



The London Resort

**Appendix 12.10:
Ecological
Compensation
Framework**

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On Behalf of:
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Limited**

March 2022
Report Reference
r075_00

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Report Ref: edp5988_r075				
Revision	Description	Issued by	Date	Approved by
r075_00	Issue for DCO Submission	TW/SC	14/03/2022	EDP/LRCH

Executive Summary

- S1 This Ecological Compensation Framework (ECF) identifies the strategy required to offset the residual adverse ecological effects predicted to arise from the Proposed Development of 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 predicted to be influenced by the Proposed Development. This ECF demonstrates how residual adverse effects upon the important ecological features, namely those effects which will remain following the implementation of avoidance and mitigation measures, will be compensated for as far as reasonably possible.
- S3 This ECF also provides details of proposed mitigation for the loss of habitat which is functionally linked to certain European Sites, which comprises off-site habitat creation but is not 'compensation' in the context of a Habitats Regulations Assessment (HRA).
- S4 The ECF includes the following principles:
- Pre-construction habitat creation and enhancement to ensure habitats are appropriate to accommodate translocated or displaced species/assemblages;
 - Implementation of a long-term management strategy to achieve the enhancement of condition and function of newly created 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.
- S5 The implementation of this ECF, together with on-site measures designed to avoid or mitigate adverse effects of the Proposed Development, will be secured as a requirement of the Development Consent Order (DCO).

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Section 1

Introduction, Context and Purpose

- 1.1 This Ecological Compensation Framework (referred to hereafter as the 'ECF') 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 ECF 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 finalisation of the ECF, and its implementation in full, will be secured as a requirement of the DCO.
- 1.4 The application is supported by an Environmental Impact Assessment (EIA). The Ecological Impact Assessment (EclA) 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 appendices, of which the following documents have been integral to the preparation of this ECF:
- Appendix 12.1: Ecology Baseline Report (Document Reference 6.2.12.1); and
 - Appendix 12.3: Ecological Mitigation and Management Framework (Document Reference 6.2.12.3).
- 1.5 This ECF demonstrates how residual adverse effects upon the important ecological features within the zone of influence of the Project Site, namely those effects which will remain following the implementation of avoidance and mitigation measures, will be compensated for as far as reasonably possible.
- 1.6 The residual effects, for which compensation is proposed, have been identified through the iterative design process and application of the mitigation hierarchy. The Chartered Institute

for Ecology and Environmental Management (CIEEM) guidelines for Ecological Impact Assessment (EclA)¹ outline the principles as follows:

“Avoidance: Seek options that avoid harm to ecological features (for example, by locating on an alternative site).

Mitigation: Negative effects should be avoided or minimised through mitigation measures, either through the design of the project or subsequent measures that can be guaranteed – for example, through a condition or planning obligation.

Compensation: Where there are significant residual negative ecological effects despite the mitigation proposed, these should be offset by appropriate compensatory measures.

Enhancement: Seek to provide net benefits for biodiversity over and above requirements for avoidance, mitigation or compensation.”

1.7 ES Chapter 12 describes the inherent mitigation contained in the design or layout of the Proposed Development and identifies potential adverse effects on important ecological features which cannot be avoided by inherent mitigation alone. The ES Chapter then goes on to consider the proposed additional measures to avoid and mitigate these effects, which are set out in greater detail within the Ecological Mitigation and Management Framework (EMMF) as referred to above.

1.8 Having factored avoidance and mitigation into the assessment several significant residual adverse effects on important ecological features remain. Thus, following the mitigation hierarchy and as a last resort, the need for off-site compensatory measures has been identified. This is consistent with the National Planning Policy Framework² (NPPF), paragraph 175(a), which states:

“(a) if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;”

1.9 This ECF also provides details of proposed mitigation for the loss of habitat which is functionally linked to certain European Sites and other designated sites in the surrounding area. This mitigation comprises off-site habitat creation (habitat which also fulfils a compensatory function for on-site impacts) but is not ‘compensation’ in the context of a Habitats Regulations Assessment (HRA).

1.10 This document supersedes the General Principles of Offsite Ecological Mitigation document (Document reference: 6.2.12.10) submitted as Appendix 12.10 to the Ecology Chapter of the Environmental Statement which accompanied the original DCO Application in December 2020. The key differences between the original Appendix 12.10 and this ECF relate to fundamental changes to the ecological baseline following the designation of the

¹ 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.

² Ministry of Housing, Communities and Local Government (February, 2019), ‘National Planning Policy Framework’

majority of the Kent Project Site as a SSSI (Swanscombe Peninsular SSSI) in March 2021. This has not only introduced the SSSI as a new 'receptor/feature' for consideration in the Ecological Impact Assessment (EclA) but has also resulted in changes to the strategy for avoiding, mitigating or compensating for adverse impacts on other non-SSSI features within the Project Site.

- 1.11 Further differences between the original 'General Principles' document and this ECF relate to the acquisition of some of the off-site land required to deliver the necessary compensatory habitat creation, which has occurred since the DCO submission. Specific habitat creation and management proposals have therefore been provided in relation to these land parcels. At the time of writing, not all of the land required to address all of the compensation requirements has been secured. Therefore, this ECF remains a live document which will be updated as additional land is secured.
- 1.12 The remainder of this document is structured as follows:
- Section 2 summarises the relevant ecological features within the Project Site and objectives that are the focus of the ECF;
 - Sections 3 to 6 provide an outline of the compensatory habitat creation and the subsequent ongoing management required to maintain features/functions; and
 - Section 7 describes the monitoring requirements to ensure successful delivery and long-term maintenance of the compensatory habitats, in order to achieve the objectives of this ECF.
- 1.13 Details of each specific parcel of off-site land in which habitat creation and/or restoration is proposed are provided in separate Annexes to the rear of this document. These Annexes describe the location and biogeographical context, the existing baseline conditions, the habitat creation/restoration proposals for each land parcel. The purpose of the habitat creation/restoration proposals, in relation to the compensation objectives outlined within this ECF, is also clearly set out. Additional Annexes will be added for each additional parcel of off-site land that is secured following the initial submission of this document.
- 1.14 Habitat creation/restoration and long-term management proposals for these specific land parcels are outlined in the Annexes to the ECF, and proposed monitoring actions are outlined in Section 7 of this ECF. However, it is proposed that detailed Ecological Management Plans (EMPs) for each compensation site be prepared following the grant of DCO consent but prior to the commencement of development. These EMPs would contain a finer level of detail with respect to the habitats to be created/restored, the methods by which habitat creation/restoration would be achieved, and the methods by which habitats would be managed and monitored to ensure they remain in suitable condition in the long-term. The EMPs will also address proposals/opportunities to provide additional public health, wellbeing and educational benefits through providing access (e.g. bird hides and footpaths) and interpretation materials where appropriate and where this would not conflict with the ecological objectives.

- 1.15 The preparation of EMPs for each compensation site, and their submission for approval by the Local Planning Authorities and Natural England prior to the commencement of development, can be secured by a suitably worded requirement attached to DCO consent.

Biodiversity Net Gain

- 1.16 The measures proposed within this ECF are intended to compensate for residual impacts occurring within the Project Site including impacts on designated sites. When considering whether biodiversity net gain can also be achieved, planning policy guidance³ associated with the NPPF states:

“Biodiversity net gain complements and works with the biodiversity mitigation hierarchy set out in NPPF paragraph 175a. It does not override the protection for designated sites, protected or priority species and irreplaceable or priority habitats set out in the NPPF. Local planning authorities need to ensure that habitat improvement will be a genuine additional benefit, and go further than measures already required to implement a compensation strategy”.

- 1.17 Thus, ecological enhancement measures can only be deemed to achieve biodiversity net gain where these provide a benefit that goes beyond that required to compensate for impacts which cannot be avoided or mitigated.
- 1.18 It is unlikely that the benefits of the enhancement measures proposed in this ECF will exceed that required to compensate for the on-site impacts. However, it is anticipated the enhancement measures proposed in this ECF will result in a net gain in biodiversity units when measured using a standard Biodiversity Metric.

³ <https://www.gov.uk/guidance/natural-environment>; Paragraph: 024 Reference ID: 8-024-20190721, Revision date: 21 07 2019

Section 2 Summary of Compensation Objectives

- 2.1 Chapter 12 of the Environmental Statement (ES) (Chapter 12: Terrestrial and Freshwater Ecology and Biodiversity, Document Reference 6.1.12) identifies a range of significant residual negative effects on Important Ecological Features which cannot be avoided or mitigated and therefore require compensation. In addition, Chapter 12 of the ES and the Shadow HRA (Document Reference 6.2.12.4) identify the need for off-site measures to mitigate the effects of the loss/disturbance of functional habitat within the Project Site.
- 2.2 A series of off-site mitigation and compensation objectives have been derived from the assessment of significant effects in the ES and Shadow HRA. These are set out below and form the basis for the structure of the remainder of this document.

Objective 1 – Provide new functionally linked grazing marsh and reedbed habitat off-site to mitigate the effects of loss and disturbance of these habitats on-site

- 2.3 Coastal/floodplain grazing marsh and reedbed habitats within the Kent Project Site have been found to support an assemblage of wintering waterfowl and wading birds which form a part of the wider populations associated with the intertidal and marsh habitats in the Thames and Medway Estuaries. Therefore, on a precautionary basis, the grazing marsh and reedbed habitats within the Project Site are deemed to be ‘functionally linked’ to the following statutory and non-statutory designated sites:
- Thames Estuary and Marshes SPA/Ramsar, and the component SSSIs including South Thames Estuary and Marshes SSSI and Mucking Flats and Marshes SSSI⁴;
 - Medway Estuary and Marshes SPA/Ramsar/SSSI⁵;
 - Inner Thames Marshes SSSI;
 - West Thurrock Lagoon and Marshes SSSI; and
 - Tilbury Marshes LWS.
- 2.4 The Proposed Development will result in the direct loss of functionally linked habitats during the construction phase. Furthermore, retained habitat is at risk of disturbance during both the construction and operation phases and, whilst measures are proposed to avoid or mitigate disturbance effects (as set out within the EMMF and Shadow HRA), it is

⁴ South Thames Estuary and Marshes SSSI and Mucking Flats and Marshes SSSI are component SSSIs to the Thames Estuary and Marshes SPA/Ramsar, with overlapping reasons for designation

⁵ Medway Estuary and Marshes SSSI is a component SSSI to the Medway Estuary and Marshes SPA/Ramsar, with overlapping reasons for designation.

predicted that some retained habitats would be effectively lost to wintering waterfowl and wading birds due to residual disturbance effects.

- 2.5 Negative effects on wintering waterfowl and waders using the Project Site, which could result in significant effects on the off-site designated sites described above, will be mitigated by the provision of new grazing marsh and reedbed habitat in an off-site location which maintains functional linkage with the designated sites.
- 2.6 Details of how this objective will be met are set out in **Section 3** of this ECF with reference to relevant Annexes providing details of specific compensation sites and habitat creation proposals.

Objective 2 – Provide new habitats off-site which are suitable for the rare vascular plants, breeding bird assemblages and invertebrate assemblages for which Swanscombe Peninsula SSSI has been notified, to compensate for the effects of loss and disturbance of these habitats on-site

- 2.7 Swanscombe Peninsula SSSI, covers the majority of the Kent Project Site and has been recently notified for the following biological interest:
- Vascular plants – populations of the following plants: divided sedge (*Carex divisa*), yellow vetchling (*Lathyrus aphaca*), slender hare's-ear (*Bupleurum tenuissimum*), Bithynian vetch (*Vicia bithynica*) and round-leaved wintergreen (*Pyrola rotundifolia* subsp. *maritima*);
 - Invertebrates – assemblages of invertebrates associated with bare sand and chalk, open short swards, open water on disturbed mineral sediments and saltmarsh and transitional brackish marsh; and
 - Breeding birds – two diverse assemblages of breeding birds: one associated with lowland open waters and their margins, lowland fen and lowland damp grassland (collectively referred to as the wetland assemblage); and the other with lowland scrub.
- 2.8 The Proposed Development will result in the direct loss (and therefore fragmentation) of habitats which support the notified features described above during the construction phase. Furthermore, with regard to the breeding bird assemblages, retained habitat is at risk of disturbance during both the construction and operation phases and, whilst measures are proposed to avoid or mitigate disturbance effects (as set out within the EMMF), it is predicted that some retained habitats would be effectively lost to breeding birds due to residual disturbance effects.
- 2.9 The significant residual negative effects on Swanscombe Peninsula SSSI, both as an entity overall and with respect to the individual notified features, will be compensated for by the provision of a range of new habitats in off-site locations which are suitable for these notified features. Where appropriate and feasible, target species will be translocated to new habitats once these have reached a suitable condition.

