on the Landscape Masterplan (Document Reference 6.3.11.15), and within the Landscape Strategy (Document Reference 6.2.11.7), to be secured as a requirement of the DCO, include:

- The retention of areas of suitable habitat within Broadness grassland, including existing woodland, tree and scrub habitats;
- The retention and management of dense bramble and low growing scrub and trees along the north-western boundaries of Black Duck Marsh, to maintain potential dispersal routes from Swanscombe Peninsula to the south-west;
- The retention and enhancement of a continuous belt of woodland habitat along the southern boundaries of Black Duck Marsh, connecting to additional green corridors proposed along the southern boundary adjacent to Tiltman Avenue, to ensure the continued functioning of existing dispersal routes to valuable off-site habitats to the south-west, including the woodland at the Swanscombe Heritage Park; and
- The retention, enhancement and creation of additional woodland habitat alongside the sensitive design of new landscaping around the peripheries of Botany Marsh, necessary to further promote habitat connectivity between Swanscombe Peninsula and habitats across the wider landscape to the south.

ADDITIONAL MITIGATION (ON-SITE)

Construction Phase

Pre-commencement Surveys

5.4 Full update presence/absence surveys will be required to inform an EPSML application if not applied for within two years of the most recent dormouse survey.

5.5 In any event, immediately prior to the commencement of any pre-construction/enabling works onsite, including vegetation clearance, a site walkover will be conducted by the suitably qualified ecologist, to determine any significant changes to those habitats supported by the Project Site with respect to dormouse. The purpose of the site walkover is to determine whether any further species-specific working methodologies relevant to current site conditions will be required.

Licensing

5.6 A Natural England EPSML for dormice will be required prior to clearance of suitable dormouse habitat due to the potential presence of dormice. The clearance works will need to be completed in line with a mitigation strategy approved through the licensing process.

Displacement Methodologies

5.7 At this stage it is envisaged that the existing dormouse population will be retained on site and sufficient habitat protected during works and enhanced in the long-term. Under such circumstances, dormice will be displaced from habitat to be lost to the Proposed Development using either summer (single-stage) or winter (two-stage) clearance methodologies in accordance with best practice guidance, depending on the works programme and the amount/quality of habitat to be removed:

Option 1: Single Stage Clearance: To be completed between 01 April-31 May and/or 01 September-31 October

5.8 Single stage, summer clearance methodologies, aimed at displacing active individuals away from the area to be cleared and towards retained vegetation adjacent, can be implemented in relation to small/discrete areas of optimal dormouse habitat or larger areas of sub-optimal dormouse habitat, to facilitate commencement of any site enabling/pre-construction activities onsite.

5.9 Single stage summer clearance works will involve the completion of both above-ground and below-ground vegetation clearance during the dormouse active season, with above ground vegetation clearance confined to the period 01 April-31 May and/or 01 September-31 October. Such timings are required to ensure the avoidance of works during the main dormouse breeding season (considered to be between June and August inclusive), and hibernation period (considered to be between November and March inclusive). The latter months of September and October will also avoid the main breeding bird season (considered to be between March to August inclusive).

5.10 Clearance works will be supervised by the suitability qualified ecologist (or their accredited agents and assistants) named on the Mitigation Licence.

5.11 A thorough pre-commencement check for dormouse and their nests will be undertaken at a slow and steady pace by the ecologist immediately prior to the clearance of all woodland, shrub and scrub sections.

5.12 Should an active dormouse be encountered during the clearance works, then the individual will be given adequate time to disperse of its own accord and away from the area subject to the clearance works and towards retained habitat adjacent, before re-commencing with the clearance works.

5.13 Should a torpid dormouse without dependant young be found during the works, they will be relocated by hand to a suitable, secure and protected area of retained habitat adjacent and/or to the nearest available dormouse box (maximum distance 100m).

5.14 As described above, the proposed timings for single stage vegetation clearance is timed to avoid the main dormouse breeding season (considered to be between June and August inclusive). However, in the unlikely event that a dormouse breeding nest containing young is encountered, clearance will cease within a 30m radius of the nest until all young have dispersed of their own accord, before works can recommence in this area. Habitat connectivity between the breeding site and area of suitable retained habitat adjacent will also be maintained by virtue of the clearance methodology employed, which ensures that vegetation is cleared in a directional manner towards retained vegetation.

5.15 Thereafter above-ground vegetation will be removed as follows:

- Vegetation will be removed using hand-held tools/machinery only and in a direction towards retained habitat to aid dispersal of wildlife potentially remaining, with the ecologist working closely alongside the contractor, declaring specified habitat sections as being clear following completion of a thorough search prior to clearance of those specified areas commencing;

- Above-ground clearance rates will necessarily be limited to c.50 square metres per day with respect to woodland habitat and 25 linear metres per day with respect to linear habitats; and

- All woody vegetation including trees, shrubs and scrub to be removed will be cut down to heights of no less than between 30cm and 50cm above ground level and in a direction towards retained vegetation.

5.16 Following above-ground clearance, brash will be checked to ensure all wildlife therein has dispersed before being taken off site or with waste chipped and stored away from vegetated areas.

5.17 Below-ground clearance will commence immediately following completion of above-ground clearance, as follows:

- Prior to below-ground clearance, a thorough pre-commencement check for dormouse, their nests and active bird nests will be undertaken by the ecologist across all areas of above-ground vegetation remaining;

- Dormouse will be active during this time and will have dispersed on their own accord; however, should any individuals be encountered during the works then such individuals will be persuaded to move away from the working area and towards

retained vegetation and dormouse boxes;

- Should a torpid dormouse without dependant young be found during the works, they will be relocated by hand to a suitable, secure and protected area of retained habitat adjacent and/or to the nearest available dormouse box (maximum distance 100m);

- In the unlikely event that a dormouse breeding nest with dependent young is encountered, clearance will cease within a 30m radius of the nest until all young have dispersed of their own accord before works can recommence in this area. Habitat connectivity to retained habitat will be maintained throughout this period; where necessary, brash piles will be created between the nest and retained habitat adjacent to facilitate future foraging and dispersal;

- In the unlikely event that an occupied, dormouse winter nest is discovered, clearance will cease within a 10m radius of the nest and will recommence during the next summer clearance window (i.e. 01 April - 31 May or 01 September – 31 October). Habitat connectivity between the hibernation site and area of suitable retained habitat adjacent will also be maintained with no clearance works continuing here; where necessary, brash piles will be created between the nest and retained habitat adjacent, to facilitate future foraging and dispersal;

- Thereafter, all below-ground material including tree stumps, root balls, buried rubble, spoil, etc., will be lifted out using hand tools or by using a tracked excavator and undertaken in a sensitive manner to ensure no significant disturbance to soil and adjacent, retained planting; and

- Any such excavations that occur within the root protection zone of retained vegetation will be undertaken by hand and backfilled as soon as possible.

5.18 Vehicles will necessarily avoid tracking across sensitive vegetated areas and will instead be confined to habitat edges/clearings or areas already cleared of vegetation, utilising long-reach machinery where required.

5.19 Following completion of above- and below-ground vegetation clearance works, such areas will be released to enable commencement of construction works.

Option 2: Two Stage Clearance: 1st stage from 1 November-30 March; 2nd stage during 01 April-31 May and/or 01 September – 31 October

5.20 All areas of optimal dormouse habitat located across the Project Site requiring removal should be undertaken using winter clearance methodologies[1]. The first stage of clearance will involve above-ground vegetation clearance undertaken between 01 November and 30 March inclusive, i.e. outside of the dormouse active season and main bird breeding season, but during the dormouse hibernation season. The second stage of clearance will

[1] Bright, P., Morris, P. & Mitchell-Jones, T (2006). *The Dormouse Conservation Handbook, 2nd Edition*. English Nature, Peterborough.

involve below-ground clearance commencing no earlier than between 01 April-31 May thereafter and/or between 01 September – 31 October.

5.21 Clearance works will be supervised by the suitability qualified ecologist (or their accredited agents and assistants) named on the EPSML.

5.22 A thorough pre-commencement check for dormouse and their nests will be undertaken at a slow and steady pace by the ecologists immediately prior to the clearance of woodland shrub and scrub areas. Any active, torpid or breeding dormice encountered during this time will be dealt with as detailed above in respect of single stage clearance.

5.23 Should an occupied, dormouse winter nest be discovered, clearance will cease within a 10m radius of the nest and will recommence no earlier than 01 April thereafter. Habitat connectivity between the hibernation site and area of suitable retained habitat adjacent will also be maintained with no clearance works continuing here; where necessary, brash piles will be created between the nest and retained habitat adjacent to facilitate future foraging and dispersal.

5.24 Thereafter above-ground vegetation will be removed as follows:

- Vegetation will be removed using hand-held tools/machinery only, undertaken in a slow and steady manner with no limits on quantities or extents to be removed, and in a direction towards retained habitat to aid dispersal of wildlife potentially remaining; and

- All woody vegetation including trees, shrubs and scrub to be removed will be cut down to heights of between 30cm and 50cm above ground level and in a direction towards retained vegetation.

5.25 Following above-ground clearance, brash will be checked to ensure all wildlife therein has dispersed before being taken off site or with waste chipped and stored away from vegetated areas.

5.26 Vehicles will necessarily avoid tracking across sensitive vegetated areas and will instead be confined to habitat edges/clearings or areas already cleared of vegetation, utilising long-reach machinery where required.

5.27 Second stage, below-ground clearance, to be completed between 01 April and 31 May and/or between 01 September and 31 October thereafter, will involve the lifting out of tree stumps, root balls, buried rubble, spoil, etc., using a tracked excavator and undertaken in a sensitive manner to ensure no significant disturbance to soil and adjacent, retained planting. Clearance works will be supervised by the suitably qualified ecologist (or their accredited agents) named on the EPSML and will follow those methodologies previously described in relation to the summer clearance option.

5.28 Following completion of above- and below-ground vegetation clearance works, such areas will be released to enable commencement of construction works.

Toolbox Talk and Site Staff Briefing

5.29 As part of the site briefing/induction process, details of the protected species resource within the Project Site will be provided to all site management staff and contractors.

5.30 In addition, where specific works are being carried out that will directly affect dormice and their habitat, a species-specific briefing/toolbox talk will be provided by the Ecological Clerk of Works (ECoW). A tool-box talk will be given to the vegetation clearance contractors by the ecologist prior to commencement, with respect to the legal protection afforded to dormouse and breeding birds, the working methodologies to be employed, identification of individuals and their nests, and procedures to be followed should any evidence of dormouse be encountered during the works.

Physical Protection Measures

5.31 Any retained habitat suitable for dormice will be protected during the construction phase through implementation of Ecological Protection Zones (EPZs). The EPZs can be delivered through co-ordination with protective measures for other ecological and arboricultural features, combined with temporary protective fencing and signage, as detailed within the main body of the EMMF (Document Reference 6.2.12.3).

Lighting

5.32 During construction, any illuminated site compounds will be sited away from all retained habitat suitable for dormice. Lighting columns will be designed so as to reduce horizontal spill, whilst the use of light spill accessories will be applied to further reduce light spill across vegetation. Timed and/or sensor lighting will also be utilised, with lighting programmed to ensure adequate dark periods between dusk and dawn across the site. Such measures seek to maintain existing habitat corridors across the site utilised by dormouse and other notable and protected species for commuting, foraging and dispersal during the pre-construction/enabling works phase onsite.

Pollution Prevention Measures

5.33 Standard pollution prevention and dust suppression measures will be implemented to minimise harm and damage to retained dormouse habitat. Such measures are detailed within the main body of this EMMF (Document Reference 6.2.12.3).

Operational Phase

Habitat Enhancement (On site)

5.34 Given the confirmed presence of dormouse onsite, the Proposed Development has been designed as far as possible to retain, protect and enhance key areas of dormouse habitat within the Project Site to maintain habitat connectivity between the Project Site and additional dormouse habitat within the surrounding landscape. Such measures, as shown on the Landscape Masterplan (Document Reference 6.3.11.15), and within the Landscape Strategy (Document Reference 6.2: Appendix 11.7), include:

- The retention of areas of suitable habitat within Broadness grassland, including existing woodland, tree and scrub habitats;

- The retention and management of dense bramble and low growing scrub and trees along the north-western boundaries of Black Duck Marsh, to maintain potential dispersal routes from Swanscombe Peninsula to the south-west;

- The retention and enhancement of a continuous belt of woodland habitat along the southern boundaries of Black Duck Marsh, connecting to additional green corridors proposed along the southern boundary adjacent to Tiltman Avenue, to ensure the continued functioning of existing dispersal routes to valuable off-site habitats to the south-west, including the woodland at the Swanscombe Heritage Park; and

- The retention, enhancement and creation of additional woodland habitat alongside the sensitive design of new landscaping around the peripheries of Botany Marsh, necessary to further promote habitat connectivity between Swanscombe Peninsula and habitats across the wider landscape to the south.

5.35 In addition to the above, habitats to be retained onsite will be subject to further enhancement through infill planting utilising native species of local provenance, and subject to management and maintenance and monitoring over the long-term. The principle aims of the above measures are to maintain the functionality and habitat quality of such habitats in respect of facilitating dormouse dispersal and foraging across the Project Site, as illustrated by the Landscape Masterplan (Document Reference 6.3.11.15), whilst maintaining connectivity to the wider landscape so as to avoid isolation of the local population.

5.36 Infill planting will include a diversity of native species of local provenance considered to be favourable to dormouse and other wildlife, chosen to maximise structural and species diversity, fruiting/flowering potential and seasonal availability, and designed to create natural woodland edges and shrubby glades. Proposed favourable plant species are summarised within Table EDP 5.1.

Table 5-1: Native Species Planting Proposed Across the Project Site

Tree, Shrub and Scrub Mix Proposed Across Retained Habitats	
Common Name	***Latin Binomial***
Hazel	*Corylus avellana*
English oak	*Quercus rober*
Willow	*Salix spp.*
Sweet chestnut	*Castanea sativa*
Blackthorn	*Prunus spinosa*
Hawthorn	*Crataegus monogyna*
Sycamore	*Acer pseudoplatanus*

Tree, Shrub and Scrub Mix Proposed Across Retained Habitats	
Common Name	***Latin Binomial***
Cherry	*Prunus avium*
Holly	*Ilex aquifolium*
Crab Apple	*Malus sylvestrus*
Honeysuckle	*Lonicera periclymenum*
Bramble	*Rubus fructicosus agg.*
Broom	*Cytisus scoparius*
Guelder rose	*Viburnum opulus*
Elder	*Sambucus nigra*
Field Maple	*Acer campestre*
Dog rose	*Rosa canina*
Wayfaring tree	*Viburnum lantana*
Gorse	*Ulex europaeus*
Spindle	*Euonymus europaea*
Dogwood	*Cornus sanguinea*

5.37 Native tree, shrub and hedgerow planting to be implemented across the Proposed Development will require ongoing sensitive and appropriate management over the lifetime of the Proposed Development.

5.38 Sensitive management will seek to maximise the value of food, dispersal, breeding, and hibernation resources for dormouse through:

- The maintenance of canopy and understorey connectivity within woodland areas through appropriate management measures, including sensitive levels of coppicing and thinning to ensure good light levels reach the woodland floor;

- The maintenance of dense and continuous hedgerow habitats through appropriate management measures, including coppicing and laying where appropriate according to species, to encourage the formation of a more dense and continuous hedgerow; and

- Minimising disturbance within newly planted areas through the provision and future maintenance of permanent fencing installed around the peripheries of dormouse habitat to be created and enhanced to facilitate establishment whilst preventing public access.

5.39 Dormouse nest boxes will also be installed in retained habitat within the Project Site, to further enhance the existing carrying capacity of such habitats for dormouse whilst enabling future population monitoring. This will include a minimum of 50 boxes, spaced 20m apart in retained linear habitat or else roughly 30 per ha of woodland/scrub block, as indicatively shown on Figure 12.44 (Document reference 6.3.12.44).

Lighting

5.40 In addition, a sensitive lighting strategy will be implemented across the development to ensure the provision of 'dark corridors' adjacent to retained habitat buffers and woodland areas to maintain and maximise dispersal of the local dormouse population across the Project Site and to the wider landscape. The implementation of a sensitive lighting strategy should seek to incorporate the following design principles:

- Use of directional, timed of low-lux lighting to ensure minimal light spillage upon retained and newly created habitats, within and adjacent to the development edge;
- Where lighting is required along roads, pedestrian and/or cycle access routes situated adjacent to such habitat features, it is recommended for such columns/bollards to be sited within the development itself and away from the habitat edge to minimise disturbance and light spill;
- The use of light spill accessories including hoods, cowls, louvres and shields to direct the light to the intended area only; and
- The programming of timed lighting to ensure adequate dark periods between dusk and dawn across the Project Site, particularly adjacent to peripheral vegetation.

ADDITIONAL MITIGATION (OFF-SITE)

5.41 Subject to the final location and design of off-site mitigation land currently being sought in order to deliver an overall biodiversity net gain across the DCO Development Site, there is potential to deliver additional compensatory habitat suitable for dormice through habitat creation and/or enhancement of existing habitats to be secured off-site.

5.42 Additionally, subject to receipt of further information on local dormouse mitigation projects currently requested from Kent County Council, there is also the potential to provide additional monetary contributions towards the restoration, creation, and enhancement of existing/future dormice habitats over the long-term, located elsewhere within the relevant local authority areas as part of the overall mitigation package proposed to ameliorate potential impacts arising upon the local dormouse population.

5.43 In respect of the above, it should be noted that at the time of the DCO application, off-site mitigation has yet to be secured. Therefore, for the purposes of this application for development consent, a set of general guiding principles has been set out with regard to the type of land that is to be acquired where off-site compensatory habitat can be secured (see 'General Principles for Off-site Ecological Mitigation', Document Reference 6.2.12.10). The final details of any off-site mitigation package is to be agreed with Natural England.

[This page is intentionally left blank]

Chapter Six ◆ MONITORING

6.1 Key monitoring actions to measure the success of the mitigation strategy are as set out below.

6.2 Compliance checks during the construction period will be carried out as per any dormouse licence mitigation strategy. This will be supplemented by regular walkover checks by an ECoW and regular liaison with site staff/management to ensure works within confirmed or potential dormouse habitat is properly planned and coordinated.

6.3 Should unplanned or unexpected works be required in areas suitable for dormouse, or if dormouse have colonised new habitat within the Project Site, update surveys will be carried out as deemed appropriate by the project ecologist/ECoW and a licence modification be applied for as necessary.

6.4 Dormouse boxes installed across the Project Site and within any receptor sites required will be subject to regular monitoring by the named ecologist (or their accredited agents and assistants) during the construction and operational phases, in accordance with those requirements set out by Natural England within the approved EPSML.

6.5 A minimum of two checks will be completed during each monitoring year between May and November. Each check will be carried out between the 19th and 25th of the nominated month in line with national monitoring methodologies.

6.6 Evidence of dormouse, including nests and individuals, will be recorded. Individuals will be sexed and weighed where appropriate to do so, before returning to the box from which it was captured.

6.7 All findings will be recorded and submitted annually to Peoples Trust for Endangered Species (PTES) and Natural England in accordance with the requirements of the EPSML.

6.8 With respect to those onsite habitats to be retained and further enhanced, a condition assessment will be carried out by an Arboricultural Association (AA), approved arboricultural contractor or professional arboriculturalist at years 1, 3 and 5 following completion of the planting works.

6.9 Once works have been completed, a licence report will be completed and returned to Natural England as required under the licence conditions.

6.10 The results of any monitoring activity will also be provided within the Annual Report described in the main body of the report.

6.11 All compensatory planting will be maintained in perpetuity throughout the operation of the Proposed Development, to ensure successful establishment and long-term value to dormice.

[This page is intentionally left blank]

Chapter Seven ◆ SUMMARY AND CONCLUSIONS

7.1 The Kent Project Site comprises open low-lying land with extensive former CKD tips and other brownfield former industrial land, which has succeeded to support a range of habitats of varying suitability and value for dormice. Dense scrub is the dominant habitat throughout the Kent Project Site and is considered to provide moderate quality dormouse habitat, offering a suitable foraging resource throughout the dormouse active season, and, in parts of the Kent Project Site such as Bamber Pit and the former sportsground, providing opportunities for breeding/hibernation. Other suitable dormouse habitats present include broadleaved semi-natural woodland (high to moderate quality), broadleaved plantation woodland (moderate to low quality), and areas of scattered, species-poor scrub over rough, tussocky grassland (low quality).

7.2 The Essex Project Site comprises predominantly hardstanding and developed land. A small linear strip of scrub is present, albeit isolated, and not considered suitable to support dormice.

7.3 Within the local area surrounding the Kent Project Site there are a number of known dormouse records and existing mitigation licences granted by Natural England. The Kent Project Site is connected to off-site areas of suitable dormouse habitat via the wooded embankments of the north Kent railway line, a green wooded corridor through the Swanscombe Heritage Park and Alkerden Lane Pit Local Wildlife Site, and existing woodland along the A2. Near the Bean junction of the A2 there lies a number of areas of high-quality woodland habitat, including Darenth Woods SSSI where records of dormice are present.

7.4 Dormouse nest tube surveys completed in 2020 have confirmed the presence of dormice within suitable habitats on the Kent Project Site, including evidence of breeding/likely breeding within Station Quarter South, former landfill, Bamber Pit and the sportsground. No evidence of breeding has been recorded on the Swanscombe peninsula itself (taken to be the land north of Tiltman Avenue, London Road and Galley Hill Road), which is used for foraging purposes throughout the summer months.

7.5 In the absence of mitigation, the Proposed Development has the potential to result in direct habitat loss (totalling approximately 51.13ha of suitable habitat), fragmentation, disturbance, killing/injury, and disturbance. The development layout has been designed to avoid impacts on the most intrinsically sensitive habitats, but unavoidably results in the loss of suitable dormouse habitats. Habitat fragmentation and isolation of dormice is considered the primary impact of greatest significance with direct habitat loss considered secondary owing to the abundance of suitable habitat within the wider landscape.

7.6 The Proposed Development includes a range of inherent mitigation measures, including the retention of large areas of existing woodland, tree and scrub habitats, as well as the retention and creation of connecting habitats to ensure the Kent Project Site remains

permeable to dormice movement and does not sever connections to off-site habitats. Additional avoidance measures are to be implemented onsite during the proposed habitat clearance works, to include the employment of dormouse displacement methodologies during construction, following grant of a Natural England EPSML, completed under the supervision of a licenced ecologist. Additional mitigation measures, in the form of habitat enhancement measures and sensitive management of retained habitats over the long term will also ameliorate impacts arising as a result of habitat loss.

7.7 In addition, off-site mitigation land being sought to deliver an overall biodiversity net gain also provides an opportunity to deliver additional compensatory habitat suitable for dormice. Furthermore, financial contributions towards the restoration, creation and enhancement of existing/future dormice habitats within the locality of the Proposed Development over the long term, for which full details are to be agreed, can also provide additional mitigation as part of a 'package' of measures to be secured through the DCO.

Appendices

[This page is intentionally left blank]

Appendix 1.0 ILLUSTRATIVE PHOTOGRAPHS

BAMBER PIT

Figure A1-1: Internal view of dense scrub habitat within Bamber Pit. Photo taken 24 February 2020.

Figure A1-2: Internal view of dense scrub habitat within Bamber Pit. Photo taken 24 February 2020.

Figure A1-3: Internal view of dense scrub habitat within Bamber Pit. Photo taken 24 February 2020.

SPORTS GROUND

Figure A1-4: Internal view of self-seeded hawthorn scrub over rough grassland with the former sportsground. Photo taken 24 February 2020.

Figure A1-5: Dense scrub within the former sportsground.

Figure A1-6: Internal view of self-seeded hawthorn scrub over rough grassland with the former sportsground. Photo taken 20 August 2020.

Figure A1-7: Dense bramble scrub within the former sportsground. Photo taken 24 February 2020.

FORMER LANDFILL

Figure A1-8: Dense bramble scrub along the boundary of the former landfill.

Figure A1-9: Dense scrub along the boundary of the former landfill.

Figure A1-10: Dense, continuous scrub along the boundary of the former landfill.

WOODLAND SOUTH OF BLACKDUCK MARSH

Figure A1-11: Mixed scrub along the southern edge of the woodland south of Blackduck Marsh. Photo taken 08 September 2020.

Figure A1-12: Internal view of woodland south of Blackduck Marsh, showing tall canopy woodland, lacking understorey layer and dense carpet of ivy on woodland floor. Photo taken 08 September 2020.

Figure A1-13: Northern edge of woodland south of Blackduck Marsh, showing numerous dead elm trees and carpet of bindweed. Photo taken 08 September 2020.

Figure A1-14: Mature, dense, continuous scrub along the eastern boundary of Blackduck Marsh, looking south. Photograph taken 07 September 2020.

Figure A1-15: Mature, dense, continuous scrub along the eastern boundary of Blackduck Marsh, looking south. Photograph taken 07 September 2020.

Figure A1-16: View looking north along main access track and eastern boundary of Blackduck Marsh, showing dense, continuous hawthorn-dominated scrub. Photograph taken 07 September 2020.

Figure A1-17: Mixed, continuous scrub along main access track, looking west along southern boundary of Blackduck marsh. Photograph taken 07 September 2020.

NORTH-EAST TIP

Figure A1-18: View from top of the north-east tip. Photograph taken 07 September 2020.

SOUTH-WEST TIP

Figure A1-19: Dense hawthorn-dominated scrub on south-west Tip. Photograph taken 07 September 2020.

Figure A1-20: View looking south from the top of south-west Tip showing dominance of dense hawthorn-dominated scrub in the foreground. Photograph taken 07 September 2020.

Figure A1-21: View from bottom of south-west Tip looking up showing dominance of dense hawthorn-dominated scrub. Photograph taken 07 September 2020.

PILGRIM'S WAY

Figure A1-22: View looking along Pilgrim's Way. Photograph taken 08 September 2020.

Figure A1-23: View looking along Pilgrim's Way. Photograph taken 08 September 2020.

BROADNESS GRASSLAND

Figure A1-24: Hawthorn and dogwood dominated scrub along the northern edge of Broadness grassland. Photograph taken 07 September 2020.

Figure A1-25: Hawthorn and dogwood dominated scrub on Broadness grassland. Photograph taken 07 September 2020.

[This page is intentionally left blank]

Annex EDP 4
Water Vole Mitigation Strategy

This page has been left blank intentionally

Revisions

Revision	Description	Issued by	Date	Approved by
r026_00	Issue for DCO Submission	ND/CR	24/12/2020	EDP/LRCH

The Environmental Dimension Partnership Ltd
Tithe Barn
Barnsley Park Estate
Barnsley
Cirencester
Gloucestershire
GL7 5EG

[This page is intentionally left blank]

Contents

[This page is intentionally left blank]

List of Tables

[This page is intentionally left blank]

Chapter One ◆ INTRODUCTION, SITE CONTEXT AND PURPOSE

INTRODUCTION

1.1. This water vole mitigation strategy has been prepared by the Environmental Dimension Partnership Ltd (EDP) on behalf of London Resort Company Holdings Limited. It considers the likely impacts of the Proposed Development on the water vole populations within the Project Site and identifies the avoidance, mitigation, compensation and enhancement measures required to enable the Proposed Development to meet legislative and/or planning policy requirements. A brief overview of the baseline situation is also provided along with a review of legislative and policy requirements.

1.2. The land within the Project Site will be subject to a Development Consent Order (DCO) application for a proposed world class destination entertainment resort with associated infrastructure, staff accommodation, dedicated access road, public amenity space and habitat creation. The application will be supported by an Environmental Impact Assessment (EIA), with this report provided as part of an overall Ecological Mitigation and Management Framework report (EMMF) (Document Reference 6.2.12.3), which is an appendix to Chapter 12 of the Environmental Statement (ES): Terrestrial and Freshwater Ecology and Biodiversity (Document Reference 6.1.12)

1.3. Detailed information on baseline conditions and survey methods employed is provided within the Ecology Baseline Report (Document Reference 6.2.12.1). Detailed consideration of the likely significant effects of the Proposed Development is provided within Chapter 12 of the ES (Document Reference Part 6.1.12).

SITE CONTEXT

1.4. The Project Site comprises two parts including the 'Kent Project Site', which includes land on the Swanscombe Peninsula, and the Ebbsfleet Valley, on the south side of the River Thames and is centred approximately at Ordnance Survey Grid Reference (OSGR) TQ 606 758, and the 'Essex Project Site', which includes land to the east of the A1089 Ferry Road and the Tilbury Ferry Terminal and is centred approximately at OSGR TQ 643 752. The Project Site lies partly within three local planning authority areas; Dartford Borough and Gravesham Borough for the Kent Project Site, and Thurrock Council for the Essex Project Site. Collectively these two parts of the entire DCO boundary are referred to as 'the Project Site'.

1.5. The Project Site comprises a range of habitat types including woodland and scrub, grasslands of varying quality, salt marsh, intertidal zones, brownfield areas, running and standing water, chalk exposures and developed land.

PURPOSE

1.6. As discussed in greater detail in Sections 2 and 3, detailed ecological surveys have identified a population of water vole (*Arvicola amphibius*) occupying habitats present on the Project Site and located within the footprint of the Proposed Development. The works required for the construction of the Proposed Development will cause permanent loss, damage and disturbance to habitats within the Proposed Development footprint, which, in the absence of appropriate mitigation, is likely to result in disturbance to the water vole population present.

1.7. The water vole is fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and is a priority conservation species. Therefore, it is intended that this Mitigation Strategy will form the basis for a future application to Natural England for a water vole licence to cover those licensable works associated with the development of the Project Site.

1.8. This mitigation strategy considers the likely impacts of the Proposed Development on the water vole population within the Project Site and identifies the avoidance, mitigation, compensation and enhancement measures required to enable the Proposed Development to meet legislative and/or planning policy requirements. A brief overview of the baseline situation is also provided along with a review of legislative and policy requirements.

1.9. This strategy therefore sets out the recommended sensitive working methodologies to be implemented during the pre-construction and construction phases of the Proposed Development. The methodologies devised are based upon the findings of the surveys completed to date by EDP during 2020, as detailed within the Ecology Baseline Report (Document Reference 6.2.12.1), and as summarised below. This strategy also sets out the recommended compensation, mitigation and enhancement measures to be implemented as part of the proposals, to ensure no significant negative effects will arise upon the favourable conservation status of the local water vole population. As such, it is considered that this strategy could form the basis of the Method Statement template comprising any future licence application submission to Natural England going forward.

1.10. The mitigation strategy has been prepared following consultation with Natural England via their Discretionary Advice Service, as discussed during a meeting held on 16 October 2020. A copy of the consultation response received from Natural England is enclosed as Annex EDP 13 to the EMMF (Document Reference 6.2.12.3).

BACKGROUND INFORMATION

1.11. The licence will be applied for on behalf of:

The London Resort Company Holdings Limited
C/o Armila Capital
20 Berkeley Square
London
W1J 6EQ

1.12. The licence and mitigation strategy will be prepared on behalf of the London Resort Company Holdings Limited by:

The Environmental Dimension Partnership
Tithe Barn
Barnsley Park Estate
Cirencester
GL7 5EG; and

Derek Gow Consultancy Ltd
Upcott Grange Farm
Broadwoodwidger
Lifton
Devon
PL16 0JS

1.13. The following guidance has been used to inform this Mitigation Strategy:

- Baker, R., Scott, D.M., Keeling, C. *et al.* Overwinter survival and post-release movements of translocated water voles: implications for current mitigation guidance. *Eur J Wildl Res* 64, 56 (2018). https://doi.org/10.1007/s10344-018-1216-8;
- Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016). The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidelines Series). Eds Fiona Mathews and Paul Chanin. The Mammal Society, London;
- Kent Mammal Group (2011) Otters in Kent Available from: https://www.kentmammalgroup.org.uk/index.php?option=com_content&view=article&id=115:otters-in-kent&catid=35:news&Itemid=53 [Accessed: 19/08/2020];
- Natural England (2007) Disturbance and protected species: understanding and applying the law in England and Wales. www.naturalengland.org.uk/Images/esisgd_tcm6-3774.pdf; and
- The Mammal Society (2020) Water Vole Available from: https://www.mammal.org.uk/species-hub/full-species-hub/discover-mammals/species-water-vole/ [Accessed: 19/08/2020].

[This page is intentionally left blank]

Chapter Two ◆ SURVEY FINDINGS

2.1 This section should be read with reference to Figure 12.1: *Project Site Areas* (Document Reference 6.3.12.1), Figure 12.4: *Extended Phase 1 Habitat Plan* (Document Reference 6.3.12.4), Figure 12.49: *Desk Study Results* (Document Reference 6.3.12.49), Figure 12.21: *Water Vole Survey Results* (Document Reference 6.3.12.21) and Figure 12.50: *Existing Hydrology* (Document Reference 6.3.12.50).

HABITAT SUITABILITY

2.2 The suitability of each of the on-site habitat areas have been assessed and described in brief below with a more detailed assessment and further information provided in Appendix 1.0 and with indicative images provided at Appendix 2.0.

Essex Project Site

2.3 Despite fronting onto the River Thames none of the habitats present on the Essex Project Site are considered suitable for water vole, being dominated by a heavily industrialised ferry terminal with steep wharfs and concrete banks preventing burrowing and with no water courses running inland from the river. Habitats within the Essex Project Site will not be considered further in this strategy.

Kent Project Site

2.4 The Kent Project Site can be viewed as two distinct areas namely the Swanscombe Peninsula in the north and the Ebbsfleet valley running south from this towards the A2 roadway. The southern edge of the Swanscombe Peninsula is delineated by a wide strip of industrial estates, heavy industry and housing with associated infrastructure including the HS1 railway line, which runs north into the Peninsula before it enters a tunnel under the River Thames. This urban landscape supports no water channels and isolates the habitats in the Peninsula from those associated with the Ebbsfleet Valley.

2.5 Given its flow and tidal fluctuations, the River Thames it is not considered to provide suitable habitat for water vole and is considered to be a barrier to dispersal, though large areas of the Swanscombe Peninsula do provide suitable water vole foraging habitat with a mosaic of interconnected drainage ditches, reedbed and swamp. However, the land is predominantly low lying and water vole are susceptible to high water levels and flood events, especially during the winter months when they rely on food resources stored in burrows.

2.6 Work completed by Buro Happold in July 2020 has confirmed that the majority of the marsh areas within the Peninsula are low lying, with Black Duck Marsh measured at 1.9m above ordnance datum (aOD), the Central Marsh 0.9m aOD, Botany Marsh West at 1.63m aOD and Botany Marsh East at 2.54m aOD (see Environmental Statement Chapter 17 – Water Resources and Flood Risk (Document Reference 6.1.17). High water levels were

recorded in these areas in winter 2019/2020 with water levels submerging extensive areas of Black Duck Marsh, the Central Marsh and large areas of Botany Marsh West. Surveyors recorded water levels exceeding 20cm across the raised trackway adjacent to Black Duck Marsh as well as a similar depth along the length of the track running through the Central Marsh up to Pond P3. Surveys conducted by Chris Blandford Associates (CBA) across the Kent Project Site in 2012 and 2015 also noted high water levels across the area in winter. Furthermore, discussions with the security team on the Swanscombe Peninsula confirmed that water level rise of this scale occurs annually and is not abnormal. It is considered likely that a rise in water levels of this scale will have a significant impact on water voles, reducing the available area for burrowing and likely flooding over-wintering voles out of their burrows, thus having a direct impact on winter mortality rates.

Black Duck Marsh

2.7 Black Duck Marsh in the west of Swanscombe Peninsula, on the Kent Project Site, supports an expansive area of wetland dominated by common reed (*Phragmites australis*), cut with wide channels and dotted with ponds and lakes. The area is subject to low levels of disturbance, however, whilst providing extensive foraging opportunities the low-lying marsh offers little suitable burrowing habitat and is heavily impacted by high water events in winter, resulting in a habitat of only low value for water vole. Black Duck Marsh is isolated on the Peninsula with roads and buildings to the south, the River Thames to the North and a wide (c.275m) area of higher dry ground with bare earth and scrub to the east.

Channel Tunnel Rail Link wetland

2.8 To the east of Black Duck Marsh the central part of the Swanscombe Peninsula supports more scrub and semi-improved grassland with a large area of reedbed to the south (the Channel Tunnel Rail Link (CTRL) wetland). Ditches wrap around this area to the north, east and west providing a wide belt of damp ground and reedbed habitat. As with Black Duck Marsh this area also experiences high water events in winter and in the summer many of the ditches and much of the wetland in this area dries, reducing its value for water vole. Some sections of the CTRL wetland area have moderate potential habitat, though it is predominantly low value.

Botany Marsh West

2.9 Botany Marsh West is situated immediately to the east of the CTRL wetland. A cattle grazing regime on this land has significantly reduced the value of the ditches in this area with the whole network heavily poached and grazing pressures removing the vast majority of the vegetation both in the ditches and along the banks. Scrapes in this area are of benefit to wildfowl, though these are shallow sided and dry completely in the summer. Again, this area experiences high water events in winter and then dries in summer, this paired with the management regime has resulted in negligible value foraging habitat for water vole. The heavy poaching and lack of vegetation in the dry ditches provides only low value dispersal habitat and is considered likely to significantly reduce the potential for water vole dispersal through the area.

Botany Marsh East

2.10 Botany Marsh East predominantly supports areas of scrub and reedbed habitat intercut by deep drainage channels choked with common reed. This area is actively managed as a nature reserve, though has the heaviest recreational pressure with many formal paths interconnecting across the land. Management includes rotational dredging of the ditches and ponds, though this is completed on both sides of the water course resulting in areas of damaged/degraded habitat. The ditches in this area provide moderate value foraging and burrowing habitat with steep earth banks and mostly permanent water, as well as reduced frequency of high-water events. The wetland/reedbed in this area dries fully in the summer and is of low value for water vole.

River Ebbsfleet

2.11 The River Ebbsfleet flows north to south through the Project Site, turning to the east before entering the River Thames. The river has a moderate flow and clear water, with banks varying along its length with a deep, steep sided channel in the south before widening out to the north with more areas of adjacent reedbed, woodland and dense scrub. The Ebbsfleet Valley provides high, moderate and low value habitats for water vole along its length within the Project Site.

2.12 Overall, the Project Site provides areas of suitable habitat for water vole, though these are isolated in a fragmented landscape. It is considered likely that dispersal of voles between these areas is limited.

REVIEW OF HISTORIC SURVEYS

2.13 In support of previous planning applications water vole surveys were conducted across the Kent Project Site by CBA in 2012 and 2015. CBA completed a desk-based assessment prior to the on-site surveys, which returned 12 records of water vole from the marshes on Swanscombe Peninsula during the period 2000-03. Furthermore, a review of the Ecological Statement for the Springhead Spine Road and Bridge Link reported the presence of positive field signs for water voles on the Ebbsfleet in 2004-07.

2.14 Detailed information for the 2012 surveys completed by CBA is not provided in their report, though the 2015 report highlights that the survey identified small quantities of feeding remains and droppings adjacent to burrows during surveys of water courses on the Swanscombe Peninsula. As a result of the spread and extent of signs found, it was concluded that a small population of water vole were likely present.

2.15 CBA completed a full survey of the water courses on Swanscombe Peninsula in August 2015 including around Black Duck Marsh, the Central Marsh including the water bodies and Botany Marsh East, though Botany Marsh West was not included. The length of the River Ebsfleet was surveyed in September 2015. The surveys followed standard practice for the time as provided in the Water Vole Conservation Handbook[1] and involved

[1] Strachan, R., Moorhouse, T. and Gelling, M. (2006). Water Vole Conservation Handbook.Second Edition. Wildlife Conservation Research Unit, Oxford

a full survey of the water courses/bodies or spot checks completed every 10m where continuous access was not possible.

2.16 The 2015 surveys identified small numbers of holes in the banks of some drainage ditches on Swanscombe Peninsula, though no conclusive field signs of water voles were recorded. CBA concluded that the survey evidence suggests that water vole were absent from the Project Site, suggesting that it could be in part due to fluctuating and recently high-water levels.

EDP WATER VOLE SURVEYS 2020

Survey method

2.17 Given the steep banks, deep sections of water and dense common reed, which covers the vast majority of the water course network, pond edge and the wetland areas, artificial latrine sites were used to help target survey effort. With reference to best practice guidance[2] this was completed using 60cmx30cm rafts of Cellotex positioned every 10m in the areas surveyed. During deployment much of the channel network was dry and as such, deployment targeted the wetter areas as these were considered more likely to support water vole. This sampling approach has ensured that rafts are deployed on the majority of the on-site water courses and should identify water vole if present. The artificial rafts were deployed on 02 June 2020 and with additional rafts deployed in Botany Marshes East on 10 June 2020. The rafts were left *in situ* for at least two weeks to allow them to bed-into the surroundings before the first survey on 25 June and the second survey on 18 August 2020.

2.18 Access to the marsh areas in August 2020 was limited by dense vegetation and so an update survey was completed on 29 September 2020, which accessed all of the rafts and included additional checks of the reedbed habitat. September is an optimal time for water vole surveys, identifying field signs when the population is at its highest and records the population at its greatest extent.

2.19 Access to Botany Marsh West was not permitted by the landowner until 28 July 2020 and as such, a traditional walkover survey was used rafter than a raft-based approach, again this was completed with reference to best practice guidance. A second survey was completed on 29 September 2020.

2.20 To ensure that the presence of latrines were not affected by water levels or rainfall all surveys were completed following at least a few days of dry weather.

[2] Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016). The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidelines Series). Eds Fiona Mathews and Paul Chanin. The Mammal Society, London

Survey limitations

2.21 Guidance[3] advises that two surveys are completed, with the first survey between mid-April and the end of June and the second survey between July and September inclusive. Whilst the first survey of Botany Marsh West was not completed until late July 2020 the presence of rafts deployed along its western and eastern boundaries mitigate for this constraint. Furthermore, the second survey period should, in theory, identify water vole populations at their highest and as such, surveys at this point should make detection of presence more likely than early in the year. Given this the findings of the water vole surveys are not considered to have been seasonally affected.

2.22 The on-site water courses and wetland areas are uniformly choked with dense stands of common reed preventing continued surveyor access across much of the suitable habitat and so a sampling approach had to be adopted.

Survey results

2.23 Surveys in June 2020 identified water vole signs in Botany Marsh East with extensive signs of feeding and many latrines in two small pockets, the first in ditch D25 covering 60m of ditch habitat with water vole signs on four rafts and the second in ditch D22 covering 70m of ditch habitat with signs found on six rafts. Raft checks and hand searches either side of these pockets did not find additional signs of water vole presence.

2.24 Two pockets of water vole signs were identified on the western edge of Botany Meadows West in ditch D18 with one small pocket at the southern extent with signs on two adjacent rafts and a larger pocket of signs to the north with signs on five of the rafts covering a 125m section of ditch. Again, raft checks and hand searches either side of these pockets did not find additional signs of water vole presence.

2.25 No additional water vole signs were noted on the August 2020 surveys, however, during the update surveys in September 2020 a single water vole latrine was identified on one of the rafts in Black Duck Marsh in ditch D9 and a single latrine was found in Central Marsh ditch D12 near to pond P4.

2.26 No signs of water vole were found during either of the hand-search surveys on Botany Marsh West.

2.27 Large areas of reedbed are present in the Ebbsfleet Valley area of the Project Site and connected by the river Ebbsfleet. Raft surveys were able to target contiguous areas of this habitat though no signs of water vole were recorded.

Further surveys

2.28 Surveys have been completed in line with current best practice guidance for identifying water vole presence and have confirmed the presence of a breeding water vole population

[3] Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016). The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidelines Series). Eds Fiona Mathews and Paul Chanin. The Mammal Society, London

on the Kent Project Site in 2020. The survey effort is considered sufficient for the purposes of the Ecological Impact Assessment presented in Chapter 12: *Terrestrial and freshwater ecology and biodiversity* (Document reference 6.1.12) of the Environmental Statement, and to inform the principles of the water vole mitigation strategy presented in this report.

Discussion

2.29 Water voles are widespread within England; however, their national population is thought to have undergone a long-term decline[4]. The presence of desk study records to the north and south of the river would suggest that populations are present in the wider landscape.

HABITAT PREDOMINANTLY FRAGMENTED OF LOW TO MODERATE VALUE

2.30 The Kent Project Site as a whole is separated into two distinct areas of habitat with no suitable interconnectivity, namely the Swanscombe Peninsula and the Ebbsfleet Valley. As such it is considered likely that the water vole population on the Peninsula is isolated and self-supporting with little movement of water vole into or out of the area.

2.31 The Swanscombe Peninsula provides large areas of low to moderate value habitat for water voles including water courses interspersed with ponds and areas of wetland habitat, though these areas are fragmented by extents of dry ground and habitats of negligible value for water vole foraging and dispersal.

2.32 Surveys in 2020 identified water vole signs across the Swanscombe Peninsula with latrines in Black Duck Marsh, CTRL wetland and Botany Marsh East. The presence of water vole signs in three isolated sections reflects the fragmented habitats present across the Peninsula and are likely affected by the absence or the poor quality of the connecting habitat. As dispersal between the habitats is limited it is likely that water voles can overwinter in each of the three areas identified, however, given the limited range of the signs found it is likely that only small numbers are present.

2.33 The presence of water vole in 2012 and 2020 with a lack of signs in 2015 indicates that the population fluctuates. As suggested by CBA and supported by surveyor observations, fluctuations in numbers and the local distribution of water vole are likely affected by high winter water levels and flood events, significantly reducing the extent of suitable over wintering habitat. Water voles suffer high winter mortality rates even in good habitat[5] and so it is likely that with additional pressures only small pockets of water vole survive where they have overwintered on areas of higher ground.

2.34 Other factors which could be responsible for fluctuations in population numbers could be the presence of American mink (*Neovison vison*), which predate water vole. The habitats

[4] The Mammal Society (2020) *Water Vole* Available from: https://www.mammal.org.uk/species-hub/full-species-hub/discover-mammals/species-water-vole/ [Accessed: 19/08/2020]

[5] Strachan R, Moorhouse T, Gelling M (2011) Water vole conservation handbook, 3rd edn. The wildlife Conservation Unit, Abingdon

present are considered suitable for American mink to thrive, though no signs of its presence were recorded during the surveys.

2.35 Access across the Project Site was limited by dense vegetation and as such, it is considered that the surveys identified only a proportion of the water vole population present, though the lack of signs in extensive areas of raft deployment support the conclusion that the population is not widespread across the Peninsula.

2.36 During surveys only a single latrine was found in Black Duck Marsh, eight latrines near the CTRL wetland and peak activity in Botany Marsh East with ten large active latrines and numerous feeding signs present, albeit spread only over a short section of the ditch. Calculating water vole numbers from latrine counts is unreliable though will give some indication of relative population size[6]. The surveys identified a peak count of six latrine sites over a 100m stretch of ditch indicating that the habitats currently support a very low-end, medium relative density population in Botany Marsh East. This survey evidence is based on rafts located every 10m and as such, it is assumed that this is a slight underestimation of the population in these areas, however, given the lack of evidence found and the limited extent of the signs within the ditches surveyed it is still considered unlikely that the Project Site supports a high relative density population.

2.37 The Ebbsfleet Valley was surveyed by CBA in 2015 and EDP in 2020 with no signs of water vole recorded during either year. Whilst the habitats present are considered suitable the lack of signs suggest that water voles are absent from this section of the Project Site.

[6] Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016). The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidelines Series). Eds Fiona Mathews and Paul Chanin. The Mammal Society, London

[This page is intentionally left blank]

Chapter Three ◆ LEGISLATIVE CONTEXT

3.1 Water voles and their habitat are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), making it an offence to:

- Intentionally capture, kill or injure water voles;
- Damage, destroy or block access to their places of shelter or protection (on purpose or by not taking enough care);
- Disturb them in a place of shelter or protection (on purpose or by not taking enough care); and
- Possess, sell, control or transport live or dead water voles or parts of them (not water voles bred in captivity).

[This page is intentionally left blank]

Chapter Four ◆ IMPACT ASSESSMENT IN ABSENCE OF MITIGATION OR COMPENSATION

4.1 This section should be read with reference to Figure 12.50 – *Existing Hydrology* (Document Reference 6.3.12.50) and Figure 12.51 – *Predicted Impacts – Hydrology* (Document Reference 6.3.12.51).

IMPACT ASSESSMENT

4.2 The following information provides a summary of the anticipated negative effects on the water vole population within the Project Site in the absence of any mitigation

4.3 As a result of the Proposed Development approximately 4.7km of water course (ditch) will be permanently lost along with 1.4km of lake/pond bankside habitat and 13.0ha of reedbed/swamp.

4.4 In addition, 1.0km of existing water course (ditch) will be subject to temporary habitat damage as a result of adjacent construction works, such as boardwalk construction in Black Duck Marsh and water vole displacement works to accommodate new ditch connections in Botany Marsh East, along with 2.4ha of reedbed/swamp. The totals, along with their condition assessment is provided in Table 4-1 and Table 4-2.

Table 4-1: Suitable habitat areas permanently lost.

Habitat Type	Habitat Condition	Habitat Length/Area
Ditch	Moderate	1.2km
Ditch	Low	2.0km
Ditch	Negligible	1.5km
1.4km Lake/pond bankside	Low	1.4km
Reedbed/swamp	Moderate	12.21ha
Total		6.1km linear habitat and 2.21ha habitat area

Table 4-2: Suitable habitat areas temporarily damaged during construction

Habitat Type	Habitat Condition	Habitat Length/Area
Ditch	Moderate	1.0km
Reedbed/swamp	Moderate	2.4ha
Total		1.0km linear habitat and 2.4ha habitat area

4.5 The loss of water bodies in the Kent Project Site is almost entirely confined to the Swanscombe Peninsula, though two ponds in the Ebbsfleet Valley will be subject to some

disturbance during the works, namely pond P18 and the quarry lake in Bamber Pit to the south of the A226. Both of these water bodies were inspected during the course of the surveys and found to be isolated from the surrounding habitat and provide habitat of negligible value for water vole with little or no bankside for burrowing and limited bankside/submergent vegetation, though these have been included within the assessment above.

4.6 These calculations include disturbance of 96m of ditch habitat, which will be damaged during displacement activities in Botany Marsh East. However, the majority of the ditch disturbance relates to construction along the boundaries of Black Duck Marsh and the installation of a boardwalk for public access.

4.7 Construction of a water vole receptor site and new ditch habitats will also require the temporary damage/disturbance of areas of reedbed in Botany Marsh East. These areas have also been included in the above calculations.

4.8 Aside from direct habitat loss and/or disturbance it is also considered that negative effects on water voles may arise from:

Construction phase

- Habitat fragmentation/loss of dispersal routes;
- Killing, injuring and disturbance of individuals;
- Increased dust, noise, vibration, visual and light disturbance;
- Hydrological effects, including changes to water quality/quantity; and
- Pollution/contamination incidents.

Operational Phase

- Habitat fragmentation/loss of dispersal routes;
- Increased noise and traffic leading to disturbance of species within retained habitats;
- Increased lighting leading to reduced hours of nocturnal foraging and a potential for increased predation;
- Hydrological effects, including changes to water quality/quantity; and
- Damage or degradation to habitats and disturbance of water voles through increased recreational pressure. Whilst the vast majority of users visiting the Proposed Development will not venture outside of the Resort during their stay there is potential for a slight increase in recreational disturbance, most likely from guests using the on-site hotel facilities and nearby accommodation.

Chapter Five ◆ MITIGATION AND COMPENSATION

5.1 This section should be read with reference to Figure 12.52 – *Mitigation and Enhancements – Hydrology* (Document Reference 6.3.12.52), Figure 12.53 – *Water Vole Receptor – Location* (Document Reference 6.3.12.53) and Figure 12.54 – *Water Vole Receptor – Design* (Document Reference 6.3.12.54), Figure 12.44 – *Ecology Mitigation Strategy: Species Measures* (Document Reference 6.3.12.44) and Figure 12.45 – *Light Mitigation Strategy* (Document Reference 6.3.12.45).

5.2 The following information provides a summary of the anticipated mitigation and compensation proposed for the water vole population within the Project Site. The assessment takes into consideration the role of inherent mitigation embedded within the design of the Proposed Development as well as the additional avoidance, mitigation, compensation and enhancement measures required to address residual effects identified in Section 3.

INHERENT MITIGATION

5.3 Inherent mitigation has been incorporated into the Landscape Masterplan (Document Reference 6.3.11.15) included within the Landscape Strategy (Document Reference 6.2.11.7), which will be secured as a requirement of the DCO. The loss and disturbance of on-site habitat is inherently mitigated through the incorporation of extensive habitat creation and enhancement within the retained space around the peripheries of the Proposed Development, including a large new constructed reedbed.

5.4 Forming new connections and enhancement/maintenance of existing connectivity across the Peninsula is key to ensure that water voles can disperse out from pockets of higher densities. The habitat creation and enhancement has sought to maintain this connectivity between Botany Marsh East, Broadness Grassland and Black Duck Marsh through the inclusion of a chain of interconnected water courses and water bodies wrapping around the side of the Proposed Development footprint. These water courses will afford an extensive habit with friable banks for burrowing and will be bordered with wetland/marsh habitat to provide a sheltered belt for water vole dispersal. These habitats will be planted with a range of suitable native bankside and water plants to improve species richness and increase the foraging resource available.

5.5 As high and low water levels have been identified as a significant constraint to the local range of the water vole population, discharge outfalls from Black Duck Marsh and Botany Marsh will include manual flow/level controls (such as a sluice gates) to adjust water levels within the marshes as required to provide a suitable level across the year. The outfalls will have non-return valves to protect the site from tidal flooding (see Environmental Statement Chapter 17 – Water Resources and Flood Risk; Document Reference 6.1.17).

5.6 Habitat creation will be brought forward at an early stage of to prevent habitat fragmentation during construction.

5.7 A summary of the proposed habitat creation and enhancement is provided in Table 5-1 and Table 5-2.

Table 5-1: Habitat creation

Habitat Type	Habitat Condition	Habitat Length/Area
Ditch	Optimal	2.3km
Ditch	Good	0.9km
Ditch	Moderate	4.8km
Lake/pond bankside	Optimal	0.1km
Lake/pond bankside	Good	0.3km
Lake/pond bankside	Moderate	0.3km
Lake/pond bankside	Low	0.4km
Reedbed/swamp	Moderate	5.69ha
Total		9.1km linear habitat and 7.5ha habitat area

Table 5-2: Habitat enhancements

Habitat Type	Habitat Condition	Habitat Length/Area
Ditch	Moderate	3.7km
Ditch	Low	0.4km
Reedbed/swamp	Moderate	18.35ha
Total		4.1km linear habitat and 14.2ha habitat area

5.8 As illustrated in Table 5-3, the Proposed Development will provide a net gain of 6.4km of ditch habitat, which will more than offset the loss of 0.3km of lake bankside. In addition, a number of small lakes/ponds, which may dry seasonally will be created across Broadness Grassland, which have not been included in this calculation. Of the ditch habitat at least 2.3km will be designed as a water vole receptor site and so will provide optimal foraging habitat for water vole.

Table 5-3: Habitat change

Habitat Type	Habitat Lost	Habitat Temporarily Damaged	Habitat Created	Habitat Enhanced	Total Gain/Loss
Ditch	4.7km	1.0km	8.0km	4.1km	+ 6.4km
Lake/pond bankside	1.4km	0.0km	1.1km	0.0km	- 0.3km
Reedbed/swamp	12.21ha	2.4ha	5.69ha	18.35ha	+ 9.43ha

5.9 The quantum of new reedbed habitat created represents a slight reduction in the total area of overall habitat, however, the damaged habitat will not be lost and significant areas of existing habitat will be enhanced to provide increased value for wildlife such that it is considered that the Project Site can provide a net increase in valuable reedbed habitat of 6.3ha.

5.10 To inform the ES a set of habitat loss/gain calculations, using the Defra Biodiversity Metric 2.0, have been produced and are presented within the Biodiversity Net Gain Assessment (Document Reference 6.2.12.2). The findings of these calculations illustrate that habitat creation and enhancement works within the Project Site alone will not be sufficient to meet London Resort Company Holdings Limited aspirations for a biodiversity net gain, and as such, additional off-site mitigation, including off-site habitat creation, is being sought to compensate for the shortfall. A set of *General Principles for Offsite Ecological Mitigation* (Document reference 6.2.12.10) is submitted along with the application for development consent to inform the scope of off-site mitigation to be secured through the Development Consent Order (DCO) examination. New wetland, reedbed and ditch habitats created as mitigation for the loss of functionally linked land on the Kent Project Site (see *Shadow Habitats Regulations Assessment* (Document reference 6.2.12.4)) will also create suitable habitat for water voles and will more than offset any potential onsite habitat losses.

5.11 Overall, it is considered that the Project Site will deliver a net conservation benefit for water voles. In addition, with the additional off-site mitigation the benefit to the local water vole population is considered likely to significantly outweigh the losses of sub-optimal habitat within the Project Site.

WATER VOLE MITIGATION

5.12 To avoid the disturbance, injury and mortality of the water vole population within the Proposed Development footprint, the water voles will be live trapped under a Natural England licence from the impacted habitats prior to the commencement of any work. Once complete, this process will enable the removal of their current habitat to facilitate construction with no risk of killing or injuring water voles.

5.13 From the outset it has been the aim to retain the water voles on the Swanscombe Peninsula to prevent a reduction in the local population size and a loss of genetic diversity. As such, a receptor site will be constructed in Botany Marsh East to accommodate the population of water voles proposed to be trapped and this is discussed further below.

Receptor site design

5.14 EDP and Derek Gow Consultancy Ltd have discussed a number of different options for the water vole receptor location, with a number of different options across the Swanscombe Peninsula and within the Ebbsfleet Valley considered. Botany Marsh East was chosen as the optimal location as:

- The peak count of water vole activity was identified in this area;

- Water vole are present in the existing ditch network and so the translocated population will not be isolated;
- The translocated water voles will help prevent genetic stagnation of the existing population;
- The Botany Marsh East is currently managed for wildlife and this can be adapted to encompass the water vole receptor site habitat;
- The wetland areas of habitat within the nature reserve are dry, with homogenous vegetation and encroaching scrub. These present scope for enhancement; and
- This section of the Peninsula sits around 1m higher than the other marshland areas on the Peninsula and be at a lower risk of impact from high water levels and flood events.

5.15 Medium relative densities of water vole signs were identified covering around 400m of the on-site water course surveyed. As discussed above in Section 2 this is considered to be an under recording of the existing population and as such, mitigation will take a precautionary approach, with a proposed receptor site designed to provide c.2.3km of optimal ditch habitat. This length of habitat is considered sufficiently large enough to support the maximum number of animals that could be captured.

5.16 Botany Marsh East has a series of interconnected paths, which loop through the area creating pockets of habitat interlinked by the ditch network. As such, there is no single space large enough to provide the adequate length of ditch habitat and so the receptor site will be constructed in three separate sections, namely Receptor North (Ordnance Survey Grid Reference: TQ 61007 75683), Receptor Central (OSGR: TQ 61005 75467) and Receptor South (OSGR TQ 61029 75214). Receptors North and Central fall close together, with a c.100m gap down to Receptor South, though all three of the areas are connected by a single north-south ditch (ditches D22 and D25 on Figure 12.21 (Document Reference 6.3.12.21), which had conclusive evidence of water vole presence during surveys in 2020.

5.17 Receptor North currently supports areas of dense thorn scrub, species-poor semi-improved grassland and reedbed dominated by common reed. The reedbed is dry across this area, likely only becoming wet in the winter months. Currently the value of this habitat for water vole is low.

5.18 Receptor Central has a similar habitat structure to Receptor North, with extensive areas of scattered scrub and dense scrub interspersed with areas of species-poor semi-improved grassland and dry reedbed. This section is considered to provide less suitable habitat than Receptor North and is of low value for water vole.

5.19 Receptor South has a more extensive area of reedbed habitat, merging into scattered scrub and species-poor semi-improved grassland to the south. The reedbed in this area is the driest and the area provides little suitable habitat for water vole.

5.20 Removal of these habitats to create the receptor site habitat would need to be conducted in a sensitive manner and preceded by a detailed survey of the area to re-confirm water vole absence. Reference will need to be made to the Rare Plant Mitigation Strategy, which is contained with the Ecological Mitigation and Management Framework (Document Reference 6.2.12.3), as soil with yellow vetchling (*Lathyrus aphaca*) and hairy vetchling (*Lathyrus hirsutus*) seedbank/plants will need to be incorporated into the receptor design. In addition, the good practice guidance for the removal of reptile habitat and breeding bird habitat will need to be considered, as described elsewhere in the Ecological Mitigation and Management Framework (Document reference 6.2.12.3).

5.21 Creation of the receptor site will require the excavation of a series of water courses around 2m deep with the aim of providing at least a 30cm deep channel of open water year-round. Excavated material will be piled on the northern or western side of the channel to provide a bank extending above the current ground level, which can act as a refuge for water voles during times of higher water levels. Positioning the bank to the north or west of the channel will increase the amount of sunshine hours the ground will receive encouraging plant growth, preventing shading of the channel and providing enhancements for basking reptiles. The wet channel should be around 1-2m wide with a shelf cut at water level to support a raft of marginal and aquatic plants at the toe of the bank.

5.22 Scrub will be allowed to naturally re-colonise between the channels along with the reedbed vegetation, though the channel will be managed to encourage a more diverse mosaic habitat. To aid establishment of the bankside vegetation both banks of the receptor site habitat will be covered with strips of mature turf. This turf can be taken from donor areas of the Project Site, which are scheduled to be lost to the Proposed Development such as Botany Marsh West and augmented with additional strips of turf with a greater species richness.

5.23 The aquatic shelf in the channel will be fitted with pre-established coir tiles supporting mature, native semi-emergent plant species. The coir tiles will be fitted every 10m along the shelf to provide regular sections of dense cover. Plug planting at the toe of the opposite bank will provide an additional fringe of vegetation at the water's edge. Species should include flowering rush (*Butomus umbellatus),* soft rush *(Juncus effusus),* hard rush *(Juncus inflexus),* yellow water-lily *(Nuphar lutea),* arrowhead *(Sagittaria sagittifolia),* marsh marigold *(Caltha palustris),* hemp-agrimony *(Eupatorium cannabinum),* yellow iris *(Iris pesudarcorus), water mint (Mentha aquatica), water smartweed (Polygonum amphibium),* pond water-crowfoot *(Ranunculus peltatus),* narrowleaf cattail (*Typha angustifolia)* and brooklime (*Veronica beccabunga)* where possible. Scattered common osier *(Salix viminalis)* should be planted in small areas along the bank tops to provide additional ground cover.

5.24 The boundaries of the receptor areas will be delineated with water vole proof fencing to prevent colonisation of this feature by water voles from the surrounding landscape. The fence will be constructed using Herpetosure[7] water vole fencing (or similar) with the base of the fence dug 500mm into the ground and rising 1200mm above ground. The new ditch

[7] https://herpetosure.com/specifications-1

network will be connected into the existing waterway using short 2-3m sections of culvert pipe. Using culvert pipe will allow the water vole fence to be installed in a continuous line over the top of these sections and a temporary one-way non-return flap will be installed on the external end of the culvert to prevent water voles entering the receptor site via the culvert.

5.25 Using pre-established turf and planting will speed the maturation process of the receptor site habitat, however, the receptor site should be completed around 12 months prior to the commencement of water vole trapping to allow the habitat to develop. The receptor site habitat will be surveyed prior to the commencement of trapping and, if the vegetation is not deemed suitable, the commencement of trapping will be delayed.

5.26 American mink monitoring will be required at the receptor site to ensure the long-term survival of the translocated water vole population. This will be achieved through the use of American mink rafts as described by the Game and Wildlife Countryside Trust (GWCT). A series of rafts will be deployed throughout the watercourses and checked regularly for footprints as part of the site management program. On identification of American mink footprints, traps will be fitted to the rafts and checked daily. Any American mink caught will be humanely dispatched.

Trapping process

5.27 Removal of water voles from the Proposed Development footprint will be completed through the use of live trapping lead by Derek Gow Consultancy Ltd. It is envisaged that trapping of water voles will commence in the same year that the development construction is proposed to begin, with trapping completed between 01 March and 15 April of that year to avoid the breeding and hibernation seasons. Numbers of water vole should also be at their lowest at this time of year.

5.28 The traps used by Derek Gow Consultancy Ltd are 45cm x 15cm x 14cm. They consist of a sheet metal boxed compartment with a ½ inch weld mesh barrel. A mesh door flap locks shut by a simple locking bar when set off. The traps are not spring loaded, which ensures a very light treadle activation weight. For extra insulation plywood is fastened around the compartment end of the trap, which ensures captured animals do not suffer in cold conditions. Half of a sweet apple is placed at the back of each trap to afford any captured animal nourishment and moisture and straw is placed on top of this piece of apple to provide a warm bedding substrate.

5.29 Traps can be set directly onto the bank and fixed in place using pegs or on Celotex foam insulation boards, cut into rectangular floats. Traps are attached to these floats using wire, and the floats are set on the water and roped to the bank using poles or bamboo canes. This method ensures that traps are not submerged where water levels are unstable. Positions of the traps are determined by searching for water vole field signs and setting traps as close to these field signs as possible. Where field signs are not evident, traps are set every 5-10m. Apple ‘chips’ are used to bait the trap along the length of the barrel to entice the water vole in and step on the treadle plate. Each trap is numbered and mapped to allow quick identification and to ensure none are missed during checks.

5.30 Traps are checked at least twice per day, first thing in the morning at around 8am and late afternoon around 4pm. If the weather is particularly warm, another midday check is required to reduce risk of mortality due to overheating. Apple chips are changed and replaced as necessary on each check and the apple half is checked daily to ensure it is present and changed for a fresh one every 3 days (more often in hot weather). Straw is topped up as necessary. When a trap has been tripped and the door is closed, it is normally relatively obvious whether there is an animal present. The straw will normally be pulled out of the back compartment along the barrel of the trap. The trap is approached quietly and carefully examined whilst ensuring the trap is kept level, so the door stays locked closed, preventing the animal from escaping. If a water vole is identified, the door is cable tied shut and the trap carried to the water vole processing/holding facility, with a replacement trap immediately set in its place.

5.31 Met-office weather forecasts will be recorded per trapping day and in the event of continued periods of poor weather, trapping will be either discontinued or the traps will be shut at night. Overnight temperatures will be recorded daily. Any captured water voles will be moved in their trap, which will be fastened shut to a mobile care facility where they will be fitted with subcutaneous microchips, weighed and sexed.

5.32 Providing the receptor site habitat is established and suitable, all trapped water voles will be temporarily retained in captivity on-site, using soft release pens situated along the banks of the receptor site and fed daily. The soft release pens are approximately 2ft by 2ft by 1ft, with a covered back providing protection from the elements and opening front and rear doors for ease of feeding and releasing. Upon capture, each water vole will be checked, weighed and sexed and placed into a lab cage within an on-site temporary holding facility for a maximum of two weeks prior to being transferred to an on-site soft release pen. Water voles will be retained within the soft release pens until such time as the vegetation within the receptor site habitat is deemed to provide adequate cover from predators and suitable foraging, and when all captured animals can be released simultaneously to prevent territorial fighting and potential fatalities. This is expected to be mid to late April. Therefore, water voles caught earlier in the trapping period will be kept in the soft release pens for longer than water voles caught later.

5.33 Following the trapping, once five consecutive days have passed with no water vole captures or evidence of fresh field signs, the destructive search will commence under the supervision of an experienced ecologist. The turf and emergent vegetation on the banks of the ditches will be mechanically removed and any burrows will then be destroyed using an excavator. The ecologist will have with them all the appropriate capture equipment - holding cages, nets and pop-up tubes.

5.34 Reed beds should be targeted first to avoid conflict with the nesting bird season. If the reedbeds are shallow enough to wade through, traps should be set in a grid format where water vole field signs are present. Once trapping in these areas has gone five days clear, the reeds should be mechanically cut back and the area drained and filled

Displacement

5.35 New channels cut for habitat enhancement and the receptor site will tie into the existing network of ditches running through Botany Marshes East which currently support a population of water voles. Connecting the new ditches into the existing network will require localised disturbance of a number of 2m sections of the existing bankside with the bank cleared 3m either side of this area as required by best practice guidance. The number of sections of displacement will not exceed six sections to ensure that the cumulative total of the displacement works will not exceed 50m of bankside. The number of displacement areas will be kept to an essential minimum and spaced at least 150m apart to prevent multiple disturbance to a single territory.

5.36 Displacement will be undertaken between 15 February and 15 April under class licence CL31 held by EDP or Derek Gow Consultancy Ltd. Works will commence with a search of the bankside to identify burrows prior to strimming of the vegetation back on both sides of the bank and in the channel, with vegetation taken down to ground level over a number of passes.

5.37 The strimmed bankside will be left for a minimum of five days and a maximum of ten days before any burrows are subject to a destructive search. Prior to the destructive search the area will be surveyed for evidence of the continued presence of water voles. Where this survey records no evidence that the burrows in the cut area are still occupied by water voles, each burrow affected must be carefully excavated and searched, and destroyed once the search is completed. This will minimise the risk that any water voles remaining in burrows will be harmed.

5.38 Any water voles found during excavation of burrows must either be allowed to escape to an adjacent refuge area or be captured and kept in a suitable animal container, with suitable bedding material and food provided, for release at an adjacent refuge area on the same day.

5.39 Works should commence within five days of completing the destructive search, where this is not possible water voles must be deterred from return to the area by;

- In-filling the channel immediately following the destructive search; or
- Maintaining the works area as bare ground until the works have taken place. This is likely to require repeat scraping/smoothing of the banks; or
- Covering the ground with a suitable matting to ensure that vegetation regeneration cannot occur; or
- Installing suitable water vole resistant fencing to prevent water voles returning.

5.40 In these situations, the displacement area will require continued monitoring to ensure that water voles do not return prior to the development works commencing.

Biosecurity

5.41 Before and on arrival at the Project Site, ecologist's footwear and vehicle tyres will be disinfected using Virkon. There will be no transfer of vegetation between other sites as the ecologists will solely be working on this location. All traps and equipment will have been washed with water to remove any remnants of vegetation since previous deployment and left out in the sun to entirely dry. Disinfectant cannot be used as this would deter water voles from entering traps, hindering the trapping process. Footwear and waders will be hosed off each time ecologists leave the Project Site to ensure no vegetation is transferred to other locations.

Justification

5.42 The process described above is compliant with the revised species guidelines for water voles and development mitigation. As such it has many successful precedents. The present population will be removed from the Proposed Development footprint to allow the construction works to proceed without impediment

ADDITIONAL CONSERVATION BENEFITS

5.43 The current habitat management plan used for the management of Botany Marsh East does not include a specification for the surveying or management of American mink. Inclusion of American mink population monitoring and management will be prescribed in the management plan for the Project Site.

ADDITIONAL CONSTRUCTION MITIGATION MEASURES

5.44 The following mitigation measures will be secured through an Ecological Construction Method Statement (ECMS), to be included within a Construction Environmental Management Plan secured as a requirement of the DCO.

Toolbox talk and site staff briefing

5.45 As part of the site briefing/induction process, details of the potential presence of water vole within the Project Site will be provided to all Site Management staff and contractors.

5.46 In addition, where specific works are being carried out that will directly affect suitable habitat, a species-specific briefing/toolbox talk will be provided by the Ecological Clerk of Works (ECoW). A toolbox talk will be given to contractors by the ECoW prior to commencement, with respect to the legal protection afforded to water vole, the working methodologies to be employed and procedures to be followed should water voles or any evidence of activity be encountered during the works.

Physical protection measures

5.47 Any retained suitable habitat will be protected during the construction phase through implementation of Ecological Protection Zones (EPZs). The EPZs can be delivered through co-ordination with protective measures for other ecological and arboricultural features,

combined with temporary protective fencing and signage, as detailed within the main body of the Ecological Mitigation and Management Framework (EMMF; Document Reference 6.2.12.3).

Lighting

5.48 The use of artificial lighting during construction is to be limited to the essential minimum throughout the Project Site, and any lighting to be used should avoid upward pointing lights, with the spread of light being kept near to or below the horizontal. During construction any illuminated site compounds will be sited away from all retained habitat suitable for water vole. Overnight working in areas of suitable habitat will be controlled through the use of method statements, including measures to minimise any potential negative effects, such as use of sensitive timings or measures to limit artificial light spill. A *Light Mitigation Strategy for Biodiversity* is provided as Figure 12.45 (Document reference 6.3.12.45).