2.10 Details of how this objective will be met are set out in **Section 4** of this ECF with reference to relevant Annexes providing details of specific compensation sites and habitat creation proposals.

Objective 3 – Provide new habitats off-site to compensate for the loss and disturbance of notable and priority habitats on-site

2.11 The following individual habitats of Local-level importance or above have been identified within the Kent Project Site:

- Broadleaved semi natural woodland (Local importance);
- Scrub (Local importance);
- Semi-improved grassland (Local to District importance);
- Coastal/floodplain grazing marsh (District importance);
- Open mosaic on previously developed land (District importance);
- Waterbodies (ponds, standing water and ditch network) (District importance); and
- Swamp (reedbed) (County importance).

2.12 The Proposed Development will result in the direct loss of habitats which support the notified features described above during the construction phase. Furthermore, retained habitats are at risk of recreational impacts during the operation phase and, whilst measures are proposed to avoid or mitigate recreational effects (as set out within the EMMF), it is predicted that some retained habitats would experience minor levels of deterioration due to residual recreational effects.

2.13 Significant residual negative effects on the notable and priority habitats described above will be compensated for by the provision of new habitats in off-site locations. This objective will effectively be met in the course of delivering the mitigation/compensation objectives in respect of designated sites (as summarised above) and/or protected and priority species (as summarised below). Details specifically addressing on-site habitats are therefore not provided separately within the ECF.

Objective 4 – Provide new habitats off-site which are suitable for European Protected Species which occur within the Project Site, to compensate for the effects of loss of habitats used by these species

2.14 The following species, which are strictly protected under the Conservation of Habitats and Species Regulations 2017 (as amended) have been recorded within the Kent Project Site:

- Bats – population of District importance, assemblage of at least eight species using the Project Site for roosting, foraging and commuting;
- Dormouse (*Muscardinus avellanarius*) - population of District importance, breeding in the southern portion of the Project Site with occasional dispersal across the northern portion (Swanscombe Peninsula); and
- Otter (*Lutra lutra*) - population of Local importance, confirmed present within Black Duck Marsh and assumed present in low numbers on the suitable habitat throughout the ditch network, reedbeds, marshes and on the River Ebbsfleet.

2.15 The Proposed Development will result in the direct loss of habitats used by the above species/species groups during the construction phase. Any loss of bat roosts would be mitigated on-site (as set out within the EMMF) such that no significant residual effects occur in this respect. However, significant residual negative effects resulting from loss of bat foraging habitat, dormouse breeding, hibernating and foraging habitat, and otter foraging habitat will be compensated for by the provision of a new habitats in off-site locations.

2.16 Details of how this objective will be met are set out in **Section 5** of this ECF with reference to relevant Annexes providing details of specific compensation sites and habitat creation proposals.

Objective 5 – Provide new habitats off-site which are suitable for WCA and S41 Species which occur within the Project Site, to compensate for the effects of loss or disturbance of habitats used by these species

2.17 The following species, which are protected under the Wildlife and Countryside Act 1981 (as amended) (WCA), have been recorded within the Kent Project Site:

- Water vole (*Arvicola amphibius*) - population of Local to District importance, latrines and feeding signs found in Botany Marsh East and West and NE tip; and
- Reptiles - population of District importance, Three species supported, with several populations of varying sizes across the Kent Project Site.

2.18 In addition, the following species, which are not legally protected as such, but which are species of principal importance in England under Section 41 of the Natural Environment and Rural Communities Act 2006 (S41), have been recorded within the Kent Project Site:

- Terrestrial wintering birds– population of County importance, assemblage of 28 species of conservation concern (including 11 S41 species) recorded in low to moderate numbers;
- Harvest mouse (*Micromys minutus*) – population of Local importance, confirmed present on Swanscombe Peninsula especially in Broadness grassland and on Botany Marsh; and
- Amphibians - population of Local to District importance, assemblage of four species including common toad (*Bufo bufo*) (S41 species).

2.19 The Proposed Development will result in the direct loss of habitats used by the above species/species groups during the construction phase. Furthermore, retained habitat is at risk of disturbance during both the construction and operation phases and, whilst measures are proposed to avoid or mitigate disturbance effects (as set out within the EMMF), it is predicted that some retained habitats would be effectively lost to terrestrial wintering birds due to residual disturbance effects.

2.20 The significant residual negative effects on WCA and S41 Species will be compensated for by the provision of a range of new habitats in off-site locations which are suitable for these species. Where appropriate and feasible, target species will be translocated to new habitats once these have reached a suitable condition.

2.21 Details of how this objective will be met are set out in **Section 6** of this ECF with reference to relevant Annexes providing details of specific compensation sites and habitat creation proposals.

Objective 6 – Monitor the success of habitat creation, and use of the new habitats by the target species, and take appropriate remedial action if required to ensure that all of the mitigation and compensation requirements are met in the long-term

2.22 To measure the success of the implementation of mitigation and compensation strategies presented in this ECF, 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 Priority Habitat Criteria (as applicable at the time of assessment); and
- In relation to species/assemblages, the following definition will be used when monitoring species populations. The conservation status of a species is defined⁶ 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:

⁶ By Article 1(i) of the EU *Habitats Directive*

- 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.

Section 3

SPA and Wintering Bird Off-site Mitigation Measures

- 3.1 As summarised within **Section 2**, grazing marsh and reedbed habitats within the Kent Project Site support wintering waterfowl and wading birds which form a part of the wider populations associated with the intertidal and marsh habitats in the Thames and Medway Estuaries. As such, these habitats are deemed to be functionally linked with the Thames Estuary and Marshes SPA/Ramsar, the Medway Estuary and Marshes SPA/Ramsar and several other statutory and non-statutory designated sites.
- 3.2 The Proposed Development will result in the direct net loss of approximately 14.55 hectares (ha) of coastal/floodplain grazing marsh and 0.94ha of reedbed. In addition, the retained and created intertidal and marsh habitats are expected to experience some levels of disturbance which may deter some wintering waterfowl and wading birds from using them.
- 3.3 With respect to the SPA/Ramsar sites, these direct and indirect impacts on functionally linked habitat have the potential to result in likely significant effects on their integrity in the absence of mitigation, and these effects have therefore been subject to an Appropriate Assessment (see Appendix 12.4: Shadow Habitats Regulations Assessment (Document Reference 6.2.12.4)).
- 3.4 To avoid or mitigate likely significant effects upon the SPA/Ramsar sites (which would, in turn, avoid or mitigate negative effects on the other functionally linked designated sites) it is proposed that functionally linked grazing marsh and reedbed habitat will be created or restored off-site. This is the first objective of this ECF, namely:

Objective 1 – Provide new functionally linked grazing marsh and reedbed habitat off-site to mitigate the effects of loss and disturbance of these habitats on-site

- 3.5 This objective will be achieved through habitat creation/restoration and long-term management at two compensation sites located on the Isle of Sheppey. Full details of these compensation sites are set out within **Annex 1** and **2** of this ECF, with summary information set out in **Table 3-1** below.
- 3.6 The wintering bird species in question are sufficiently widespread and/or mobile to take advantage of new/restored habitats in the proposed off-site locations such that no translocation is required. Habitat and species monitoring will identify if the mitigation measures have been successful and if modifications to management are required.

Table 3-1: Summary of compensation sites relevant to Objective 1 (SPA/Winter Birds)

Site Name/Ref.	Site 1 – Harty Marshes (see Annex EDP 1)	Site 2 – Leysdown Marshes (see Annex EDP 2)
OS Grid Ref.	TR 007 669	TR 045 687
Strategic Location	Within Greater Thames Marshes National Character Area (NCA) and Nature Improvement Area (NIA). Directly adjacent to Swale SPA/Ramsar/SSSI	Within Greater Thames Marshes National Character Area (NCA) and Nature Improvement Area (NIA). Directly adjacent to Swale SPA/Ramsar/SSSI
Distance from Project Site (see Figure 12.60 , Document reference 6.3.12.60)	39km (east)	43.4km (east)
Total Site Area	202ha	152ha
Existing land use and dominant habitats	Intensive farmland – arable and improved grassland	Intensive farmland – arable
Extent of Habitat Proposed for Winter Birds		
<i>Grazing marsh to be restored</i>	83.70ha	11.17ha
<i>Grazing marsh to be created</i>	33.86ha	95.24ha
<i>Reedbed to be created</i>	N/A	7.15ha
<i>White Clover Forage to be created</i>	N/A	18.21ha
Total(s)	117.56ha	141.77ha
Other habitats to be created within site	Seasonal and permanent pools, ditches/foot drains Open mosaic habitat (scrub, grassland, sparsely vegetated and bare ground, and shallow pools)	Seasonal and permanent pools, ditches/foot drains

Site Name/Ref.	Site 1 – Harty Marshes (see Annex EDP 1)	Site 2 – Leysdown Marshes (see Annex EDP 2)
Other compensation objectives which site will contribute to meeting	<u>Objective 2</u> (Swanscombe SSSI – wetland and scrub breeding birds, OMH and aquatic invertebrates) <u>Objective 3</u> (various notable and priority habitats) <u>Objective 4</u> (bat foraging and otter) <u>Objective 5</u> (water vole, reptiles, terrestrial wintering birds, harvest mouse and amphibians)	<u>Objective 2</u> (Swanscombe SSSI – wetland breeding birds and aquatic invertebrates) <u>Objective 3</u> (various notable and priority habitats) <u>Objective 4</u> (bat foraging and otter) <u>Objective 5</u> (water vole and amphibians)

- 3.7 The total area of created and new habitat for wintering waterfowl and wading birds is 259.33ha across the two compensation sites.
- 3.8 As set out within the detailed Annexes, the proposed habitat creation and restoration, and long-term monitoring and management, at these off-site locations will be fully funded and delivered by the Applicant and this will be secured via the Section 106 agreement.
- 3.9 As a result of the proposed off-site habitat creation and restoration, the total area of habitat for wintering birds, which is functionally linked with the Thames and Medway Estuary and Marshes SPAs, will be significantly increased. This is predicted to avoid potential negative effects of the Proposed Development and have a significant beneficial effect on these SPAs in the long-term.

Section 4

Swanscombe Peninsula SSSI Compensation Measures

- 4.1 As summarised within **Section 2**, a large proportion of the Kent Project Site has recently been notified as Swanscombe Peninsula SSSI, with the notified biological interest relating to five nationally scarce vascular plant species, four habitat-based invertebrate assemblages and two habitat-based breeding bird assemblages.
- 4.2 The Proposed Development will result in the direct net loss of approximately 109.60ha of SSSI notified habitat, representing 42.25% of the total SSSI area (259.43ha). This loss breaks down approximately as follows:
- 0.09ha of amenity grassland;
 - 0.67ha of hard-standing;
 - 1.30ha of ditches;
 - 13.74ha of floodplain wetland mosaic (CFGM);
 - 6.01ha of lowland calcareous grassland (including 5.24ha from within OMHPDL grouping);
 - 4.04ha of lowland mixed deciduous woodland;
 - 31.46ha of mixed scrub (including 8.81ha from within OMHPDL grouping);
 - 31.17ha of modified grassland/scrub mosaic (including 19.89ha from within OMHPDL grouping and 0.74ha from within CFGM grouping);
 - 13.74ha of wet grassland (CFGM);
 - 0.26ha of other woodland; broadleaved;
 - 0.72ha of ponds (contaminated);
 - 1.07ha of other ponds;
 - 11.95ha of reedbed (including 2.85ha from within OMHPDL grouping);
 - 7.67ha of ephemeral vegetation (OMHPDL); and,
 - 1.24ha of bare ground (1.08ha from within OMHPDL grouping).