Pollution prevention measures

5.49 Standard pollution prevention and dust suppression measures will be implemented to minimise harm and damage to retained habitat. Such measures are detailed within the main body of the EMMF (Document Reference 6.2.12.3).

ADDITIONAL OPERATION MITIGATION MEASURES

Lighting design

5.50 Whilst areas of suitable habitat will be retained and enhanced, the retained habitats within the Project Site may be subject to increased light levels during the operational phases of the Proposed Development which could have a negative impact on water vole foraging habits. Therefore, the avoidance or minimisation of light spill where development is in close proximity to suitable retained habitats is required. The type of light fitting used can reduce the level of light spill however other considerations should include:

- Column heights, which should be carefully considered to minimise light spill;
- Timers and dimming regimes should be incorporated where appropriate; and
- Baffles, hoods and louvers should be used as a last resort to reduce light spill.

5.51 An illustration of the proposed light zones including buffers for sensitive habitats/species within the Kent Project Site during the operational phase is provided in Figure 12.45 (Document Reference 6.3.12.45). Further details of the proposed lighting will be secured as a requirement of the DCO.

Water level management

5.52 Ecological monitoring of the wetlands pre- and post-development will be put in place for the first three years following completion to ensure the water levels within the marsh

areas support the intended habitats. The water levels within the marshes are proposed to be managed to ensure no deterioration of habitat. Discharge outfalls from Black Duck Marsh and Botany Marsh to the Thames will include manual flow/level controls (such as a sluice gates) to adjust water levels within the marshes as required as part of the EMMF (Document Reference 6.2.12.3) for the marshes. The outfalls will have non-return valves to protect the Project Site from tidal flooding. Further details of the water level management and ecological monitoring during the operational phase will be secured as a requirement of the DCO.

[This page is intentionally left blank]

Chapter Six ◆ MONITORING AND WORKS SCHEDULE

MONITORING

Water vole

6.1 The following scope of monitoring works will be secured through a condition attached to the Natural England Water Vole Licence required to complete the proposed works.

6.2 Monitoring of the released water vole population will take place for 3 years following the release of the trapped water vole population. Experienced ecologists will revisit the receptor site annually in August/September to conduct field sign surveys of the receptor site habitat and new water courses. The information gathered will allow ecologists to assess the survival, breeding success, dispersal and population growth of the released population and therefore the overall success of the translocation. If further impact control, mitigation or remedial actions are necessary, this will be identified during the survey.

6.3 The water voles released within the Project Site will be provided with long term security in the form of appropriate habitat management for foraging and security as outlined in the Water Vole Conservation Handbook 2011.

WORKS SCHEDULE

6.4 Table 6-1 gives a very early indication of the proposed timings for different phases of the work in relation to commencement of onsite construction

Table 6-1: Initial timetable of proposed works

Date	Action	Completion
Spring (year 1 – date TBC)	Creation of receptor habitat	Spring, one year prior to trapping commencement. Complete at least nine months prior to trapping
Spring (year 2 – date TBC)	Set up trapping exercise, remove water voles from affected area	Spring, on planned year of development commencement
Late Spring (year 2 – date TBC)	Release of water voles into the wider receptor site from soft-release pens	Completed by 15 April, on year of planned development commencement

Date	Action	Completion
Late Spring (year 2 – date TBC)	Destructive search of suitable areas	Completed in phases following survey completion with reedbed targeted for early removal to reduce breeding bird constraints
August (year 2 – date TBC)	Monitoring of translocated animals by field sign surveys	Survey over 1-2 days
August/September (years 3 and 4 – dates TBC)	Annual monitoring of On-site population through field sign surveys for a further two years	Autumn (year 4)

Chapter Seven ◆ SUMMARY AND CONCLUSIONS

7.1 None of the habitats present on the Essex Project Site are considered suitable for water vole, being dominated by a heavily industrialised ferry terminal with steep wharfs and concrete banks. The Kent Project Site contains a complex of habitats, which provide foraging, breeding and dispersal opportunities for water vole.

7.2 Surveys have been completed in line with current best practice guidance for identifying water vole presence and are considered sufficient to inform the EcIA and to the principles of the water vole mitigation strategy.

7.3 In addition to the direct loss of habitat, and the potential killing/injuring of any individuals present, the potential or actual adverse effects on the water vole population anticipated as a result of the Proposed Development, in the absence of mitigation, include loss, damage, degradation, fragmentation and/or disturbance of habitat during construction, and habitat fragmentation, disturbance (light, visual and aural) during the operational phase.

7.4 The overall aim in respect of the water vole population is to ensure the Project Site continues to support/provide a range of habitats capable of supporting thriving populations of water vole. As such, the Proposed Development includes inherent mitigation measures within the scheme's design including the retention of key foraging areas at Black Duck Marsh and Botany Marsh East. These areas will be enhanced through re-profiling of the water course, additional planting and improved management.

7.5 Habitat creation works will be conducted to offset losses from the Proposed Development footprint, including an extensive new network of ditch habitat within Botany Marsh East, a wide belt of reedbed and water course running around the north-east of the Project Site and a swale and ditch feature providing connectivity across the Swanscombe Peninsula and around the entire Proposed Development Footprint Boundary.

7.6 The mitigation strategy includes a range of measures to be implemented prior to construction including the trapping and translocation of water vole to a specially designed receptor area, sensitive removal of suitable vegetation, toolbox talks and site briefings, sensitive lighting, physical habitat protection, and pollution prevention measures.

7.7 During construction measures including the adoption of a sensitive lighting strategy, limited times of works and pollution prevention measures will reduce disturbance.

7.8 Throughout the operational phase the range of habitats retained, created or enhanced on the Kent Project Site will be subject to an appropriate management regime to ensure they continue to support adequate resources for the water vole population.

7.9 Off-site mitigation land still to be secured presents an additional opportunity to provide valuable habitat for water vole.

7.10 Subject to the implementation of this mitigation strategy in full throughout the delivery of the Proposed Development, it is considered that the water vole population present at the Project Site can be safeguarded in the long-term and the project can deliver a net conservation benefit for these species.

Appendices

[This page is intentionally left blank]

Appendix 1.0 ◆ ON-SITE HYDROLOGY – WATER VOLE ASSESSMENT

[This page is intentionally left blank]

Table A1-1: Detailed assessment of the on-site hydrology as surveyed between June and October 2020

Water Course/Body Reference	Description	Water Vole Suitability Discussion
Black Duck Marsh	A wide expanse of reedbed and swamp habitat dominated by common reed. Area is dotted with small pools and larger lakes though the whole area has high water levels in winter. Wide channels cut across the marsh with open water habitats present in the winter during reed dieback. pond P8 covered with dense reedbed and dries during the summer months. Whole area of Black Duck Marsh largely inaccessible due to deep water in winter, deep obscured channels and dense reedbed vegetation	Single water vole latrine recorded in ditch D9 on the eastern marsh boundary. Black Duck Marsh provides good habitat for water vole in the summer with a wide expanse of wetland habitat cut with channels retaining water. However, the area is all low lying providing little habitat for water vole during winter high water events. Habitats of moderate value for water vole.

Water Course/Body Reference	Description	Water Vole Suitability Discussion
CTRL wetland, and surrounding habitats	A mosaic of scrub and semi-improved grassland fills the northern half of this area with an expansive area of reedbed/swamp to the south. The wetland area supports three medium sized lake habitats fringed with common reed and likely to remain wet all year. This whole area is encircled by a large, drainage ditch with shallow earth banks which has become filled with common reed. These ditches dry ephemerally. Ditch D10 flows out of pond P3 to the west. Both habitats provide a good water source all year round and some suitable earth bankside habitat for burrowing. Large sections of this habitat has high water levels in winter reducing the potential for year-round water vole occupation. No access was granted for the reedbed areas though these areas are largely inaccessible and very difficult to survey due to the dense common reed.	No signs of water vole were recorded. Overall ditch D10 and ponds P3, P9 and P10 are considered to provide good foraging and refuge opportunities for water vole, with dense bankside reedbed. However, the area is all low lying providing limited habitat for water vole during high water events. Habitats of low to moderate value for water vole.
Botany Marsh West	A series of heavily cattle grazed fields interspersed with a heavily poached ditch network. Ditches in this section predominantly have low shallow earth banks with limited opportunities for burrowing. The western boundary of this area is delineated by a large, drainage ditch D18 with shallow earth banks and filled with common reed. This ditch dries ephemerally.	Water vole presence recorded in the D18 on the western boundary. Ditch D18 adjacent to the Central Marsh is considered to provide some good foraging and refuge opportunities for water vole, with dense bankside reedbed. However, the vast majority of the marsh comprises heavily grazed and poached ditches with shallow banks and a channel which fills completely during winter high water events and dries during the summer.

Water Course/Body Reference	Description	Water Vole Suitability Discussion
		Habitats of moderate and negligible value for water vole.
Botany Marsh East	An area of marshland managed as a nature reserve. The land is interspersed with a network of ditches and paths for public recreation. The nature reserve is actively managed for biodiversity. Ditches predominantly around 1m deep with steep sided earth banks. Water levels across much of the network appears permanent throughout the year though the majority of the ditches are heavily choked with phragmites reducing access to the water. Little to no flow was noted during the survey. Away from the ditch network the habitat is largely dominated by encroaching scrub and species poor semi-improved grassland though large areas of reedbed are present. These reedbeds were dry at the time of survey, likely only wet during the winter.	Water vole presence recorded in ditches D22 and 25. Overall, the ditch habitats are considered to provide some good foraging and refuge opportunities for water vole, with dense bankside reedbed. The wider reedbeds were dry though and offered little or no suitable habitat. The marsh area is low lying and is likely at risk of has high water levels during wetter years. Habitat of low and moderate value for water vole.

Water Course/Body Reference	Description	Water Vole Suitability Discussion
Ebbsfleet Valley	The rived Ebbsfleet flows northwards through the Project Site. Riparian habitats around the channel include wide belts of wetland, reedbed, marsh, woodland and scrub. The water appears clean and has a moderate flow rate over a gravel and silt substrate. The river flows in a narrow 2m wide channel to the south, with steep vegetated banks and limited submergent vegetation. The channel widens in the centre of the Ebbsfleet Valley area with expansive reedbed areas alongside. To the north the channel enters an area of dense scrub with pockets of dense submergent vegetation present only in the areas where scrub has not fully encroached.	No water vole or otter presence recorded. The Ebbsfleet provides large areas of suitable reedbed habitat for water vole with a channel of permanent water and opportunities for burrowing. It is not known if the Ebbsfleet floods regularly though some sections of bank are high and could readily accommodate a large rise in water level. Habitats of low, moderate and high value for water vole.

Appendix 2.0 ◆ INDICATIVE WATERCOURSE IMAGES

[This page is intentionally left blank]

BLACK DUCK MARSH

Figure A2-1: Spring view looking west over Black Duck Marsh

Figure A2-2: Summer view looking west over Black Duck Marsh

CTRL WETLAND (AND SURROUNDING HABITATS)

Figure A2-3: Looking north along ditch D10

Figure A2-4: High winter water levels in pond P3 at the northern end of ditch D10

Figure A2-5: Wetland/reedbed areas around pond P10

Figure A2-6: High water levels in ditch D13 in the north of the Central section

BOTANY MARSH WEST

Figure A2-7: Looking over a dry scrape in Botany Marsh West

Figure A2-8: Looking south over Botany Marsh West showing impacts cattle grazing with dry, heavily poached and grazed ditches

Figure A2-9: Looking south along ditch D18 on the western marsh boundary

BOTANY MARSH EAST

Figure A2-10: Looking south over the north-western corner of Botany Marsh East

Figure A2-11: Public track through the marsh with reedbed and scrub either side

Figure A2-12: Looking west along ditch D28 showing dense common reed

Figure A2-13: Looking north along ditch D28. A rare section not overgrown with common reed

Figure A2-14: Dredging management in ponds illustrating how management strategy can be improved for biodiversity

Figure A2-15: Water vole latrines and feeding signs recorded in ditch D22

Ebbsfleet Valley

Figure A2-16: Looking north along the river Ebbsfleet in the south of the Project Site

Figure A2-17: Wide marsh area on the Ebbsfleet to the east of pond P18

Figure A2-18: Ebbsfleet adjacent to the A226

Figure A2-19: Looking south over pond P18

Figure A2-20: Looking south over pond P17

Annex EDP 5
Otter Mitigation Strategy

This page has been left blank intentionally

Revisions

Revision	Description	Issued by	Date	Approved by
r043_00	Issue for DCO Submission	ND/AV	24/12/2020	EDP/LRCH

The Environmental Dimension Partnership Ltd
Tithe Barn
Barnsley Park Estate
Barnsley
Cirencester
Gloucestershire
GL7 5EG

[This page is intentionally left blank]

Contents

[This page is intentionally left blank]

List of Tables

[This page is intentionally left blank]

Chapter One ◆ INTRODUCTION, SITE CONTEXT AND PURPOSE

INTRODUCTION

1.1 This Otter Mitigation strategy has been prepared by the Environmental Dimension Partnership Ltd (EDP) on behalf of London Resort Company Holdings Limited. It considers the likely impacts of the Proposed Development on otter populations within the Project Site and identifies the avoidance, mitigation, compensation and enhancement measures required to enable the Proposed Development to meet legislative and/or planning policy requirements. A brief overview of the baseline situation is also provided along with a review of legislative and policy requirements.

1.2 The land within the Project Site will be subject to a Development Consent Order (DCO) application for a proposed world class destination entertainment resort with associated infrastructure, staff accommodation, dedicated access road, public amenity space and habitat creation. The application will be supported by an Environmental Impact Assessment (EIA), with this report provided as part of an overall Ecological Mitigation and Monitoring Framework (EMMF) report (Document reference: 6.2.12.3) which is an appendix to Chapter 12 *Terrestrial and Freshwater Ecology and Biodiversity* of the Environmental Statement (ES): (Document Reference 6.1.12).

1.3 Detailed information on baseline conditions and survey methods employed is provided within the Ecology Baseline Report (Document Reference 6.2.12.1). Detailed consideration of the likely significant effects of the Proposed Development is provided within Chapter 12 of the ES (Document Reference 6.1.12).

SITE CONTEXT

1.4 The Project Site comprises two parts including the 'Kent Project Site', which includes land on the Swanscombe Peninsula, and the Ebbsfleet Valley on the south side of the River Thames and is centred approximately at Ordnance Survey Grid Reference (OSGR) TQ 606 758, and the 'Essex Project Site', which includes land to the east of the A1089 Ferry Road and the Tilbury Ferry Terminal and is centred approximately at OSGR TQ 643 752. The Project Site lies partly within three local planning authority areas; Dartford Borough and Gravesham Borough for the Kent Project Site, and Thurrock Council for the Essex Project Site. Collectively these two parts of the entire DCO boundary are referred to as 'the Project Site'.

1.5 The Project Site comprises a range of habitat types including woodland and scrub, grasslands of varying quality, salt marsh, intertidal zones, brownfield areas, running and standing water, chalk exposures and developed land.

PURPOSE

1.6 As discussed in greater detail in Sections 2 and 3, detailed ecological surveys have identified Eurasian otter (*Lutra lutra*) occupying habitats present on the Kent Project Site and located within the footprint of the Proposed Development. The works required for the construction of the Proposed Development will result in the permanent loss, damage and disturbance to habitats potentially used by otter, which, in the absence of appropriate mitigation, is likely to result in negative effects to the otter population present. No suitable habitats for otter were identified in the Essex Project Site and as such no surveys were completed in this area.

1.7 The Eurasian Otter is a European Protected Species (EPS) and is also protected under sections 9 and 11 of the Wildlife and Countryside Act 1981 (as amended). The predicted impacts on otter are not considered likely to require a European Protected Species Mitigation Licence (EPSML) from Natural England though this report has been prepared to illustrate how negative impacts from habitat loss and disturbance will be mitigated during the construction and operational phases of the Proposed Development.

1.8 This mitigation strategy considers the likely impacts of the Proposed Development on the otter populations within the Project Site and identifies the avoidance, mitigation, compensation and enhancement measures required to enable the Proposed Development to meet legislative and/or planning policy requirements. A brief overview of the baseline situation is also provided along with a review of legislative and policy requirements.

1.9 This strategy therefore sets out the recommended sensitive working methodologies to be implemented during the pre-construction and construction phases of the Proposed Development. The methodologies devised are based upon the findings of the surveys completed to date by EDP during 2020, as detailed within the Ecology Baseline Report (Document Reference 6.2.12.1), as summarised below. This strategy also sets out the recommended compensation, mitigation and enhancement measures to be implemented as part of the proposals, to ensure no significant negative effects will arise upon the favourable conservation status of the local otter population. As such, it is considered that this strategy could form the basis of the Method Statement comprising any future licence application submission to Natural England if required.

1.10 The mitigation strategy has been prepared following consultation with Natural England via their Discretionary Advice Service, as discussed during a meeting held on 16 October 2020. A copy of the consultation response received from Natural England is enclosed as Annex EDP 13 to the Ecological Mitigation and Management Framework (EMMF) (Document Reference 6.2.12.3).

BACKGROUND INFORMATION

1.11 If required, a licence will be applied for on behalf of:

The London Resort Company Holdings Limited
c/o Armila Capital
20 Berkeley Square
London
W1J 6EQ

1.12 The licence and mitigation strategy will be prepared on behalf of the London Resort Company Holdings Limited by:

The Environmental Dimension Partnership
Tithe Barn
Barnsley Park Estate
Cirencester
GL7 5EG; and

Derek Gow Consultancy Ltd
Upcott Grange Farm
Broadwoodwidger
Lifton
Devon
PL16 0JS

GUIDANCE

1.13 The following guidance has been used to inform this Mitigation Strategy:

- Chanin P (2003a) Ecology of the European Otter. Conserving Natura 2000 Rivers, Ecology Series No. 10. English Nature, Peterborough;
- Chanin P (2003b) Monitoring the Otter Lutra lutra. Conserving Natura 2000 Rivers Monitoring Series No 10. English Nature, Peterborough;
- Chartered Institute of Ecology and Environmental Management and The Mammal Society (2013). Technical Guidance Series, Competencies for Species Survey: Eurasian Otter;
- Kent Mammal Group (2011) Otters in Kent Available from: https://www.kentmammalgroup.org.uk/index.php?option=com_content&view=article&id=115:otters-in-kent&catid=35:news&Itemid=53 [Accessed: 19/08/2020]; and
- Natural England (2007) Disturbance and protected species: understanding and applying the law in England and Wales. www.naturalengland.org.uk/Images/esisgd_tcm6-3774.pdf.

[This page is intentionally left blank]

Chapter Two ◆ SURVEY FINDINGS

2.1 This section should be read with reference to Figure 12.1: *Project Site Areas* (Document Reference: 6.3.12.1), Figure 12.4: *Extended Phase 1 Habitat Plan* (Document Reference: 6.3.12.4), Figure 12.22: *Otter Survey Results* (Document reference: 6.3.12.22), and Figure 12.50 – *Existing Hydrology* (Document Reference 6.3.12.50).

HABITAT SUITABILITY

2.2 The suitability of each of the onsite habitat areas have been assessed and described in brief below, with a more detailed assessment and further information provided in Appendix 1.0 and with indicative images provided at Appendix 2.0.

Essex project site

2.3 Despite fronting onto the River Thames, none of the habitats present on the Essex Project Site are considered suitable for otter, being dominated by a heavily industrialized ferry terminal with steep wharfs restricting sprainting and concrete banks preventing holt construction and no water courses running inland from the river. Habitats within the Essex Project Site will therefore not be considered further in this strategy.

Kent project site

2.4 The Kent Project Site is split into two areas namely the Swanscombe Peninsula in the north and the Ebbsfleet Valley running south from this towards the A2. The southern edge of the Peninsula is delineated by a wide strip of industrial estates, heavy industry and housing with associated infrastructure including the High Speed 1 (HS1) railway line which runs north into the Peninsula before it enters a tunnel under the River Thames. This urban landscape supports no water channels and isolates the habitats in the Peninsula from those associated with the Ebbsfleet Valley.

2.5 Large areas of the Swanscombe Peninsula provide suitable otter foraging habitat with a mosaic of interconnected drainage ditches, reedbed and swamp all fringed by a wide belt of saltmarsh and tidal creeks running all the way around the northern edge and connected by the River Thames.

2.6 High water levels were recorded across Swanscombe Peninsula in winter 2019/2020 with water levels submerging extensive areas of Black Duck Marsh, the Channel Tunnel Rail Link (CTRL) wetland and nearby areas of low-lying land, and large areas of Botany Marsh West. Surveyors recorded water levels exceeding 20cm across the raised trackway adjacent to Black Duck Marsh as well as a similar depth along the length of the track running through the Central Marsh up to Pond P3. Surveys conducted by Chris Blandford Associates (CBA) across the Project Site in 2012 and 2015 also noted high water levels across the area in winter. Furthermore, discussions with the security team on the Swanscombe peninsula confirmed that water level rise of this scale occurs annually and is not abnormal.

2.7 Work completed by Buro Happold has confirmed that the majority of the marsh areas within the Swanscombe Peninsula on the Kent Project Site are low lying, with Black Duck Marsh measured at 1.9 metres above ordnance datum (aOD), the Central Marsh 0.9m aOD, Botany Marsh West at 1.63m aOD and Botany Marsh East at 2.54m aOD (see Environmental Statement Chapter 17 – 'Water Resources and Flood Risk', Document reference 6.1.17). Otter foraging and dispersal is unlikely to be significantly impacted by an annual rise in water levels though their holts are constructed into the banks adjacent to the water courses and as such are susceptible to large flood events. Otter can breed throughout the year[1] and as such high-water levels and flood events can have a direct impact on breeding success.

Black Duck Marsh

2.8 Within the Swanscombe Peninsula, Black Duck Marsh supports an expansive area of wetland dominated by common reed (*Phragmites australis*), cut with wide channels and supporting areas of open water. The interior of the marsh is subject to low levels of disturbance, but there is frequent use of the adjoining seawall and public footpath by walkers. Black Duck Marsh provides foraging opportunities for otter, although fish surveys undertaken of the easternmost ditch (D9, as shown on Figure 6.3.12.22) recorded no fish within this ditch, or any of the other waterbodies surveyed across the Swanscombe Peninsula (Document Reference 6.2.12.1). The low-lying marsh offers little holt digging habitat and water levels rise significantly in winter resulting in a habitat of only moderate value for otter.

Channel Tunnel Rail Link (CTRL) wetland

2.9 To the east of Black Duck Marsh, the central part of the Swanscombe peninsula supports more scrub and rough semi-improved grassland though with a large area of reedbed to the south (the Channel Tunnel Rail Link (CTRL) wetland) and a small number of large ponds/lakes. Ditches wrap around this central area to the north, east and west providing a wide belt of damp ground and reedbed habitat. As with Black Duck Marsh this area also has high water levels in winter and in the summer many of the ditches and much of the wetland in this area dried, reducing its value for otter foraging. Some sections of the CTRL wetland area have moderate potential habitat, though it is predominantly low value.

Botany Marsh West

2.10 Botany Marsh West is situated immediately to the east of the CTRL wetland. A cattle grazing regime on this land has significantly reduced the value of the ditches in this area with the whole network heavily poached and grazing pressures removing the vast majority of the vegetation both in the ditches and along the banks. Scrapes have been created in this area for wildfowl though these are shallow sided and dry completely in the summer. Again, this area has high water levels in winter and then dries in summer. This paired with

[1] Chanin P (2003a) Ecology of the European Otter. Conserving Natura 2000 Rivers, Ecology Series No. 10. English Nature, Peterborough

the management regime has resulted in negligible value habitat for otter foraging though may still provide some dispersal opportunities, albeit of low value.

Botany Marsh East

2.11 Botany Marsh East predominantly supports areas of scrub and reedbed habitat intercut by drainage channels choked with common reed. This area is actively managed as a nature reserve though has the heaviest recreational pressure with many formal paths interconnecting across the land. The ditches in this area provide moderate value habitat with steep earth banks and mostly permanent water, as well as reduced frequency of high-water events. The wetland/reedbed in this area dries fully in the summer and is of low value for otter.

River Ebbsfleet

2.12 The River Ebbsfleet flows south to north through the Kent Project Site, turning to the east before entering the River Thames. The river has a moderate flow and clear water, with banks varying along its length with a deep steep sided channel in the south before widening out to the north with more areas of adjacent reedbed, woodland and dense scrub. The river provides high, moderate and low value habitats for otter along its length within the Kent Project Site.

2.13 The majority of the habitats discussed above provide suitable foraging and dispersal habitat for otter at certain times of the year although holt construction areas are more likely to be found in the Botany Marsh East or within the Ebbsfleet Valley due to the high-water levels experienced in the other areas.

Review of Historic Surveys

2.14 Water vole surveys were conducted across the Kent Project Site by Chris Blandford Associates (CBA) in 2012 and 2015 though no reference was made to specific otter surveys and no otter presence was noted. Given the level of survey effort undertaken in proximity to water courses considered suitable for otters, their presence would likely have been incidentally recorded during water vole surveys, however no such recordings were made.

Desk Study

2.15 An update desk study was undertaken by EDP in April 2020 to confirm the presence of any known otter records within the Project Site and its potential Zone of Influence (pZoI). The desk study included a search of records held by Kent & Medway Biological Record Centre (KMBRC) and the Essex Field Club (EFC) from a 2km search radius around the Project Site.

2.16 No otter records were returned from KMBRC or EFC.

EDP Otter Surveys 2020

Survey method

2.17 Detailed walkover surveys were undertaken in 2020 by experienced surveyors and completed with reference to best practice guidance[2]. Surveys were completed on 25 June and 18 August 2020 across the whole Kent Project Site with the exception of Botany Marsh West. Access to Botany Marsh West was not permitted by the landowner until 28 July 2020 and so the otter walkover survey was completed on 28 July and 29 September 2020. The otter surveys completed were considered to provide a robust baseline for assessment; however, as these had not found signs of activity, an additional otter survey of the whole Kent Project Site was completed on 27 October 2020.

2.18 As described above, none of the habitats present on the Essex Project Site are considered suitable for otter, and therefore no survey work was undertaken here.

2.19 The habitats present within the Kent Project Site are not conducive to a full search of the bankside, due to the presence of dense vegetation, and as such detailed searches were targeted at bridging points and culverts which will typically be used by otter for territory markings. All signs of otter activity were recorded, including:

- sightings;
- spraints;
- holts;
- feeding signs;
- footprints; and
- possible runs/slides.

Survey Limitations

2.20 The onsite water courses and wetland areas are uniformly choked with dense stands of common reed and interspersed with dry and wet channels preventing surveyor access across much of the suitable habitat.

Survey Results

2.21 An otter was sighted within Black Duck Marsh in March 2020 though no other signs of otter have been recorded. The aquatic and semi-aquatic habitats across much of the Swanscombe Peninsula as well as the Ebbsfleet valley are considered to provide suitable foraging and refuge for this species.

[2] Chartered Institute of Ecology and Environmental Management and The Mammal Society (2013). Technical Guidance Series, Competencies for Species Survey: Eurasian Otter.

Further survey effort

2.22 Otter surveys have been conducted across the Kent Project Site in line with current best practice guidance. The survey effort is considered sufficient for the purposes of the Ecological Impact Assessment presented in Chapter 12: Terrestrial and freshwater ecology and biodiversity (Document reference 6.1.12) of the Environmental Statement, and to inform the principles of the otter mitigation strategy presented in this report.

Discussion

2.23 Otter are widespread across England however populations are fragmented in many areas, despite some localised population increases[3]. A 2011 report by Kent Mammal Group indicated populations present on the Medway in west Kent and on the north Kent marshes[4].

2.24 The habitats within the Kent Project Site offer some potential for otter to forage though the existing fragmentation of the marshlands limits dispersal across the Peninsula. As the River Thames flows around the Swanscombe Peninsula to the north, it is considered more likely that this provides connectivity rather than otter crossing the open ground. Annual high-water levels are considered likely to limit the potential of the Swanscombe Peninsula to support active otter holts through the winter though holt construction may be possible within some of the higher land areas. Furthermore, fish surveys undertaken across the waterbodies throughout the Kent Project Site did not capture or observe any fish (see Document Reference 6.2.12.1). Whilst it may be possible that fish are present within the drains and lakes, it is unlikely that fish are present in large numbers or indeed a wide range of species, thereby limiting the foraging opportunities for otter.

2.25 The single otter sighting in March 2020 has confirmed that otter are present in Black Duck Marsh though no other territory signs have been found to date and it may have been an individual passing through. This lack of evidence might suggest that otter are absent from the CTRL wetland and Botany Marshes however given the limitations of the surveys, on a precautionary basis, it has been assumed that otter may be using the marshland areas on the Kent Project Site for low levels of foraging use.

2.26 At this stage the mitigation strategy has adopted a precautionary approach, assuming that additional otters could be present across the Kent Project Site and precautionary mitigation is provided as such.

[3] The Mammal Society (2020) *Otter* Available from: https://www.mammal.org.uk/species-hub/full-species-hub/discover-mammals/species-otter/ [Accessed: 19/08/2020]

[4] Kent Mammal Group (2011) *Otters in Kent* Available from: https://www.kentmammalgroup.org.uk/index.php?option=com_content&view=article&id=115:otters-in-kent&catid=35:news&Itemid=53 [Accessed: 19/08/2020]

[This page is intentionally left blank]

Chapter Three ◆ LEGISLATIVE CONTEXT

3.1 The otter is listed as a European Protected Species (EPS) on Schedule 2 of the Conservation Regulations (Annex IV(a) to the Habitats Directive), affording them strict protection under the Conservation of Habitats and Species Regulations 2017 (as amended), making it an offence to:

- Deliberately capture, injure or kill a wild animal of an EPS;
- Deliberately disturb wild animals of an EPS wherever they are occurring, in particular any disturbance that is likely to impair their ability to survive, to breed or reproduce, or in the case of hibernating or migratory species, to hibernate or migrate or to affect significantly the local distribution or abundance of the species to which they belong;
- Deliberately take or destroy the eggs/young of a wild animal of an EPS; or
- Damage or destroy a breeding site or resting place of a wild animal of an EPS.

3.2 Additional protection for otters is also afforded under the Wildlife and Countryside Act 1981 (as amended), making it an offence to intentionally or recklessly disturb otters whilst they are occupying a structure or place that is used for shelter or protection, or to obstruct access to this structure or place.

[This page is intentionally left blank]

Chapter Four ◆ IMPACT ASSESSMENT IN ABSENCE OF MITIGATION OR COMPENSATION

4.1 This section should be read with reference to Figure 12.50: *Existing Hydrology* (Document reference: 6.3.12.50) and Figure 12.51: *Predicted Impacts – Hydrology* (Document reference: 6.3.12.51).

IMPACT ASSESSMENT

4.2 The following information provides a summary of the anticipated negative effects on the aquatic habitats within the Kent Project Site in the absence of any mitigation.

4.3 As a result of the Proposed Development approximately 4.7km of water course (ditch) will be permanently lost along with 1.4km of lake/pond bankside habitat and 12.21ha of reedbed/swamp.

4.4 In addition, 1.0km of existing water course (ditch) will be subject to temporary habitat damage as a result of adjacent construction works, such as boardwalk construction in Black Duck Marsh and water vole displacement works to accommodate new ditch connections in Botany Marsh East, along with 2.4ha of reedbed/swamp. The totals, along with their condition assessment is provided in **Error! Reference source not found.** and **Error! Reference source not found.** below.

Table 4-1: Suitable habitat areas permanently lost

Habitat Type	Habitat Condition	Habitat Length/Area
Ditch	Moderate	1.2 km
Ditch	Low	2.0 km
Ditch	Negligible	1.5 km
Lake/pond bankside	Low	1.4 km
Reedbed/swamp	Moderate	12.21 ha
Total		6.1 km linear habitat and 12.21 ha habitat area

Table 4-2: Suitable habitat areas temporarily damaged during construction

Habitat Type	Habitat Condition	Habitat Length/Area
Ditch	Moderate	1.0 km
Reedbed/swamp	Moderate	2.4 ha
Total		1.0 km linear habitat and 2.4 ha habitat area

4.5 The loss of water bodies is almost entirely confined to the Swanscombe Peninsula though two ponds in the Ebbsfleet valley will be loss/disturbed during the works, namely pond P18 and the quarry lake in Bamber Pit to the south of the A226. Despite its proximity to the River Ebbsfleet, pond P18 is completely surrounded by well-maintained chain link fencing likely to prevent otter access, and the quarry lake in Bamber Pit is isolated from any nearby water courses and it is considered unlikely that otter are able to access this feature. However, both of these water bodies have been included within the assessment above.

4.6 The majority of the ditch habitat temporarily damaged relates to construction along the boundaries of Black Duck Marsh and the installation of a boardwalk for public access. Works in this area will potentially have a greater impact on otter given that this is the area where they have previously been identified.

4.7 Aside from direct habitat loss and/or disturbance it is also considered that negative effects on otter may arise from:

Construction phase

- Habitat fragmentation/loss of dispersal routes;
- Killing, injuring and disturbance of individuals;
- Increased dust, and noise, vibration, visual and light disturbance;
- Hydrological effects, including changes to water quality/quantity; and
- Pollution/contamination incidents.

Operational phase

- Habitat fragmentation/loss of dispersal routes;
- Increased noise and traffic leading to disturbance of species within retained habitats;
- Increased lighting leading to reduced hours of nocturnal foraging;
- Hydrological effects, including changes to water quality/quantity; and
- Damage or degradation to habitats and disturbance of otters through increased recreational pressure. Whilst the vast majority of users visiting the Proposed Development will not venture outside of the Resort during their stay, there is potential for a slight increase in recreational disturbance, most likely from guests using the onsite hotel facilities and nearby accommodation, and the proposed staff accommodation.

Chapter Five ◆ MITIGATION AND COMPENSATION

5.1 This section should be read with reference to Figure 12.45: *Light Mitigation Strategy for Biodiversity* (Document reference 6.3.12.45), Figure 12.52 – *Mitigation and Enhancements – Hydrology* (Document Reference 6.3.12.52), and Figure 12.55: *Artificial Otter Holt – Location and Design* (Document reference 6.3.12.55).

5.2 The following information provides a summary of the anticipated mitigation and compensation proposed for otter within the Project Site. The assessment takes into consideration the role of inherent mitigation embedded within the design of the Proposed Development as well as the additional avoidance, mitigation, compensation and enhancement measures required to address residual effects identified in Section 3.

INHERENT MITIGATION

5.3 Inherent mitigation has been incorporated into the Landscape Masterplan (Figure 6.3.11.15) included within the Landscape Strategy (Document Reference 6.2.11.7), which will be secured as a requirement of the DCO. The loss and disturbance of onsite habitat is mitigated through the incorporation of extensive habitat creation and enhancement within the retained space around the peripheries of the Proposed Development, including a large new constructed reedbed.

5.4 Whilst the River Thames is considered to provide a suitable corridor for otter dispersal, additional connectivity across the Peninsula has been proposed to ensure that otter do not have to use the river to move between the west, north and east of the Project Site. The habitat creation and enhancement has sought to provide this connectivity between Botany Marsh East, Broadness Salt Marsh and Black Duck Marsh through the inclusion of a chain of water courses and water bodies wrapping around the side of the Proposed Development footprint. These water courses will provide a sheltered belt of wetland/marsh habitat with a deep-water course suitable for foraging and dispersal. These habitats will be planted with a range of suitable native bankside and water plants to improve species richness and increase the foraging resource available.

5.5 As high and low water levels have been identified as a constraint to holt construction, new discharge outfalls from Black Duck marsh and Botany Marsh will include manual flow/level controls (such as a sluice gate) to adjust water levels within the marshes as required to provide a suitable level across the year. The outfalls will have non-return valves to protect the site from tidal flooding (see Environmental Statement Chapter 17– Water Resources and Flood Risk (Document Reference Part 6.1.17).

5.6 Habitat creation will be brought forwards at an early stage of the construction period to prevent habitat fragmentation during construction.