- 4.3 In addition, the retained habitats within the SSSI are expected to experience some levels of disturbance which may deter some species, in particular breeding birds, from using them.
- 4.4 To compensate for these negative effects, which cannot be avoided or mitigated on-site, it is proposed that equivalent habitats will be created or restored off-site which are capable of supporting the SSSI notified features. This is the second objective of this ECF, namely:

Objective 2 – Provide new habitats off-site which are suitable for the rare vascular plants, breeding bird assemblages and invertebrate assemblages for which Swanscombe Peninsula SSSI has been notified, to compensate for the effects of loss and disturbance of these habitats on-site

- 4.5 This objective will be achieved through habitat creation/restoration and long-term management at several compensation sites. Full details of those compensation sites which have been secured are set out within **Annex 1** and **2** of this ECF, with summary information set out in **Table 4-1** below.
- 4.6 One of the key features of Swanscombe Peninsula SSSI is its mosaic of habitats and range of ecotones. Many of the species supported by the SSSI rely on different habitats within this mosaic as part of their life cycle. Therefore, whilst it is not possible to deliver all of the required compensation for impacts on the SSSI within a single off-site location, each SSSI compensation site will be specifically designed to include mosaics of habitats and a range of ecotones. Whilst some habitats are likely to be better represented in some compensation sites than in others, reflecting the local conditions, the complexity of each site will be maximised and, overall, all habitats will be represented and will be delivered at a scale proportionate to the impacts.
- 4.7 The Applicant is in the process of securing additional compensation land. With regard to SSSI compensation, this includes the following:
- Land which currently comprises OMH but which is capable of being enhanced for the benefit of the SSSI notified features; and
 - Land which has been subject past extraction (e.g. former landfill), upon which it is feasible to create OMH for the benefit of the SSSI notified features.
- 4.8 Details of additional compensation sites will be added to this document once these have been secured.
- 4.9 Following the identification of the required total area of compensation land, further consideration will be given to probability of natural colonisation of these compensation sites by the SSSI notified plant and invertebrate species and the need for translocation of specific taxa. This will depend upon a range of factors including the range/mobility of the species in question, the proximity of the compensation sites to the Project Site, and the presence or absence of existing habitat connections and dispersal routes.

- 4.10 The breeding bird species in question are sufficiently widespread and/or mobile to take advantage of new/restored habitats in the proposed off-site locations such that no translocation is required. Habitat and species monitoring will identify if the compensation measures have been successful and if modifications to management are required.
- 4.11 As set out within the detailed Annexes, the proposed habitat creation and restoration, and long-term monitoring and management, at these off-site locations will be fully funded and delivered by the Applicant and this will be secured via the Section 106 agreement.
- 4.12 As a result of the proposed habitat creation and restoration on the secured compensation sites, together with additional compensation sites still to be acquired, the negative residual effects upon Swanscombe Peninsula SSSI and its notified interest features can be compensated.

Table 4-1: Summary of compensation sites relevant to Objective 2 (Swanscombe Peninsula SSSI)

Site Name/Ref.	Site 1 – Harty Marshes (see Annex EDP 1)	Site 2 – Leysdown Marshes (see Annex EDP 2)	Site X – Name (see Annex EDP X)
OS Grid Ref.	TR 007 669	TR 045 687	Details of additional compensation sites to be added once confirmed.
Strategic Location	Within Greater Thames Marshes National Character Area (NCA) and Nature Improvement Area (NIA). Directly adjacent to Swale SPA/Ramsar/SSSI.	Within Greater Thames Marshes National Character Area (NCA) and Nature Improvement Area (NIA). Directly adjacent to Swale SPA/Ramsar/SSSI.	
Distance from Project Site (see Figure 12.60, Document reference 6.3.12.60)	39km (east)	43.4km (east)	
Total Site Area	202ha	152ha	
Existing land use and dominant habitats	Intensive farmland – arable and improved grassland.	Intensive farmland – arable.	
Extent of Habitat Suitable for Vascular Plants (via colonisation/translocation):			
<i>Dry grassland to be restored or enhanced</i>	N/A	N/A	Details of additional compensation sites to be added once confirmed.
<i>Dry grassland to be created</i>	4.42ha	11.01ha	
<i>Wet grassland to be restored or enhanced</i>	83.70ha	11.17ha	
<i>Wet grassland to be created</i>	33.86ha	95.24ha	
Total(s)	121.98ha	117.42ha	
Extent of Habitat Suitable for Invertebrates (via colonisation/translocation):			
<i>Open mosaic habitat (scrub, grassland, sparsely vegetated and bare ground, and shallow pools) to be created</i>	42.05ha	N/A	Details of additional compensation sites to be added once confirmed.
<i>Wet grassland to be restored or enhanced</i>	83.70ha	11.17ha	
<i>Wet grassland to be created</i>	33.86ha	95.24ha	
<i>Reedbed to be created</i>	N/A	7.15ha	
<i>Ponds and ditches to be created</i>	6.32ha	8.17ha	
Total(s)	165.93ha	121.73ha	
Extent of Habitat Suitable for Breeding Birds (via colonisation)			
<i>Wet grassland to be restored or enhanced</i>	83.70ha	11.17ha	Details of additional compensation sites to be added once confirmed.
<i>Wet grassland to be created</i>	33.86ha	95.24ha	
<i>Reedbed to be created</i>	N/A	7.15ha	
<i>Ponds and ditches to be created</i>	6.32ha	8.17ha	
<i>Dense scrub to be created</i>	N/A	N/A	
<i>Scrub mosaic to be created</i>	42.05ha	N/A	
Total(s)	165.93ha	121.73ha	
Other habitats to be created within site	N/A	N/A	

Site Name/Ref.	Site 1 – Harty Marshes (see Annex EDP 1)	Site 2 – Leysdown Marshes (see Annex EDP 2)	Site X – Name (see Annex EDP X)
Other compensation objectives which site will contribute to meeting	<u>Objective 1</u> (SPA/winter birds) <u>Objective 3</u> (various notable and priority habitats) <u>Objective 4</u> (bat foraging and otter) <u>Objective 5</u> (water vole, reptiles, terrestrial wintering birds, harvest mouse and amphibians)	<u>Objective 1</u> (SPA/winter birds) <u>Objective 3</u> (various notable and priority habitats) <u>Objective 4</u> (bat foraging and otter) <u>Objective 5</u> (water vole and amphibians)	

Section 5

European Protected Species Compensation Measures

- 5.1 As summarised within **Section 2**, the Kent Project Site supports European Protected Species (EPS), namely bats, dormouse and otter.
- 5.2 With respect to the individual EPS, residual impacts resulting from the Proposed Development can be summarised as follows.

Bats

- 5.3 Approximately 124.58ha of bat foraging habitat (primarily used in the summer, but also infrequently in winter) of moderate suitability will be lost, damaged or degraded.

Dormouse

- 5.4 Approximately 46.26ha of habitat suitable for breeding, hibernation and foraging by dormouse, will be lost comprising:
- 4.18ha of broadleaved semi-natural woodland of high to moderate quality;
 - 0.55ha of broadleaved plantation woodland of moderate to low quality;
 - 34.80ha of dense/continuous scrub of moderate quality; and
 - 6.73ha of scattered scrub over poor semi-improved grassland of low quality.
- 5.5 In addition, the retained habitats are expected to experience some levels of disturbance which may deter dormice from using them.

Otter

- 5.6 Approximately 4.7km of water course (ditch) will be permanently lost along with 1.4km of lake/pond bankside habitat and 11.95ha of reedbed/swamp. These habitats provide suitable foraging habitat for otter.
- 5.7 In addition, the retained habitats are expected to experience some levels of disturbance which may deter otter from using them.
- 5.8 To compensate for these negative effects, which cannot be avoided or mitigated on-site, it is proposed that equivalent habitats will be created or restored off-site which are capable of supporting these species. This is the fourth objective of this ECF, namely:

Objective 4 – Provide new habitats off-site which are suitable for European Protected Species which occur within the Project Site, to compensate for the effects of loss of habitats used by these species

- 5.9 This objective will be achieved through habitat creation/restoration and long-term management at several compensation sites. Full details of those compensation sites which have been secured to date are set out within **Annex 1** and **2** of this ECF, with summary information set out in **Table 5-1** below.
- 5.10 The compensation sites secured to date are not appropriate for dormouse compensation. In a letter dated 09 October 2020 (Natural England ref: DAS/UD7110, issued as part of a wider consultation via Natural England’s Discretionary Advice Service), Natural England have stated that it would unlikely accept a net loss in habitat when determining an EPS derogation licence application in respect of dormice. However, during a subsequent meeting held with Natural England on 20 October 2020, in recognition of the difficulties in securing off-site land connected to the Project Site due to the presence of surrounding land being largely already developed or committed for development purposes, Natural England agreed to the consideration of an alternative mitigation ‘package’ that may not strictly replace lost habitat on a 1:1 basis nor provide a quantifiable net gain in habitat area. This would, however, be subject to there being a comprehensive package of offset mitigation measures which delivers a ‘qualitative’ net gain to the local dormouse population, so as to ensure the maintenance of the favourable conservation status of the local dormouse population. This package would likely include a combination of measures which are developer-funded, including new habitat creation/management, alongside the provision of financial contributions to new or existing dormouse mitigation projects/recording schemes/management plans.
- 5.11 As noted in **Section 4**, the Applicant is in the process of securing additional compensation land. With regard to dormouse compensation, this includes land which is sufficiently well connected to the Project Site via habitat corridors and on which the presence of dormouse has been confirmed, and which can accommodate significant areas of native woodland/scrub planting to create new high quality dormouse habitat.
- 5.12 Details of additional compensation sites, and any alternative forms of compensation through financial contributions, will be added to this document once these have been secured.
- 5.13 Whilst bats are sufficiently widespread to take advantage of new foraging habitats in any of the proposed off-site locations, compensation sites in which new habitat is proposed for dormouse and otter have only been (or will only be) considered suitable if they are within range of existing populations of these species, based on detailed surveys and/or interrogation of local records.
- 5.14 Compensation of impacts on these species at a population level will therefore be achieved through the natural colonisation of new habitats rather than translocation of individual animals from the Project Site. Habitat and species monitoring will identify if the

compensation measures have been successful and if modifications to management are required.

- 5.15 As set out within the detailed Annexes, the proposed habitat creation and restoration, and long-term monitoring and management, at these off-site locations will be fully funded and delivered by the Applicant and this will be secured via the Section 106 agreement.
- 5.16 As a result of the proposed habitat creation and restoration on the secured compensation sites, together with additional compensation sites still to be acquired, the negative residual effects upon bats, dormouse and otter can be compensated. In the case of bats and otter, where new habitat creation significantly exceeds that being lost, this is predicted to result in a significant beneficial effect in the long-term.