5.7 A summary of the proposed habitat creation and enhancement is provided in Table 5-1 and Table 5-2 below.

Table 5-1: Habitat creation

Habitat Type	Habitat Condition	Habitat Length/Area
Ditch	Optimal	2.3 km
Ditch	Good	0.9 km
Ditch	Moderate	4.8 km
Lake/pond bankside	Optimal	0.1 km
Lake/pond bankside	Good	0.3 km
Lake/pond bankside	Moderate	0.3 km
Lake/pond bankside	Low	0.4 km
Reedbed/swamp	Moderate	5.69 ha
Total		9.1 km linear habitat and 5.69 ha habitat area

Table 5-2: Habitat enhancement

Habitat Type	Habitat Condition	Habitat Length/Area
Ditch	Moderate	3.7 km
Ditch	Low	0.4 km
Reedbed	Moderate	18.35 ha
Total		4.1 km linear habitat and 18.35 ha habitat area

Table 5-3: Habitat change

Habitat Type	Habitat Lost	Habitat Temporarily Damaged	Habitat Created	Habitat Enhanced	Total Gain/Loss
Ditch	4.7 km	1.0 km	8.0 km	4.1 km	+ 6.4 km
Lake/pond bankside	1.4 km	0.0 km	1.1 km	0.0 km	- 0.3 km
Reedbed	12.21 ha	2.4 ha	5.69 ha	18.35 ha	+9.43 ha

5.8 As illustrated in Table 5-3, the Proposed Development will provide a net gain of 6.4km of ditch habitat which will more than offset the loss of 0.3 km of lake bankside. In addition, a number of small lakes/ponds which may dry seasonally will be created across Broadness Grassland which have not been included in this calculation.

5.9 The quantum of new reedbed habitat created represents a slight reduction in the total area of overall habitat however the damaged habitat will not be lost and significant areas of existing habitat will be enhanced to provide increased value for wildlife such that it is considered that the Project Site can provide a net increase in valuable reedbed habitat of 9.43 ha.

5.10 To inform the ES, a set of habitat loss/ gain calculations, using the Defra Biodiversity Metric 2.0, have been produced and are presented within the Biodiversity Net Gain Assessment (Document Reference 6.2.12.2). The findings illustrate that habitat creation and enhancement works within the Project Site alone will not be sufficient to meet LRCH's aspirations for a biodiversity net gain, and as such additional offsite mitigation, including off-site habitat creation, is being sought to compensate for the shortfall. A set of *General Principles for Offsite Ecological Mitigation* (Document reference 6.2.12.10) is submitted along with the application for development consent to inform the scope of off-site mitigation to be secured through the Development Consent Order (DCO) examination. New wetland, reedbed and ditch habitats created as mitigation for the loss of functionally linked land on the Kent Project Site (see *Shadow Habitats Regulations Assessment* (Document reference 6.2.12.4)) will also create suitable habitat for otter and will more than offset any potential onsite habitat losses.

5.11 Overall, it is considered that the Proposed Development will not be at detriment to the favourable conservation status of the local otter population, and will, subject to the delivery of additional off-site mitigation, deliver a net conservation benefit for otters which is considered likely to significantly outweigh the losses of sub-optimal habitat within the Kent Project Site.

OTTER MITIGATION

5.12 The following mitigation measures will be secured through an Ecological Construction Method Statement (ECMS), to be included within a Construction Environmental Management Plan secured as a requirement of the DCO.

Vegetation clearance

5.13 As an otter has been seen onsite, there is potential for an otter holt to be present in the Proposed Development footprint though no field signs have been found to date which could indicate where an otter holt could be located. Pre-commencement otter surveys will be completed in an effort to identify any additional signs of otter presence/activity. If a holt is found within the Proposed Development footprint during these surveys, a EPSML from Natural England will be applied for. Notwithstanding the findings of the update surveys, a sensitive vegetation clearance methodology will be adopted during the clearance of any suitable habitats within the Proposed Development area. This will be conducted as follows:

- Clearance works should commence in the south-centre of the Proposed Development and work outwards towards the retained marsh habitats to the north, east and west. In this instance any disturbed animals will be able to escape into undamaged habitat.

Otter are a highly mobile animal and will be able to move ahead of the works;

- Prior to any clearance works an ecologist should thoroughly search the area to be affected for any signs of otter. This should be conducted a maximum of 48 hours prior to a section being cleared. Where otter signs are found the area should be searched intensively for further signs that a holt may be in the vicinity;

- Where a full survey is not possible due to access constraints from dense vegetation the vegetation should be removed in a controlled manner and under the direct supervision of a suitably qualified Ecological Clerk of Works (ECoW). Checks will be completed as the vegetation is removed to identify signs of otter activity; and

- If an otter holt is identified all works will cease and a Natural England licence application will be submitted.

Artificial holt

5.14 If an otter holt is found within the Proposed Development footprint during clearance works it will likely need to be closed under a Natural England licence. In this scenario, providing an artificial holt may be a requirement to mitigate for the negative impacts.

5.15 In advance of the clearance works detailed above two artificial holts will be constructed within the retained habitats, with one located in the southern half of Botany Marsh East and a second within the southern boundary of Black Duck Marsh, with the indicative location of the otter holts provided in Figure 6.3.12.55. The positioning of both holts will be informed by the flood strategy and will be positioned on areas of higher ground which are less likely to be affected. The artificial holts will be used as advanced mitigation in the event that a holt requires closure or will be left as enhancement.

5.16 The artificial holt will be created using a series of prefabricated timber chambers, constructed from 25mm marine plywood to create a box structure circa 380mm (H) x 850mm (W) x 1200mm (D) in which a sub-chamber measuring 600mm x 600mm will be constructed in one corner, as shown on Figure 6.3.12.55. A double right-angle turn will be required at each of the two entrances to the main chamber to reduce direct airflow, light ingress and to reduce the potential for use by other species. The chamber should be level, dug into the bank top, within 8m of the water channel and above flood level, with a gradual slope down to the water.

5.17 Two access tunnels should be installed with one entrance around or just below average water level and the other around 0.5m above this to allow for fluctuations in water levels. The access tunnels should be made from plastic culvert pipe with an internal diameter of 200mm and with the entrances made to fit flush to the bankside.

5.18 A sheet of steel reinforced mesh should be laid on top of the chamber prior to back filling. This metal will be detectable by a C.A.T scanner and will mark the location of the chamber should excavation works be required in the area in the future. Following construction of the tunnels and nesting chambers, excavated soil will be backfilled around the chambers and firmed in with additional soil added to the top of the holt and compacted to stabilise

the structure. Topsoil is replaced over the structure to facilitate vegetative growth. The area around the holt will then be landscaped with shrub species such as hawthorn, blackthorn, elder and bramble to provide sufficient cover for this species as well as deterring access to the immediate area. Marginal plant species such as bottle sedge (*Carex rostrata*) will be planted around the entrance tunnels to provide a more instant cover. Planting will be monitored during the construction phase of the Proposed Development to ensure sufficient establishment prior to the operational phase of the Proposed Development.

Biosecurity

5.19 Before and on arrival at the Project Site, ecologist's footwear and vehicle tyres will be disinfected using Virkon. There will be no transfer of vegetation between other sites as the ecologists will solely be working on this location. All equipment will have been washed with water to remove any remnants of vegetation since previous deployment and left out in the sun to entirely dry. Footwear and waders will be hosed off each time ecologists leave site to ensure no vegetation is transferred to other locations.

Additional construction mitigation measures

Toolbox talk and site staff briefing

5.20 As part of the site briefing/induction process, details of the potential presence of otter within the Project Site will be provided to all Site Management staff and contractors.

5.21 In addition, where specific works are being carried out that will directly affect suitable habitat, a species-specific briefing/toolbox talk will be provided by the ECoW. A tool-box talk will be given to contractors by the ECoW prior to commencement, with respect to the legal protection afforded to otter specifically and other species potentially present including water vole, the working methodologies to be employed and procedures to be followed should any evidence of protected species be encountered during the works.

Physical protection measures

5.22 Any retained suitable habitat will be protected during the construction phase through implementation of Ecological Protection Zones (EPZs). The EPZs can be delivered through co-ordination with protective measures for other ecological and arboricultural features, combined with temporary protective fencing and signage, as detailed within the main body of the Ecological Mitigation and Management Framework (EMMF) (Document reference: 6.2.12.3).

Lighting

5.23 The use of artificial lighting during construction is to be limited to the essential minimum throughout the Project Site, and any lighting to be used should avoid upward pointing lights, with the spread of light being kept near to or below the horizontal. During construction any illuminated site compounds will be sited away from all retained habitat suitable for otter. Overnight working in areas of suitable habitat will be controlled through

the use of method statements, including measures to minimise any potential negative effects, such as use of sensitive timings or measures to limit artificial light spill. A *Light Mitigation Strategy for Biodiversity* is provided as Figure 12.45 (Document reference 6.3.12.45).

Pollution prevention measures

5.24 Standard pollution prevention and dust suppression measures will be implemented to minimise harm and damage to retained habitat. Such measures are detailed within the main body of the EMMF (Document Reference 6.2.12.3).

Additional operation mitigation measures

Lighting design

5.25 Whilst areas of suitable habitat will be retained and enhanced, the retained habitats within the Project Site may be subject to increased light levels during the operational phases of the Proposed Development which could have a negative impact on otter foraging habits. Therefore, the avoidance or minimisation of light spill where development is in close proximity to suitable retained habitats is required. The type of light fitting used can reduce the level of light spill however other considerations should include:

- Column heights, which should be carefully considered to minimise light spill;
- Timers and dimming regimes should be incorporated where appropriate; and
- Baffles, hoods and louvers should be used as a last resort to reduce light spill.

5.26 An illustration of the proposed light zones including buffers for sensitive habitats/species within the Kent Project Site during the operational phase is provided in Figure 12.45 (Document reference 6.3.12.45). Further details of the proposed lighting will be secured as a requirement of the DCO.

Water level management

5.27 Ecological monitoring of the wetlands pre- and post-development will be put in place to ensure the water levels within the marsh areas support the intended habitats. The water levels within the marshes are proposed to be managed to ensure no deterioration of habitat. Discharge outfalls from Black Duck marsh and Botany Marsh to the Thames will include manual flow/level controls (such as sluice gates) to adjust water levels within the marshes as required as part of the Ecological Management and Maintenance Framework for the marshes. The outfalls will have non-return valves to protect the Project Site from tidal flooding. Further details of the water level management and ecological monitoring during the operational phase will be secured as a requirement of the DCO.

Chapter Six ◆ MONITORING AND WORKS SCHEDULE

MONITORING

6.1 If no Natural England licence is required, then direct monitoring of otter will not be completed however incidental signs of otter will be recorded during water vole monitoring surveys as detailed in the Water Vole Mitigation Strategy appended to the EMMF (Document Reference Part 6.2.12.3). This will include checks for signs of recent activity around the artificial holts being created. The EMMF will be secured as a requirement of the DCO.

WORKS SCHEDULE

6.2 The schedule below gives a very early indication of the proposed timings for different phases of the work in relation to commencement of onsite construction.

Table 6-1: Initial Timetable of Proposed Works

Date	Action	Completion
Spring (March) 2021	Otter Specific Survey	
Late Spring (year 2 - date TBC)	Destructive search of suitable areas	Completed in phases following survey completion with reedbed targeted for early removal to reduce breeding bird constraints
August (year 2 – date TBC)	Monitoring. Search for field signs and inspection of otter holts	Survey over 1-2 days
August/September (years 3 and 4 – dates TBC)	Annual monitoring. Search for field signs and inspection of otter holts	Autumn (year 4)

[This page is intentionally left blank]

Chapter Seven ◆ SUMMARY AND CONCLUSIONS

7.1 None of the habitats present on the Essex Project Site are considered suitable to support otter. The Kent Project Site contains a complex of habitats which provide foraging, breeding and dispersal opportunities for otter.

7.2 Surveys of the Kent Project Site have been completed in line with existing guidance and are considered sufficient to inform the EcIA. Surveys have confirmed the presence of otter. Using a precautionary approach, it is assumed that otter will continue to be present within suitable habitats on the Kent Project Site.

7.3 In addition to the direct loss of habitat, and the potential killing/injuring of any individuals present, the potential or actual adverse effects on the otter population anticipated as a result of the Proposed Development, in the absence of mitigation include loss, damage, degradation, fragmentation and/or disturbance of habitat during construction, and habitat fragmentation, disturbance (light, visual and aural) during the operational phase.

7.4 The overall aim in respect of the otter population is to ensure the Project Site continues to support/provide a range of habitats capable of supporting a thriving otter population. To achieve this the Proposed Development includes inherent mitigation measures within the scheme's design including the retention of key foraging areas at Black Duck Marsh and Botany Marsh East. These areas will be enhanced through re-profiling of the water course, additional planting and improved management.

7.5 Habitat creation works will be conducted to offset losses from the proposed development footprint, including an extensive new network of ditch habitat within Botany Marsh East, a wide belt of reedbed and water course running around the north-east of the Project Site and a swale and ditch feature providing connectivity around the entire Proposed Development Footprint Boundary.

7.6 The mitigation strategy includes a range of measures to be implemented prior to construction including the sensitive removal of suitable vegetation, toolbox talks and site briefings and physical habitat protection.

7.7 During construction, measures including adoption of a sensitive lighting strategy, limited times of works and pollution prevention measures will reduce disturbance.

7.8 Throughout the operational phase the range of habitats retained, created or enhanced on the Kent Project Site will be subject to an appropriate management regime to ensure they continue to support adequate resources for the otter populations.

7.9 Off-site mitigation land to be secured through the DCO presents an opportunity to provide an extensive area of additional valuable habitat for otter.

7.10 Subject to the implementation of this mitigation strategy in full throughout the delivery of the Proposed Development, it is considered that the otter populations present at the Project Site can be safeguarded in the long-term and the project can deliver a net conservation benefit for this species.

Appendices

[This page is intentionally left blank]

Appendix 1.0 ◆ ON-SITE HYDROLOGY – OTTER HABITAT ASSESSMENT

[This page is intentionally left blank]

Table A1-1: Detailed assessment of the on-site hydrology

Water Course/Body Reference	Description	Otter Suitability Discussion
Black Duck Marsh	A wide expanse of reedbed and swamp habitat dominated by common reed. Area is dotted with small pools and larger lakes though the whole area has high water levels in winter. Wide channels cut across the marsh with open water habitats present in the winter during reed dieback. Pond P8 covered with dense reedbed and dries during the summer months. Whole area of Black Duck Marsh largely inaccessible due to deep water in winter, deep obscured channels and dense reedbed vegetation.	The wetland habitat provides good foraging opportunities for otter with low potential for holt construction on areas of higher ground to the east and south. A single otter was sighted in this habitat in March 2020. Habitats of moderate value for otter.
CTRL wetland, and surrounding habitats	A mosaic of scrub and semi-improved grassland fills the northern half of this area with an expansive area of reedbed/swamp to the south. The wetland area supports three medium sized lake habitats fringed with common reed and likely to remain wet all year. This whole area is encircled by a large, drainage ditch with shallow earth banks which has become filled with common reed. These ditches dry ephemerally Ditch D10 flows out of pond P3 to the west. Both habitats provide a good water source all year round and some suitable earth bankside habitat for burrowing.	The central wetland and lake habitats provide some suitable foraging opportunities for otter. Opportunities for holt construction are likely limited to the western boundary of this area, adjacent to ditch D10 Habitats of low to moderate value for otter

Water Course/Body Reference	Description	Otter Suitability Discussion
	Large sections of this habitat are subject to high water levels annually No access was granted for the reedbed areas though these areas are largely inaccessible and very difficult to survey due to the dense common reed	
Botany Marsh West	A series of heavily cattle grazed fields interspersed with a heavily poached ditch network. Ditches in this section predominantly have low shallow earth banks with and are dry over the majority of the year, with high water levels in winter. The western boundary of this area is delineated by a large, drainage ditch D18 with shallow earth banks and filled with common reed. This ditch dries ephemerally.	Overall ditch D18 is considered to provide some good foraging and dispersal opportunities for otter, with dense bankside reedbed. However, the majority of the habitat across this area is unsuitable and opportunities for holt construction are likely negligible. Habitats of negligible value for otter.
Botany Marsh East	An area of marshland managed as a nature reserve. The land is interspersed with a network of ditches and paths for public recreation. The nature reserve is actively managed for biodiversity. Ditches predominantly around 1m deep with steep sided earth banks. Water levels across much of the network appears permanent throughout the year though the majority of the ditches are heavily choked with phragmites reducing access to the water. Little to no flow was noted during the survey.	The ditch habitats and dense bankside reedbed provide good foraging, holt building and dispersal opportunities for otter. The marsh area is low lying and is likely at risk of flooding during wetter years. Habitats of moderate value for otter.

Water Course/Body Reference	Description	Otter Suitability Discussion
	Away from the ditch network the habitat is largely dominated by encroaching scrub and species poor semi-improved grassland though large areas of reedbed are present. These reedbeds were dry at the time of survey, likely only wet during the winter.	
Ebbsfleet Valley	The river Ebbsfleet flows northwards through the Project Site. Riparian habitats around the channel include wide belts of wetland, reedbed, marsh, woodland and scrub. The water appears clean and has a moderate flow rate over a gravel and silt substrate. The river flows in a narrow 2m wide channel to the south, with steep vegetated banks and limited submergent vegetation. The channel widens in the centre of the Ebbsfleet Valley area with expansive reedbed areas alongside. To the north the channel enters an area of dense scrub with pockets of dense submergent vegetation present only in the areas where scrub has not fully encroached.	The Ebbsfleet provides large areas of suitable reedbed habitat for otter with a channel of permanent water and opportunities for holt construction. It is not known if the Ebbsfleet floods regularly though some sections of bank are high and could readily accommodate a large rise in water level. Otter assumed present due to value of habitat for this species. Good foraging and holt building habitat. Habitats of low, moderate and high value for otter.

[This page is intentionally left blank]

Appendix 2.0 ◆ INDICATIVE WATERCOURSE IMAGES

[This page is intentionally left blank]

Black Duck Marsh

Figure A2-1: Spring view looking west over Black Duck

Figure A2-2: Summer view looking west over Black Duck Marsh

CTRL WETLAND (AND SURROUNDING HABITATS)

Figure A2-3: Looking north along ditch D10

Figure A2-4: High winter water levels in pond P3 at the northern end of ditch D10

Figure A2-5: Wetland/reedbed areas around pond P10

Figure A2-6: High water levels in ditch D13 in the north of the central part of the peninsula

Botany Marsh West

Figure A2-7: Looking over a dry scrape in Botany Marsh West

Figure A2-8: Looking over a dry scrape in Botany Marsh West

Figure A2-9: Looking south along ditch D18 on the western marsh boundary

BOTANY MARSH EAST

Figure A2-10: Looking south over the north-western corner of Botany Marsh

Figure A2-11: Public track through the marsh with reedbed and scrub either side

Figure A2-12: Looking west along ditch D28 showing dense common reed

Figure A2-13: Looking north along ditch D28. A rare section not overgrown with common reed

Figure A2-14: Dredging management in ditch D30. Stretches dredged on rotation

Figure A2-15: Dredging management in ponds illustrating how management strategy can be improved for biodiversity

Ebbsfleet Valley

Figure A2-16: Looking north along the river Ebbsfleet in the south of the Project Site

Figure A2-17: Wide marsh area on the Ebbsfleet to the east of pond P18

Figure A2-18: Ebbsfleet adjacent to the A226

Figure A2-19: Looking south over pond P18

Figure A2-20: Looking south over pond P17

[This page is intentionally left blank]

Annex EDP 6
Harvest Mouse Mitigation Strategy

This page has been left blank intentionally

Revisions

Revision	Description	Issued by	Date	Approved by
r038_00	Issue for DCO Submission	JS/FJ	24/12/2020	EDP/LRCH

The Environmental Dimension Partnership Ltd
Tithe Barn
Barnsley Park Estate
Barnsley
Cirencester
Gloucestershire
GL7 5EG

[This page is intentionally left blank]

Contents

[This page is intentionally left blank]

List of Figures

[This page is intentionally left blank]

Chapter One ◆ INTRODUCTION, SITE CONTEXT AND PURPOSE

INTRODUCTION

1.1 This Harvest Mouse Mitigation Strategy has been prepared by the Environmental Dimension Partnership Ltd (EDP) on behalf of London Resort Company Holdings Limited. It considers the likely impacts of the Proposed Development on the harvest mouse (*Micromys minutus)* population within the Project Site and identifies the avoidance, mitigation, compensation and enhancement measures required to enable the Proposed Development to meet legislative and/or planning policy requirements and deliver an overall biodiversity net gain. A brief overview of the baseline situation is also provided along with a review of legislative and policy requirements.

1.2 The land within the Project Site will be subject to a Development Consent Order (DCO) application for a world class destination entertainment resort with associated infrastructure, staff accommodation, dedicated access road, public amenity space and habitat creation. The application will be supported by an Environmental Impact Assessment (EIA), with this mitigation plan provided as part of an overall Ecological Mitigation and Monitoring Framework (EMMF) report (Document reference 6.2.12.3) which is an appendix to Chapter 12 – *Terrestrial and Freshwater Ecology and Biodiversity* of the Environmental Statement (ES) (Document reference 6.1.12).

1.3 Detailed information on baseline conditions and survey methods employed is provided within the Ecology Baseline Report (Document reference 6.2.12.1). Detailed consideration of the likely significant effects of the Proposed Development is provided within Chapter 12 of the Environmental Statement (Document reference 6.1.12).

SITE CONTEXT

1.4 The Project Site comprises two parts including the 'Kent Project Site', which includes land on the Swanscombe Peninsula, and the Ebbsfleet Valley, on the south side of the River Thames and is centred approximately at Ordnance Survey Grid Reference (OSGR) TQ 606 758, and the 'Essex Project Site', which includes land to the east of the A1089 Ferry Road and the Tilbury Ferry Terminal and is centred approximately at OSGR TQ 643 752. The Project Site lies partly within three local planning authority areas; Dartford Borough and Gravesham Borough for the Kent Project Site, and Thurrock Council for the Essex Project Site. Collectively these two parts of the entire DCO boundary are referred to as 'the Project Site'.

1.5 The Project Site comprises a range of habitat types including woodland and scrub, grasslands of varying quality, salt marsh, intertidal zones, brownfield areas, running and standing water, chalk exposures and developed land.

PURPOSE

1.6 As described in the Ecological Baseline Report (Document reference 6.2.12.1) and in further detail below, a desk study and surveys undertaken across the Kent Project Site in 2015 and 2020 confirmed the presence of harvest mouse on the Kent Project Site. The Essex Project Site supports no suitable habitat for harvest mouse and therefore the species is considered likely absent, and not discussed further in relation to the Essex Project Site.

1.7 Harvest mouse is a Species of Principal Importance as defined by Section 41 of Natural Environment and Rural Communities (NERC) Act 2006, which places a duty on decision-makers such as public bodies, including local and regional authorities, to have regard to the conservation of such species when carrying out their normal functions.

1.8 In the absence of mitigation, the Proposed Development is considered likely to result in the destruction of, and disturbance to, harvest mouse habitat within the DCO Limits.

1.9 This strategy therefore sets out the recommended sensitive working methodologies to be implemented during the pre-construction and construction phases of the Proposed Development. The methodologies devised are based upon the findings of the harvest mouse surveys completed in 2015 by Chris Blandford Associates and 2020 by EDP, as summarised below. This strategy also sets out the recommended mitigation and enhancement measures to be implemented as part of the Proposed Development, to reduce development impacts and create further opportunities for harvest mice within the Project Site.

Chapter Two ◆ SURVEY FINDINGS

SUMMARY OF BASELINE CONDITIONS

2.1 This Section of the Mitigation Strategy should be read in conjunction with Figure 6.3.12.1, which illustrates the Project Sites Areas as referenced below.

Previous Surveys and Desk Study Information

2.2 For the Essex Project Site, three records for harvest mouse were provided by Essex Field Club, with only one from the last 10 years and none from the Essex Project Site. This species is not considered to be present on the Essex Project Site.

2.3 One record for harvest mouse was provided by Kent and Medway Biological Records Centre dating from 1963, located within the Swanscombe peninsula on the Kent Project Site.

2.4 The 2015 report identified a 2010 record of harvest mouse nests from Botany Marsh East within the Kent Project Site.

2.5 In 2015, a harvest mouse survey was conducted, searching for harvest mouse nests within areas of suitable habitat within the Kent Project Site. Harvest mouse nests were found within Broadness Grassland and in a triangle of grassland and scrub to the south-east of Black Duck Marsh. Outside Swanscombe Peninsula, no harvest mouse nests were found in Station Quarter South. Figure EDP 2-1 and Figure EDP 2-2 overleaf illustrate the location of harvest mouse nests found in 2015.

Figure 2-1: Harvest Mouse Survey Results 2015

Figure 2-2: Harvest Mouse Survey Results 2015

2020 Surveys

2.6 An updated survey was carried out by EDP on 29 October 2020, by a team of surveyors systematically hand searching through grassland for abandoned summer nests. The survey area was confined to Swanscombe Peninsula and suitable habitat within Station Quarter, as illustrated on Figure 6.3.12.23.

2.7 The 2020 surveys found 11 full harvest mouse nests and a further three partial nests as shown on Figure 6.3.12.23. Nine nests were found on Broadness Grasslands with one nest on the north-eastern tip and another nest in Botany Marsh. This is broadly in agreement with the 2015 surveys.

2.8 Harvest mice are widespread within England; however, their national population is thought to be declining[1]. No information on the local status or distribution of the harvest mouse within Kent was available at the time of submission of this application.

[1] The Mammal Society (2020) *Harvest Mouse* Available from: https://www.mammal.org.uk/species-hub/full-species-hub/discover-mammals/species-harvest-mouse/ [Accessed: 20/08/2020]

2.9 It is not possible to identify the size of the harvest mouse population present based on nest searches alone, however on a precautionary basis the population is considered of local level ecological value.

SUMMARY OF RELEVANT LEGISLATION AND REQUIREMENT FOR LICENSING

2.10 As noted above, harvest mouse is a Species of Principal Importance as defined by Section 41 of the NERC Act 2006. Whilst this does not equate to strict legal protection of individuals of a species, Section 40 of the NERC Act 2006 places a duty on decision-makers such as public bodies, including local and regional authorities to have regard to the conservation of such species when carrying out their normal functions.

2.11 No licences are required as part of the Proposed Development and implementation of any mitigation measures in respect of harvest mouse.

Chapter Three ◆ IMPACT ASSESSMENT IN ABSENCE OF MITIGATION OR COMPENSATION

3.1 The following information provides a summary of the anticipated significant positive and negative effects on the harvest mouse population within the Project Site. The assessment takes into consideration the role of inherent mitigation embedded within the design of the Proposed Development. Additional avoidance, mitigation, compensation and enhancement measures required to address residual effects (additional to that provided by inherent mitigation alone) is provided in the subsequent section.

CONSTRUCTION PHASE

3.2 The following construction phase effects upon the harvest mouse population are anticipated:

- Direct habitat loss, damage or degradation;
- Habitat fragmentation;
- Habitat disturbance; and
- Killing, injuring and disturbance of harvest mice.

OPERATIONAL PHASE

3.3 The following operational phase effects upon the harvest mouse population are anticipated:

- Habitat fragmentation;
- Damage or degradation to habitats and disturbance of harvest mice through increased recreational pressure and trampling; and
- Potential positive effects/benefits through provision of habitats with greater biodiversity value than those currently present, and implementation of appropriate management of the retained and created habitats to maximise their biodiversity potential.

3.4 In addition to the negative effects identified above, the creation of new saltmarsh habitat as part of the overall Landscape Strategy (Document reference 6.2.11.7) constitutes a positive effect during the operation of the Proposed Development, since this will result in an increase in the amount of habitat available for harvest mice.

[This page is intentionally left blank]

Chapter Four ◆ MITIGATION AND COMPENSATION

4.1 The overall aims in respect of the harvest mouse population is to retain and enhance the population of harvest mouse within the Kent Project Site.

4.2 To achieve this aim, the objectives for the mitigation strategy to be secured through adherence to the EMMF (Document reference 6.2.12.3), which will be a requirement of the DCO, will be to:

- Retain and enhance harvest mouse habitat within the Swanscombe Peninsula as far as possible;
- To enhance habitat connectivity to the wider landscape; and
- Ensure that nesting and foraging resources remain available to the local harvest mouse population throughout the active season.

4.3 The following should be read in conjunction with the Landscape Masterplan (Figure 6.3.11.15) and Landscape Strategy (Document reference 6.2.11.7), which illustrates the overall vision with respect to habitat provision for harvest mouse and a range of other wildlife species.

MITIGATION PRINCIPLES

4.4 Key mitigation measures relevant to harvest mouse, as reflected on the Landscape Masterplan, include:

- The retention of areas of suitable habitat within Broadness Grassland;
- The retention and management of reedbed and marsh habitats within Black Duck Marsh;
- The creation of additional grassland, reedbed, marsh and saltmarsh habitat on the eastern side of the peninsula, between Botany Marsh and Broadness Grasslands;
- The retention and enhancement of a continuous belt of habitat along the southern boundaries of Black Duck Marsh, connecting to additional green corridors proposed along the southern boundary adjacent to Tiltman Avenue, to provide dispersal routes to valuable off-site habitats to the south-west; and
- The sensitive design of new landscaping around the peripheries of Botany Marsh, necessary to further promote habitat connectivity between Swanscombe Peninsula and habitats across the wider landscape to the south.

ADDITIONAL MITIGATION (ON-SITE)

Construction Phase

Pre-commencement Surveys

4.5 Prior to commencement of works across harvest mouse habitat, a pre-commencement check for evidence of harvest mouse presence will be carried out.

Licensing

4.6 There is no requirement for licensing for harvest mouse.

Translocation/Exclusion

4.7 No translocation or exclusion of harvest mouse is proposed. Minimising of harm and injury to the harvest mouse population will be managed through sensitive working methods and timings, as detailed below.

Toolbox Talk and Site Staff Briefing

4.8 As part of the site briefing/induction process, details of the protected species resource within the Project Site will be provided to all Site Management staff and contractors.

4.9 In addition, where specific works are being carried out that will directly affect harvest mice and their habitat, a species-specific briefing/toolbox talk will be provided by the Ecological Clerk of Works (ECoW) to all contractors/site staff working within the area.

Precautionary Methods of Working

4.10 Areas of habitat to be lost during the construction phase will be cleared outside of the most sensitive periods for harvest mice, which are during the summer breeding season (generally May - October) and the winter period when harvest mice become less active, subject to natural population decline and are therefore more vulnerable to decline/localised loss.

4.11 If this is not possible, habitat clearance will be carried out under the supervision of an ECoW, with checks carried out for any presence of breeding nests. Where breeding nests are found, the nest and an appropriate buffer will be left in situ until the nest is no longer in use. The buffer should include sufficient foraging habitat (or connection to sufficient habitat) to allow the successful weaning of young. Connections to areas of suitable retained habitat will be maintained to allow individuals to disperse away from areas of habitat removal/construction.

Physical Protection Measures

4.12 Any retained habitat suitable for harvest mice will be protected during the construction phase through implementation of Ecological protection zones (EPZs), as detailed within the main body of the EMMF (Document reference 6.2.12.3).

Pollution Protection Measures

4.13 Standard pollution prevention and dust suppression measures will be implemented to minimise harm and damage to harvest mouse habitat. Such measures are detailed within the main body of this EMMF.

Operational Phase

Habitat Enhancement

4.14 The enhancement of grassland, riparian and reedbed habitats within the Project Site in line with Biodiversity Net Gain targets will benefit harvest mice through provision of higher quality grassland habitats, managed in the long-term for biodiversity.

Habitat Creation

4.15 Habitat creation for harvest mice (as well as benefitting other species) will include the following measures:

- Native hedgerows with tall grass margins;
- Rough, tussocky grassland (including species such as cock's-foot (*Dactylis glomerata*)), seeded and managed appropriately, including being cut on a 3-5 year rotation; and
- Tall riparian/marginal/reedbed/rush pasture habitat with adjacent scrub habitat for refuge during periods of flooding, planted and/or managed appropriately.

4.16 Such habitats will be adequately buffered from areas of human activity to minimise disturbance and offer protection from predators.

4.17 Retained and new habitats suitable for harvest mice will be ecologically connected to the wider landscape, to ensure harvest mice populations are not isolated in the long-term and are able to change or extend their known range in line with climate change effects.

SUMMARY OF ADDITIONAL MITIGATION (OFF-SITE)

4.18 Land acquisition is still underway, however, the primary aim of creating new grazing marsh and ditch habitats presents an opportunity to provide additional valuable harvest mouse habitat. Further details of the principles for off-site mitigation are provided in the *General Principles for Offsite Ecological Mitigation* (Document reference 6.2.12.10).

[This page is intentionally left blank]

Chapter Five ◆ MONITORING

MONITORING ACTIONS

5.1 No specific monitoring actions for harvest mouse are considered necessary; however, monitoring of habitats suitable for harvest mouse will be carried out to ensure management and maintenance activities are appropriate to maintain the population within the Project Site in the long-term. The results of such compliance checks will be reported on an annual basis, as described within Table 7-1 of the EMMF (Document refence 6.2.12.3).

[This page is intentionally left blank]

Annex EDP 7
Amphibian Mitigation Strategy

This page has been left blank intentionally

Revisions

Revision	Description	Issued by	Date	Approved by
r039_00	Issue for DCO Submission	JSp/FD	24/12/20	EDP/LRCH

The Environmental Dimension Partnership Ltd
Tithe Barn
Barnsley Park Estate
Barnsley
Cirencester
Gloucestershire
GL7 5EG

[This page is intentionally left blank]

Contents

[This page is intentionally left blank]

Chapter One ◆ INTRODUCTION, SITE CONTEXT AND PURPOSE

INTRODUCTION

1.1 This Amphibian Mitigation Strategy has been prepared by the Environmental Dimension Partnership Ltd (EDP) on behalf of London Resort Company Holdings Limited. It considers the likely impacts of the Proposed Development on the amphibian populations within the Project Site and identifies the avoidance, mitigation, compensation and enhancement measures required to enable the Proposed Development to meet legislative and/or planning policy requirements. A brief overview of the baseline situation is also provided along with a review of legislative and policy requirements.

1.2 The land within the Project Site will be subject to a Development Consent Order (DCO) application for a world class destination entertainment resort with associated infrastructure, staff accommodation, dedicated access road, public amenity space and habitat creation. The application will be supported by an Environmental Impact Assessment (EIA), with this report provided as part of an overall Ecological Mitigation and Monitoring Framework report which is an appendix to the Environmental Statement (ES).

1.3 Detailed information on baseline conditions and survey methods employed is provided within the Ecology Baseline Report (Document reference 6.2.12.1). Detailed consideration of the likely significant effects of the Proposed Development is provided within Chapter 12- *Terrestrial and Freshwater Ecology and Biodiversity* of the Environmental Statement (ES) (Document reference 6.1.12).

SITE CONTEXT

1.4 The Project Site comprises two parts including the 'Kent Project Site', which includes land on the Swanscombe Peninsula, and the Ebbsfleet Valley, on the south side of the River Thames and is centred approximately at Ordnance Survey Grid Reference (OSGR) TQ 606 758, and the 'Essex Project Site', which includes land to the east of the A1089 Ferry Road and the Tilbury Ferry Terminal and is centred approximately at OSGR TQ 643 752. The Project Site lies partly within three local planning authority areas; Dartford Borough and Gravesham Borough for the Kent Project Site, and Thurrock Council for the Essex Project Site. Collectively these two parts of the entire DCO boundary are referred to as 'the Project Site'.

1.5 The Project Site comprises a range of habitat types including woodland and scrub, grasslands of varying quality, salt marsh, intertidal zones, brownfield areas, running and standing water, chalk exposures and developed land.

PURPOSE

1.6 As described in further detail below, desk study records and surveys undertaken across the Kent Project Site in 2015 and 2020 confirmed the presence of populations of amphibians.

1.7 No surveys were undertaken at the Essex Project Site due to the lack of suitable habitat.

1.8 Of the species recorded as present within the Project Site, common toad (*Bufo bufo)* is a Species of Principal Importance as defined by Section 41 of NERC Act 2006, which places a duty on decision-makers such as public bodies, including local and regional authorities, to have regard to the conservation of such species when carrying out their normal functions.

1.9 In addition, even with low populations of the four native species, if all four were present, this would mean Swanscombe peninsula could be designated as a Local Wildlife Site on grounds of its amphibian assemblage[1].

1.10 In the absence of appropriate compensation and mitigation measures, the Proposed Development is considered likely to result in harm to amphibians and the destruction of amphibian habitat within the DCO Limits.

1.11 This strategy therefore sets out the recommended sensitive working methodologies to be implemented during the pre-construction and construction phases of the Proposed Development. The methodologies devised are based upon the extent of suitable habitat for amphibians within the Kent Project Site and desk study records. This strategy also sets out the recommended compensation, mitigation and enhancement measures to be implemented as part of the proposals, to reduce development impacts and create further opportunities for amphibians within the Project Site.

1 Local Wildlife Sites in Kent (Formerly called Sites of Nature Conservation Interest) Criteria for Selection and Delineation Version 1.5, August 2015, Kent Wildlife Trust on Behalf of the Kent Nature Partnership

Chapter Two ◆ SURVEY FINDINGS

SUMMARY OF BASELINE CONDITIONS

2.1 This Section of the Strategy should be read in conjunction with Figure 6.3.12.1, which illustrates the Project Site Areas as referenced below. Figure 6.3.12.24 illustrates the Project Site areas subject to survey in 2020, and the distribution of historic great crested newt (*Triturus cristatus)* records provided by Kent and Medway Biological Records Centre.

Previous Surveys and Desk Study Information

2.2 Kent and Medway Biological Records Centre provided records for palmate newt (*Lissotriton helveticus*), smooth newt (*Lissotriton vulgaris*), common toad, marsh frog (*Pelophylax ridibundus*) and common frog (*Rana temporaria*) within the Kent Project Site. No recent records within 500m of the Essex Project Site were provided by Essex Field Club. No recent records for great crested newts within the Project Site or within 500m were provided.

2.3 Palmate newt, smooth newt, common frog and common toad are native species. Marsh frog is a non-native species.

2.4 Previous ecological surveys undertaken in 2015 at the Kent Project Site recorded incidental records for smooth newt and marsh frog from the Swanscombe Peninsula, smooth newt from Botany Marsh East and smooth newt and common toad from Bamber Pit. Incidental sightings of large numbers of marsh frog have been recorded throughout the Peninsula during the course of 2020 ecological surveys. The extent of the wetland habitat and waterbodies within the Kent Project Site has the potential to support large numbers of amphibians, and records suggest that smooth and palmate newt, common toad and common frog are present.

2.5 Amphibians are assumed absent from the Essex Project Site based on a lack of suitable habitat.

2.6 During previous surveys carried out at the Kent Project Site, it was concluded that no waterbodies within the Project Site are used for breeding by great crested newts. Environmental DNA (eDNA) testing of 8 ponds and 21 ditches carried out by EDP in 2020 were negative for great crested newt. No habitat suitable for great crested newt is present within the Essex Project Site. On this basis, great crested newts are assumed likely absent from the Project Site and are not considered within this Mitigation Strategy.

SUMMARY OF RELEVANT LEGISLATION AND REQUIREMENT FOR LICENSING

2.7 None of the amphibian species recorded within the Project Site, or their habitat, are protected by European or national legislation from harm, injury or disturbance. Marsh frog is an invasive, non-native species listed on Schedule 9 of the *Wildlife and Countryside Act*

1981 (as amended). Section 14 of the Act prevents the release into the wild of any species listed on Schedule 9.

2.8 As mentioned above, the amphibian assemblage as a whole is considered to be of local to district level ecological value and common toad is a Species of Principal Importance as defined by Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. Whilst this does not equate to strict legal protection of individuals of a species, Section 40 of the NERC Act places a duty on decision-makers such as public bodies, including local and regional authorities to have regard to the conservation of such species when carrying out their normal functions.

2.9 No licences are required as part of the development and implementation of any mitigation measures in respect of amphibians.

Chapter Three ◆ IMPACT ASSESSMENT IN ABSENCE OF MITIGATION OR COMPENSATION

3.1 The following information provides a summary of the anticipated significant positive and negative effects on the amphibian population within the Kent Project Site. The assessment takes into consideration the role of inherent mitigation embedded within the design of the Proposed Development. Additional avoidance, mitigation, compensation and enhancement measures required to address residual effects (additional to that provided by inherent mitigation alone) is provided in the subsequent section.

3.2 Figure 6.3.12.51 identifies the predicted impacts to the hydrology of the Kent Project Site.

CONSTRUCTION PHASE

3.3 The following construction phase effects are anticipated on the amphibian population:

- Direct habitat loss, damage or degradation, especially in areas with high potential for amphibians such as Botany Marsh West and the Channel Tunnel Rail Link (CTRL) wetland;
- Habitat fragmentation/loss of dispersal routes via the loss of the above areas. This will separate the habitat on Broadness Grasslands and Botany Marsh East from that around Black Duck Marsh, and separating both of the above areas from that on Bamber Pit and the Ebbsfleet valley areas;
- Habitat disturbance, especially on habitat in close proximity to the construction areas;
- Killing, injuring and disturbance of reptiles that stray onto the construction site;
- Hydrological effects, including changes to water quality/quantity; and
- Pollution/contamination incidents.

OPERATIONAL PHASE

3.4 The following operational phase effects are anticipated on the amphibian population:

- Habitat fragmentation/loss of dispersal routes. Habitat on Broadness Grasslands and Botany Marsh East will be separated from that on Black Duck Marsh, and both of these areas will be separated from habitat on Bamber Pit and the Ebbsfleet valley;
- Increased risk of harm to amphibians straying onto the development site;
- Hydrological effects, including changes to water quality/quantity;

- Damage or degradation to habitats and disturbance of wildlife through increased recreational pressure and trampling; and

- Potential positive effects/benefits through provision of habitats with greater biodiversity value than those currently present, and implementation of appropriate management of the retained and created habitats to maximise their biodiversity potential.

Chapter Four ◆ MITIGATION AND COMPENSATION

4.1 The overall aim in respect of the amphibian population is to retain and enhance the population within the Kent Project Site.

4.2 To achieve this aim, the objectives for the mitigation strategy, to be secured through adherence to the EMMF (Document reference 6.2.12.3), which will be a requirement of the DCO, will be to:

- Retain and enhance amphibian habitat within the Swanscombe Peninsula;
- Improve habitat quality through improvement in water quality and appropriate habitat management; and
- Ensure that both terrestrial and aquatic habitat resources remain available to the local amphibian population to provide year-round habitat availability.

4.3 The following should be read in conjunction with the Landscape Masterplan (Figure 6.3.11.15) and Landscape Strategy (Document reference 6.2.11.7), which illustrates the overall vision with respect to habitat provision for amphibians and a range of other wildlife species.

MITIGATION PRINCIPLES

4.4 Key mitigation measures relevant to amphibians, as reflected on the Landscape Masterplan (Figure 6.3.11.15), include:

- The retention of areas of suitable terrestrial and aquatic habitat within Broadness Grassland;
- The retention and management of reedbed and marsh habitats within Black Duck Marsh;
- The creation of 7.5 hectare (ha) additional reedbed and marsh and 5.7km of ditch/bankside vegetation on the eastern side of the peninsula, between Botany Marsh and Broadness Grasslands; and
- The sensitive design of new landscaping around the peripheries of Botany Marsh, necessary to further promote habitat connectivity between Swanscombe Peninsula and habitats across the wider landscape to the south.

ADDITIONAL MITIGATION (ON-SITE)

Construction Phase

4.5 The following mitigation measures will be secured through an Ecological Construction Method Statement (ECMS), to be included within a Construction Environmental Management Plan secured as a requirement of the DCO.

Pre-commencement Surveys

4.6 In the event that construction works are delayed beyond two years from the date of the 2020 surveys, update surveys for great crested newts are likely to be required, subject to consultation.

Licensing

4.7 Based on the current survey findings, there is no requirement for licensing for amphibians.

Translocation/Exclusion

4.8 An amphibian assemblage including smooth newt, palmate newt, common frog and common toad as well as the non-native marsh frog, is considered likely to be using the Kent Project Site, including much of the proposed Construction Zone. It will therefore be necessary to exclude and remove any amphibians from the Construction Zone before the ground vegetation and topsoil is stripped. This is proposed to take place in tandem with the translocation of the reptiles as detailed within the Reptile Mitigation Strategy provided within the Ecological Mitigation and Management Framework (EMMF) (Document reference 6.2.12.3).

4.9 Amphibians captured during the reptile translocation will be released into suitable retained habitat outside of the construction footprint or to newly created habitats as part of the Water Vole Mitigation Strategy and the Invertebrate Mitigation Strategy, detailed in EMMF (Document reference 6.2.12.3).

4.10 In addition to terrestrial amphibians captured during the reptile translocation, any waterbodies to be removed will be drained down with reference to standard methodologies[2], with amphibians captured and translocated to retained or new habitats.

4.11 Due to the legislation surrounding the non-native marsh frog, any captured individuals of this species cannot be translocated to the receptor site and will be removed from the Project Site.

4.12 Once the translocation has been completed, habitats within the construction footprint will be subject to a destructive search, as per the Reptile Mitigation Strategy detailed in EMMF (Document reference 6.2.12.3).

[2] English Nature (2001) *Great crested newt mitigation guidelines*. English Nature, Peterborough

4.13 Upon completion of the destructive search, the construction footprint will be released for construction. The construction footprint will be maintained as unsuitable for terrestrial amphibians throughout the construction phase and particularly throughout the active amphibian season (typically mid-March until mid-October). This will involve preventing the re-colonisation of the construction footprint by maintaining the perimeter exclusion fencing.

Toolbox Talk and Site Staff Briefing

4.14 As part of the site briefing/induction process, details of the potential presence of amphibians within the Project Site will be provided to all Site Management staff and contractors.

4.15 In addition, where specific works are being carried out that will directly affect suitable habitat, a species-specific briefing/toolbox talk will be provided by the Ecological Clerk of Works (ECoW). A tool-box talk will be given to contractors by the ECoW prior to commencement, with respect to the legal protection afforded to amphibians, the working methodologies to be employed and procedures to be followed should amphibians be encountered during the works.

Precautionary Methods of Working

4.16 Areas of habitat to be lost during the construction phase will be cleared outside of the most sensitive periods for amphibians, which are during the spring breeding season (generally March to June), and the winter period when amphibians become less active and are more vulnerable to decline/localised loss.

4.17 Habitat clearance will be supervised by a suitably qualified ecologist acting as an ECoW.

Physical Protection Measures

4.18 Any retained habitat suitable for amphibians will be protected during the construction phase through implementation of Ecological Protection Zones (EPZs), as detailed within the main body of the EMMF (Document reference 6.2.12.3).

Pollution Prevention Measures

4.19 Standard pollution prevention and dust suppression measures will be implemented to minimise harm and damage to amphibian habitat. Such measures are detailed within the main body of this EMMF (Document reference 6.2.12.3).

Operational Phase

Habitat Enhancement

4.20 Retention of areas of ecological value that support amphibians including Black Duck Marsh, Botany Marsh East, parts of Broadness Grasslands, Bamber Pit and areas of semi-natural habitat throughout the Ebbsfleet Valley, will ensure suitable habitat for

amphibians is retained throughout the construction and operational phases of development.

4.21 Measures to ensure this retained habitat is enhanced for amphibians include:

- Construction of a new wetland to link Botany Marsh with Broadness Harbour;
- Management schemes established for Black Duck Marsh and Botany Marsh to ensure continuation of open water in ditches and ponds and to control scrub encroachment;
- Management schemes established for Black Duck Marsh and Botany Marsh to ensure continuation of open water in ditches and ponds and to control scrub encroachment;
- Creation of log/brash piles and hibernacula as detailed for reptiles in the EMMF (Document reference 6.2.12.3) will also benefit terrestrial amphibians, especially if these are located close to water bodies;
- Such areas will be under on-going management and maintenance sensitive to amphibians on an annual basis including the following:
  - Any desilting or deepening works required to water bodies within this habitat will take place over winter, with all dredging material left on the banks for a minimum of 24 hours to allow any wildlife residing in it time to get back into the water;
  - Grassland areas cut in late summer to a height of approximately 150mm, on a 3-year rotation (i.e. no more than one third of a grassland compartment cut in any one year to allow movement of amphibians out of the cut area). All arisings to be removed from site unless used for habitat piles;
  - Areas of developing/encroaching scrub (most likely to occur within marsh areas) to be cut using hand-held strimmers or brushcutters to a height of approximately 150mm (to reduce the likelihood of harm to any amphibians present). All arisings to be removed from site unless used for log/brash piles; and
  - Log/brash/habitat piles to be 'topped up' with new material if required, as the base material decomposes.
- A Sustainable Drainage System to both avoid or mitigate any potential effects on water quality and flow within sensitive habitats, and to provide suitable hydrological conditions for new wetland habitats of ecological value to become established.

Habitat Creation and Maintenance

4.22 New reedbed and marsh habitat will be created as part of the Water Vole Mitigation Strategy and Otter Mitigation Strategy, as detailed in the EMMF (Document reference 6.2.12.3). This habitat will be suitable for amphibians to enable it to be used as the 'receptor site'.

4.23 Retained and new habitats suitable for amphibians will be ecologically connected to the wider landscape, to ensure populations are not isolated in the long-term and are able to change or extend their known range in line with climate change effects.

SUMMARY OF ADDITIONAL MITIGATION (OFF-SITE)

4.24 The acquisition of off-site mitigation land is still underway however, the primary aim of creating new grazing marsh and ditch habitats presents an opportunity to provide additional valuable amphibian habitat. Further details of the principles for off-site mitigation are provided in the *General Principles for Offsite Ecological Mitigation* (Document reference: 6.2.12.10).

[This page is intentionally left blank]

Chapter Five ◆ MONITORING

5.1 No specific monitoring actions for amphibians are required; however, monitoring of habitats suitable for amphibians will be carried out to ensure management and maintenance activities are appropriate to maintain the population within the Project Site in the long-term. The results of such compliance checks will be reported on an annual basis, as described within the EMMF (Document reference 6.2.12.3).

[This page is intentionally left blank]

Annex EDP 8
Reptile Mitigation Strategy

This page has been left blank intentionally

Revisions

Revision	Description	Issued by	Date	Approved by
r040_00	Issue for DCO Submission	JSp/FD	24/12/2020	EDP/LRCH

The Environmental Dimension Partnership Ltd
Tithe Barn
Barnsley Park Estate
Barnsley
Cirencester
Gloucestershire
GL7 5EG

[This page is intentionally left blank]

Contents

[This page is intentionally left blank]

List of Tables

[This page is intentionally left blank]

Chapter One ◆ INTRODUCTION, SITE CONTEXT AND PURPOSE

INTRODUCTION

1.1 This Reptile Mitigation Strategy has been prepared by the Environmental Dimension Partnership Ltd (EDP) on behalf of London Resort Company Holdings Limited. It considers the likely impacts of the Proposed Development on the reptile population within the Project Site and identifies the avoidance, mitigation, compensation and enhancement measures required to enable the Proposed Development to meet legislative and/or planning policy requirements. A brief overview of the baseline situation is also provided along with a review of legislative and policy requirements.

1.2 The land within the Project Site will be subject to a Development Consent Order (DCO) application for a world class destination entertainment resort with associated infrastructure, staff accommodation, dedicated access road, public amenity space and habitat creation. The application will be supported by an Environmental Impact Assessment (EIA), with this report provided as part of an overall Ecological Mitigation and Monitoring Framework report which is an appendix to the Environmental Statement (ES).

1.3 Detailed information on baseline conditions and survey methods employed is provided within the Ecology Baseline Report (Document reference 6.2.12.1). Detailed consideration of the likely significant effects of the Proposed Development is provided within Chapter 12 – *Terrestrial and Freshwater Ecology and Biodiversity* of the Environmental Statement (ES) (Document reference 6.1.12).

SITE CONTEXT

1.4 The Project Site comprises two parts including the 'Kent Project Site', which includes land on the Swanscombe Peninsula, and the Ebbsfleet Valley, on the south side of the River Thames and is centred approximately at Ordnance Survey Grid Reference (OSGR) TQ 606 758, and the 'Essex Project Site', which includes land to the east of the A1089 Ferry Road and the Tilbury Ferry Terminal, is centred approximately at OSGR TQ 643 752. The Project Site lies partly within three local planning authority areas; Dartford Borough and Gravesham Borough for the Kent Project Site and Thurrock Council for the Essex Project Site. Collectively these two parts of the entire DCO boundary are referred to as 'the Project Site'.

1.5 The Kent Project Site comprises a range of habitat types including woodland and scrub, grasslands of varying quality, salt marsh, intertidal zones, brownfield areas, running and standing water, chalk exposures and developed land. No suitable habitat for reptiles is considered to be present within the Essex Project Site.

PURPOSE

1.6 As discussed in greater detail in Sections 2 and 3, detailed ecological surveys have identified populations of reptiles occupying habitats present on the Kent Project Site and located within the footprint of the Proposed Development. The works required for the construction of the Proposed Development will cause permanent loss, damage and disturbance to habitats within the proposed development footprint which, in the absence of appropriate mitigation, is likely to result in harm to the reptile population present.

1.7 The three widespread native reptile species confirmed present within the Kent Project Site, including common lizard (*Zootoca vivipara*), grass snake (*Natrix natrix*) and slow worm (*Anguis fragilis*), receive protection from harm under Schedule 5 of the Wildlife and Countryside Act 1981. There are no suitable reptile habitats present within the Essex Project Site, and as such reptiles are considered likely absent and not discussed further in relation to the Essex Project Site.

1.8 This mitigation strategy considers the likely impacts of the Proposed Development on the reptile population within the Project Site and identifies the avoidance, mitigation, compensation and enhancement measures required to enable the Proposed Development to meet legislative and/or planning policy requirements. A brief overview of the baseline situation is also provided along with a review of legislative and policy requirements.

1.9 This strategy therefore sets out the recommended sensitive working methodologies to be implemented during the pre-construction and construction phases of the Proposed Development. The methodologies devised are based upon the findings of the surveys completed to date by EDP during 2020, as detailed within the Ecology Baseline Report (Document reference 6.2.12.1), and summarised below. This strategy also sets out the recommended compensation, mitigation and enhancement measures to be implemented as part of the Proposed Development, to ensure no significant negative effects will arise upon the reptile population.

Chapter Two ◆ SURVEY FINDINGS

SUMMARY OF BASELINE CONDITIONS

2.1 This Section of the Mitigation Strategy should be read in conjunction with Figure 12.1, which illustrates the Project Site Areas as referenced below, as well as Figures 12.25 and 12.26, which detail the reptile survey areas, previous records and results of the 2020 surveys.

Previous Surveys and Desk Study Information

2.2 In 2015, common lizard, slow worm and grass snake were recorded during the surveys, of which common lizard was the most widespread and abundant, being recorded in all survey areas and with an exceptional population on Swanscombe Peninsula[1].

2.3 It was also found that Swanscombe Peninsula, Craylands Lane Pit/West Quarry, Bamber Pit and Station Quarter South qualify as Key Reptile Sites and would be eligible for designation as Local Wildlife Sites based on their reptile populations/assemblages. They are therefore considered to be of County Importance for reptiles. All other areas are considered to be of Local Importance.

2.4 In 2020, Kent and Medway Biological Records Centre provided many reptile records for the Kent Project Site. The majority of records were from the Old Malbeon Hospital, which is located 1.5km west of the Kent Project Site. There were 189 records for common lizard (nine of which were from within the Kent Project Site), 104 records of slow worm (two from within the Kent Project Site) and 22 records of grass snake (three from within the Kent Project Site).

2.5 The 2020 desk study identified 53 records of adder (*Vipera berus),* however, none were from the Kent Project Site.

2.6 Essex Field Club returned records of all four reptile species, none of which were from the Essex Project Site. There is no suitable reptile habitat within the Essex Project Site therefore this mitigation strategy only refers to the Kent Project Site.

2020 Surveys

2.7 No adders were found during direct observation surveys in spring 2020.

2.8 Populations of grass snake, common lizard and slow worm were recorded on the Kent Project Site with males, females (including some gravid) and juveniles all recorded.

[1] Chris Blandford Associates, London Resort Company Holdings (LRCH) Ltd. London Paramount Entertainment Resort 2015 & 2016 Reptile Survey Report, August 2016

2.9 All project areas on the Swanscombe peninsula (Blackduck Marsh, Botany Marsh, Broadness Grassland, Channel Tunnel Rail Line (CTRL) Wetland, NE tip and SW tip) are sufficiently linked for reptiles to be able to move between these areas. Therefore, these areas are grouped together for peak counts and referred to as 'peninsula'. Due to topographical barriers or roads and other built up areas forming barriers to reptile movement, it is thought that the reptiles present within Bamber Pit, the Sports Ground, the Former Landfill, Station Quarter North and Station Quarter South cannot disperse from these areas and are thus separate, isolated populations. Therefore, the peak counts of these areas are all considered separately. Table 2-1 displays the peak counts of each separate reptile population within the Kent Project Site.

Table 2-1: Peak survey counts of each separate reptile population within the Kent Project Site.

Kent Project Site Area (Figure 6.3. 12.1)	Peak survey count		
	Slow worm	Common lizard	Grass snake
Peninsula	-	21	11
Craylands Pit	39	5	-
Bamber Pit	14	3	1
Sports Ground	-	2	-
Landfill	2	9	1
Station Quarter North	-	1	-
Station Quarter South	3	23	2

2.10 All areas of the Kent Project Site, with the exception of the Sports Ground and Station quarter north would qualify as a Local Wildlife Site (LWS) on reptile criteria. There is an exceptional population of grass snake on the peninsula, exceptional populations of common lizard on the peninsula and station quarter south and an exceptional population of slow worm in Craylands Pit.

SUMMARY OF RELEVANT LEGISLATION AND REQUIREMENT FOR LICENSING

2.11 All species of common reptile (including common lizard, slow worm, grass snake and adder) receive at least limited protection from harm under the Wildlife and Countryside Act, 1981 (as amended), and it is an offence to cause the intentional killing and injuring of these species. In addition, the three reptile species present at the Project Site are Species of Principal Importance as defined by Section 41 of Natural Environment and Rural Communities (NERC) Act 2006. Whilst this does not equate to strict legal protection of individuals of a species, section 40 of the NERC Act places a duty on decision-makers such as public bodies, including local and regional authorities to have regard to the conservation of such species when carrying out their normal functions.

2.12 No licences are required as part of the development and implementation of any mitigation measures in respect of reptiles.

Chapter Three ◆ IMPACT ASSESSMENT IN ABSENCE OF MITIGATION OR COMPENSATION

3.1 The following information provides a summary of the anticipated significant positive and negative effects on the reptile population within the Project Site. The assessment takes into consideration the role of inherent mitigation embedded within the design of the Proposed Development. Additional avoidance, mitigation, compensation and enhancement measures required to address residual effects (additional to that provided by inherent mitigation alone) is provided in the subsequent section.

CONSTRUCTION PHASE

3.2 The following construction phase effects are anticipated on the reptile population:

- Approximately 84 hectare (ha) of direct habitat loss, damage or degradation, especially in areas with high concentrations of reptiles such as Craylands Pit, SW tip, NE tip and the Main Access Track;
- Habitat fragmentation/loss of dispersal routes via the loss of the above areas. This will separate the reptile habitat on Broadness Grasslands from that around Black Duck Marsh and separating both of the above areas from that on Bamber Pit and the Ebbsfleet valley areas;
- Habitat disturbance, especially on habitat in close proximity to the construction areas;
- Killing, injuring and disturbance of reptiles that stray onto the construction site;
- Hydrological effects, including changes to water quality/quantity (particularly impacting grass snakes); and
- Pollution/contamination incidents.

Operational Phase

3.3 The following operational phase effects are anticipated on the reptile population:

- Habitat fragmentation/loss of dispersal routes. Reptile habitat on Broadness Grasslands will be separated from that on Black Duck Marsh and both of these areas will be separated from habitat on Bamber pit and the Ebbsfleet valley;
- Increased risk of harm to reptiles straying onto the development site;
- Hydrological effects, including changes to water quality/quantity (relevant to grass snake);

- Damage or degradation to habitats and disturbance of wildlife through increased recreational pressure and trampling; and

- Potential positive effects/benefits through provision of habitats with greater biodiversity value than those currently present, and implementation of appropriate management of the retained and created habitats to maximise their biodiversity potential.

Chapter Four ◆ MITIGATION AND COMPENSATION

4.1 The overall aim in respect of the reptile population is to retain and enhance the population within the Kent Project Site.

4.2 To achieve this aim, the objectives for the mitigation strategy, to be secured through adherence to the EMMF (Document reference 6.2.12.3), will be to:

- Retain and enhance reptile habitat within the Swanscombe Peninsula;
- Improve habitat quality through introduction of long-term appropriate habitat management; and
- Ensure that sufficient habitat resources remain available to the local reptile population to provide year-round habitat availability.

4.3 The following should be read in conjunction with the Landscape Masterplan (Figure 6.3.11.15) and Landscape Strategy (Document reference 6.2.11.7), which illustrate the overall vision with respect to habitat provision for reptiles and a range of other wildlife species.

MITIGATION PRINCIPLES

4.4 Key mitigation measures relevant to reptiles, as reflected on the Landscape Masterplan (Figure 6.3.11.15), include:

- The retention of areas of suitable terrestrial and aquatic habitat within Broadness Grassland;
- The retention and management of grassland, scrub, reedbed and marsh habitats within and surrounding Black Duck Marsh;
- The creation of additional 3ha saltmarsh, 7.53ha reedbed and marsh and 5.7km of ditch/bankside habitat on the eastern side of the peninsula, between Botany Marsh and Broadness Grasslands; and
- The sensitive design of new landscaping around the peripheries of Botany Marsh, necessary to further promote habitat connectivity between Swanscombe Peninsula and habitats across the wider landscape to the south.

ADDITIONAL MITIGATION (ON-SITE)

Construction Phase

4.5 The following mitigation measures will be secured through an Ecological Construction Method Statement (ECMS), to be included within a Construction Environmental Management Plan secured as a requirement of the DCO.

Pre-commencement Surveys

4.6 Based on the extent of survey data gathered in 2015 and 2020, no update surveys for reptiles will be required. Reptiles are widespread across the Kent Project Site and their population is unlikely to change prior to commencement of construction work.

Licensing

4.7 There is no requirement for licensing for reptiles.

Translocation/Exclusion

4.8 Large populations of slow worm, common lizard and grass snake were recorded within the Kent Project Site, including much of the proposed construction footprint. It will therefore be necessary to exclude and remove any reptiles from the construction footprint before the ground vegetation and topsoil is stripped. An outline of the proposed methodology is set out below.

4.9 Installation of fencing, and all other exclusion and translocation measures will take place during the active reptile season (typically mid-March to October, depending on weather conditions at the time) to avoid disturbing reptiles when in hibernation.

4.10 The fencing route will ensure all habitat areas which would potentially be disturbed or destroyed during construction are enclosed, while excluding habitats which although located close to the development can be left undisturbed. The exact route will be determined by specialist contractors prior to installation in light of on-site practicalities and the extent to which above ground vegetation will have been removed in advance (given nesting bird considerations).

4.11 Immediately prior to installation of the fencing, the fencing contractor(s) will be briefed by an experienced ecologist on the potential presence of reptiles, their legal protection and of working practices which would avoid harming any reptile that may be present.

4.12 Specification of the proposed reptile fence is to be determined but it will comprise a perimeter fence with internal ‘drift’ fencing, utilised to compartmentalise the site and aid in reptile capture/ displacement.

4.13 Perimeter fencing will remain in place throughout the construction period. A phased removal of Internal ‘drift fencing’ will be implemented once the translocation is complete and construction commences across the site.

4.14 The reptile fencing will be monitored by the Ecological Clerk of Works (ECoW) during the capture phase on a daily basis with any damages/defects notified to the site manager immediately. Any remedial works will be the responsibility of the Principal Contractor.

4.15 To maximise the chance of reptiles using the refugia on site, vegetation will be cut prior to the refugia placement within the enclosed area to reduce the amount of alternative shelter. The vegetation will be directionally cut using a hand-held strimmer, cutting from the centre of the site outwards, to reduce vegetation height to 300mm. This process will be completed under the supervision of the ECoW.

4.16 Following the erection of the reptile exclusion fencing and the initial habitat thinning, reptile refugia, comprising roofing felt sheets measuring approximately 0.75m2 in area at a density of at least 100 per hectare, will be laid across all potentially suitable habitats within the construction footprint no later than ten days weeks before the start of reptile capture and release.

Capture and Release

4.17 The checking of reptile refugia will take place on a daily basis during suitable weather conditions (i.e. dry, still conditions with air temperatures between 10 and 20°C).

4.18 All reptiles found will be captured by hand and transported in suitable containers to the receptor site, taking care to ensure they are not subject to undue stress or heat. Reptiles would be released into areas of the receptor site close to suitable cover and/or beside the purpose-built refuges/hibernacula. All reptiles will be released as soon as possible following capture, unless environmental conditions require the animals to be held temporarily until weather conditions become more suitable. Capture records, including information on sex, age, location of capture, weather conditions and location of release, will be noted per visit by the ECoW.

4.19 Based on the size of the reptile population recorded within the Kent Project Site, it is proposed that the deployed refugia be checked for reptiles over a minimum period of 30 days (1 check per day, or 2 per day subject to capture rates). When capture rates begin to decline noticeably during the capture period, vegetation within the enclosed area will be directionally cut using a hand-held strimmer, cutting from the centre of the site outwards, to maintain vegetation height at 150mm. This process will be completed under the supervision of the ECoW.

4.20 The capture period will only cease if no reptiles are captured or reptile sightings recorded during no fewer than the final 5 days of this minimum 30day period. Should reptiles continue to be recorded/captured during the final 5 days, then the capture period will continue until no capture has been achieved over 5 consecutive days.

Destructive Search

4.21 Upon completion of the translocation exercise the enclosed area cleared of reptiles will undergo a destructive search supervised by the ECoW. This will involve the cutting to

ground level of all remaining vegetation (excluding that to be retained as part of the development) using a brush cutter and/or strimmer.

4.22 In tandem with the final vegetation cut across the site, all sections of internal drift fencing will be removed from the construction footprint. Perimeter site fencing will remain in place throughout construction unless it is deemed no longer necessary to do so by the ECoW, such as if the risk of reptile entering the site from suitable habitats of site is deemed negligible.

4.23 In addition, all other debris and potential reptile refugia, such as piles of rubble, logs, will be checked by hand by the ECoW before being removed from the construction footprint. All reptiles found during this clearance will be released into the receptor site on the same day.

4.24 Upon completion of the destructive search, the site will be released for construction. The construction footprint will be maintained as unsuitable for reptiles throughout the construction phase and particularly throughout the active reptile season (typically mid-March until mid-October). This will involve preventing the re-colonisation of the site by clearance of vegetation and maintaining the perimeter exclusion fencing to prevent reptiles re-entering.

Toolbox Talk and Site Staff Briefing

4.25 As part of the site briefing/induction process, details of the protected species resource within the Project Site will be provided to all Site Management staff and contractors.

4.26 In addition, where specific works are being carried out that will directly affect reptiles and their habitat, a species-specific briefing/toolbox talk will be provided by the ECoW to all contractors/site staff working within the area.

Precautionary Methods of Working

4.27 Areas of habitat to be lost during the construction phase will be cleared outside of the most sensitive periods for amphibians, which are during the spring breeding season (generally March to June), and the winter period when amphibians become less active and are more vulnerable to decline/localised loss.

4.28 Habitat clearance will be supervised by a suitably qualified ecologist acting as an ECoW.

Physical Protection Measures

4.29 Any retained habitat suitable for reptiles will be protected during the construction phase through implementation of Ecological Protection Zones (EPZs), as detailed within the main body of the EMMF (Document reference 6.2.12.3).

Pollution Prevention Measures

4.30 Standard pollution prevention and dust suppression measures will be implemented to minimise harm and damage to reptile habitat. Such measures are detailed within the main body of this EMMF.

Operational Phase

Habitat Enhancement

4.31 Retention of areas of ecological value that support reptiles including Black Duck Marsh, parts of Broadness Grasslands, Bamber Pit, the Sports Ground and areas of semi-natural habitat throughout the Ebbsfleet Valley will ensure 98 ha of habitat (approximately 54% of the original habitat available for reptiles) is retained throughout the construction and operational phases of development.

4.32 As illustrated on the Landscape Masterplan (Figure 6.3.11.15) and Figure 12.44, measures to ensure this the retained habitat is enhanced for reptiles include:

- Measures to encourage a structurally complex grassland sward in Broadness Grassland with; a substantial 'litter layer', areas of bare ground, areas of short sward, areas of longer sward areas and a high diversity of plant species. This could be achieved through;
  - Cutting and harrowing areas;
  - Sowing with an appropriate wildflower mix; and
  - Rotational cutting of different areas to ensure different sward heights.
- Measures to create open 'glade' areas or scalloped edges within existing woodland and scrub to increase the extent of open grassland and scrub edge cover available to reptiles;
- Creation of log/brash piles and hibernacula (to provide sheltering and hibernating habitats for reptiles);
- Creation of grass snake breeding sites through raking a small proportion of arisings from grassland management into piles of a minimum volume of 1m3 located in sunny locations near to suitable grassland habitat, or reptile refugia; and
- Such areas will be under on-going management and maintenance sensitive to reptiles on an annual basis including the following:
  - Grassland areas cut in late summer to a height of approximately 150mm, on a 3-year rotation (i.e. no more than one third of a grassland compartment cut in any one year to allow movement of reptiles out of the cut area). All arisings to be removed from site unless used for habitat piles;

- Areas of developing/ encroaching scrub (most likely to occur within cleared glades) to be cut using hand-held strimmers or brush cutters to a height of approximately 150mm (to reduce the likelihood of harm to any reptiles present). All arisings to be removed from site unless used for log/brash piles; and

- Log/brash/habitat piles to be 'topped up' with new material if required, as the base material decomposes.

Habitat Creation and Maintenance

4.33 Due to the large populations of reptiles present on the Kent Project Site, it is thought that the retained habitat is unlikely to have sufficient capacity to support the additional reptiles displaced from the construction footprint, and thus a proportion of reptiles removed from the construction footprint would need to be translocated to an additional off-site 'receptor site'.

4.34 Details on this receptor site are yet to be fixed but it is thought that the land required for the Project to achieve a biodiversity net gain will provide sufficient habitat to support the translocated reptiles. London Resort Company Holdings Limited will be working with local landowners, consultees, stakeholders and delivery partners to devise an appropriate biodiversity offsetting scheme.

4.35 Once the land is secured, it will be surveyed for suitability for reptiles and a programme of enabling works to be completed before the translocation occurs (such as installation of artificial hibernacula and refugia) will be devised (if required).

4.36 Depending on the types of habitat present within the off-site land, the habitat creation principles for reptiles (as well as benefitting other species) will likely be similar to that for the enhancement of the retained habitat:

- Measures to encourage a structurally complex grassland sward;

- Measures to create open 'glade' areas or scalloped edges within existing woodland and scrub;

- Creation of log/brash piles and hibernacula; and

- Creation of grass snake breeding sites.

4.37 Following the completion of the creation works described above (prior to translocation), the maintenance works will be implemented on an annual basis will likely be similar to those described above for the retained and enhanced habitat.

Chapter Five ◆ MONITORING

MONITORING ACCESS

5.1 In order to monitor the success of this mitigation strategy, it is proposed that habitat condition within the enhanced and created (receptor site) areas will be monitored in years 1, 3 and 5, following the completion of the enabling works and release of reptiles into the site. Habitat condition monitoring will be undertaken by the ECoW and include recording the physical and qualitative characteristics of the vegetation and the installed habitat features, both photographically and in written form.

5.2 A monitoring report will be submitted in years 1, 3 and 5, including details of any remedial actions undertaken should the habitat condition within any of the areas not meet expectations.

[This page is intentionally left blank]

Annex EDP 9
Invertebrate Mitigation Strategy

This page has been left blank intentionally

Revisions

Revision	Description	Issued by	Date	Approved by
r024_00	Issue for DCO Submission	TW/NH	24/12/2020	EDP/LRCH

The Environmental Dimension Partnership Ltd
Tithe Barn
Barnsley Park Estate
Barnsley
Cirencester
Gloucestershire
GL7 5EG

[This page is intentionally left blank]

Contents

[This page is intentionally left blank]

List of Figures

[This page is intentionally left blank]

Chapter One ◆ INTRODUCTION, SITE CONTEXT AND PURPOSE

INTRODUCTION

1.1 This Invertebrate Mitigation Strategy has been prepared by the Environmental Dimension Partnership Ltd (EDP) on behalf of London Resort Company Holdings Limited. It considers the likely impacts of the Proposed Development on the invertebrate population within the Project Site and identifies the avoidance, mitigation, compensation and enhancement measures required to enable the Proposed Development to meet legislative and/or planning policy requirements and result in an overall biodiversity net gain. A brief overview of the baseline situation is also provided along with a review of legislative and policy requirements.