Table 5-1: Summary of compensation sites relevant to Objective 4 (EPS)

Site Name/Ref.	Site 1 – Harty Marshes (see Annex EDP 1)	Site 2 – Leysdown Marshes (see Annex EDP 2)	Site X – Name (see Annex EDP X)
OS Grid Ref.	TR 007 669	TR 045 687	Details of additional compensation sites to be added once confirmed
Strategic Location	Within Greater Thames Marshes National Character Area (NCA) and Nature Improvement Area (NIA). Directly adjacent to Swale SPA/Ramsar/SSSI	Within Greater Thames Marshes National Character Area (NCA) and Nature Improvement Area (NIA). Directly adjacent to Swale SPA/Ramsar/SSSI	
Distance from Project Site (see Figure 12.60, Document reference 6.3.12.60)	39km (east)	43.4km (east)	
Total Site Area	202ha	152ha	
Existing land use and dominant habitats	Intensive farmland – arable and improved grassland	Intensive farmland – arable	
Extent of Habitat Suitable for Foraging Bats:			
<i>Broadleaved woodland to be restored or enhanced</i>	N/A	N/A	Details of additional compensation sites to be added once confirmed
<i>Broadleaved woodland to be created</i>	N/A	N/A	
<i>Dense scrub to be created</i>	N/A	N/A	
<i>Scrub mosaic to be created</i>	42.05ha	N/A	
<i>Grassland to be created/restored</i>	121.98ha	117.42ha	
<i>Reedbed to be created</i>	N/A	7.15ha	
<i>Ponds and ditches to be created</i>	6.32ha	8.17ha	
Total(s)	170.35ha	132.74ha	
Extent of Habitat Suitable for Dormouse:			
<i>Broadleaved woodland to be restored or enhanced</i>	N/A	N/A	Details of additional compensation sites to be added once confirmed
<i>Broadleaved woodland to be created</i>	N/A	N/A	
<i>Dense scrub to be created</i>	N/A	N/A	
<i>Scrub mosaic to be created</i>	N/A	N/A	
<i>Approx. no. dormouse boxes to be installed</i>	N/A	N/A	
Total(s)	N/A	N/A	
Extent of Habitat Suitable for Otter			
<i>Wet grassland to be restored or enhanced</i>	83.70ha	11.17ha	Details of additional compensation sites to be added once confirmed
<i>Wet grassland to be created</i>	33.86ha	95.24ha	
<i>Reedbed to be created</i>	N/A	7.15ha	
<i>Ponds and ditches to be created</i>	6.32ha	8.17ha	
Total(s)	123.88ha	121.73ha	
Other habitats to be created within site	N/A	N/A	

Site Name/Ref.	Site 1 – Harty Marshes (see Annex EDP 1)	Site 2 – Leysdown Marshes (see Annex EDP 2)	Site X – Name (see Annex EDP X)
Other compensation objectives which site will contribute to meeting	<u>Objective 1</u> (SPA/winter birds) <u>Objective 2</u> (Swanscombe SSSI – wetland and scrub breeding birds, OMH and aquatic invertebrates) <u>Objective 3</u> (various notable and priority habitats) <u>Objective 5</u> (water vole, reptiles, terrestrial wintering birds, harvest mouse and amphibians)	<u>Objective 1</u> (SPA/winter birds) <u>Objective 2</u> (Swanscombe SSSI – wetland and scrub breeding birds and aquatic invertebrates) <u>Objective 3</u> (various notable and priority habitats) <u>Objective 5</u> (water vole and amphibians)	

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Section 6

WCA and S41 Species Compensation Measures

- 6.1 As summarised within **Section 2**, the Kent Project Site supports WCA protected species, namely water vole and reptiles, and S41 species, namely terrestrial wintering birds, harvest mouse and amphibians.
- 6.2 With respect to the individual species/species groups, residual impacts resulting from the Proposed Development can be summarised as follows.

Water Vole

- 6.3 Approximately 4.7km of water course (ditch) will be permanently lost along with 1.4km of lake/pond bankside habitat and 11.95ha of reedbed/swamp. These habitats are suitable for breeding and foraging by water voles.

Reptiles

- 6.4 Approximately 68.66ha of habitat suitable for breeding, foraging and refuge by reptiles will be lost, damaged or degraded.

Terrestrial Wintering Birds

- 6.5 Approximate loss of foraging habitat for terrestrial wintering birds is as follows:
- 76.47ha dense scrub, grassland/scrub mosaic and rough grassland;
 - 11.95ha reedbed;
 - 13.74ha coastal/floodplain grazing marsh; and
 - 4.73ha woodland.

Harvest Mouse

- 6.6 Approximately 88.42ha of habitat suitable for breeding, foraging and refuge by harvest mouse will be lost, damaged or degraded.

Amphibians

- 6.7 The majority of terrestrial and freshwater habitats to be lost are suitable for breeding, foraging or refuge by amphibians (i.e. approximately 14.32ha).
- 6.8 In addition to the direct loss of habitat summarised above, the retained habitats are expected to experience some levels of disturbance which may deter these species from using them.
- 6.9 To compensate for these negative effects, which cannot be avoided or mitigated on-site, it is proposed that equivalent habitats will be created or restored off-site which are capable of supporting these species. This is the fifth objective of this ECF, namely:

Objective 5 – Provide new habitats off-site which are suitable for WCA and S41 Species which occur within the Project Site, to compensate for the effects of loss or disturbance of habitats used by these species

- 6.10 Full details of those compensation sites which have been secured to date are set out within **Annex 1** and **2** of this ECF, with summary information set out in **Table 6-1** below. Details of additional compensation sites will be added to this document once these have been secured.
- 6.11 Whilst the land secured to date will provide sufficient new habitat to accommodate the translocated population of water vole, additional habitat and/or habitat which is in closer proximity to the Project Site is still to be sought to compensate for the effects on reptiles, terrestrial wintering birds, harvest mouse and amphibians.
- 6.12 As noted in **Section 4**, the Applicant is in the process of securing additional compensation land. In this case, the land which is suitable for the enhancement or the creation of new OMH habitat to compensate for SSSI impacts would also provide compensatory habitat for reptiles, terrestrial wintering birds, harvest mouse and amphibians.
- 6.13 Compensation sites in which new habitat is proposed for water vole and reptiles have only been (or will only be) considered suitable if they are within range of existing populations of these species, based on detailed surveys and/or interrogation of local records. Furthermore, in part due to their legal protection and in line with best practice, water voles and reptiles at risk of harm within or adjacent to the footprint of the Proposed Development will be captured and translocated to new habitats once these have reached a suitable condition.
- 6.14 Terrestrial wintering birds, harvest mouse and amphibians are sufficiently widespread to take advantage of new foraging habitats in any of the proposed off-site locations, and compensation of impacts on these species at a population level will be achieved through the natural colonisation of new habitats rather than translocation of individual animals from the Project Site. Habitat and species monitoring will identify if the compensation measures have been successful and if modifications to management are required.

- 6.15 As set out within the detailed Annexes, the proposed habitat creation and restoration, and long-term monitoring and management, at these off-site locations will be fully funded and delivered by the Applicant and this will be secured via the Section 106 agreement.
- 6.16 As a result of the proposed habitat creation and restoration on the secured compensation sites, together with additional compensation sites still to be acquired, the negative residual effects upon water vole, reptiles, terrestrial wintering birds, harvest mouse and amphibians can be compensated. In the case of terrestrial wintering birds, where new habitat creation significantly exceeds that being lost, this is predicted to result in a significant beneficial effect in the long-term.

Table 6-1: Summary of compensation sites relevant to Objective 5 (WCA and S41 Species)

Site Name/Ref.	Site 1 – Harty Marshes (see Annex EDP 1)	Site 2 – Leysdown Marshes (see Annex EDP 2)	Site X – Name (see Annex EDP X)
OS Grid Ref.	TR 007 669	TR 045 687	Details of additional compensation sites to be added once confirmed
Strategic Location	Within Greater Thames Marshes National Character Area (NCA) and Nature Improvement Area (NIA). Directly adjacent to Swale SPA/Ramsar/SSSI	Within Greater Thames Marshes National Character Area (NCA) and Nature Improvement Area (NIA). Directly adjacent to Swale SPA/Ramsar/SSSI	
Distance from Project Site (see Figure 12.60, Document reference 6.3.12.60)	39km (east)	43.4km (east)	
Total Site Area	202ha	152ha	
Existing land use and dominant habitats	Intensive farmland – arable and improved grassland	Intensive farmland – arable	
Extent of Habitat Suitable for Water Vole:			
<i>Reedbed to be created</i>	N/A	7.15ha	Details of additional compensation sites to be added once confirmed
<i>Ponds and ditches to be created</i>	6.32ha	8.17ha	
Total(s)	6.32ha	15.32ha	
Extent of Habitat Suitable for Reptiles:			
<i>Open mosaic habitat (scrub, grassland, sparsely vegetated and bare ground, and shallow pools) to be created</i>	42.05ha	N/A	Details of additional compensation sites to be added once confirmed
<i>Wet grassland to be restored or enhanced</i>	83.70ha	11.17ha	
<i>Wet grassland to be created</i>	33.86ha	95.24ha	
<i>Dry grassland to be created</i>	4.42ha	11.01ha	
<i>Reedbed to be created</i>	N/A	7.15ha	
<i>Ponds and ditches to be created</i>	6.32ha	8.17ha	
<i>Approx. no. log piles/hibernacula to be created</i>	N/A	N/A	
Total(s)	170.35ha	132.74ha	
Extent of Habitat Suitable for Terrestrial Wintering Birds			
<i>Broadleaved woodland to be restored or enhanced</i>	N/A	N/A	Details of additional compensation sites to be added once confirmed
<i>Broadleaved woodland to be created</i>	N/A	N/A	
<i>Dense scrub to be created</i>	N/A	N/A	
<i>Scrub mosaic to be created</i>	42.05ha	N/A	
<i>Reedbed to be created</i>	N/A	7.15ha	
Total(s)	42.05ha	7.15ha	

Site Name/Ref.	Site 1 – Harty Marshes (see Annex EDP 1)	Site 2 – Leysdown Marshes (see Annex EDP 2)	Site X – Name (see Annex EDP X)
Extent of Habitat Suitable for Harvest Mouse			
<i>Scrub mosaic to be created</i>	42.05ha	N/A	Details of additional compensation sites to be added once confirmed
<i>Dry grassland to be restored or enhanced</i>	N/A	N/A	
<i>Dry grassland to be created</i>	4.42ha	11.01ha	
Total(s)	46.47ha	11.01ha	
Extent of Habitat Suitable for Amphibians			
<i>Ponds and ditches to be created</i>	6.32ha	8.17ha	Details of additional compensation sites to be added once confirmed
<i>Broadleaved woodland to be restored or enhanced</i>	N/A	N/A	
<i>Broadleaved woodland to be created</i>	N/A	N/A	
<i>Dense scrub to be created</i>	N/A	N/A	
<i>Scrub mosaic to be created</i>	42.05ha	N/A	
<i>Dry grassland to be restored or enhanced</i>	N/A	N/A	
<i>Dry grassland to be created</i>	4.42ha	11.01ha	
<i>Approx. no. log piles/hibernacula to be created</i>	N/A	N/A	
Total(s)	52.79ha	19.18ha	
Other habitats to be created within site	N/A	N/A	
Other compensation objectives which site will contribute to meeting	<u>Objective 1</u> (SPA/winter birds) <u>Objective 2</u> (Swanscombe SSSI – wetland and scrub breeding birds, OMH and aquatic invertebrates) <u>Objective 3</u> (various notable and priority habitats)	<u>Objective 1</u> (SPA/winter birds) <u>Objective 2</u> (Swanscombe SSSI – wetland and scrub breeding birds and aquatic invertebrates) <u>Objective 3</u> (various notable and priority habitats)	

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Section 7 Management and Monitoring

- 7.1 Appropriate long-term management and monitoring of off-site mitigation and compensation measures are crucial to successfully meeting the objectives of this ECF.
- 7.2 As described in **Section 1**, it is proposed that detailed Ecological Management Plans (EMPs) for each compensation site be prepared following the grant of DCO consent but prior to the commencement of development. These EMPs would contain a finer level of detail with respect to the habitats to be created/restored, the methods by which habitat creation/restoration would be achieved, and the methods by which habitats would be managed and monitored to ensure they remain in suitable condition in the long-term. The preparation of EMPs for each compensation site, and their submission for approval by the Local Planning Authorities and Natural England prior to the commencement of development, can be secured by a suitably worded requirement attached to DCO consent.
- 7.3 This section therefore provides an overview of the management and monitoring requirements to deliver the objectives of this ECF, which would be developed further in future EMPs.

Management

- 7.4 Habitat creation/restoration and long-term management proposals for specific land parcels are outlined in the Annexes to the ECF. These are summarised in **Table 7-1** and **7-2** below, together with the principles of establishment and management of habitats which would apply to additional off-site land once it is secured.

Establishment Phase

Table 7-1: Habitat Establishment Principles

Habitats/Features	Key Principles
Wet Grassland/Grazing Marsh	<ul style="list-style-type: none"> • Where being achieved through arable conversion, soil fertility to be reduced and grassland seed mix applied and allowed to establish before rewetting occurs; and • Where being achieved through rewetting of existing poor/draind grassland, no seeding required.
Reedbed	<ul style="list-style-type: none"> • Where being achieved through creation of new wetlands not directly connected to existing reedbed, some transplanting/seeding is to be undertaken to increase rate of establishment; and • Where being achieved through extension of existing wetlands supporting reedbed, no transplanting/seeding should be required.

Habitats/Features	Key Principles
Ponds and Ditches	<ul style="list-style-type: none"> • Ponds within free-draining soils (i.e. within dry open mosaic habitat) to be lined with clay or other impermeable substrate; • Variable depth profile within and between ponds to create variation between permanent and ephemeral open water conditions; • Larger ponds should include islands to provide nesting birds, otter and water vole additional refuge from predators; • New ditches for water voles to have steep banks on at least one side to facilitate burrowing. Ditches to include a variable profile with some incorporating a 'shelf' of shallow water to encourage aquatic invertebrates; and • Dams or sluices to be installed in new and existing ditches where necessary to impede flow/raise the water table and enable control of water levels.
Open Mosaic Habitat	<ul style="list-style-type: none"> • Where being achieved through arable conversion or other areas of mature vegetation, soil fertility to be reduced through topsoil strip or inverting topsoil and subsoil; • A wide range of mineral substrates to be imported and/or exposed (e.g. on former mineral extraction sites) to create nutrient poor free draining conditions. Substrates to range from very fine to very coarse grain and to include concrete rubble with large fragments; • Earth and substrates to be shaped/mounded to create a highly varied microtopography in terms of depth, slope and aspect; • Limited seeding/planting to be undertaken to increase rate of establishment of sparsely vegetated ground, grassland and scrub habitats; • Bare, sparse and vegetated habitats to be created in a fine mosaic with variable patch size; and • Establishment of pools, dry grassland and scrub described above and below.
Dry Grassland	<ul style="list-style-type: none"> • Where being achieved through arable or improved grassland conversion, soil fertility to be reduced and grassland seed mix applied; and • Where being achieved on semi-improved grassland, sward to be heavily scarified and over sown with grassland seed mix to improve botanical diversity.
Dense Scrub	<ul style="list-style-type: none"> • Achieved through a combination of expanding existing stands/patches of scrub and new planting of low growing native shrubs and small trees (including bramble).
Broadleaved Woodland	<ul style="list-style-type: none"> • Planting a combination of native whips and more mature standards to increase rate of establishment. Use of fencing or tree guards to protect young trees from damage by rabbits and deer etc; and • Initial planting densely packed to promote vertical growth, followed by thinning to create structure and aid canopy expansion.
Dormouse Boxes	<ul style="list-style-type: none"> • Durable wooden boxes of appropriate design installed on existing mature trees or shrubs, at a suitable height and accessible location which facilitates future monitoring.

Habitats/Features	Key Principles
Reptile/Amphibian Hibernacula	<ul style="list-style-type: none"> Positioned in sheltered locations with 100m of ponds; At least 3m x 2m in size, constructed from a mix of logs, rubble and loose earth, capped with turf or seeded topsoil; and Partially buried if on permeable soils but constructed above ground on impermeable soils to avoid flooding in winter.
Reptile/Amphibian Log/Brash Piles	<ul style="list-style-type: none"> Positioned in sheltered locations on the edge of woodland/scrub habitat; and At least 3m x 2m in size, constructed above ground from a mix of large logs and smaller branches/brash.

Post-establishment Management Phase

Table 7-2: Habitat Management Principles

Habitats/Features	Key Actions/Considerations
Wet Grassland/Grazing Marsh	<ul style="list-style-type: none"> Low intensity summer grazing by cattle or ponies (c.0.7 livestock units [LSU]/ha/yr through April-October); and Grazing intensity to be fine-tuned to ensure the grassland can support grazing geese in autumn, and breeding by waders, such as redshank and curlew, in spring and early summer.
Reedbed	<ul style="list-style-type: none"> Rotational cutting to avoid the encroachment of scrub into drier areas, with no more than 20% cut in one year.
Ponds and Ditches	<ul style="list-style-type: none"> Rotational trimming of edge habitat in winter; and Periodic desilting/reprofiling in spring/autumn.
Open Mosaic Habitat	<ul style="list-style-type: none"> Periodic interventions to maintain bare ground and halt natural succession.
Dry Grassland	<ul style="list-style-type: none"> Periodic cutting and removal of arisings to reduce nutrient levels and prevent scrub encroachment.
Dense Scrub	<ul style="list-style-type: none"> Rotational cutting to maintain a similar overall coverage of scrub but prevent encroachment of adjacent open habitats.
Broadleaved Woodland	<ul style="list-style-type: none"> Occasional thinning to create open patches and increase structural complexity.
Dormouse Boxes	<ul style="list-style-type: none"> Periodic inspection and repair or replace as necessary.
Reptile/Amphibian Hibernacula	<ul style="list-style-type: none"> Periodic inspection and repair or replenish as necessary.
Reptile/Amphibian Log/Brash Piles	<ul style="list-style-type: none"> Periodic inspection and repair or replenish as necessary.

Habitat Monitoring

- 7.5 The aim of post-development monitoring activities is to evaluate the effectiveness of species-specific measures as well as the management and function of restored, and newly created habitats as identified above.
- 7.6 Periodic monitoring visits/site inspections will be vital to ensure that any remedial measures are identified to ensure that the objectives of the ECF 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 EMP. The specific frequency of these inspections will be specified in the EMP(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.

7.7 It is envisaged that detailed management and maintenance tasks within the future EMP(s) will be formally reviewed at Year 5 of the first development phase with any necessary changes required incorporated into a revised EMP(s). After Year 5, detailed monitoring activities will be completed as required, with any necessary changes incorporated into a revised EMP, until 30 years after completion of the Proposed Development. The final review of the EMP at Year 30 will identify if and where habitats have not achieved their desired status. Future management and monitoring measures from year 31 onwards will be determined in consultation with Applicant and relevant LPA, with a new EMP written and approved, as necessary.

7.8 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.

7.9 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 EMP to be approved by the authority.

7.10 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.

Reedbed, Marsh, Ponds and Ditches

7.11 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).

7.12 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.

Open Mosaic Habitats

- 7.13 The OMH will be monitored to ensure structural composition and the complexity of the habitat mosaic is appropriate and management activities are being carried out to the required standards. Monitoring visits will be carried out during the summer months where a more reliable record of bare, sparse and densely vegetated substrates can be made.

Woodland and Scrub

- 7.14 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; and
- Terrestrial succession and scrub encroachment.

Species Rich Grassland

- 7.15 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.

Dormouse Boxes

- 7.16 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

- 7.17 Reptile and amphibian hibernacula will be checked annually to ensure they are still present and functional, with no signs of collapse, disturbance or damage.

Species Monitoring

7.18 Species monitoring will be undertaken to measure the success of the compensation measures (and mitigation measures with reference to SPA bird populations). This will also be undertaken to ensure that relevant protected species populations are maintained at a Favourable Conservation Status (FCS) as required by the protected species licensing process. The proposed frequency and type of species monitoring is summarised in **Table 7-3**. Each survey will use a standard protocol which is easily repeatable to enable comparisons of data sets between years. Unless stated otherwise, the years given in the table below refer to the number of years following completion of habitat creation or enhancement works within relevant compensation sites.

Table 7-3: Summary Table of Protected/Notable Species Monitoring Actions

Species	Monitoring Action	Frequency/Timing
Birds	Survey of SPA wintering waterfowl and waders.	Monthly surveys (November-March inclusive) in years 3, 5 and 10.
	Survey of other/terrestrial wintering birds.	As above.
	Survey of breeding birds.	Monthly surveys (April-July inclusive) in years 3, 5, 10 and 20.
Vascular Plants	Botanical surveys to record presence (or absence) and abundance of rare species.	Two visits, between June and August inclusive, in years 3, 5, 10 and 20.
Invertebrates	Invertebrate surveys and analysis using Pantheon to assess target habitat assemblages.	Three visits, between May and September inclusive, in years 3, 5, 10 and 20.
Bats	Bat activity surveys using automated detector surveys.	Three visits, between May and September inclusive, in years 3, 5 and 10.
Dormouse	Surveys of installed dormouse boxes.	Two visits, between May and November inclusive, during each monitoring year as specified in the EPS Licence.
Water Vole	Initial survey of the released water vole population.	In August following the release via a mark, release, recapture exercise.
	Survey of the receptor habitat using field sign surveys.	In August/September, annually for 3 years following the release of the trapped water vole population, then in years 5 and 10.
Otter	Incidental signs of otter will be recorded during the water vole monitoring surveys.	As water vole timings above.
Reptiles	Survey using artificial refugia and visual searches.	5 visits, between May and September inclusive, in years 3, 5 and 10.
Harvest Mouse	Nest searches.	Autumn, in years 3, 5 and 10.
Amphibian Assemblage	Torchlight survey of water bodies after dark.	Two visits, during April and May inclusive, in years 3, 5 and 10.

Annex EDP 1
Details of Compensation Site 1 – Harty Marshes

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Revisions

Revision	Description	Issued by	Date	Approved by
r076_00	Issue for DCO Submission	TW/SC	14/03/2022	EDP/LRCH

The Environmental Dimension Partnership Ltd

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Chapter One ◆ SITE CONTEXT AND LOCATION

- 1.1 This document outlines proposed habitat creation/restoration and long-term management at Harty Marshes, to compensate for ecological impacts anticipated as a result of the London Resort (the ‘Proposed Development’).
- 1.2 It is proposed that a detailed Ecological Management Plan (EMP) for this compensation site be prepared following the grant of DCO consent but prior to the commencement of development. The EMP will contain a finer level of detail with respect to the habitats to be created/restored, the methods by which habitat creation/restoration would be achieved, and the methods by which habitats would be managed and monitored to ensure they remain in suitable condition in the long-term. The EMP will also address proposals/opportunities to provide additional public health, wellbeing and educational benefits though providing access (e.g. bird hides and footpaths) and interpretation materials where appropriate and where this would not conflict with the ecological objectives.
- 1.3 The preparation of the EMP for the Harty Marshes compensation site, and its submission for approval by the Local Planning Authorities and Natural England prior to the commencement of development, can be secured by a suitably worded requirement attached to DCO consent.

SITE LOCATION

- 1.4 Harty Marshes (hereafter referred to as ‘the Site’) lie on the southern edge of the Isle of Sheppey, centred at approximately OS Grid Reference TR 007 669. The Site measures approximately 203ha and lies between Harty Ferry Lane and Capel Fleet. The Site’s location in the context of the Project Site and other mitigation/compensation land is shown on ES Figure 12.60 (Document reference 6.3.12.60).

SITE CONTEXT

- 1.5 The Site lies approximately 39km to the east of the Kent Project Site and is currently in agricultural production. The Swale SPA/Ramsar site/SSSI surrounds the Site to the north, west and south and in some places forms part of the Site.
- 1.6 The Thames Estuary and Marshes SPA/Ramsar site/SSSI and Medway Estuary and Marshes SPA/Ramsar site/SSSI are situated 12.7km north-west and 8.1km west respectively. The Thanet Coast and Sandwich Bay SPA/Ramsar site is also situated 11.7km to the east.
- 1.7 The Site is part of the Greater Thames Marshes National Character Area (NCA) and Nature Improvement Area (NIA), of which the Swanscombe peninsula and the Essex Project Site are also a part.

- 1.8 With regard to the Site's suitability for compensating effects on invertebrates of brownfield/open mosaic habitats, the Site is located within the 'Thames Gateway' area as defined by Buglife¹. This area has a unique climate, which is more continental than the rest of the UK, including low rainfall causing soil water deficit, higher than average temperatures and sunshine levels in summer, and mild winters. The climate helps to maintain dry, open habitats, allowing wildlife with Mediterranean elements to develop, many at the northerly limits of their range and unable to survive elsewhere in the UK.

¹ Robins, J. et al. *The state of brownfields in the Thames Gateway*. Buglife 2013.

Chapter Two ◆ COMPENSATION OBJECTIVES

- 2.1 This chapter should be read in conjunction with Section 2 of the Ecological Compensation Framework (ECF) (Document reference 6.2.12.10).