1.2 The land within the Project Site will be subject to a Development Consent Order (DCO) application for a world class destination entertainment resort with associated infrastructure, staff accommodation, dedicated access road, public amenity space and habitat creation. The application will be supported by an Environmental Impact Assessment (EIA), with this report provided as part of an overall Ecological Mitigation and Monitoring Framework report which is an appendix to the Environmental Statement (ES).

1.3 Detailed information on baseline conditions and survey methods employed is provided within Appendix 12.1: *Ecology Baseline Report* (Document reference 6.2.12.1). Detailed consideration of the likely significant effects of the Proposed Development is provided within Chapter 12: *Terrestrial and Freshwater Ecology and Biodiversity* of the Environmental Statement (Document reference 6.1.12).

SITE CONTEXT

1.4 The Project Site comprises two parts including the 'Kent Project Site', which includes land on the Swanscombe Peninsula, and the Ebbsfleet Valley, on the south side of the River Thames and is centred approximately at Ordnance Survey Grid Reference (OSGR) TQ 606 758, and the 'Essex Project Site', which includes land to the east of the A1089 Ferry Road and the Tilbury Ferry Terminal and is centred approximately at OSGR TQ 643 752. The Project Site lies partly within three local planning authority areas; Dartford Borough and Gravesham Borough for the Kent Project Site, and Thurrock Council for the Essex Project Site. Collectively these two parts of the entire DCO boundary are referred to as 'the Project Site'.

1.5 The Project Site comprises a range of habitat types including woodland and scrub, grasslands of varying quality, salt marsh, intertidal zones, brownfield areas, running and standing water, chalk exposures and developed land.

PURPOSE

1.6 As described in further detail below, surveys undertaken across the Kent Project Site in 2012, 2015 and 2020 have confirmed the presence of a Nationally significant invertebrate assemblage, primarily associated with Open Mosaic Habitats on Previously Developed Land (OMH), saltmarsh habitat in the intertidal zone and other brackish and freshwater marsh and reedbed habitats.

1.7 The Project Site supports a wide range of Species of Principal Importance, as defined by Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006, which places a duty on decision-makers such as public bodies, including local and regional authorities, to have regard to the conservation of such species when carrying out their normal functions. With reference to local and national policies requiring development to deliver a net gain in biodiversity, the presence of a wide range of Section 41 species, together with a significant number of other rare or nationally scarce species, confirms that the invertebrate population present forms a major and important component of the Project Site's biodiversity.

1.8 In the absence of appropriate compensation and mitigation measures, the Proposed Development is considered likely to result in the destruction of, and disturbance to, important invertebrate habitat within the DCO Limits.

1.9 This strategy therefore sets out the recommended advanced mitigation measures to be implemented during the pre-construction and construction phases of the Proposed Development, to maintain the overall range of habitat niches, foodplants and nectar sources essential to the invertebrate population. This strategy also sets out the recommended compensation, mitigation and enhancement measures to be implemented as part of the proposals, to reduce development impacts and create further opportunities for invertebrates within the Project Site and on off-site land.

1.10 A draft of this mitigation strategy was submitted to Natural England on 22 September 2020 as part of a suite of draft mitigation reports submitted via Natural England's Discretionary Advice Service ahead of the DCO application being submitted. At the time of making the DCO application, no comments on the document have been received from Natural England.

Chapter Two ◆ SURVEY FINDINGS

OVERVIEW

2.1 This Section of the Mitigation Strategy should be read in conjunction with Figure 6.3.12.1, which illustrates the Project Site Areas as referenced below. The sampling locations and results of the aquatic macroinvertebrate surveys are provided in Figures 6.3.12.27 – 6.3.12.29.

2.2 The Kent Project Site contains a large complex of habitats offering a very diverse array of different micro-habitats and, accordingly, it supports a diverse range of terrestrial and aquatic invertebrate species. The Essex Project Site does not support any habitat with potential to support a significant assemblage of terrestrial and aquatic invertebrates. Therefore, only the Kent Project Site is considered further in this strategy.

2.3 Rather than one particular habitat being of key importance, the value of the Project Site to invertebrates lies in its complex mosaic of habitats, in which a range of different successional stages are represented and in which other environmental conditions such as water/moisture levels and salinity vary significantly. These conditions are, in large part, the result of a long history of modification and disturbance by industrial activity which continues on the site to the present day. The mosaic of habitats formed upon previously disturbed or made ground, which cover large portions of the Swanscombe Peninsula and the disused chalk pits in the Ebbsfleet Valley, meet the definition of Open Mosaic Habitats on Previously Developed Land (OMH), which are known to support particularly diverse invertebrate populations.

2.4 The habitat mosaics of particular importance to invertebrates are as follows:

- Dry habitats on made ground and/or hardstanding with well drained, generally nutrient-poor thin soils and supporting a mosaic of bare ground, early colonising/ephemeral vegetation, grassland and scrub; and

- Fresh water and brackish wetland habitats, predominantly comprising saltmarsh reedbed and marshy grassland but including open water (ponds, ditches and streams).

2.5 The previous surveys and assessment of the invertebrate population at the Kent Project Site in 2012. and 2015 considered terrestrial and aquatic invertebrate populations as somewhat separate entities and the previous findings, summarised below, are divided on these lines. However, in reality there is continuum between wet and dry conditions, and many species of conservation importance rely on habitats at the transition between the two. The 2020 invertebrate survey and assessment recognises transitional as well as purely wet or dry biotopes and habitat types. Therefore, whilst the aquatic invertebrate survey findings will play a specific and separate role in assessing the water quality within the Kent Project Site's waterbodies, the evaluation of the invertebrate population, the

assessment of impacts and the strategy for avoidance and mitigation of impacts will consider the invertebrate assemblage as a whole.

PREVIOUS SURVEY FINDINGS

Terrestrial invertebrates

2.6 The terrestrial invertebrate population supported by the Kent Project Site was assessed as being of National importance based on the findings of previous surveys in 2012 and 2015. A large number of species (1,193) were recorded, including 253 Red Data Book and/or Nationally Scarce species, and 16 Species of Principal Importance as listed on Section 41 (S41) of the Natural Environment and Rural Communities (NERC) Act 2006. In 2012, it was concluded that the site was of most importance for its thermophilic spider fauna, including the S41 distinguished jumping spider (*Sitticus distinguendus*), although this species was not recorded during update surveys in 2015.

2.7 As noted above, the most notable invertebrate fauna present are associated with the remnant saltmarsh community and with bare ground and/or sparsely vegetated habitats on skeletal and/or disturbed soils and hardstanding. Across most the Swanscombe peninsula the alkaline substrate, made up of deposited cement kiln dust (CKD), is heavily influential in terms of the botanical communities and associated invertebrate populations. Other important OMH habitats are present within the disused and partially infilled chalk pits, in particular Craylands Pit and Bamber Pit.

Aquatic invertebrates

2.8 The aquatic invertebrate population supported by the Project Site was assessed as being of County to Regional importance based on the findings of previous surveys in 2015, with a total of 199 species of aquatic macroinvertebrate recorded amongst approximately 70,000 individuals. Amongst these, several species of conservation concern were recorded; one Vulnerable, three Near Threatened, 11 Nationally Scarce and 51 with a Local distribution within the UK.

2.9 The most important habitat areas for aquatic invertebrates are as follows:

- Botany Marsh – a network of ditches, typically brackish and dominated by reeds. These ditches supported several species of conservation interest and were categorised as being between Fairly High and Very High conservation value. The newly created pond in the east of the marsh had a sufficiently rich faunal assemblage to be categorised as a UK Biodiversity Action Plan (BAP) Priority Pond;

- Swanscombe Marsh – a series of wetland areas amongst a network of interconnected ditches to the west (Black Duck Marsh) and an area of reedbed, ditches and ponds to the east (Botany Marsh). Several species of conservation interest were found in the surveyed ditches on Swanscombe Marsh and as such, these habitats can be considered as relatively high conservation value. The two wetland areas supported notably rich faunal assemblages with several species of conservation concern; both wetlands were categorised as Very High conservation value. Of the surveyed ponds, three were of the

quality necessary for UK BAP Priority Pond status; and

- Waterbodies within the wider Swanscombe area – the Ebbsfleet corridor; the Ebbsfleet Stream and its riparian margins, and two nearby ponds, one balancing pond and one within a disused chalk pit. The Ebbsfleet Stream was categorised as between Moderate and High conservation value; one of the ponds achieved the quality of UK BAP Priority Pond status.

2020 SURVEY FINDINGS

2.10 In 2020, Kent & Medway Biological Record Centre (KMBRC) returned records of the following species within 2km of the Project Site: 61 lepidoptera records (five butterfly, 56 moth); 10 Hymenoptera; two diptera; and three coleoptera. EFC returned records of 215 different beetle species, 10 butterfly species, four dragonfly species, 154 Hymenoptera species, 125 moth species, six orthoptera species, 48 hemiptera species and 485 diptera species. None were from the Essex Project Site.

2.11 From the combined 2020 survey area a total of 1,446 invertebrate species were recorded, comprising 1,304 derived from terrestrial sampling methods and 142 from aquatic sampling.

2.12 In total, 204 species of recognised conservation status in the UK were recorded from the 2020 survey. These included 10 species listed as Species of Principal importance and two 'research only' species under Section 41 of the NERC Act (2006); as well as 33 species listed in one of the pre-1994 or post-2001 IUCN red data book categories as being RDB3 or Near Threatened, or rarer, and 159 species currently classed as Nationally Scarce in the UK.

2.13 Of the S41 species, the Nationally Rare and Endangered Duffey's Bell-head Spider (*Praestigia duffeyi*), a saltmarsh specialist, was recorded from the Swanscombe Saltmarsh alongside the Saltmarsh Short-spur (*Anisodactylus poeciloides*), a ground beetle species; together with several S41 flagship species of Open Mosaic Habitat (OMH) and Thames terrace grasslands including the Brown-banded Carder Bee (*Bombus humilis*) (recorded from several sample areas) as well as the Five-banded Weevil Wasp (*Cerceris quinquefasciata*), Black-headed Mason Wasp (*Odynerus melanocephalus*) and Phoenix Fly (*Dorycera graminum*). However, a large number of other equally rare, and in some cases rarer species, equally representative of their respective habitats were recorded during the survey.

2.14 In addition, two species were recorded for the first time in the UK from 2020 survey data. These included an aderid beetle (*Anidorus sanguinolentus*) and a leafhopper (*Macrosteles sardus*), both of which were recorded from Area 8 Botany Marsh East. Several species only recorded from the UK in recent years were also recorded, including a jumping spider (*Macaroeris nidicolens*), a weevil (*Larinus turbinatus*), Variable Nomad Bee (*Nomada zonata*) and a jewel wasp (*Hedychrum nobile*), as well as several other species.

2.15 From Pantheon biotope-level analysis of all survey data, 783 species were attributed to 'Open habitats', 257 to 'Wetlands', 175 to 'Tree-associated' habitats and 61 species with

an affinity to 'Coastal' habitats were recorded. From site-level Pantheon analysis of data, 'Tall sward and shrub' habitat-level assemblages were best represented on grassland and scrub mosaic/OMH sites; stand-out assemblages were almost always recorded for the 'Short sward and bare ground' habitat-level assemblages, and on the best sites the nested SAT assemblages F111 'Bare sand and chalk' and F112 'Open short sward' frequently obtained scores exceeding their respective Favourable Condition thresholds in Pantheon.

2.16 From coastal saltmarsh, brackish coastal marsh ditches and brackish/freshwater transition marshes, some assemblages of National importance were also recorded, attributed to W211 'Open water on disturbed mineral sediments' and M311 'Saltmarsh and transitional brackish marsh' SATs; these often being expressed in samples from similar habitats.

2.17 Besides Pantheon analysis, independent SQI scores were calculated for each sub-site using a method described in Ball (1986), used by Harvey (2014). These were used alongside Pantheon output and other ecological considerations including habitat and species assemblage representativeness, ecological position and overall condition, to inform sub-site level conservation value. In addition, an SQI score was calculated for the entire 2020 invertebrate dataset. The resultant score of 11.9 indicated that the whole site supported an invertebrate population of National importance. Whilst the majority of sites within the survey area have been found to support representative invertebrate assemblages of National importance, usually the aquatic elements of the freshwater habitats and the more wooded areas were of somewhat lower conservation value. However, the interdependence of species requiring a combination of one or more habitats means that the value of wooded and wetland elements in relation to open ground habitats should not be disregarded.

2.18 From evaluation of the 2020 survey results on a sub-site level; 10 of the 17 sample areas on the Kent Project Site were found to support invertebrate assemblages of National importance; five sample areas were considered to support assemblages of Regional importance; one sample area was assessed as supporting an assemblage of County importance; and one sample area (Tilbury Docks, verges) was considered to support an assemblage of District importance at most.

SUMMARY OF RELEVANT LEGISLATION AND REQUIREMENT FOR LICENSING

2.19 As noted above, the Project Site supports several Species of Principal Importance as defined by Section 41 of NERC Act 2006. Whilst this does not equate to strict legal protection of individuals of a species, Section 40 of the NERC Act places a duty on decision-makers such as public bodies, including local and regional authorities to have regard to the conservation of such species when carrying out their normal functions.

2.20 No licences are required as part of the development and implementation of any mitigation measures in respect of invertebrates.

Chapter Three ◆ IMPACT ASSESSMENT IN ABSENCE OF MITIGATION OR COMPENSATION

3.1 The following information provides a summary of the anticipated significant positive and negative effects on the invertebrate population within the Project Site. The assessment takes into consideration the role of inherent mitigation embedded within the design of the Proposed Development. Additional avoidance, mitigation, compensation and enhancement measures required to address residual effects (additional to that provided by inherent mitigation alone) is provided in the subsequent section.

CONSTRUCTION PHASE

3.2 The following construction phase effects are anticipated in relation to invertebrates:

- Direct habitat loss, damage or degradation – with reference to the biodiversity impact calculations set out in the Biodiversity Net Gain Assessment (Document reference 6.2.12.2), the most relevant habitat losses for invertebrates are as follows:
  - OMH in 'good' condition – 15.42ha (100%) lost;
  - OMH in 'moderate' condition – 33.24ha (64.29%) lost;
  - Lowland mixed deciduous woodland – 4.41ha (20.29%) lost;
  - Floodplain Wetland Mosaic (CFGM) in 'moderate' condition – 14.55ha (99%) lost;
  - Ponds (Priority Habitat) – 1.23ha (46.22%) lost;
  - Reedbeds – 9.34ha (43%) lost; and
  - Saltmarshes and saline reedbeds – 1.01ha (12.3%).
- Habitat fragmentation;
- Light pollution; and
- Hydrological effects, including changes to water quality/quantity.

OPERATIONAL PHASE

3.3 The following operational phase effects are anticipated in relation to invertebrates:

- Increased lighting, noise and traffic leading to disturbance of species within retained and newly created habitats;

- Use of herbicides and/or pesticides e.g. within the formal landscaping in the main resort, and subsequent drift into adjacent valuable invertebrate habitats; and

- Hydrological effects, including changes to water quality/quantity (mainly affecting aquatic invertebrates).

3.4 In addition to the negative effects identified above, the creation of new saltmarsh habitat as part of the overall Landscape Strategy (Document reference 6.2.11.7) constitutes a positive effect during the operation of the development.

Chapter Four ◆ MITIGATION AND COMPENSATION

4.1 The overall aim in respect of the invertebrate population is to maintain the overall site-wide habitat mosaic, and associated diverse range of microhabitats and niches, foodplants and nectar sources, to meet the needs of the diverse range of invertebrates present on site.

4.2 The following should be read in conjunction with the Landscape Masterplan (Figure 6.3.11.15), Landscape Strategy (Document reference 6.2.11.7) and Figures 6.3.12.44 and 6.3.12.45, which illustrate the overall vision with respect to habitat provision for invertebrates and a range of other wildlife species.

SUMMARY OF INHERENT MITIGATION

4.3 With reference to the biodiversity impact calculations set out in The Biodiversity Net Gain Assessment (Document reference 6.2.12.2), the following invertebrate-rich habitats are to be retained and protected during construction, and enhanced during the operational phases of development:

- 16.21ha OMH in 'moderate' condition;
- 20.72ha broadleaved woodland;
- 2.01ha of ponds/standing water;
- 11.95ha of Floodplain Wetland Mosaic in 'fairly poor' condition;
- 11.31ha of reedbed; and
- 7.18ha saltmarshes and saline reedbeds.

4.4 The key locations for habitat retention and enhancement are:

- OMH habitats within the eastern portion of 'Broadness Saltmarsh';
- Saltmarsh on the north-west and north-east fringes of the Swanscombe peninsula;
- Black Duck Marsh on the western side of Swanscombe peninsula; and
- Botany Marsh on the eastern site of Swanscombe peninsula.

SUMMARY OF ADDITIONAL MITIGATION (ON-SITE)

4.5 The quantum of previously developed land on the Swanscombe peninsula will be unavoidably reduced to make way for the Proposed Development, which in turn will reduce the total extent of open mosaic habitat (OMH) available to invertebrates. The

underlying substrate of this habitat has formed as a result of a unique history of modification of the original saltmarsh and cannot be simply recreated elsewhere. The aim of maintaining the existing range of microhabitats, foodplants and nectar sources associated with OMH will therefore be primarily achieved by introducing greater variety and complexity within the areas of OMH that are to be retained in the Broadness Saltmarsh area, to the east of the main resort site.

4.6 In addition to enhancing the retained OMH habitat as summarised above, 1.33ha of brown roof habitat will be created on new buildings across the development. These are to be created using substrate (crushed concrete and chalk) originating from with the development footprint and as such will, over time, replicate some of the OMH habitats which are being lost and will be likely be of value to a proportion of the existing brownfield/OMH invertebrate population.

4.7 Approximately 3ha of saltmarsh habitat will be increased through managed retreat on the northern and eastern edge of Swanscombe peninsula, to the benefit of the invertebrates associated with this habitat.

4.8 A larger proportion of the existing aquatic habitats of importance to invertebrates are to be retained in comparison with the terrestrial/OMH habitats. However, a range of measures are proposed to mitigate the effects of loss of wetland habitat from within the development footprint, aimed at improving water quality, habitat diversity and complexity within the retained wetlands and the creation of new species-rich wetland habitat.

4.9 Finally, further habitat of value to invertebrates will be provided within the amenity greenspaces within the resort itself, including native tree and shrub planting, wildflower strips, green roofs and walls on buildings and 'bug hotels'.

SUMMARY OF MITIGATION (OFF-SITE)

4.10 Land acquisition is still underway for the purposes of off-site habitat creation. This is intended to fulfil a range of ecological objectives and functions but includes the creation of a range of habitats (including OMH) for invertebrates to mitigate the loss of habitat from the Project Site.

4.11 A summary of the aims for off-site land can be found within the General Principles for Offsite Ecological Mitigation (Document reference 6.2.12.10).

CONSTRUCTION PHASE

Advanced mitigation measures

4.12 As a general principle, habitat enhancement and creation works will take place in advance of construction works (and associated habitat losses) to allow time for source populations of invertebrates within the development footprint to locate and colonise the new habitats created.

OMH habitat

4.13 Prior to and/or during the construction works within OMH habitats in the development footprint, the following measures will be undertaken to enhance the quality of the retained OMH habitat in the Broadness Saltmarsh area for invertebrates:

- Creation of bare ground scrapes through mechanical removal of topsoil to reveal the substrate beneath. Individual scrapes should be between 10 and 50m^2 in size and have a mainly southerly aspect (but with some variation) and positioned at least 20m from any footpaths/trails. Upon completion of works, bare ground should comprise approximately 5% of the OMH habitat area (See Figure 4-1 below for an example);

- Creation of shallow pools of varying depth which are lined/capped with impermeable material to hold water throughout most, if not all of the year. At least 20 pools, between 10 and 50m^2 in size, will be created in scattered locations around the retained OMH habitats. Upon completion of works, shallow pools should comprise approximately 5% of the OMH habitat area (See Figure 4-2 below for an example);

- Creation of piles/mounds of mixed crushed and coarse concrete rubble e.g. salvaged from existing piles, or derived from breaking up existing concrete hardstanding, within the construction footprint. At least 20 piles, approximately 5m long x 3m wide x 0.5m high, will be created in scattered locations around the retained OMH habitats and positioned at least 20m from any footpaths/trails (See Figure 4-3 below for an example); and

- Creation of mounds and low bunds using chalk ballast material derived from construction works or tunnelling activities within the disused chalk pits. At least 20 chalk mounds/bunds, approximately 6m long x 2m wide x 0.5m high, with the long axis generally orientated west to east but with some variation, will be created in scattered locations around the retained OMH habitats and positioned at least 20m from any footpaths/trails. (See Figure 4-4 below for an example).

Figure 4-1: Example of existing bare and sparsely vegetated substrate

Figure 4-2: Example of an existing shallow pond

Figure 4-3: Example of existing mixed concrete rubble pile

Figure 4-4: Example of existing low mound/bare slopes on chalk substrate

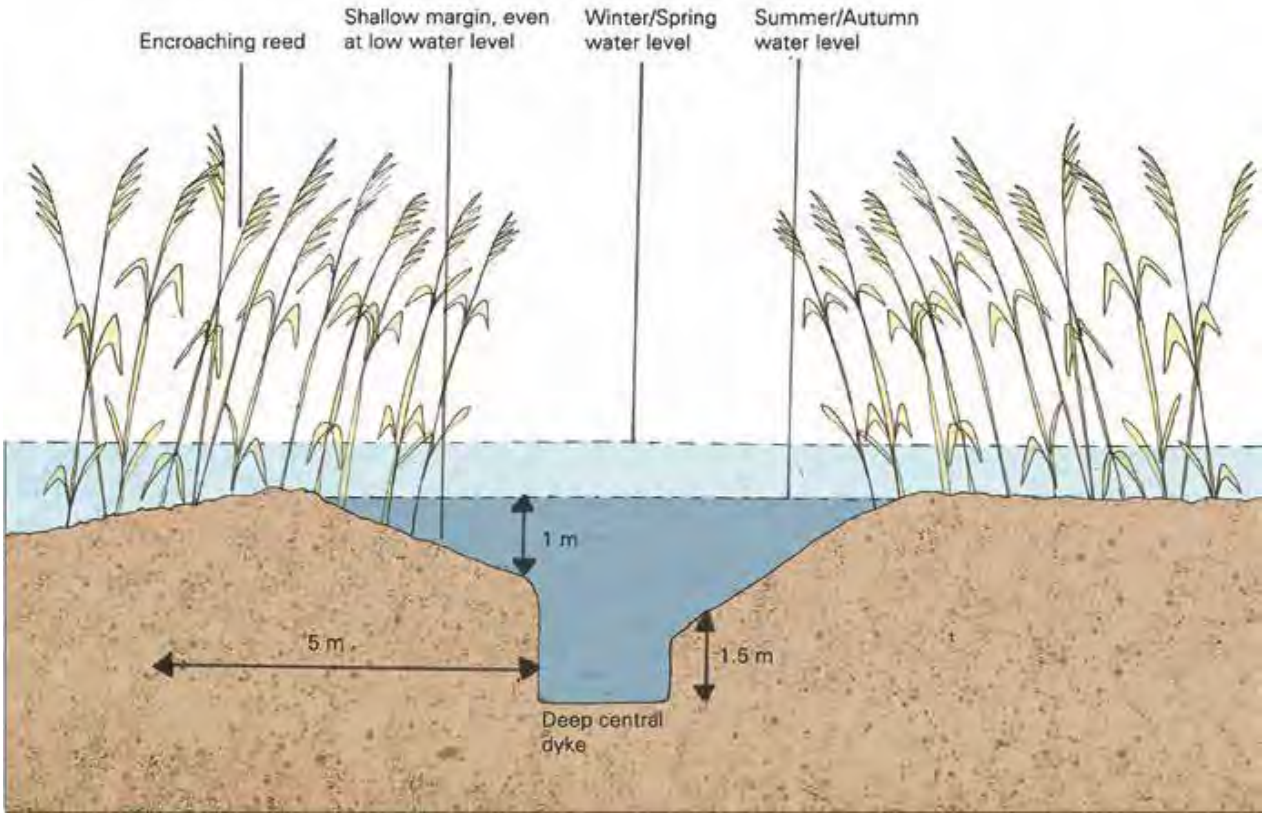
4.14 In addition to the above, concrete rubble and chalk substrate derived from the construction footprint will be stockpiled in a suitable location for later use in the creation of biodiverse brown roofs during the operational phase (see below).

Wetland habitat

4.15 During the construction works within wetland habitats in the development footprint, the following measures will be undertaken to enhance the quality of the retained wetland habitat on the western and eastern sides of the Swanscombe peninsula for invertebrates:

- Reduction of scrub encroachment e.g. in Botany Marsh and Black Duck Marsh in particular;
- Selected conversion of simple trapezoidal cross-sectional ditches (such as those typically observed on Botany Marsh) to a more complex profile through the creation of a step in the bank profile beneath the water level. (See Figure 4-5 below for an example); and
- Mechanical excavation of parts of Black Duck marsh to create additional scrapes/ deep areas and variety in depth profile across the reedbed.

Figure 4-5: More complex ditch profile to increase variation and value to invertebrates



Physical protection measures

4.16 An Ecological Protection Zone (EPZ) will be established to protect the retained strip of OMH habitat on the north-eastern edge of the resort area, including a zone around the base of the central electricity pylon in Broadness Marsh, throughout the construction phase. An EPZ with a 5m buffer will also be established around all retained wetland habitats throughout the construction phase. The EPZs can be delivered through co-ordination with protective measures for other ecological and arboricultural features, combined with temporary protective fencing and signage, as detailed within the main body of this EMMF (Document reference 6.2.12.3), which will be a requirement of the DCO.

Sensitive or restricted lighting

4.17 The use of artificial lighting is to be limited to the essential minimum throughout the site, and any lighting to be used should avoid upward pointing lights, with the spread of light being kept near to, or below the horizontal.

Pollution prevention measures

4.18 Measures to prevent pollution incidents will follow the recommendations set out in the Environment Agency's Pollution Prevention Guidelines (PPGs), or other best practice guidance available at the time of works.

4.19 Detailed pollution prevention measures are provided in the main body of this report; however, in summary these will include:

- Measures to be implemented to prevent and deal with pollution incidents;
- Security to prevent vandalism-related pollution incidents;
- Drip trays and bunds around fuel storage and refuelling areas;
- Appropriate wheel washing facilities and road cleaning regime; and
- Silt fencing and settlement lagoons/soakaways to prevent silt runoff.

OPERATIONAL PHASE

Habitat enhancement

4.20 The principles of management activities to maintain or enhance all of the retained and new habitats within the Project Site are provided in Section 6 of the main EMMF document, with the monitoring activities required to ensure management and maintenance activities achieve their required outcomes is provided in Section 7 of the EMMF. The management objectives in relation to important invertebrate habitats are summarised below.

OMH habitats

4.21 Following the advanced enhancement of the retained OMH habitats described above, the value of these habitats for invertebrates will be maintained and/or further enhanced through periodic vegetation clearance and/or creation of new bare ground scrapes to maximise habitat complexity. The frequency of these interventions will depend on rates of recolonisation/regrowth, which will be determined through post-construction monitoring (discussed below), however, the aim is to achieve and maintain the overall mosaic of habitat in the following approximate proportions:

- Bare ground and shallow pools:- 10%;
- Sparsely vegetated ground (less than 20% cover):- 10%;
- Sparsely vegetated ground (20-60% cover):- 10%;
- Open species-rich grassland (more than 60% cover):- 25%;
- Species-rich grassland with scattered scrub:- 20%; and
- Dense scrub:- 25%.

4.22 In addition to the above, 20% of each rubble pile created in the OMH habitat areas will be mechanically disturbed/turned over every 5 years, on rotation, to create a range of different stages of colonisation to maximise the diversity of microhabitats.

4.23 It is not proposed to apply seed to bare ground or mounds/piles of chalk and rubble as it is anticipated that these will naturally colonise with a variety of plant species already present on site. By maintaining the overall mix of habitats including ephemeral vegetation and more established species-rich calcareous grassland, the supply of foodplants and nectar sources important to the invertebrate population will also be maintained.

Wetland habitat

4.24 Approximately 17ha reedbed (including within areas of Floodplain Wetland Mosaic) and 2.3km ditch will be enhanced to the benefit of aquatic invertebrates through the following measures:

- Rotational management of scrub to maintain a continuity of supply but prevent excessive regrowth/encroachment;
- Rotational cutting of reed vegetation to create a variety in age and structure; and
- Improve water quality in retained habitats though removal of or separation from contaminants through a surface water management strategy including a sustainable drainage system (SuDS) and associated treatment train.

4.25 Further details of enhancements to Botany Marsh are provided in Figure 11.15 (Document reference 6.3.11.15).

Habitat creation (on-site)

Biodiverse brown roofs

4.26 New OMH will be created in the form of biodiverse brown roofs on a number of buildings within the new development.

4.27 1.3ha of biodiverse brown roofs are to be created across several buildings, as shown on the Landscape Masterplan (Figure 6.3.11.15) and on Figure 12.44 (Document refence 6.3.12.44). The key features of these habitats are as follows:

- To be primarily constructed of crushed concrete and chalk substrates taken from within the development footprint, to create similar OMH conditions to parts of the existing Project Site (See Figure 4-6 below for an example);
- No plant seeds or sedum etc. applied but instead the bare substrate is allowed to colonise naturally, by plant seeds blown by the wind or introduced by birds; and
- Over time a range of locally occurring invertebrates associated with OMH habitats are expected to colonise these habitats to the benefit of the overall invertebrate population but also birds and bats.

Figure 4-6: Example of naturally colonising brown roof on similar substrates to the Project Site

4.28 All roof top habitats will require specialist maintenance with respect to their root barrier and waterproofing membranes in accordance with the manufacturer's specifications. For example, these areas will require periodic removal of self-sown saplings and young shrubs, the roots of which (if allowed to mature) could damage the waterproof membrane or other key components.

Saltmarsh

4.29 As shown on the Landscape Masterplan (Document reference 6.3.11.15) the existing saltmarsh habitat on the north eastern edge of Swanscombe peninsula is to be extended by 3ha through managed retreat.

4.30 This will involve 'retiring' the flood defence through the creation of a naturalised sloping bank to increase areas of mud flat, saltmarsh, small pools, rocks and shingle areas and reeds, sedges and grasses transitioning into scrub vegetation.

4.31 It is anticipated that saltmarsh vegetation will naturally colonise the area over time once the intertidal conditions are created.

Wetland habitat

4.32 Maintenance of connectivity across the Peninsula is key to ensure that wetland invertebrates can continue to disperse and colonise areas of suitable habitat. This connectivity between Botany Marsh East, Broadness Salt Marsh and Black Duck Marsh will

be maintained through the inclusion of a chain of water courses and water bodies wrapping around the side of the Proposed Development footprint. These water courses will have varying depth profiles, be planted with a range of suitable native bankside and water plants and be bordered with wetland/marsh habitat, to promote a diverse and heterogenous habitat mosaic to the benefit of invertebrates and a range of other wildlife.

4.33 Approximately 5.69ha of reedbed and 8.0km of linear ditch/open water habitat and bankside habitat is to be created.

Other habitats

4.34 Further habitat of value to invertebrates will be provided within the amenity greenspaces within the resort itself, as illustrated on Figure 12.44 (Document reference 6.3.12.44), including:

- Native tree and shrub planting;
- Wildflower strips rich in nectar sources;
- Green roofs and walls on buildings; and
- 'Bug hotels' (See Figure 4-7 below for an example).

Figure 4-7: Example of 'bug hotel' of value to invertebrates and as an educational resource

4.35 The provision of these features in certain key/prominent locations within the resort will also provide an opportunity to raise the profile of invertebrate and biodiversity conservation, when accompanied by suitable educational material such as interpretation boards or signs.

Control of chemical usage

4.36 The management and maintenance schedules for the formal landscaping and amenity spaces within the main resort area will include measures to minimise, or avoid altogether, the use of herbicides and pesticides which could be harmful to the invertebrate population, either by causing direct mortality or altering the botanical composition of their habitats.

4.37 Should it not be feasible to avoid chemical use altogether, any usage/application of herbicides and pesticides will be undertaken a minimum of 50m from the natural habitats retained/enhanced/created outside of the main resort area.

Habitat creation (off- site)

4.38 Land acquisition is still underway for the purposes of off-site habitat creation, which is intended to fulfil a range of ecological objectives and functions, including the following:

- Mitigation for the loss of coastal/floodplain grazing marsh and reedbed which, on a precautionary basis, is being treated as functionally linked to the Thames Estuary and Marshes SPA/Ramsar site;
- Mitigation for the loss of dormouse habitat (scrub and woodland);
- Creation of a receptor site to accommodate reptiles to be translocated from habitats within the development footprint;
- Deliver a net biodiversity gain, as measured through the use of a Biodiversity Metric.

4.39 In fulfilling the objectives above, it is envisaged that significant areas new habitat of value to invertebrates will be created. In addition, within the overall off-site land area, it is proposed that 'new' brownfield habitat/OMH will created specifically for invertebrates to mitigate the loss of such habitat from the Project Site. This has been done successfully on other sites in the Thames Gateway area, for example to offset losses of habitat from the development of the London Distribution Park (LDP) at Tilbury[1]. In this example, new brownfield habitat/OMH was created in 2013 by spreading chalk slurry over wide area and then placing dunes made from waste fly ash and chalk bunds on the top. Monitoring studies in 2019 found that the new habitats supported a proportionally higher number of rare and scarce invertebrate species than had been found at the LDP site in 2011 prior to development.

4.40 A summary of the aims for off-site land can be found within the General Principles for Offsite Ecological Mitigation (Document reference 6.2.12.10).

[1] https://www.forthports.co.uk/latest-news/wildlife-study-finds-habitat-created-by-the-port-of-tilbury-is-now-a-site-of-national-importance-for-invertebrates/

[This page is intentionally left blank]

Chapter Five ◆ MONITORING AND WORKS SCHEDULE

5.1 Key monitoring actions to measure the success of the mitigation strategy for invertebrates are as follows:

1. Site visits/checks by the Project Ecologist/ECoW prior to, at key stages during (at least monthly), and at the end of the advanced habitat enhancement phase(s) to ensure these works have been implemented in accordance with the proposed mitigation strategy;

2. Site visits/checks by the Project Ecologist/ECoW prior to, at key stages during (at least monthly), and at the end of the construction phase(s) to ensure measures to protect retained habitat from physical damage and/or pollution are implemented and maintained;

3. Site visits/checks by the Project Ecologist/ECoW prior to, at key stages during (at least monthly), and at the end of the post-construction landscaping phase(s) to ensure measures to create new habitats or enhance existing habitats have been implemented in accordance with the proposed mitigation strategy;

4. Updated invertebrate surveys and analysis using Pantheon, using a standard protocol, to assess target habitats/assemblages (to be determined following completion of 2020 survey and analysis, but currently anticipated to include: 'short sward and bare ground'; 'tall sward and scrub'; 'reed-fen and pools' and 'saltmarsh') in years 3, 5 and 10 following completion of the development; and

5. Update habitat surveys using a standard protocol to assess the success of the habitat enhancement, creation and management works in creating and maintaining the overall mosaic and mix of target habitat types in the desired proportions, in years 3, 5 and 10 following completion of the development.

5.2 Actions 1 to 3 above will include regular feedback loops to ensure that significant deviation from the desired outcome is corrected in a timely fashion.

5.3 Actions 4 and 5 above will be cross-referenced to identify trends in habitat proportions and the conservation status of the invertebrate assemblage, and the information used to review the ongoing habitat management and maintenance regime.

5.4 The results of any monitoring activity will be provided within the Annual Report described in the main body of the EMMF (Document reference 6.2.12.3).