SITE SPECIFIC COMPENSATION OBJECTIVES

- 2.2 The Project Site contains a complex mosaic of habitats, supporting a range of protected and notable species. It is not possible to provide the compensation required for impacts upon all of those habitats and species as a result of the Proposed Development in a single off-site location. However, it is anticipated that habitat creation and enhancement within the Site at Harty Marshes would contribute to partially fulfilling each of the compensation objectives defined within the ECF, namely:
1. Provide new functionally linked grazing marsh and reedbed habitat off-site to mitigate the effects of loss and disturbance of these habitats on-site. As described within Appendix 12.4: Shadow Habitats Regulations Assessment (Document Reference 6.2.12.4), this will mitigate potential adverse effects on the Thames Estuary and Marshes SPA/Ramsar and Medway Estuary and Marshes SPA/Ramsar sites;
 2. Provide new habitats off-site which are suitable for the rare vascular plants, breeding bird assemblages and invertebrate assemblages for which Swanscombe Peninsula SSSI has been notified, to compensate for the effects of loss and disturbance of these habitats on-site;
 3. Provide new habitats off-site to compensate for the loss and disturbance of notable and priority habitats on-site;
 4. Provide new habitats off-site which are suitable for European Protected Species (EPS), which occur within the Project Site, to compensate for the effects of loss of habitats used by these species;
 5. Provide new habitats off-site which are suitable for WCA and S41 Species which occur within the Project Site, to compensate for the effects of loss or disturbance of habitats used by these species; and
 6. Monitor the success of habitat creation, and use of the new habitats by the target species and take appropriate remedial action if required to ensure that all of the mitigation and compensation requirements are met in the long-term.

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Chapter Three ♦ ECOLOGICAL BASELINE

- 3.1 Ecological surveys have been carried out at the Site between November 2020 and July 2021, including the following:
- An Extended Phase 1 Habitat survey;
 - Wintering bird surveys;
 - Breeding bird surveys; and
 - Water vole and otter surveys.
- 3.2 A summary of each survey is included below.

ON-SITE HABITATS

- 3.3 The Extended Phase 1 Habitat survey was undertaken between 14 and 16 June 2021 by suitably experienced surveyors. Habitats within the Site were categorised and an indicative species-list compiled in order to assign an ecological value to each habitat. These habitats are shown on ES Figure 12.61 (Document reference 6.3.12.61).
- 3.4 The Site mainly comprises intensively managed agricultural habitats of low intrinsic value, but habitats of higher value are present along the margins of fields, particularly on the peripheries of the Site. Habitats present are summarised below.

Arable

- 3.5 The eastern half of the Site is mostly arable farmland, low lying in the west and gradually rising onto the Isle of Harty. No notable arable weeds were recorded, although black-grass (*Alopecurus myosuroides*) was common in wheat fields. All fields were surrounded by wide grassy margins, as described below.

Arable Field Margins

- 3.6 All of the arable fields are surrounded by large field margins measuring between 5 and 10m wide. Many of the margins appear to be managed for wildlife, particularly pollinators and birds.
- 3.7 They are characterised by rough grassland with a number of tall and/or hardy wildflower species indicative of unmanaged or lightly managed ‘waste’ ground, including birds-foot trefoil (*Lotus corniculatus*), common knapweed (*Centaurea nigra*), cow parsley (*Anthriscus sylvestris*), bulbous buttercup (*Ranunculus bulbosus*), grass vetchling (*Lathyrus nissolia*), mayweed sp. (*Anthemis* sp.), cut-leaved cranesbill

(*Geranium dissectum*), hemlock (*Conium maculatum*), bristly ox-tongue (*Helminthotheca echioides*), fat-hen (*Chenopodium album*), black mustard (*Brassica nigra*), black medick (*Medicago lupulina*), common mallow (*Malva sylvestris*), common vetch (*Vicia sativa*), lesser trefoil (*Trifolium dubium*), mugwort (*Artemisia vulgaris*) and red clover (*Trifolium pratense*).

- 3.8 Grasses present included creeping bent (*Agrostis stolonifera*), timothy (*Phleum pratense*), soft brome (*Bromus hordeaceus*), false oat-grass (*Arrhenatherum elatius*), meadow barley (*Hordeum secalinum*), perennial rye-grass (*Lolium perenne*), black-grass, wall barley (*Hordeum murinum*), tall fescue (*Festuca arundinacea*), and crested dog's-tail (*Cynosurus cristatus*). Flowers sown for pollinators including lacy phacelia (*Phacelia tanacetifolia*), sainfoin (*Onobrychis viciifolia*) and salsify (*Tragopogon porriflorus*) were present along many margins.

Improved Grassland (Coastal/Floodplain Grazing Marsh)

- 3.9 The south-westernmost field is a large, flat and open grassland field divided into two by a wet ditch. The sward is dominated by perennial rye-grass, although a small number of other species are also present, including cock's-foot (*Dactylis glomerata*), creeping bent, meadow foxtail (*Alopecurus pratensis*), crested dog's-tail, wall barley, bulbous buttercup, curled dock (*Rumex crispus*), soft brome, grass vetchling and tall fescue. Although no indicator species were recorded, its positioning on low ground and apparent wet depressions shown on aerial imagery suggests that this land may qualify as coastal/floodplain grazing marsh (CFGM) priority habitat.
- 3.10 A further, improved grassland field (not CFGM) is present on the higher ground in the south-east. This field was almost exclusively perennial rye-grass but had been cut recently at the time of survey so may contain further, unrecorded species.

Brackish Ditches

- 3.11 Most fields are separated by a ditch network, which drains into Capel Fleet to the west. Ditch margins are dominated by sea club-rush (*Bolboschoenus maritimus*), indicating a brackish influence.
- 3.12 Ditches on higher ground were occasionally dry, and where wet, were dominated by either common reed (*Phragmites australis*) or *Typha* sp. bulrushes.

Bare Ground

- 3.13 Some areas of bare ground are present across the Site, particularly associated with farmyards, storage yards and farm tracks.

Standing Water

- 3.14 A number of ponds are present, mostly associated with widenings of the ditch network. These ponds are fed by the ditches and therefore have a brackish therefore influence. The margins are dominated by sea club-rush and no submerged plants were recorded.

- 3.15 A scrape has been created in the north-west of the Site with a scalloped, shallow edge and an island in the centre. This feature provides an important resource for existing wetland birds on the Site.
- 3.16 There is a large pond on the higher ground in the south-east, which again has margins dominated by sea club-rush, although common reed is present around its southern edge.

Semi-improved Grassland

- 3.17 The large field bordering the saltmarsh in the very south of the Site is more species-rich than other areas of pasture and is characterised by similar species to the field margins around the rest of the Site. The southern part of the field is dominated by hawthorn scrub.

Scrub

- 3.18 Small areas of scrub are present across the Site along field margins and, as noted above, in larger areas within the south-easternmost field in the Site.

Hedgerows

- 3.19 A small number of hedgerows are present in some of the field margins of the higher ground. These hedgerows are species-poor and outgrown, containing mostly hawthorn (*Crataegus monogyna*), willow (*Salix* sp.), elder (*Sambucus nigra*) and ash (*Fraxinus excelsior*). Wild privet (*Ligustrum vulgare*), plum (*Prunus domestica*) dogwood (*Cornus sanguinea*) and dog rose (*Rosa canina*) are also present.

PROTECTED/NOTABLE SPECIES

- 3.20 Species groups considered most likely to be affected by any change of land use within the Site were subject to targeted surveys, as follows.

Wintering Birds

- 3.21 Over-wintering birds were considered to be a key constraint for the Site, given its positioning alongside the Swale SPA/Ramsar site/SSSI and other nearby SPA/Ramsar sites.
- 3.22 A summary of the results of wintering bird surveys undertaken at the Site is given below, and a full set of results can be provided on request.
- 3.23 Surveys were undertaken monthly between November 2020 and March 2021 by surveyors with extensive bird survey experience. The methodology used was a hybrid between a farmland bird walkover and vantage point (VP) surveys undertaken from high ground. This involved walking the boundaries of each field and following tramlines to cut across the centre, where deemed appropriate. Two-hour VPs were timed to incorporate dawn, dusk, high tide and low tide to gain a picture of how the Site is used by larger species, such as raptors, wildfowl and waders.
- 3.24 Harty Marshes supported a high abundance and diversity of raptors, wildfowl and waders, mostly concentrated along the southern and western edges of the land but with some

activity all the way through to the northernmost fields, including swans, ducks and the occasional geese. It appears that there is considerable interplay between the neighbouring saltmarsh and the arable and grassland fields here. Arable land and improved grassland can be important for geese in particular over winter because it provides relatively high nutrient grazing compared to natural systems², however, the value of much of this land could be limited by the lack of accessible fresh water³ – leaving foraging grounds to find drinking water expends significant energy. Peak counts for wader and waterfowl species are presented in Table 3-1 below.

Table 3-1: Raptor, wader and waterfowl peak counts, Harty Marshes 2020-2021

Species	Peak Count
Barnacle goose	2
Bewick's swan	1
Brent goose	103
Curlew	137
Dunlin	20
Gadwall	43
Golden plover	60
Greylag	84
Grey plover	30
Hen harrier	1
Lapwing	105
Mallard	45
Marsh harrier	4
Merlin	1
Mute swan	17
Peregrine falcon	1
Redshank	3
Ruff	1
Shelduck	211
Short-eared owl	1
Snipe	4
Teal	54
Tufted duck	6
White-fronted goose	668
Wigeon	8

² Tinkler, E., Montgomery, W.L. & Elwood, R.W. (2009) Foraging ecology, fluctuating food availability and energetics of wintering brent geese. *Journal of Zoology V.278 Issue 4 p.313-323* showed that the relative energy content of foods available to light-bellied brent geese *Branta bernicla hrota* feeding at Strangford Lough, Northern Ireland varied from 14 kJ g⁻¹ on intertidal *Zostera*, their tradition natural habitats, to 16 kJ g⁻¹ on saltmarsh and 21 kJ g⁻¹ on managed pasture.

³ Owen, M. (1973) The management of grassland areas for wintering geese. *Wildfowl 24:123-130*

- 3.25 Also present were flocks of corn bunting, skylark, linnet and other declining farmland species associated with the rough grass margins and stubble.

Breeding Birds

- 3.26 The breeding bird survey (BBS) was undertaken with reference to standard methodology, entailing a modified Common Bird Census (CBC) ‘territory mapping’ approach⁴. This involved one survey visit per month to each area of the Site between May and July 2021 (i.e. at the height of the breeding bird season for lowland Britain).
- 3.27 The Site was split into three sections and surveyed by two experienced surveyors over two mornings. The sections were designed to limit double counting by incorporating adjacent similar habitats within single sections where possible.
- 3.28 Following best practice, the survey visits were timed to start around first light, to coincide with the period of peak activity for birds, most particularly passerine songbird species. Surveys were also undertaken during suitable weather conditions, i.e. days/periods with strong winds and heavy or persistent rain were generally avoided. It is therefore considered that the results are not significantly limited by seasonal or climatic factors.
- 3.29 The survey methodology involved walking to within c.50m of all parts of the Site, where possible, and recording all birds listed within the Birds of Conservation Concern (BoCC) report⁵ and their activity status, with a particular emphasis placed upon those elements considered to relate to, or be indicative of, breeding. This ensured that the survey identified all birds using the margins of the Site, as well as those in the interior.
- 3.30 The BBS was carried out by experienced ornithologists, at an appropriate time of year for the locality, and in suitable weather conditions. It is therefore considered that the results provide a representative overview of the breeding bird interest at the Site.
- 3.31 A summary of the results of the surveys is included below.
- 3.32 Throughout the three surveys, skylark, corn bunting and yellow wagtail were recorded frequently in the fields and their margins. Oystercatcher were also recorded regularly within the arable fields, and also present in significant numbers were reed bunting, lapwing and linnet. There were breeding waterfowl and waders along the ditches and along the margins of the SPA/Ramsar site, including snipe, avocet, mute swan, mallard and shelduck. Reed, sedge and Cetti’s warbler were all present in the vegetated margins of ditches. The large pond in the south-east of the Site supported a range of ducks, including shelduck, mallard, wigeon and the IUCN vulnerable pochard, which is also found breeding at the Kent Project Site. Marsh harriers were recorded frequently along the

⁴ British Trust for Ornithology, Common Bird Census. [REDACTED]

⁵ Eaton, M.A., Aebischer, N.J., Brown, A.F., Hearn, R.D., Lock, L., Musgrove, A.J., Noble, D.G., Stroud, D.A. and Gregory, R.D. (2015). *Birds of Conservation Concern 4: the population status of birds in the UK, Channel Islands and Isle of Man*. British Birds, Vol. 108, 708-746.

ditches, particularly in the south of the Site. A species list is given in Table 3-2 below, with pair estimates for species of conservation concern.