[This page is intentionally left blank]

Chapter Six ◆ SUMMARY AND CONCLUSIONS

6.1 The Project Site contains a large complex of habitats offering a very diverse array of different micro-habitats and, accordingly, it supports a diverse range of terrestrial and aquatic invertebrate species. The invertebrate population present forms a major and important component of the Project Site's biodiversity.

6.2 The mosaic of habitats formed upon previously disturbed or made ground, which cover large portions of the Swanscombe Peninsula and the disused chalk pits in the Ebbsfleet Valley, meet the definition of Open Mosaic Habitats on Previously Developed Land (OMH).

6.3 The habitat mosaics of particular importance include:

- Dry habitats on made ground and/or hardstanding with well drained, generally nutrient-poor thin soils and supporting a mosaic of bare ground, early colonising/ephemeral vegetation, grassland and scrub; and

- Fresh water and brackish wetland habitats, predominantly comprising saltmarsh reedbed, and marshy grassland but including open water (ponds, ditches and streams).

6.4 Potential or actual adverse effects on the invertebrate population are anticipated as a result of the Proposed Development include loss, degradation and fragmentation of habitat during construction, and light and chemical pollution during the operational phase.

6.5 The overall aim in respect of the invertebrate population is to maintain the overall site-wide habitat mosaic, and associated diverse range of microhabitats and niches, foodplants and nectar sources, to meet the needs of the diverse range of invertebrates present on site.

6.6 The maintenance the existing range of microhabitats, foodplants and nectar sources associated with OMH will be primarily achieved by introducing greater variety and complexity within the areas of OMH that are to be retained in the Broadness Saltmarsh area.

6.7 In addition, 1.3ha brown roof habitat will be created using substrate originating from within the development footprint to replicate some of the OMH habitats which are being lost, and the quantum of saltmarsh habitat will be increased through managed retreat on the northern and eastern edge of Swanscombe peninsula.

6.8 A range of measures are proposed to mitigate the effects of loss of wetland habitat from within the development footprint, aimed at improving water quality, habitat diversity and complexity within the retained wetlands and the creation of new species-rich wetland habitat.

6.9 Habitat creation and enhancement for invertebrates will also be provided off-site as part of the mitigation package, including new areas of OMH and inclusion of invertebrate habitat features within other off-site habitat creation schemes associated with the Proposed Development, targeting other species requirements.

6.10 Further habitat of value to invertebrates will be provided within the amenity greenspaces within the resort itself, including native tree and shrub planting, wildflower strips, green roofs and walls on buildings and 'bug hotels'.

6.11 Measures are to be put in place to protect retained and new habitats from damage, disturbance or pollution during the construction and operational phases of the Proposed Development.

6.12 Subject to the development of this mitigation strategy in further detail, and its subsequent implementation in full throughout the delivery of the Proposed Development, the Nationally significant invertebrate population present at the Project Site can be safeguarded in the long-term.

Annex EDP 10
Rare Plant Mitigation Strategy

This page has been left blank intentionally

Revisions

Revision	Description	Issued by	Date	Approved by
r037_00	Issue for DCO Submission	JSp/ET	24/12/2020	EDP/LRCH

The Environmental Dimension Partnership Ltd
Tithe Barn
Barnsley Park Estate
Barnsley
Cirencester
Gloucestershire
GL7 5EG

[This page is intentionally left blank]

Contents

[This page is intentionally left blank]

List of Tables

[This page is intentionally left blank]

Chapter One ◆ INTRODUCTION, SITE CONTEXT AND PURPOSE

INTRODUCTION

1.1. This Rare Plant Mitigation Strategy has been prepared by the Environmental Dimension Partnership Ltd (EDP) on behalf of London Resort Company Holdings Limited. It considers the likely impacts of the Proposed Development on the rare plants recorded within the Kent Project Site and identifies the avoidance, mitigation, compensation and enhancement measures required to enable the Proposed Development to meet legislative and/or planning policy requirements and result in an overall biodiversity net gain.

1.2. The term 'rare' in the context of this strategy refers to those plants which are listed as being Nationally Scarce (occurring within 16-100 hectares (ha) in Great Britain) or Nationally rare (occurring in 15 or fewer hectares on the Vascular red plant list[1]). A brief overview of the baseline conditions a review of legislative and policy requirements for each rare plant recorded is provided within Chapter 3 of this report.

1.3. The land within the Project Site will be subject to a Development Consent Order (DCO) application for a world class destination entertainment resort with associated infrastructure, staff accommodation, dedicated access road, public amenity space and habitat creation. The application will be supported by an Environmental Impact Assessment (EIA), with this mitigation strategy provided as part of an overall Ecological Mitigation and Monitoring Framework (EMMF; Document reference 6.2.12.3) report which is provided as an appendix to Chapter 12 – *Terrestrial and Freshwater Ecology and Biodiversity* of the Environmental Statement (ES) (Document reference 6.1.12).

1.4. Detailed information on baseline conditions for a rare plant assemblage and survey methods employed is provided within the Ecology Baseline Report (Document reference 6.2.12.1). Detailed consideration of the likely significant effects of the Proposed Development upon a rare plant assemblage comprising Important Ecological Features (IEF) is provided within Chapter 12 of the Environmental Statement (Document reference 6.1.12).

SITE CONTEXT

1.5. The wider Project Site comprises two parts including the 'Kent Project Site' considered within this report, which includes land on the Swanscombe Peninsula, and the Ebbsfleet Valley, on the south side of the River Thames and is centred approximately at Ordnance Survey Grid Reference (OSGR) TQ 606 758. The second part of the Project Site is the 'Essex Project Site', which includes land to the east of the A1089 Ferry Road and the Tilbury Ferry Terminal and is centred approximately at OSGR TQ 643 752. The Project Site lies partly

[1] The Vascular Plant Red Data List for Great Britain - 2006 Cheffings, C. and Farrell, L. (Editors)

within three local planning authority areas (Dartford Borough and Gravesham Borough for the Kent Project Site, and Thurrock Council for the Essex Project Site). Collectively these two parts of the entire DCO boundary are referred to as 'the Project Site'.

1.6. The Project Site comprises a range of habitat types including woodland and scrub, grasslands of varying quality, salt marsh, intertidal zones, brownfield areas, running and standing water, chalk exposures and developed land. The rare plants considered within this mitigation strategy are those plants which have been recorded within the Kent Project Site.

PURPOSE

1.7. As described in further detail below, surveys undertaken across the Kent Project Site in 2020 have confirmed the presence of a number of rare plant species primarily associated with Open Mosaic Habitats (OMH) on Previously Developed Land, as well as within the ditch networks and more permanent areas of grassland. No detailed botanical surveys were deemed necessary on the Essex Project Site due to the lack of botanically rich habitats present.

1.8. Two of the rare plant species recorded are Species of Principal Importance as defined by Section 41 of NERC Act 2006, which places a duty on decision-makers such as public bodies, including local and regional authorities, to have regard to the conservation of such species when carrying out their normal functions. In addition, local and national planning policies require development to deliver a net gain for biodiversity. The presence of several nationally rare plant species are considered to form a major and important component of the Project Site's biodiversity.

1.9. In the absence of appropriate compensation and mitigation measures, the Proposed Development is considered likely to result in the loss of some plant species and reduction in the size and condition of populations of those species which remain within the DCO Order Limits.

1.10. This strategy therefore sets out the recommended advanced mitigation measures to be implemented during the pre-construction and construction phases of the Proposed Development to maintain these rare plant species on site. This strategy also sets out the recommended compensation, mitigation and enhancement measures, which are delivered through the EMMF (Document reference 6.2.12.3) secured as a requirement of the DCO.

Chapter Two ◆ SURVEY FINDINGS

SUMMARY OF BASELINE CONDITIONS

2.1 This section of the Mitigation Strategy should be read in conjunction with Figure 12.1 (Document reference: 6.3.12.1), which illustrates the Project Site Areas as referenced below. Figure 12.5 (Document reference: 6.3.12.5) identifies the locations of the rare plant species populations recorded within the Kent Project Site.

2.2 A detailed botanical survey of the Kent Project Site was previously undertaken by Chris Blandford Associates in 2016[2] which identified a number of rare plant species. This survey was updated by EDP in 2020 where the previously recorded rare plants species were searched for and their locations mapped as well as any other rare plant species not previously recorded.

2.3 As previously stated, the rare plants considered and included within an assessment during 2020 were those listed as being of conservation concern within The Vascular Plant Red Data List for Great Britain[3] (the Red List). However, further assessment of a plant's rarity at a National level was undertaken based on the Botanical Society of the British Isles (BSBI) amendments to this Red List[4]. The assessment of a plant's status at a county level (Kent) was also undertaken based on the draft Kent Rare Plant register documents[5] produced by the Kent Branch of the BSBI. However, it should be noted that draft accounts of some species were not available at the time of preparing this report. A summary of the plant's status at a national and local level is provided within **Table 2-1** below. Where a species is listed as a Priority Species on Section 41 of the NERC Act this is also shown. And lastly the ecological value of the plant at a geographical context is provided.

[2] Chris Blandford Associates (2016) London Paramount Entertainment Resort: Phase 1 and Botanical Survey Report

[3] The Vascular Plant Red Data List for Great Britain - 2006 Cheffings, C. and Farrell, L. (Editors)

[4] The Vascular Plant Red Data List for Great Britain: a summary of amendments in years 12 and 13 (2017-2018) of the annual amendments process. BSBI News 141

[5] Available from https://bsbi.org/kent. Accessed September 2020.

Table 2-1: Rare Plant National and Local Conservation Status

Species	Notes	National Status	County Status	Geographical Value
Man Orchid (*Orchis anthropophora*)	Previously recorded in 2016 but not recorded in 2020. Previous record suggests a limited distribution within the Kent Project Site. Area in which it was previously recorded has become overgrown and it is suspected the plant is still present and has become dormant	Nationally Scarce*/ Endangered** Priority species	In Kent the species is widespread and fairly frequent, and so it does not qualify as rare or scarce in Kent	County
Round-leaved Wintergreen (*Pyrola rotundifolia subsp. Maritima)*	Restricted distribution within the Kent Project Site, growing AT a single location at the west	Nationally Scarce*/ Least concern**	The species is very scarce in Kent	County
Bithynian vetch *(Vicia bithynica)*	Large population recorded on the north western boundary of the Kent Project Site growing on the sea wall	Nationally Scarce*/Vulnerable**	No assessment available	Local

Species	Notes	National Status	County Status	Geographical Value
Yellow Vetchling (*Lathyrus aphaca*)	Substantial populations exist within all areas of suitable habitat within the Kent Project Site	Nationally scarce*/Vulnerable**	In Kent the species is widespread and fairly frequent, and so it does not qualify as rare or scarce in Kent	Local
Hairy Vetchling (*Lathyrus hirsutus*)	Substantial populations exist within all areas of suitable habitat within the Kent Project Site	Nationally Rare*/ Vulnerable**	It is scarce in Kent.	County
Borrers Salt marsh grass (*Puccinellia fasciculata*)	Restricted distribution within the Project Site with a single population present at the north of the Kent Project Site	Nationally Scarce*/Near threatened**	In Kent it is neither rare nor scarce, although there is evidence of decline; but Kent holds more of this grass than any other county in the British Isles except Essex	Local
Stiff Salt marsh grass (*Puccinellia rupestris*)		Nationally Scarce*/Least concern**	The species is neither rare nor scarce in Kent	Local
Sickle Clover (Medicago sativa subsp. Falcata)	Difficulties with identification mean that the record of this plant is not certain	Nationally scarce*/Least concern**	No assessment available	Local

Species	Notes	National Status	County Status	Geographical Value
Divided sedge (*Carex divisa*)	Restricted distribution with the Kent Project Site, occurring at a single location on a former playing field to the east	Nationally scarce*/Vulnerable** Priority species	In Kent it is quite common in low coastal areas and no county designation of scarcity is appropriate	Local
Brackish water crowfoot (*Ranunculus baudoti*)	Restricted distribution with the Kent Project Site, occurring in a small cluster of ditches	Least concern**	No assessment available	Local

* A Vascular Plant Red List for Great Britain ** The Vascular Plant Red Data List for Great Britain, revised February 2019

2.4 As is shown in Table 2-1, the majority of plants, although considered to be of some conservation concern at a national level, are actually locally abundant within Kent, with Kent providing a strong hold for some populations of these species. The populations of these rare plants on the whole occupy areas of open grassland within the Kent Project Site. These areas of open grassland form a mosaic with other habitats and within other appendices this area as a whole is referred to as OMH.

2.5 The Round-leaved Wintergreen *Ssp. Maritima* requires further comment as this subspecies is particularly rare in Kent. This subspecies is largely recorded on the western coast of Great Britain and has only been recorded at two locations within Kent. All other records of round-leaved wintergreen within Kent are the *ssp rotundifolia*. The population of *ssp maritima* within the Kent Project Site is well documented, having first been seen at Bamber Pit in 1976.

SUMMARY OF RELEVANT LEGISLATION AND REQUIREMENT FOR LICENSING

2.6 As noted above, the Project Site supports two Species of Principal Importance as defined by Section 41 of NERC Act 2006. Whilst this does not equate to strict legal protection of individuals of a species, the NERC Act places a duty on decision-makers such as public bodies, including local and regional authorities, to have regard to the conservation of such species when carrying out their normal functions.

2.7 None of the remaining species receive any specific legal protection or direct policy protection, however, public bodies have a duty to ensure developments achieve a biodiversity net gain and the rare plants within the Project Site are considered to provide a significant contribution to the sites biodiversity.

2.8 No licences are required as part of the development and implementation of any mitigation measures in respect of rare plants.

SUMMARY OF PLANT SUSCEPTIBILITIES TO IMPACTS

2.9 When considering potential impacts on the rare plants which have been recorded within the Kent Project Site it is important to take into account the varying physiological adaptations of these plant species to their environments. With regards to those rare plants recorded these physiological adaptions can largely be divided into:

- Those plants which occupy transitional habitats or habitats subject to regular disturbance; and
- Those plants which occupy more stable environments.

2.10 Those plants which occur within the more transitional or disturbed habitats tend to be annual or biannual and/or produce a large amount of seed with a relatively long-lived seed bank, with seed germinating once suitable conditions exist. Those plants which occur in more stable plant communities tend to be perennial, have fewer seeds as well as tending to propagate vegetatively.

2.11 Following these very broad classifications, the rare plants recorded within the Kent Project Site can be grouped as detailed within Table 2-2.

Table 2-2: Plant Susceptibility to Impacts

Perennial Plants of More Stable Plant Communities	
Man Orchid	Perennial. Slow at colonising new areas by seed as the plant is mycorrhizal and dependent on the presence of fungal associates for germination and establishment Plants take a number of years from germination to first flowering. Mature plants can become dormant for a number of years if conditions become unfavourable such as lack of grazing or scrub encroachment.
Round-leaved Wintergreen	Perennial. Seed is wind dispersed. However, the plant is mycorrhizal, dependent on the presence of fungal associates for germination and establishment. Within Kent *ssp. rotundifolia* is associated *Salix caprea.* However, it has been observed[6] that *Pyrola rotundifolia ssp maritima* elsewhere in the UK is often found in association with heavily-disturbed landscapes that have had several decades to develop a semi-natural plant community and thus the species may be adventitious in its origins.
Divided Sedge	Perennial. Can spread by seed but also spreads vegetatively through a creeping rhizome.

[6] Personal communication with Phil Quin September 2020.

Annual/biennial and Short Lived Perennial Plants of More Disturbed Plant Communities	
Bithynian vetch	Annual
Yellow Vetchling	Annual
Hairy Vetchling	Annual
Borrer's Saltmarsh grass	Short lived perennial
Stiff Saltmarsh grass	Annual or biennial
Sickle Clover	Perennial. Exists within dry open grassland
Brackish water crowfoot	Annual or perennial and can spread vegetatively from stem and leaf fragments

2.12 In consideration of the summary provided in Table 2-2, it is likely that those species adapted to more disturbed transitional habitats are less susceptible to impacts resulting from construction than those species dependent on more stable environments. Further consideration of these potential impacts is provided below.

Chapter Three ◆ IMPACT ASSESSMENT IN ABSENCE OF MITIGATION OF COMPENSATION

3.1 The following information provides a summary of the anticipated significant positive and negative effects on the rare plants recorded within the Kent Project Site. The assessment takes into consideration the role of inherent mitigation embedded within the design of the Proposed Development. Additional avoidance, mitigation, compensation and enhancement measures required to address residual effects (additional to that provided by inherent mitigation alone) is provided in the subsequent section.

Summary of Relevant Inherent Mitigation Measures

3.2 The following information provides a summary of the anticipated significant effects on the rare plant populations within the Kent Project Site. The assessment takes into consideration the role of inherent mitigation embedded within the design of the Proposed Development.

3.3 The inherent mitigation proposed includes the retention of the following key areas of habitat:

- 0.3ha of OMH habitats within the eastern portion of Broadness Saltmarsh;
- Approximately 7ha saltmarsh on the north-west and north-east fringes of the Swanscombe Peninsula;
- Black Duck Marsh on the western side of Swanscombe Peninsula; and
- Botany Marsh on the eastern site of Swanscombe Peninsula.

3.4 The location of these areas is shown on Figure 11.15 (Document reference 6.3.11.15). The purpose of these retained areas is to avoid and mitigate for impacts on a number of protected species, the baseline conditions for which are detailed within the Ecological Baseline Report (Document reference 6.2.12.1) and associated annexes.

3.5 During the operational phase of development, these retained areas will not be open to the general public, except for footpaths which are to be used by the existing residents. It is considered very unlikely that visitors to the Proposed Development will access the retained area of habitat.

IMPACT ASSESSMENT

3.6 The following information provides a summary of the anticipated significant positive and negative effects on the population of rare plants within the Kent Project Site. The assessment takes into consideration the role of inherent mitigation as described above.

CONSTRUCTION PHASE

3.7 The following construction phase effects are anticipated in relation to plants:

- Direct loss, damage or degradation;
- Habitat fragmentation;
- Light pollution; and
- Pollution incidents and dust deposition.

OPERATIONAL PHASE

3.8 The following operational phase effects are anticipated in relation to plants:

- Use of herbicides and/or pesticides, e.g. within the formal landscaping in the main resort, and subsequent drift into adjacent retained habitats;
- Hydrological effects, including changes to water quality/quantity; and
- Positive effects arising from implementation of a suitable management regime across the retained parts of the Kent Project Site which will maintain and enhance the site-wide mosaic of habitats currently present.

Chapter Four ◆ MITIGATION AND COMPENSATION STRATEGY

4.1 The overall aim in respect of rare plants is to maintain their presence within the Kent Project Site and to ensure any populations are allowed to expand within the Kent Project Site.

4.2 The following should be read in conjunction with Figure 11.15 (Document reference: 6.3.11.15) and Figure 12.44 (Document reference: 6.3.12.44), which illustrate the overall vision with respect to habitat provision for rare plants and a range of other wildlife species.

ADDITIONAL MITIGATION

Construction

Advanced Mitigation Measures

4.3 As a general principle, habitat enhancement and creation works will take place in advance of construction works (and associated habitat losses) to ensure robust populations of the rare plants are present and that there has been a sufficient contribution to the seed bank during any intervening period between determination of the DCO application and construction works commencing.

4.4 Habitat enhancement measures are proposed which are largely aimed at protected and notable non-plant species but will have direct benefits for some of the rare plants recorded. In particular the proposed habitat enhancement measures for invertebrates summarised below will also create and maintain ideal growing conditions for many of the annual species:

- Creation of bare ground scrapes through mechanical removal of topsoil to reveal the substrate beneath. Individual scrapes should be between 10 and 50m^2 in size and have a mainly southerly aspect (but with some variation) and positioned at least 20m from any footpaths/trails to prevent future trampling/disturbance Upon completion of works bare ground should comprise approximately 5% of the OMH habitat area;

- Creation of piles/mounds of mixed crushed and coarse concrete rubble, e.g. salvaged from existing piles, or derived from breaking up existing concrete hardstanding, within the construction footprint. At least 20 piles, approximately 5m long x 3m wide x 0.5m high, will be created in scattered locations around the retained OMH habitats and positioned at least 20m from any footpaths/trails; and

- Creation of mounds and low bunds using chalk ballast material derived from construction works or tunnelling activities within the disused chalk pits. At least 20 chalk mounds/bunds, approximately 6m long x 2m wide x 0.5m high, with the long axis

generally orientated west to east but with some variation, will be created in scattered locations around the retained OMH habitats and positioned at least 20m from any footpaths/trails.

4.5 In addition to the above, wetland areas comprising 7.5ha of reedbed and 5.7km of ditch and bankside habitat are to be created to provide compensatory habitat for water voles and invertebrates, which will provide habitat for brackish water crowfoot.

4.6 Additional, species-specific management is required prior to construction works commencing in relation to man orchid as set out below.

4.7 Man orchid was not recorded in 2020 and there is a possibility that the plant/s have become dormant owing to scrub encroachment. As such the scrub within the area in which man orchid was previously recorded should be removed at least two years/two growing seasons before construction works commence. Scrub should be removed using hand-held machinery only to avoid compacting the soil in this area. Immediately prior to construction works a survey should then be undertaken in May when the plant is flowering. All plants will then be marked with an appropriate stake/peg so that they can be found again once the plant material has died back.

PHYSICAL PROTECTION MEASURES

4.8 An Ecological Protection Zone (EPZ) will be established to protect the retained areas of habitat. An EPZ with a 5m buffer will also be established around all retained wetland habitats throughout the construction phase. The EPZs can be delivered through co-ordination with protective measures for other ecological and arboricultural features, combined with temporary protective fencing and signage, as detailed within the main body of the EMMF (Document Reference 6.2.12.3). Such measures will be detailed within an Ecological Construction Method Statement to be included within a Construction Environmental Management Plan secured as a requirement of the DCO.

ENVIRONMENTAL AND POLLUTION PREVENTION MEASURES

4.9 Measures to prevent pollution incidents will follow the recommendations set out in the Environment Agency's Pollution Prevention Guidelines (PPGs), or other best practice guidance available at the time of works.

4.10 Detailed pollution prevention measures are provided in the EMMF (Document reference 6.2.12.3) and associated Construction Environmental Management Plan (CEMP; Document reference 6.2.3.2). However, in summary these will include:

- Measures to be implemented to prevent and deal with pollution incidents;
- Security to prevent vandalism-related pollution incidents;
- Drip trays and bunds around fuel storage and refuelling areas;
- Appropriate wheel washing facilities and road cleaning regime; and

- Silt fencing and settlement lagoons/soakaways to prevent silt runoff.

4.11 Standard dust suppression measures will also be implemented throughout construction works.

Species-Specific Mitigation Measures

4.12 Specific mitigation measures for man orchid, round-leaved wintergreen, Bithynian vetch and brackish water crowfoot are to be undertaken at the start of construction works as detailed in the following sections.

Man Orchid (if present)

4.13 If man orchid has been recorded within the Kent Project Site following scrub removal, then the following measures will be undertaken.

4.14 Plants are to be excavated when the plant is dormant and there is a decreased risk of prolonged dry spells (typically September to March). Plants are unlikely to have any above ground vegetation at this time and therefore it is important that the location of the plants are marked with stakes when they are actively growing.

4.15 There is limited published data on the translocation of orchids. Established mature plants are not dependent on mycorrhizal fungus to continue growing, however, the ability of any translocated plants to spread by seed within the areas they are translocated to is. It is therefore important that as much of the soil is translocated as possible along with the plant itself to ensure successful translocation of the mycorrhizal fungi; the man orchid itself grows from an underground rhizome and does not have an extensive root system.

4.16 A suitable location for the translocation of any man orchid plants is to be agreed prior to translocation by a suitably qualified ecologist. The area in which it is to be translocated to must have a similar topography and soil conditions to that of where it is presently growing.

4.17 In consideration of the above the following measures are to be undertaken to translocate the man orchid plants:

- Ecological Clerk of Works (ECOW) to oversee excavation works;
- Area in which plants are to be translocated to is to be excavated using a toothed bucket with holes approximately $1m^3$ excavated;
- Plants to be dug out as individuals or group using a large toothed bucket such that approximately $1m^3$ of topsoil is excavated in one movement;
- Excavated plants to be carried within digger bucket to translocation area;
- Translocated plants to be placed in pre-excavated holes;
- If possible, weed species such as dock and seedlings of scrub species are to be

removed;

- Area in which the plant is translocated to is to be fenced off with rabbit proof fencing for the first growing season; and

- Plant and are to be regularly inspected and are to be water during extended dry period (periods of no rain for 2-3 weeks).

Round-leaved Winter Green

4.18 There is limited published data on the translocation of round-leaved winter green. However, this plant is, in some respects, similar to man orchid, growing from an underground rhizome and having seeds dependent on mycorrhizal fungi for germination. This plant is evergreen and therefore easy to locate at most times of the year. Translocation of this plant will therefore be undertaken in accordance with the measures set out above for man orchid with a suitable location for the translocation of plant to be agreed prior to translocation by a suitably qualified ecologist. The area in which it is to be translocated to must have a similar topography and soil conditions to that of where it is presently growing.

Bithynian Vetch

4.19 The turves and top 150-300mm of topsoil on top of the sea wall is to be removed to facilitate required works to the sea wall whilst ensuring the retention of Bithynian vetch. Translocation and re-instatement of the turfs is to be undertaken as follows:

- Prior to commencement of works, an area of the site which could accommodate the turves is to be selected by the appointed ECOW. Existing vegetation in this area will be scraped back to leave bare subsoil;

- Turves and topsoil are to be removed using a suitably sized excavator in the Autumn and Winter months after the Bithynian vetch has set seed and before the seed germinates in the Spring;

- Turfs are to be laid edge to edge to minimise the amount of exposed soils;

- Turfs should be laid back on the completed sea wall as identified in Figure 12.44 (Document reference: 6.3.12.44) before Spring. Once in place turfs are to be regularly inspected and are to be watered during extended dry period (periods of no rain for 2-3 weeks); and

- If there is a delay in works such that turfs cannot be re-instated before Spring then turves should be left in place until the following Autumn, allowing any plants which have germinated in the interim period to sett seed.

Brackish Water Crowfoot

4.20 Prior to the destruction of the ditches in which brackish water crowfoot has been recorded the silt from the ditch and any plant material of the crow foot is to be removed using a suitably sized excavator and placed within the newly created ditch and pool network. This should allow for sufficient seed and plant material to be translocated to these new areas.

OPERATIONAL PHASE

Habitat Enhancement

4.21 The principles of management activities to maintain or enhance all of the retained and new habitats within the Project Site is provided in Section 6 of the main EMMF (Document reference 6.2.12.3), with the monitoring activities required to ensure management and maintenance activities achieve their required outcomes is provided in Section 7 of the EMMF. The management objectives in relation to rare plant habitats are summarised below.

OMH Habitats

4.22 Following the advanced enhancement of the retained OMH habitats described above, the value of these habitats for plants will be maintained and/or further enhanced through periodic vegetation clearance and/or creation of new bare ground scrapes to maximise habitat complexity. The frequency of these interventions will depend on rates of recolonisation/regrowth, which will be determined through post-construction monitoring (discussed below). However, the aim is to achieve and maintain the overall mosaic of habitat in the following approximate proportions:

- Bare ground and shallow pools – 10%;
- Sparsely vegetated ground (less than 20% cover) – 10%;
- Sparsely vegetated ground (20-60% cover) – 10%;
- Open species-rich grassland (more than 60% cover) – 25%;
- Species-rich grassland with scattered scrub – 20%; and
- Dense scrub – 25%.

4.23 In addition to the above, 20% of each rubble pile created in the OMH habitat areas will be mechanically disturbed/turned over every 5 years, on rotation which will create areas of disturbed ground suitable for annual species to become established.

4.24 It is not proposed to apply seed to bare ground or mounds/piles of chalk and rubble as it is anticipated that these will naturally colonise with a variety of plant species already present on-site.

Wetland Habitat

4.25 Retained wetland habitat will be managed as per the following to create areas of open water suitable for brackish water crowfoot:

- Rotational management of scrub to maintain a continuity of supply but prevent excessive regrowth/encroachment;
- Rotational cutting of reed vegetation to create a variety in age and structure; and
- Improve water quality in retained habitats though removal of or separation from contaminants through a surface water management strategy including a sustainable urban drainage system (SuDS) and associated treatment train.

Control of Chemical Usage

4.26 The management and maintenance schedules for the formal landscaping and amenity spaces within the main resort area will include measures to minimise, or avoid altogether, the use of herbicides and pesticides which could be harmful to the offsite habitats either by causing direct mortality or altering the botanical composition of the habitats.

4.27 Should it not be feasible to avoid chemical use altogether, any usage/application of herbicides and pesticides will be undertaken a minimum of 50m from the natural habitats retained/enhanced/created outside of the main resort area.

Chapter Five ◆ MONITORING AND WORKS SCHEDULE

5.1 Key monitoring actions to measure the success of the mitigation strategy for plants are as follows:

1) Site visits/checks by the Project Ecologist/ECoW prior to, at key stages during (at least monthly), and at the end of the advanced habitat enhancement phase(s) to ensure these works have been implemented in accordance with the proposed mitigation strategy;

2) Site visits/checks by the Project Ecologist/ECoW prior to, at key stages during (at least monthly), and at the end of the construction phase(s) to ensure measures to protect retained habitat from physical damage and/or pollution are implemented and maintained;

3) Site visits/checks by the Project Ecologist/ECoW prior to, at key stages during (at least monthly), and at the end of the post-construction landscaping phase(s) to ensure measures to create new habitats or enhance existing habitats have been implemented in accordance with the proposed mitigation strategy; and

4) Update habitat surveys using a standard protocol to assess the success of the habitat enhancement, creation and management works in retaining the rare plants within the site. Surveys to be undertaken in years 3, 5 and 10 following completion of the development.

5.2 Actions 1 to 3 above will include regular feedback loops to ensure that significant deviation from the desired outcome is corrected in a timely fashion.

5.3 Action 4 will allow for a review the ongoing habitat management and maintenance regime and where declines in plants species are noted this will result in changes to the management regime if appropriate.

5.4 Such measures, where they relate to the construction phase, will be detailed within an Ecological Construction Method Statement to be included within a Construction Environmental Management Plan secured as a requirement of the DCO. Long-term measures to be delivered during the operational phase will be secured through the EMMF and Landscape Management Plan (Document reference 6.2.11.8) secured as a requirement of the DCO.

5.5 The results of any monitoring activity will be provided within the Annual Report described in the main body of the EMMF (Document Reference 6.3.12.3).

[This page is intentionally left blank]

Chapter Six ◆ SUMMARY AND CONCLUSIONS

6.1 The Kent Project Site supports a number of nationally rare plant species although the majority of these plants have a strong hold within Kent and at the local level are relatively common and widespread. However, given that Kent is the only location where these plants are abundant, places a greater importance on conserving those populations. No rare plants are present on the Essex Project Site.

6.2 Potential or actual adverse effects on the rare plants anticipated as a result of the Proposed Development include loss and reduction in population extent during construction. The overall aim in respect of the rare plants is to maintain their presence within the Kent Project Site and to allow for the natural colonisation of newly created habitats.

6.3 This aim is to be achieved through the retention of habitat and appropriate management of these areas and newly created areas and where required translocation of plants to suitable retained areas of habitat.

6.4 Measures are to be put in place to protect retained and new habitats from damage, disturbance or pollution during the construction and operational phases of the Proposed Development with the amendment of retained and created habitats secured for the long-term.

6.5 Subject to the development of this mitigation strategy as the detailed design of each phase of Proposed Development progresses, and its subsequent implementation in full throughout the delivery of the Proposed Development, the rare plants present at the Project Site can be safeguarded in the long-term.

[This page is intentionally left blank]

Annex EDP 11
Non-native Invasive Plant Mitigation Strategy

This page has been left blank intentionally

Revisions

Revision	Description	Issued by	Date	Approved by
r041_00	Issued for DCO Submission	JG/ET	24/12/2020	EDP/LRCH

The Environmental Dimension Partnership Ltd
Tithe Barn
Barnsley Park Estate
Barnsley
Cirencester
Gloucestershire
GL7 5EG

[This page is intentionally left blank]

Contents

[This page is intentionally left blank]

Chapter One ◆ INTRODUCTION, SITE CONTEXT AND PURPOSE

INTRODUCTION

1.1. This Non-native Invasive Plant Species Mitigation Strategy has been prepared by the Environmental Dimension Partnership Ltd (EDP) on behalf of London Resort Company Holdings Limited. It provides an overview of the likely mitigation measures required to meet legislative and/or planning policy requirements to manage and/or eradicate those non-native invasive plant species which have been recorded within the Project Site.

1.2. The land within the Project Site will be subject to a Development Consent Order (DCO) application for a world class destination entertainment resort with associated infrastructure, staff accommodation, dedicated access road, public amenity space and habitat creation. The application will be supported by an Environmental Impact Assessment (EIA), with this report provided as part of an overall Ecological Mitigation and Monitoring Framework (EMMF) (Document Reference 6.2.12.3) report which is an appendix to the Environmental Statement (ES).

1.3. Detailed information on baseline conditions and survey methods employed is provided within the Ecology Baseline Report (Document Reference 6.2.12.1). Detailed consideration of the likely significant effects of the Proposed Development is provided within Chapter 12 - *Terrestrial and Freshwater Ecology and Biodiversity* of the Environmental Statement (ES) (Document Reference 6.1.12).

SITE CONTEXT

1.4. The Project Site comprises two parts including the 'Kent Project Site', which includes land on the Swanscombe Peninsula, and the Ebbsfleet Valley, on the south side of the River Thames and is centred approximately at Ordnance Survey Grid Reference (OSGR) TQ 606 758, and the 'Essex Project Site', which includes land to the east of the A1089 Ferry Road and the Tilbury Ferry Terminal and is centred approximately at OSGR TQ 643 752. The Project Site lies partly within three local planning authority areas (Dartford Borough and Gravesham Borough for the Kent Project Site, and Thurrock Council for the Essex Project Site). Collectively these two parts of the entire DCO boundary are referred to as 'the Project Site'.

1.5. The Project Site comprises a range of habitat types including woodland and scrub, grasslands of varying quality, salt marsh, intertidal zones, brownfield areas, running and standing water, chalk exposures and developed land.

PURPOSE

1.6. Surveys undertaken across the Project Site in 2012, 2019 and 2020 have confirmed the presence of a number of non-native invasive plant species listed on Schedule 9 of the Wildlife and Countryside Act (as amended) and Schedule 2 of the Invasive Alien Species (Enforcement and Permitting) Order 2019.

1.7. In the absence of appropriate compensation and mitigation measures, the Proposed Development is considered likely to result in the further spread of these plants within the Project Site and wider landscape.

1.8. This strategy therefore sets out the recommended mitigation measures to be implemented during the pre-construction and construction phases of the Proposed Development to manage, and where feasible, eradicate those non-native plant species present within the Project Site. It also provides measures to prevent the colonisation of non-native plant species during the operational phase of the development.

Chapter Two ◆ SURVEY FINDINGS

OVERVIEW AND SURVEY RESULTS

2.1 The desk study and ecological surveys of the Project Site have recorded the presence of several non-native invasive plant species including: Japanese knotweed (*Fallopia japonica*); giant hogweed (*Heracleum mategazzianum*); Himalayan balsam (*Impatiens glandulifera*); and wall cotoneaster (*Cotoneaster horizontalis*), at various locations within the Project Site.

Summary of Relevant Legislation and Requirement for Licensing

2.2 Those plant species which are considered to be non-native to the UK and present a threat to biodiversity or commercial interests are listed within Schedule 9 of the Wildlife and Countryside Act 1981 as amended. Under the Act it is illegal to plant or otherwise cause to grow in the wild any plant listed in Schedule 9 of the Act. Japanese knotweed, giant hogweed, Himalayan balsam and wall cotoneaster are all listed within Schedule 9.

2.3 Those plant species which are considered to be non-native and a threat to biodiversity and commercial interest at a European level are listed on Schedule 2 of the Invasive Alien Species (Enforcement and Permitting) Order 2019. Under the act it is an offence to plant or otherwise cause to grow in the wild any species of plant which is included in Schedule 2. Himalayan balsam and giant hogweed are both listed under Schedule 2.

2.4 Japanese knotweed and giant hogweed are identified as controlled waste under the Environmental Protection Act 1990. Plant material and soils likely to contain these species is to be disposed as controlled waste and removal and transport offsite must be undertaken by a licenced carrier and disposed of at a licenced facility.

[This page is intentionally left blank]

Chapter Three ◆ IMPACT ASSESSMENT IN ABSENCE OF OR COMPENSATION

3.1 The following information provides a summary of the anticipated significant negative effects on the presence of non-native invasive plant species within the Project Site.

CONSTRUCTION PHASE

3.2 The following construction phase effects are anticipated in relation to non-native invasive plant species:

- Dispersal of plant material through direct damage of plants allowing vegetative spread, particularly in relation to Japanese knotweed;
- Dispersal of seeds thorough movement of soils and construction traffic; and
- Creation of disturbed soils allowing for colonisation by non-native invasive plant species.

OPERATIONAL PHASE

3.3 The operational phase effect of continued unchecked spread of invasive plant resulting in a loss of biodiversity within retained and newly created habitats is anticipated in relation to non-native invasive plant species.

[This page is intentionally left blank]

Chapter Four ◆ MITIGATION AND COMPENSATION

4.1 The overall aim in respect of the invasive non-native plant species is to prevent their further spread within and beyond the Project Site and where possible eradicate them from the Project Site.

SUMMARY OF MITIGATION

4.2 During the advanced works prior to construction commencing Japanese knotweed, giant hogweed, Himalayan balsam and wall cotoneaster within the Project Site are to be mapped and a suitable strategy for their removal developed prior to construction. Any programme of eradication will need to take into account the varying treatment approaches specific to each plant and the construction timetable as summarised below. The treatment/ eradication of invasive non-native plant species will be detailed within the Construction Environmental Management Plan to be secured as a requirement of the DCO.

4.3 On a precautionary basis, and subject to detailed survey work all soils within 10m of an invasive plant is to be considered contaminated and not to be used within any landscaping schemes or otherwise spread across or removed from the Project Site. No construction traffic or personnel are permitted to enter this area without appropriate biosecurity measures in place.

4.4 When an invasive species is being removed biosecurity measures must be adhered to within the working area around the plant to prevent the spread of plant material on machinery, personnel's clothing, etc. All works in relation to non-native invasive species is to be undertaken by an appropriately experienced contractor or over seen by such a person.

4.5 Further specific measures in relation to those non-native invasive species which have been recorded is provided below.

JAPANESE KNOTWEED

4.6 Plants unaffected by construction works are to be fenced off, with fencing placed at least 7m from the crown of each plant. Herbicide is to be applied as directed by a specialist, likely involving stem injection of herbicide applied in the Autumn months. Typically, several treatments over a 3-4 year period are required before the plant is killed off. Fencing around each plant is to remain in place throughout this period.

4.7 Japanese knotweed growing within construction areas will require more immediate removal to allow construction works to commence. Given that areas of habitat are being retained on site it is considered that excavation of the plant and burial on site is the most effective method of treatment. Excavated material is to be placed at a sufficient depth

and, where required, within an excavation lined with root barrier or similar woven material as per best practice guidelines.

4.8 The burial area will not be near any watercourses and accurate records of the burial area will be kept and maintained and, if required, submitted to the Environment Agency.

GIANT HOGWEED

4.9 Plants in retained areas are to be fenced off. Giant hogweed is wind dispersed and can spread a significant distance from the parent plant. In addition, the plant has several growth forms from germination through to flowering with plants taking 3-4 years to flower from germination. After flowering the plant dies. Therefore, a person experienced in identifying all growth stages will undertake a survey of the Project Site in April/May when seedlings are germinating to record the full extent of the plant. The area in which they are growing will be fenced off. Subsequently plants will be subject to herbicide treatment in April/May prior to mature plants setting seed.

4.10 The giant hogweed seed bank is very long-lived, persisting in soils for up to 20 years. As such herbicide treatment will need to be undertaken on an annual basis for this period of time.

4.11 Plants growing in any construction areas will need to be removed prior to works commencing. This will require removal of mature and semi-mature plants as well as removal of the top 50cm of topsoil in areas suspected to contain giant hogweed seed. The area of soil to be removed will be informed by survey work undertaken by a person experienced in identifying all growth stages, during April/May when seedlings are germinating, to record the full extent of the plant.

4.12 As giant hogweed and soil containing giant hogweed material is classified as controlled waste any soils and plant material removed will be buried on site as per the requirements for Japanese knotweed.

HIMALAYAN BALSAM

4.13 Himalayan balsam is difficult to eradicate from sites without identifying and removing the source population. This species is dispersed by seed which are typically transported along the watercourses along which it grows. Therefore, the source populations can be several kilometres away from a site. As such, a strategy for the Project Site will be focused on its management rather than eradication from the Project Site.

4.14 Himalayan balsam has a relatively short-lived seed bank and being an annual species is best dealt with by stimming or hand pulling in May/June before the plant flowers and sets seed. Cut/pulled material is to be left *in-situ*. Management of Himalayan balsam will form part of the annual management regime for the Project Site.

WALL COTONEASTER

4.15 There is limited published guidelines on the control of cotoneaster species, a species which is readily dispersed by seeds. The species is a woody species which does not readily propagate vegetatively. It also has relatively waxy leaves and a woody stem such that herbicide treatment is difficult to effectively apply. It is therefore recommended that cotoneaster is uprooted from where it is growing and left to dry out and decompose naturally.

[This page is intentionally left blank]

Chapter Five ◆ MONITORING AND WORKS SCHEDULE

5.1 Key monitoring actions to measure the success of the mitigation strategy for non-native invasive plant species are as follows, with further details to be provided in the CEMP secured as a requirement of the DCO:

1) Site visits/checks by the Project Ecologist/Ecological Clerk of Works (ECoW) prior to, at key stages during (at least monthly), and at the end of the construction period to ensure these works have been implemented in accordance with the proposed mitigation strategy;

2) Site visits/checks by the Project Ecologist/ECoW on a yearly basis to ensure the management and eradication programme is being implemented and is effective. prior to, at key stages during (at least monthly), and at the end of the construction phase(s) to ensure measures to protect retained habitat from physical damage and/or pollution are implemented and maintained; and

3) Updated surveys using a standard protocol to assess the success of the management and eradication programme in years 3, 5 and 10 following completion of the development. During this survey the spread of any additional non-native species previously not recorded within the Project Site will be identified and appropriate measures implemented to control their spread.

[This page is intentionally left blank]

Chapter Six ◆ SUMMARY AND CONCLUSIONS

6.1 The Project Site contains Japanese knotweed, giant hogweed, Himalayan balsam and wall cotoneaster at various locations within the Project Site (as shown on Figure 12.4; Document Reference 6.3.12.4) which potentially will continue to spread across the Project Site, reducing its overall biodiversity value.

6.2 The overall aim in respect of these species is to prevent their further spread and where possible eradicate them from the Project Site.

6.3 Subject to the development of this mitigation strategy in further detail, and its subsequent implementation in full throughout the delivery of the Proposed Development, the non-native invasive plant species currently present can be managed to reduce their impact on the Project Site's biodiversity.

[This page is intentionally left blank]

Annex EDP 12
Timetable of Works

This page has been left blank intentionally

edp5988_r042a Ecological Mitigation and Management Framework Timetable

Optimal

Sub-optimal

Task	Notes	Timings	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Construction														
General Measures														
Toolbox talk			Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Installing fencing around ecological protection zones		Undertaken before construction works commence	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Walkover survey		Once per month	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Invasive non-native plant species (INNPS)														
Update INNPS survey		Undertaken before construction works commence				Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Sub-optimal		
Fencing off of INNPS		Undertaken before construction works commence	Sub-optimal	Sub-optimal	Sub-optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Sub-optimal	Sub-optimal	Sub-optimal
Treatment/removal of INNPS	Exact timing is specific to each species present	Ongoing process undertaken throughout construction peroid	Sub-optimal	Sub-optimal	Sub-optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Sub-optimal	Sub-optimal	Sub-optimal
Rare Plants														
Creation of bare ground scrapes		Undertaken before construction works commence	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Creation of mixed, crushed and coarse concrete rubble		Undertaken before construction works commence	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Creation of chalk ballast mounds		Undertaken before construction works commence	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Removal of scrub in area which man orchid was previously recorded		To be completed two growing seasons prior to translocation	Optimal	Optimal	Optimal							Optimal	Optimal	Optimal
Man Orchid translocation	Only required if present after scrub removal	Undertaken before construction works commence	Optimal	Optimal	Optimal						Optimal	Optimal	Optimal	Optimal
Round-leaved winter green translocation		Undertaken before construction works commence	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Preparation of Bithynian Vetch receptor site		Undertaken before construction works commence	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Removal of Bithynian Vetch turfs		During construction peroid	Optimal	Optimal								Optimal	Optimal	Optimal
Reinstatement of Bithynian Vetch turfs		During construction peroid	Optimal	Optimal								Optimal	Optimal	Optimal
Brackish water crowfoot translocation		Undertaken during destuction of ditches	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Water Vole														
Creation of water vole mitigation area	To be completed at least 12 months prior to translocation to allow vegetation to establish	Undertaken before construction works commence	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Pre-commencement survey	2 visits to be undertaken 2 months apart	Undertaken before construction works commence					Optimal	Optimal	Optimal	Optimal	Optimal			
Obtain licence from Natural England	Must be obtained prior to commencement of works	Undertaken before construction works commence	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Mink survey	Mink must be removed prior to water vole capture	Undertaken before construction works commence	Optimal	Optimal	Optimal						Optimal	Optimal		
Water vole Translocation		Undertaken before construction works commence			Optimal	Optimal						Sub-optimal	Sub-optimal	Sub-optimal
Destructive search		Undertaken before construction works commence			Optimal	Optimal						Sub-optimal	Sub-optimal	Sub-optimal
Displacement of water voles	Displacement can only be undertake between 15th February and 15th April	Undertaken before construction works commence		Optimal	Optimal	Optimal								
Otter														
Pre-commencement survey	Check for presence of holts within works area	Undertaken before construction works commence	Optimal	Optimal	Optimal	Optimal	Sub-optimal	Sub-optimal	Sub-optimal	Sub-optimal	Sub-optimal	Optimal	Optimal	Optimal
Obtain licence from Natural England	If holts found during pre-clearance surveys	Undertaken before construction works commence	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Provision of artificial holt x 2		In place prior to habitat clearance	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Harvest Mouse														
Pre-commencement check		Undertaken prior to vegetation clearance	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Clearance of vegetation within harvest mouse areas					Optimal	Optimal	Optimal	Optimal						
Reptiles														
Reptile surveys	Only required if construction works have not started within 2 years of previous survey work (2020)	Undertaken before construction works commence				Sub-optimal	Optimal	Optimal	Sub-optimal	Sub-optimal	Optimal	Sub-optimal		
Enhancement of retained habitat		Undertaken before construction works commence				Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal		
Offsite receptor site improvement works	TBC	To be completed 6 months prior to start of translocation				Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal		
Reptile fence installation		Undertaken before construction works commence				Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal		
Vegetation strimming	To be completed immeadiately prior to translocation	Undertaken before construction works commence				Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal		
Reptile translocation	Minimum of 30 days, requires 5 clear days before translocation ends	Undertaken before construction works commence				Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal		
Destructive search	Upon completion of translocation	Undertaken before construction works commence				Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal		
Invertebrates														
Creation of invertebrate mitigation area		Undertaken before construction works commence	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Broadness Saltmarsh enhancement		Undertaken before construction works commence												
Creation of brown roofs	To be created from the concrete, rubble and chalk substrate derived from construction	Undertaken during construction peroid	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Creation of saltmarsh		Undertaken before construction works commence												
Enhancement of greenspaces within the resort		Planting and bug hotels to be erected when green spaces are created.	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Creation of scrapes in open mosaic habitat		Undertaken before construction works commence	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Creation of a minimum of 20 pools		Undertaken before construction works commence	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Creation of mixed, crushed and coarse concrete rubble		Undertaken before construction works commence	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Creation of mounds and low bunds	Mounds to be created from material derived from construction work within the chalk pits	To be created in tandem with works in the chalk pits	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Reduction of scrub encroachment		Undertaken before construction works commence	Sub-optimal	Sub-optimal							Optimal	Optimal	Sub-optimal	Sub-optimal
Creation of steps in wet ditches		Undertaken before construction works commence	Sub-optimal	Sub-optimal							Optimal	Optimal	Sub-optimal	Sub-optimal
Creation of scrapes in black duck marsh		Undertaken before construction works commence	Sub-optimal	Sub-optimal							Optimal	Optimal	Sub-optimal	Sub-optimal
Dormouse														
Enhancement of woodland belt Blackduck marsh		Undertaken before construction works commence	Optimal	Optimal									Optimal	Optimal

Enhancement and creation of woodland on botany marsh		Undertaken before construction works commence																			
Infill planting		Undertaken before construction works commence																			
Dormouse survey	If works not started within 2 years of previous survey. Tubes should be deployed at the end of March and left out till at least the end of September	Undertaken before construction works commence																			
Obtain licence from Natural England	Must be obtained prior to commencement of works	Undertaken before construction works commence																			
Installation of dormouse boxes		Undertaken before construction works commence																			
One stage vegetation clearance		Undertaken before construction works commence																			
Two stage clearance- Above ground vegetation		Undertaken before construction works commence																			
Two stage clearance- Below ground vegetation		Undertaken before construction works commence																			
Birds																					
Clearance of scrub and woodland		Undertaken before construction works commence																			
Clearance of reedbed		Undertaken before construction works commence																			
Clearance to create saltmarsh habitat		Undertaken before construction works commence																			
Reduction of scrub encroachment		Undertaken before construction works commence																			
Wetland hbaitat creation		Undertaken before construction works commence																			
Creation of scrapes in Black Duck Marsh		Undertaken before construction works commence																			
Offsite habitat creation	TBC	TBC																			
Bat																					
Updated tree survey and aerial tree inspection		Undertaken before construction works commence																			
Bat building survey	One survey for buildings with low potential, between May and August. Two surveys required on buildings with moderate potential, with at least one survey between May and August. Three surveys required on high suitability buildings with two surveys between May and August.																				
Obtain licence from Natural England	Must be obtained prior to commencement of works	Undertaken before construction works commence																			
Installation of bat boxes	Prior to destruction of roost	Undertaken before construction works commence																			
Demolition of Building B32 and B67	Timing based on a non-breeding roost being present	Undertaken during construction period																			
Operational																					
General Measures																					
Quarterly walkover in Years 1 and 2		Once every 3 months in Years 1 and 2																			
Annual walkover in Years 3, 5 and 10	Update habitat surveys using a standard protocol to assess the success of the habitat enhancement, creation and management works in creating and maintaining the overall mosaic and mix of target habitat types in the desired proportions	Annually in years 3, 5 and 10																			
Invasive non-native plant species (INNPS)																					
Herbicide application and removal as required		Annually																			
Water Vole																					
Monitoring survey- habitats within receptor site		In years 1, 2 and 3 following release of water voles in receptor site																			
Monitoring surveys- water vole trapping		In years 1, 2 and 3 following release of water voles in receptor site																			
Water level monitoring	Check water levels in wetland habitats	Annually, over winter																			
Otter																					
Water level monitoring	Check water levels in wetland habitats	Annually, over winter																			
Monitoring surveys	Survey for signs of otter and use of artificial holts	Annually as part of habitat monitoring																			
Dormouse																					
Monitoring surveys	Frequency as required by EPS licence																				
Birds																					
Breeding bird monitoring survey	Updated bird surveys to assess changes to breeding and winter bird assemblages in years 3, 5 and 10 following completion of the development																				
Wintering bird monitoing survey																					
Bats																					
Compliance checks of replacement roost features	Immediately upon completion of installation of features																				
Updated bat activity surveys	To assess changes to bat assemblage	In years 3, 5 and 10 following completion of the development																			
Monitoring of dark corridors for bats	Using lux levels and bat activity surveys	In years 1, 5 and 10 following completion of the development																			
Monitoring of habitats suitable for bats to ensure management and maintenance activities are appropriate		Annually as part of habitat monitoring																			
Inspection of replacement and enhancement bat boxes/roost features+B94:P109B94:Q109C51B104:D109		Annually																			

Annex EDP 13
Consultation Response Received from Natural England

This page has been left blank intentionally

Date: 09 October 2020
Our ref: DAS/UD7110
Your ref:

Mr James Bird
The Environmental Dimension Partnership Ltd
Second Floor, Darwin House,
67 Rodney Road,
Cheltenham GL50 1HX

Customer Services
Hornbeam House
Crewe Business Park
Electra Way
Crewe
Cheshire
CW1 6GJ

0300 060 3900

BY EMAIL ONLY

Dear Mr Bird

Discretionary Advice Service (Charged Advice)
Consultation No. 319936
Development proposal and location: The London Resort,

Thank you for your consultation on the above which was received on 22 September 2020.

This advice is being provided as part of Natural England's Discretionary Advice Service. London Resort Company Holdings Limited has asked Natural England to provide advice on:

- Draft Dormouse Mitigation Strategy (edp5988_r025a)
- Draft Bat Mitigation Strategy (edp5988_r027b)
- Draft Water Vole Mitigation Strategy (ref edp5988_r026a_draft)

This advice is provided in accordance with the Quotation and Agreement UDS 7110 dated 16th June 2020.

The following advice is based upon the information within :

- Draft Dormouse Mitigation Strategy (edp5988_r025a) September 2020
- Draft Bat Mitigation Strategy (edp5988_r027b) September 2020
- Draft Water Vole Mitigation Strategy (ref edp5988_r026a_draft) September 2020

Protected species advice

Dormouse - Draft Dormouse Mitigation Strategy (edp5988_r025a) September 2020
Reviewed by Roxanne Gardiner, NEWLS

The report should include all relevant information regarding the dormouse mitigation strategy within one document. Currently survey information and relevant maps are split between the Mitigation Strategy and Ecology Baseline Report (Part 1 and 2).

Introduction

- Detail regarding the site location / red line boundary should be made clear from the start. Any sites not to be included further within the report (e.g. Essex Project Site) should be shown on initial maps, and it should be explained why they have not been included in the remainder of the report.

- A site map labelling the various regions within the Kent Project Site should be included in regards to dormice.

Desk Study

- Figure EDP 2.1 shows planned development in the wider area, which is likely to impact on the same population of dormice. This should be considered when designing mitigation/compensation proposals.
- Large infrastructure projects in the vicinity that may impact on dormice should also be considered – e.g. Lower Thames Crossing.

Habitat description

- The Essex Project Site is not considered to be suitable for dormice, however the proximity to nearby known dormouse populations should be included.
- A map should be included demonstrating the location of each habitat type on-site, and highlighting the suitability for dormice.
- A map including photograph locations (Appendix EDP 1) could also be included.

Off-site habitats

- Avoiding habitat fragmentation and isolation is a key theme to the project – therefore further information regarding dormouse records in the wider area, and maintaining connection between these, should be included.

Impact Assessment in Absence of Mitigation or Compensation

- No indication has been given of the location that habitat will be removed. A map of destroyed/damaged/retained vegetation should be provided.
- Clearance of a large proportion of scrub on-site is proposed (43% of dense continuous scrub, 46% of scattered scrub/poor semi-improved grassland and 100% of scattered scrub/semi-improved calcareous grassland). Scrub is vital for dormice, providing foraging opportunities, shelter and connectivity – therefore we would need to see thorough justification as to why this has been proposed.
- We would need to see that alternative plans for the site have been considered – plans that would have a lower impact on dormice and require a smaller area of vegetation clearance. We would need thorough justification as to why these are not feasible.

Mitigation and Compensation

- There is reference to a Landscape Masterplan, however I could not find a copy of this within this report.
- Habitat enhancement seems to be the commonly proposed compensation strategy – enhancement can contribute to the overall mitigation strategy, however compensatory planting would also need to play a large role.
- No detail has been provided as to the area of proposed planting – we would be unlikely to accept a net loss proposal.

Displacement Methodologies

- Options 1 and 2 state that if torpid dormice without young are discovered, they will be relocated a maximum distance of 150m from where they were found. As stated in the dormouse mitigation licence Method Statement and licence annex, dormice should be relocated no further than 100m.
- It is stated in the report that if a breeding nest is found, a buffer of 10m will be created. However, this is unlikely to be sufficient, as the nest must be allowed to remain in situ, undisturbed. Vegetation clearance would not be licensed to take place during the breeding season.
- It also states that brash piles may be used to maintain connectivity for a breeding nest to the wider woodland. This is unlikely to be acceptable, as we would require vegetation to be cleared in a directional manner towards retained vegetation.

Additional mitigation (Off-site)

- In order for us to consider this as part of the mitigation for the project, we would need further information as to the location of this proposed compensation.

Monitoring and Works Schedule

- All compensatory planting would need to be maintained for multiple years post-development, to ensure successful establishment of the vegetation.

In summary

- To be able to comment on the project in more detail, further information would be required regarding the location of the various types of habitat on-site that are suitable for dormice.
- Large clearances are proposed, therefore we would need to see where these clearances are proposed in order to assess the potential impact on dormice.
- The location and size of compensation proposals – both compensatory planting and enhancement – will be important, as it is unlikely that habitat enhancement alone will be sufficient.
- The wider mitigation strategy should demonstrate how habitat connectivity to the wider landscape will be maintained, to prevent isolation of this dormouse population.

Bats – Draft Bat Mitigation Strategy (edp5988_r027b) September 2020
Reviewed by Phil Bowater, NEWLS

The strategy needs to clearly set out the development proposals to enable the reader to understand the context at an appropriate level. This should include habitat maps, development proposals master plan and clear labelling of areas referred to in the report.

Surveys

- The report fails to clearly illustrate the results obtained from prior survey work. The report should include, for example, heat maps and clearly identify areas considered to be of importance for bat commuting, foraging and roosting. Where appropriate, maps should be species specific

- It is not clear whether there has been any hibernation survey/checks of other buildings within the development site

- Justification is required as to why the survey work undertaken provides appropriate confidence in understanding the importance of the site for bats.

  Bat transects undertaken are between 3-6km long which would not provide a good understanding of bat activity at the site due to the distance covered.

  We would typically expect a higher number of static bat detectors to be deployed for a development of this scale. No surveys of the river appear to have been undertaken; which may also be of importance to bats

- Bat activity – It is not clear if Bat activity is to be impacted by the development, this is due to the surveys supplied in the report are not clearly showing when they were undertaken on site

.

- Given the habitats on site and the proximity to the river, it can be expected that there are invertebrates available at the site throughout the winter period. The site may therefore be of importance to winter foraging bats yet the document does not detail whether survey work has been undertaken; or justify why such survey work has not been completed.

- Bat roosts in trees – there is a lack of detail in the summary provided as to the level of survey effort expended to determine bat roosting potential / further survey work undertaken.

- Bat roosts in buildings – the section details that some buildings are still undergoing survey but does not clearly detail which buildings have been surveyed (and results); or those still requiring survey work.

- Bat activity – it would aid understanding of the site if a map of bat activity was provided (e.g. a heat map). For rarer species, it would be beneficial to have separate maps for these to help identify critical areas for these species.

  The report states that the bat activity is fairly typical of an urban edge site in SE England yet goes on to state a number of rarer bat species have been identified. This appears to be contradictory.

  From the desk study data obtained, when combined with the survey data, it would be reasonable to assume that the site supports Myotis species of natterer's; Brandts; and Daubenton's. These species have been recorded in the vicinity of the site and the site supports suitable habitats for these species. It can therefore be assumed that the site supports <u>at least</u> 10 species of bat.

  It is noted that Brandts and Natterer's bat are considered rare (or very rare) in the local area and this needs reflecting in the strategy document and subsequent assessment / strategy.

  Further detail should be provided on how the site is considered to be of only 'Local' importance – particularly when it is likely to support rarer species of bat and the level of survey work is unlikely to have fully captured bat activity at the site. The precautionary principle must be adopted in order to ensure the conservation status of bats.

<u>Impact Assessment</u>

This section details the potential impacts which could arise as a result of the development proposals. It fails however to provide an assessment of the potential implications of these impacts on bat species conservation (and thus the most important areas to focus the mitigation strategy upon).

<u>Mitigation and Compensation</u>

- The overall aims of the project are ambiguous and open to interpretation. I recommend that a clear aim is defined with objectives set out as to how that aim will be achieved.

  The aim of the project should include consideration of the legislative and planning policy background.

- Pre-construction surveys – trees
  Whilst the pre-construction surveys are welcomed, a clearer protocol needs to be set out for a range of scenarios on how trees will be surveyed (and any further survey) with corresponding mitigation/compensation

- Pre-construction surveys – buildings
  The details of any pre-construction survey need to be defined for a range of scenarios.

  As a minimum, it is recommended that at least an external/internal inspection of all buildings is undertaken within 3 months of development works commencing.

<u>Licensing</u>

- It is recommended that you further define the broad approach / principles to be employed for the known roosts as part of the bat licensing mitigation/compensation so this can be agreed at an early stage
- Proposed timing of works for bat roost features are not in line with the typical timings for the roost types defined. Please can you provide justification why this is the case or amend accordingly.

- General - Measures should be defined as what 'will' occur not 'could' or 'may' be put in place.

- Construction Lighting -The specifications are currently open to very wide interpretation and would not be enforceable; nor do they provide confidence that lighting will not adversely affect key bat habitat throughout the construction phase. A plan may help to convey this information.

- Welcome the proposed habitat creation and enhancement measures although cannot provide comment on details. It would be beneficial to have a plan providing an overview of these measures.

  This section also needs to assess the residual impact of any strategic value the site holds e.g. as a wildlife corridor.

- This section needs to provide a much more detailed assessment of the mitigation and compensation measures being put forward and the residual impact on bats. Currently measures are proposed with no real analysis of the worth of such measure.

- Provision of roosting features - The provision of bat boxes throughout the site is welcomed however very little detail (e.g. type, location, number etc.) is provided on these so it is difficult to comment further.

  Given the size of the proposed development, bat compensation measures could certainly be bolder in attempting to improve the suitability of the site for use by roosting bats. For example the provision of bespoke, dedicated, bat barns

- Operational lighting - That the lighting design will be in line with the latest best practice is welcomed. Given the stage of the proposals it would be beneficial to define overarching objectives for the lighting strategy (e.g. maintain X number of flight routes / feeding areas as dark corridors), together with a lighting strategy plan (i.e. to show dark corridors and feeding areas). Lux contour plans for the development would be welcomed; particularly for areas adjoining key bat habitat.

- Off-site compensation - Given the potential impacts resulting from the development proposals, this will likely be of critical importance. It is recommended that, at least, broad principles for the compensation strategy are defined. Compensation measures will need to ensure that they are appropriately placed within the landscape to maximise their compensation value and ensure no adverse effect on bat populations arises as a result of the development proposals.

<u>Monitoring</u>

- The monitoring section needs to include additional detail on the monitoring proposals and define the aims/objectives of the monitoring work. It is currently ambiguous what level of monitoring work will be undertaken outside of licensing; for example will static detectors be deployed in retained habitats to determine continued bat usage of these areas/ and species assemblages.

- The monitoring section needs to also define potential remedial options should monitoring work identify significant issues with the mitigation and compensation.

- Lighting monitoring also needs to be more clearly defined – a plan showing sampling locations would be useful.

In summary

- The report itself needs to provide a stand-alone document which allows the reader to properly understand the proposals, survey work undertaken, impacts and proposed mitigation and compensation (and the overall strategy for this) in detail. Currently the report fails to do this.

- The strategy needs to have greater emphasis on defining overall aims and objectives to ensure bat conservation

- The mitigation strategy fails to consider the potential strategic importance of the site to bat activity; notably the potential for the site to act as a wildlife corridor to the river.

- The document needs to clearly set out the strategy for bat mitigation. For example including an Ecological Constraints and Opportunities Plan (ECOP) and bat dark corridors, flyways and foraging areas.

- There needs to be a clearly defined strategy for artificial lighting at the site; with overarching aims and objectives. This should then be demonstrated through a lux (horizontal and vertical) contour plan for any retained bat habitat.

- There is no consideration of the potential for winter bat activity (foraging/commuting) at the site. The presence of the river/marshland may mean the site is an important winter foraging resource.

- The report appears to under-represent the potential importance of the site for bat activity.

- A precautionary approach needs to be undertaken where there is a lack of information/confidence in survey results

- There is no commitment to use biodiversity metrics or achieve a net-gain for biodiversity.

- There is no consideration of the potential for cumulative impacts with other nearby proposed development

<u>Water Vole and Otter</u> - Draft Water Vole Mitigation Strategy (ref edp5988_r026a_draft) September 2020
Reviewed by Caroline Harrison, NEWLS

It is recommended that the report should be separated into two different reports, one for Water Voles and one for Otter to enable us to understand the proposals, survey work undertaken, impacts and proposed mitigation and compensation (and the overall strategy for this) in detail for each species, thus then will make it easier to transfer to any licence applications required.

<u>Survey findings</u>

Water voles

- Surveys have been undertaken on Botany Marsh East on 25^{h} June 2020 (with rafts set out from 2nd June 2020). It is noted however that vegetation would be fairly high by this point in

the year and so difficult to gain true field signs.

- Surveys were also undertaken at Botany Marsh West, however, these surveys were not undertaken until the 28th July 2020 and a further survey to be undertaken on the 29th September 2020 no earlier surveys have been undertaken to capture where the water voles are located during the early part of the season when vegetation is starting to grow. It was stated that the reason for the late survey was due to being 'restricted', but no further explanation as to why, has been given.

- It is advised that any Environmental assessments is based on field surveys conducted at either end of the season to enable a better picture when proposing mitigation.

- It is recommended that further surveys are undertaken in Spring 2021 on all ditches to enable a better conclusion of where Water voles are located to ensure mitigation is appropriate.

Otter

- I note an otter was sighted within Black Duck Marsh however, with the location of proposed development it is likely that the otters will lose connectivity to the other marsh areas. Due to the lack of surveys being undertaken within the site we are unsure of how the otter(s) are using the site. For this application site we require further surveys to establish where the otter(s) are located, their feeding areas and whether there are any holts located in the area and the likelihood of disturbance to the otters during development.
- You can survey at any time of year but the best time is spring. This is because evidence is often easier to find during spring, as water levels recede and wet mud is exposed where paw prints can be seen more easily. You must provide enough information in the survey to understand what kinds of impacts there might be on otters and how impacts might affect otters
- Otter activity varies according to the season. You might need to do several surveys throughout the year to establish how big the impacts are and what mitigation measures might be necessary. How many surveys you'll need to do depends on how likely it is that otters will be affected by any development work and the size of the development, eg if a large development close to where otters are it might affect them more.
- I refer you to our guidance for otters and surveying : https://www.gov.uk/guidance/otters-protection-surveys-and-licences#survey-methods

Impact Assessment / Mitigation

- It is written that there will be 5.05km of water course and 1o ha of wetland to be permanently lost along with 0.6km of watercourse and 2.4ha of wetland disturbed during construction. Has the areas of displacement undertaken to create culverts been included in these figures?

- I would recommend a map showing which watercourses and wetlands are to be lost/disturbed and also where culverting is likely to be undertaken.

- Also with the habitat creation proposed being 5km of watercourse and 6.6ha of wetland and enhancement of 2.3km of watercourse and 3.5ha of wetland. I would expect habitat loss to be mitigated or offset by the creation of new habitat or the enhancement of existing habitat for water voles, which should be at least the equivalent to that lost.

- I note that signs of a water vole being present at Black Duck Marsh shows that the due to the Central Marsh being proposed development, this could cause fragmentation as I am unable to see any connectivity to the rest of the site wetlands and watercourses.

- Displacement has been suggested for the installation of culverts however where 2m culverts are to be installed you will require 8m or bank to be displaced, has this been taken into account when measuring permanent and temporary losses. How many culverts are being proposed?

Should these culverts be only 2m in length how do you propose them to stop water voles colonising as we are aware of water voles travelling though culverts of up to 50m in length. Also will these culverts be permanent?

- Numbers of likely water voles present has been recorded within the report to ensure mitigation is sufficient.

- Receptor area should be created as soon as possible to enable the habitat to establish and create a suitable site for the Water Voles to be released in post capture (March / April), thus not hindering the start of their breeding season.

Biosecurity

- I refer you to Appendix 2 of 'The Water Vole Mitigation Handbook' (Traps), *"traps should be thoroughly cleaned, disinfected, rinsed in clean water and dried after use and between trapping sites*."

Monitoring

- I refer you to Box 4, if 'The Water Vole Mitigation Handbook' monitoring methods, frequency and duration as I do not feel it is necessary for water voles to be trapped for monitoring purpose and also when you are proposing to trap during August is within the breeding season. Should you wish to see an overall conservation benefit then monitoring could be extended over a longer period.

Appendix

- Plan EDP 2 show Target Notes, however there is no summary of these notes to identify relevance to Water voles or Otter

- Plan EDP 3 does not show on the key what are water vole burrows, latrines, feeing areas, or showing where the otter was sighted. Also the purple boxes are not in the key I presume these are the numbers of rafts deployed?

- Plans are required showing areas to be lost or disturbed and where culverts are proposed to be installed.

I would recommend that if you are seeking to provide 'letters of no impediment' (LONI) with your submission that a full draft licence application is forwarded to us as soon as possible, once you have got all information and surveys together for the relevant species thus enabling us to resolve any further issues that may arise..

Generic advice

The advice on this proposal, and the guidance contained within Natural England's standing advice relates to this case only and does not represent confirmation that a species licence (should one be sought) will be issued. Please see **Annex 1** for information regarding licensing for European Protected Species.

For clarification of any points in this letter, please contact Caroline Harrison on 0208 225 8985.

commercialservices@naturalengland.org.uk
As the Discretionary Advice Service is a new service, we would appreciate your feedback to help shape this service. We have attached a feedback form to this letter and would welcome any comments you might have about our service.

The advice provided in this letter has been through Natural England's Quality Assurance process.

The advice provided within the Discretionary Advice Service is the professional advice of the Natural England adviser named below. It is the best advice that can be given based on the information provided so far. Its quality and detail is dependent upon the quality and depth of the information which has been provided. It does not constitute a statutory response or decision, which will be made by Natural England acting corporately in its role as statutory consultee to the competent authority after an application has been submitted. The advice given is, therefore, not binding in any way and is provided without prejudice to the consideration of any statutory consultation response or decision which may be made by Natural England in due course. The final judgement on any proposals by Natural England is reserved until an application is made and will be made on the information then available, including any modifications to the proposal made after receipt of discretionary advice. All pre-application advice is subject to review and revision in the light of changes in relevant considerations, including changes in relation to the facts, scientific knowledge/evidence, policy, guidance or law. Natural England will not accept any liability for the accuracy, adequacy or completeness of, nor will any express or implied warranty be given for, the advice. This exclusion does not extend to any fraudulent misrepresentation made by or on behalf of Natural England.

Yours

Caroline Harrison
Natural England Wildlife Licensing Team

Cc commercialservices@naturalengland.org.uk
Sean.Hanna@naturalengland.org.uk

Annex 1
European Protected Species

A licence is required in order to carry out any works that involve certain activities such as capturing the animals, disturbance, or damaging or destroying their resting or breeding places. Note that damage or destruction of a breeding site or resting place is an absolute offence and unless the offences can be avoided (e.g. by timing the works appropriately), it should be licensed. In the first instance it is for the developer to decide whether a species licence will be needed. The developer may need to engage specialist advice in making this decision. A licence may be needed to carry out mitigation work as well as for impacts directly connected with a development. Further information can be found in Natural England's 'How to get a licence' publication.

If the application requires planning permission, it is for the local planning authority to consider whether the permission would offend against Article 12(1) of the Habitats Directive, and if so, whether the application would be likely to receive a licence. This should be based on the advice Natural England provides at formal consultation on the likely impacts on favourable conservation status and Natural England's guidance on how the three tests (no alternative solutions, imperative reasons of overriding public interest and maintenance of favourable conservation status) are applied when considering licence applications.

Natural England's Pre-submission Screening Service can screen application drafts prior to formal submission, whether or not the relevant planning permission is already in place. Screening will help applicants by making an assessment of whether the draft application is likely to meet licensing requirements, and, if necessary, provide specific guidance on how to address any shortfalls. The advice should help developers and ecological consultants to better manage the risks or costs they may face in having to wait until the formal submission stage after planning permission is secured, or in responding to requests for further information following an initial formal application.

The service will be available for new applications, resubmissions or modifications – depending on customer requirements. More information can be found on Natural England's website.