Table 3-2: Breeding Bird Survey Results, Harty Marshes 2021

Species	Bocc Status ⁶	Breeding Status	Estimated Population/Other Notes
Avocet	Amber	Possible breeding	Up to 3 pairs on island within scrape in north-west of site.
Barn owl	Green/Sch.1	Possible breeding	Individuals seen foraging. Only suitable breeding habitat on Isle of Harty.
Bearded tit	Amber/Sch.1	Confirmed breeding	Up to 3 pairs. Family group seen on edge of Ramsar.
Blackbird	Green	Probable breeding	Infrequent towards the east.
Blackcap	Green	Possible breeding	Infrequent in scrub areas, particularly on Isle of Harty
Black-headed gull	Amber	Non-breeding	Regular flyovers, occasional resting.
Buzzard	Green	Possible breeding	Suitable breeding habitat on Isle of Harty. Seen flying over site.
Cetti's warbler	Green/Sch.1	Probable breeding	Regular in ditch-side vegetation where suitable.
Coot	Green	Confirmed breeding	Common in ditch network and ponds. Adult seen with chicks.
Corn bunting	Red	Probable breeding	7-10 pairs. Common on western edge of site within edges of grazing marsh habitat.
Curlew	Red	Non-breeding	Seen on adjacent saltmarsh - occasional flyovers.
Grey heron	Green	Non-breeding	Regular along ditches.
Greylag	Amber	Probable breeding	Up to 15 pairs. Large group recorded in July but considered to be a post-breeding aggregation.
Herring gull	Red	Non-breeding	Occasional flyovers.
House sparrow	Red	Probable breeding	Small numbers associated with farm buildings at Mockett's Farm and at the Ferry House Inn.
Lapwing	Red	Probable breeding	Up to 10 pairs. Small numbers recorded on arable land on Isle of Harty, reasonable numbers recorded within grazing marsh and within existing scrape in north-west of the site.
Lesser black-backed gull	Amber	Non-breeding	Occasional flyovers.

⁶ 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.

Lesser whitethroat	Green	Probable breeding	Occasional singing males in south-east of site.
Linnet	Red	Probable breeding	12-17 pairs. Common, particularly along the southern boundary and around Mockett's Farm.
Little egret	Green	Non-breeding	Small numbers of foraging individuals.
Little grebe	Green	Probable breeding	Recorded frequently along ditches. Likely to be under-recorded.
Long-eared owl	Green	Confirmed breeding	1 pair. Juveniles heard calling from scrub in south-east of site.
Mallard	Amber	Probable breeding	Very common. Large numbers (200+) on the large pond at Mockett's Farm and frequent elsewhere near to water.
Marsh harrier	Amber/Sch.1	Possible breeding	Up to 3 pairs. Males and females seen hunting regularly across the site.
Meadow pipit	Amber	Possible breeding	2-3 pairs. Individuals recorded along the western boundary of the site in July.
Mediterranean gull	Amber/Sch.1	Non-breeding	Occasional flyovers.
Moorhen	Green	Probable breeding	Occasional individuals along ditches and on ponds.
Mute swan	Amber	Confirmed breeding	Up to 3 pairs. Family group recorded on larger ditch.
Oystercatcher	Amber	Confirmed breeding	10-13 pairs. Recorded within arable fields and grazing marsh.
Pochard	Red/IUCN vulnerable	Confirmed breeding	Up to 8 pairs. Group recorded on pond at Mockett's Farm, some breeding within ditch network.
Redshank	Amber	Possible breeding	Up to 5 pairs. Present in grazing marsh just north of salt marsh. At least 1 pair on scrape in north-west of site.
Reed bunting	Amber	Probable breeding	10-12 pairs. Common along ditches, also present at Mockett's Farm on pond.
Reed warbler	Green	Probable breeding	Very common along ditches.
Robin	Green	Probable breeding	Infrequent in east of site.
Sedge warbler	Green	Probable breeding	Common along ditches.
Shelduck	Amber	Confirmed breeding	Up to 8 pairs. Group recorded on pond at Mockett's Farm, including 7 juveniles. Regular interaction with saltmarsh to the south.
Skylark	Red	Probable breeding	20-27 pairs. Extremely common across western part of the site, within grazing marsh and arable land.
Song thrush	Red	Possible breeding	1 pair. Heard singing from trees on Isle of Harty.

Starling	Red	Possible breeding	Up to 4 pairs. Small groups recorded around the edges of the site. Breeding habitat only on Isle of Harty.
Stock dove	Amber	Possible breeding	1 pair. Single bird recorded near Mockett's Farm.
Swift	Amber	Non-breeding	Seen foraging over the site. Possible breeding habitat at Mockett's Farm.
Teal	Amber	Possible breeding	Two individuals recorded in north-west of site, one within a ditch and one on scrape.
Whitethroat	Green	Probable breeding	Infrequent within scrub in south and east of site.
Wigeon	Amber	Possible breeding	Single individual recorded on the pond at Mockett's Farm.
Yellow wagtail	Red	Confirmed breeding	12-18 pairs. Recorded commonly around the edges of fields across the site.

Water Vole and Otter

3.33 The first water vole and otter survey visit was carried out in the final week of June and the second survey visit in September 2021. The survey involved walking the edges of ditches across the Site and recording evidence of the presence/absence of both water voles and otters.

3.34 Evidence of water voles was found across the Site in the form of latrines, feeding signs and burrows. No evidence of otters was found, although access to every ditch bank was not possible due to dense vegetation. Otter signs were recorded within the proposed compensation land at Leysdown Marshes (see Annex 2 of the ECF) approximately 4km to the east of the Site, and there are a series of water courses which connect these two land parcels (and the Swale estuary to the south). It is therefore likely that otter would use habitats within the Site especially following the proposed enhancements.

Reptiles

3.35 The field margins, the sea wall, grazing marsh and scrub were all considered suitable for reptiles. Three survey visits were undertaken across October and early November 2021.

3.36 A medium common lizard population and a small slow worm population was recorded with peak counts of eleven and three respectively. The reptiles were recorded predominantly along ditch D18 and D20 and along the northeast field margin of field F18a.

Chapter Four ◆ PROPOSED HABITATS

- 4.1 This chapter describes the habitats that are proposed to be created/enhanced within the Site. The final design is subject to inputs from engineering specialists.
- 4.2 Given the topography of the Site, two subsets of habitats are proposed, divided between predominantly wet and predominantly dry. Each habitat will contribute to a different set of the compensation objectives outlined in Chapter 2 above.
- 4.3 An illustrative layout of the proposed habitats at the Site is shown on ES Figure 12.63 (Document reference 6.3.12.63). The approximate habitat extents set out below is based on this illustrative layout and could therefore be subject to some variation at the detailed design stage.

PREDOMINANTLY DRY HABITATS

- 4.4 Approximately 46.47ha of the Site are elevated, forming part of the Isle of Harty in the south-east, such that predominantly dry habitats can be created here.
- 4.5 With reference to the ECF objectives summarised in Chapter 2 above, the specific habitats/species targeted by proposed habitat creation in this part of the Site are as follows:
- Objective 2 (SSSI compensation) – rare vascular plants associated with dry grassland and open mosaic habitat; assemblages of invertebrates associated with bare sand and chalk, open short swards, open water on disturbed mineral sediments; and the assemblage of breeding birds associated with lowland scrub;
 - Objective 3 (notable/priority habitat compensation) – scrub; semi-improved grassland; open mosaic habitats on previously developed land (OMHPDL); and water bodies;
 - Objective 4 (EPS compensation) – bat foraging habitat; and
 - Objective 5 (WCA and S41 species compensation) – reptiles; terrestrial wintering birds; harvest mouse; and amphibians.

Open Mosaic Habitats (42.05 ha)

- 4.6 The loss of OMHPDL will be partially compensated through the creation of a diverse mosaic of habitats within existing arable fields. The creation of this habitat will target a mix of habitats on spectrum between completely open (bare ground and water) to closed (dense scrub), with an emphasis on the open end of the spectrum. The following ratios will be targeted in order to maximise the value to invertebrates:
- 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%.

4.7 This will require regular management to achieve. Measures to establish and manage habitats are included in Chapter 5.

Bare Ground and Shallow Pools

4.8 Areas of bare ground will be maintained in small patches across the dry areas of the Site. Some of these will be created using the existing substrate and others using imported substrate.

4.9 New pools will be created across the Site. These will range from permanently wet to ephemeral or seasonal pools.

Sparsely Vegetated Ground

4.10 Areas of sparsely vegetated ground will be created through mechanical means. These areas will be allowed to self-seed and be managed to form a range of coverage rates.

Species-rich Dry Grassland

4.11 Areas of species-rich grassland will be created as part of the mosaic. These grasslands will include a mix of more intensively managed grassland, such as hay meadows, and almost unmanaged rough grassland.

4.12 Existing grassland will be enhanced in order to increase the species diversity and maximise benefits for invertebrates.

Grassland/Scrub Mosaic

4.13 The existing scrub/grassland mosaic in the south of the Site will be managed to ensure the habitat is maintained in favourable condition for the targeted objectives, as described in Chapter 5.

4.14 A limited amount of dense scrub habitats will be created on suitable land, although land further to the west of the high ground, close to open wetland, will be managed as an open mosaic.

PREDOMINANTLY WET HABITATS

- 4.15 Approximately 125ha of the Site are lower lying, forming Harty Marshes, sandwiched between Capel Fleet and the Isle of Harty. The land currently is mostly dry due to extensive draining, although historically formed part of the extensive saltmarshes along the east coast of England. The proposed strategy will require the raising of the water table through the blocking of drainage channels. This will be carried out with input from drainage engineers and through consultation with the relevant statutory bodies. A range of predominantly wet habitats will be formed here through initial intervention, raising the water table and ongoing management.
- 4.16 With reference to the ECF objectives summarised in Chapter 2 above, the specific habitats/species targeted by proposed habitat creation in this part of the Site are as follows:
- Objective 1 (SPA mitigation) – coastal/floodplain grazing marsh (CFGM) and reedbed habitat suitable for wintering waterfowl and wading birds;
 - Objective 2 (SSSI compensation) – rare vascular plants associated with coastal grazing marsh; assemblages of invertebrates associated with open water on disturbed mineral sediments, and saltmarsh and transitional brackish marsh; and the assemblage of breeding birds associated with lowland open waters and their margins, lowland fen and lowland damp grassland;
 - Objective 3 (notable/priority habitat compensation) – CFGM; water bodies and swamp/reedbed;
 - Objective 4 (EPS compensation) – bat foraging habitat; and
 - Objective 5 (WCA and S41 species compensation) – reptiles and amphibians.

Coastal/Floodplain Grazing Marsh (117.56 ha)

- 4.17 A large proportion of the predominantly wet parts of the Site will form new CFGM habitat. These will be as species-rich as possible and will be divided by foot drains, channels and scrapes to form a diverse mosaic.
- 4.18 The existing grassland in the south-west of the Site will be enhanced to create a more structurally diverse, species-rich sward. Historic scrapes and channels visible on aerial imagery will be reinstated.

Seasonal and Permanent Pools (5.31 ha)

- 4.19 Large areas will be created, forming a range of permanent and seasonal pools. These will create roosting and foraging opportunities for large flocks of wildfowl and waders. Islands will be created in the centre of pools to create refuge opportunities in the winter and breeding opportunities for waders during spring/summer.

Ditches and Foot-Drains (1.24 ha)

- 4.20 Existing ditches will be partially blocked to slow the movement of water from the Site and raise the water table, without reducing the amount of ditch habitat available.
- 4.21 The existing ditch network will be supplemented through the creation of foot drains. The primary function of the foot-drains will be to transport water into the middle of larger fields, but they will also provide breeding opportunities for ducks such as pochard.

Chapter Five ◆ ESTABLISHMENT, MANAGEMENT AND MONITORING

- 5.1 The measures required to establish and manage the habitats outlined above are detailed below, along with prescriptions to monitor the success of compensation works and ensure that the objectives are met for the lifetime of the Project.

ESTABLISHMENT OF CREATED HABITATS

Open Mosaic Habitats on Previously Developed Land

Soil Preparation

- 5.2 The creation of diverse OMHPDL on arable land will require extensive preparation of the underlying soil/geology. This can be achieved in a number of ways, but the desired outcome is the reduction of soil fertility and the establishment of diverse substrates.
- 5.3 A topsoil strip could be used to achieve lower soil fertility. On arable land, this would involve stripping the top 20cm of soil (that soil regularly ploughed over and to which fertiliser has been added annually). This soil could then be used to form banks and vary the topography of other areas of the Site, particularly those where scrub establishment is desired and low fertility is not required.
- 5.4 An alternative method of lowering fertility would be to plough the current topsoil beneath the sub-soil. Using this method, the soil should be ploughed to a depth of at least 50cm to invert the soil profile and expose the less fertile sub-soil. This method is generally less effective than a topsoil strip, but will reduce the amount of soil movement from or around the Site.

Establishment of Substrates

- 5.5 In order to form the micro-diversity of habitats required to maximise invertebrate biodiversity, a range of substrates will be necessary. The substrate at the Project Site is mainly Cement Kiln Dust (CKD). Because CKD is highly toxic and creates highly alkaline leachate, it is not considered possible to use substrate removed from the Project Site during construction to create OMHPDL habitats on the Site. However, chalk taken from tunnelling through the chalk spines at the southern edge of the Swanscombe Peninsula could be used to create areas of pulverised chalk and chalk gravel/rubble. Additional substrates could be imported to the Site, including Thanet sand and slate. These substrates should be scattered and are not expected to form the basis for the entire area of dry habitats on the Site. Some substrates should be piled to form rubble piles.
- 5.6 As noted in Chapter 4 above, this habitat will be formed of a subset of habitat types. These are discussed in turn below.

Bare Ground

- 5.7 Areas of bare ground in the proportions suggested above should be left unseeded. Areas will be kept open through management, as described below.

Ephemeral and Permanent Pools

- 5.8 The predominant existing geology at the Site is London clay/silt. Pools should be constructed at a range of depths and lined with clay. This clay should then be compacted in order to increase its capacity to hold water. Shallower pools will be more ephemeral, whereas permanent ponds should be dug deeper to allow retention of water throughout the year.

Sparsely Vegetated Ground

- 5.9 Areas of land intended to form sparsely vegetated ground should be seeded at a very low rate using an appropriate seed mix for the location. This seed mix should be at least partially collected from the Kent Project Site to ensure a similar range of species are present. It is anticipated that some of the bare ground will be colonised by early successional species, which are often carried by the wind or lie dormant in the seedbed.
- 5.10 Open ground will be maintained through regular management, as described below.

Open, Species-Rich Grassland

- 5.11 Areas intended to form open grassland should be seeded at the standard rate using an appropriate seed mix, as described above.

Scattered and Dense Scrub

- 5.12 Areas of scattered and dense scrub should be established through appropriate management, as described below, rather than planting. However, where no scrub species are present, a small number of locally-sourced saplings can be established to form a source population.

Coastal/Floodplain Grazing Marsh

- 5.13 Areas of arable land that will be converted to CFGM will be prepared as described above under “*Soil Preparation*” and then seeded with an appropriate seed mix for the location.

Seasonal and Permanent Pools

- 5.14 Pools will be established as described above, however, pools in the low-lying land should be considerably larger in order to be suitable to attract wildfowl and wader species. Pools of approximately 0.2-1ha in size are considered appropriate, and larger pools should include islands.

- 5.15 Islands within pools should be covered with a thick layer of gravel to suppress vegetation growth and encourage nesting by wader species.

Ditches and Foot-Drains

- 5.16 New ditches will be created in order to provide new habitat for water voles. These ditches should have steep banks and will contain minimal junctions with other ditches.
- 5.17 New and existing drains should be blocked at regular intervals using rocks or wooden dams. These dams should not be designed to completely stop water flow but to increase the water table.
- 5.18 Foot-drains, connected to the main ditch network at at least one point will be created across larger fields in order to allow water from ditches to travel into the middle of fields.

Reedbed

- 5.19 Reedbeds will be formed on the lowest lying areas of land adjoining ditches already supporting common reed. Land should be re-profiled to allow inundation for long periods of the year. Where the reedbed extends further from ditches, seeds should be manually transplanted to aid establishment.

MANAGEMENT OF CREATED AND ENHANCED HABITATS

Open Mosaic Habitats on Previously Developed Land

- 5.20 OMHPDL will be managed through regular, rotational, mechanical disturbance. Following the establishment of OMHPDL 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%.

- 5.21 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.
- 5.22 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.

Coastal/Floodplain Grazing Marsh

- 5.23 CFGM should be lightly grazed by cows or horses to control grass and scrub growth. Sheep should be avoided as they create an even sward and suppress wildflower growth.
- 5.24 In order to maximise value to grazing geese, sward depth should be managed to achieve a length of approximately 6cm in October. This should be done through careful control of stocking and an appropriate grazing plan.
- 5.25 Stock density throughout the spring and early-summer should be sufficiently low to allow the use of grassland by breeding waders, such as redshank and curlew.

Seasonal and Permanent Pools

- 5.26 Removal of reeds may be necessary to maintain areas of open water in shallower pools. This should be done on a rotational basis to avoid the loss of large areas of habitat in any one year. Some scrub should be allowed to establish in order to provide roosting opportunities for species such as Cetti's warbler.

Ditches and Foot-Drains

- 5.27 Ditch-side vegetation should be removed on a rotational basis as needed to avoid the total loss of open water. No one ditch should be cut more regularly than every 3 years.

Reedbed

- 5.28 Reedbed should be rotationally cut to avoid the encroachment of scrub into drier areas. No more than 20% of the on-site reedbed should be cut in any one year and areas supporting Schedule 1 species, such as bearded tit, Cetti's warbler and marsh harrier.

MONITORING

Monitoring Objectives

- 5.29 Monitoring of the mitigation habitat will be carried out at regular intervals. The purpose of this monitoring will be to ensure the following:

1. Habitats have established well/are establishing as expected and approximately in the stated proportions;
2. Management prescriptions are appropriate and enabling progress towards Site Specific Compensation Objectives identified in Chapter 2 of this report; and
3. Target species, i.e. those identified in the Site Specific Compensation Objectives, are utilising restored/enhanced habitats as expected and work completed is sufficient to mitigate or compensate for impacts within the Kent Project Site.

Monitoring Methodology

5.30 Based on the target habitat/species relevant to the Site at Harty Marshes, the following monitoring surveys should take place at appropriate intervals following completion of the habitat creation/enhancement works:

- Extended Phase 1 Habitat Survey and Botanical Survey;
- Wintering birds;
- Breeding birds;
- Invertebrates;
- Bat (foraging);
- Water voles and otters;
- Reptiles;
- Harvest mouse; and
- Amphibians.

5.31 The frequency and timings of these monitoring surveys should follow that set out in Section 7 of the ECF.

5.32 These surveys will aim to determine any population trends as a result of habitat works on the Site, and therefore methodology should remain the same on each visit.

5.33 Results of monitoring surveys should be used to inform the ongoing management of the Site. If one or more of the compensation objectives are not being met, the management plan should be adjusted accordingly.

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Chapter Six ◆ SUMMARY AND CONCLUSIONS

- 6.1 The Site at Harty Marshes has been determined to support important breeding and wintering bird populations, water voles and reptiles. It is adjacent to internationally important nature designations and contains a number of important habitats, including the ditch network and large areas of coastal/floodplain grazing marsh.
- 6.2 It is considered possible through soft engineering and appropriate ongoing management to significantly increase the nature conservation value of the Site for all species currently present, and to provide opportunities for species negatively impacted by the Proposed Development on the Kent Project Site.
- 6.3 Therefore, Harty Marshes is considered capable of providing partial compensation for all of the Conservation Objectives listed in Section 2 of this report.

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Annex EDP 2

Details of Compensation Site 2 – Leysdown Marshes

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Revisions

Revision	Description	Issued by	Date	Approved by
r077_00	Issue for DCO Submission	TW/SC	14/03/2022	EDP/LRCH

The Environmental Dimension Partnership Ltd

Tithe Barn
 Barnsley Park Estate
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Chapter One ◆ SITE CONTEXT AND LOCATION

- 1.1 This document outlines proposed habitat creation/restoration and long-term management at Leysdown Marshes, to compensate for ecological impacts anticipated as a result of the London Resort (the 'Proposed Development').
- 1.2 It is proposed that a detailed Ecological Management Plan (EMP) for this compensation site be prepared following the grant of DCO consent but prior to the commencement of development. The EMP will contain a finer level of detail with respect to the habitats to be created/restored, the methods by which habitat creation/restoration would be achieved, and the methods by which habitats would be managed and monitored to ensure they remain in suitable condition in the long-term. The EMP will also address proposals/opportunities to provide additional public health, wellbeing and educational benefits though providing access (e.g. bird hides and footpaths) and interpretation materials where appropriate and where this would not conflict with the ecological objectives.
- 1.3 The preparation of the EMP for the Leysdown Marshes compensation site, and its submission for approval by the Local Planning Authorities and Natural England prior to the commencement of development, can be secured by a suitably worded requirement attached to DCO consent.

SITE LOCATION

- 1.4 Leysdown Marshes (hereafter referred to as 'the Site') lie on the eastern edge of the Isle of Sheppey, centred at approximately OS Grid Reference TR 045 687. The Site measures approximately 116ha and lies between the settlements of Shellness and Leysdown-on-Sea. The Site's location in the context of the Project Site and other mitigation/compensation land is shown on ES Figure 12.60 (Document reference 6.3.12.60).

SITE CONTEXT

- 1.5 The Site lies approximately 43.4km to the east of the Project Site and is currently in agricultural production. The Swale SPA/Ramsar site/SSSI surrounds the Site to the east, south and partially to the west.
- 1.6 The Thames Estuary and Marshes SPA/Ramsar site/SSSI and Medway Estuary and Marshes SPA/Ramsar site/SSSI are situated 15.8km north-west and 12.8km west respectively. The Thanet Coast and Sandwich Bay SPA/Ramsar site is also situated 8.2km to the east.
- 1.7 The Site is part of the Greater Thames Marshes National Character Area (NCA) and Nature Improvement Area (NIA), of which the Swanscombe peninsula and the Essex Project Site are also a part.

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Chapter Two ◆ COMPENSATION OBJECTIVES

- 2.1 This chapter should be read in conjunction with Section 2 of the Ecological Compensation Framework (ECF) (Document reference 6.2.12.10).

SITE SPECIFIC COMPENSATION OBJECTIVES

- 2.2 The Project Site contains a complex mosaic of habitats, supporting a range of protected and notable species. It is not possible to provide the compensation required for impacts upon all of those habitats and species as a result of the Proposed Development in a single off-site location. However, it is anticipated that habitat creation and enhancement within the Site at Harty Marshes would contribute to partially fulfilling each of the compensation objectives defined within the ECF, namely:
1. Provide new functionally linked grazing marsh and reedbed habitat off-site to mitigate the effects of loss and disturbance of these habitats on-site. As described within Appendix 12.4: Shadow Habitats Regulations Assessment (Document Reference 6.2.12.4), this will mitigate potential adverse effects on the Thames Estuary and Marshes SPA/Ramsar and Medway Estuary and Marshes SPA/Ramsar sites;
 2. Provide new habitats off-site which are suitable for the rare vascular plants, breeding bird assemblages and invertebrate assemblages for which Swanscombe Peninsula SSSI has been notified, to compensate for the effects of loss and disturbance of these habitats on-site;
 3. Provide new habitats off-site to compensate for the loss and disturbance of notable and priority habitats on-site;
 4. Provide new habitats off-site which are suitable for European Protected Species which occur within the Project Site, to compensate for the effects of loss of habitats used by these species;
 5. Provide new habitats off-site which are suitable for WCA and S41 Species which occur within the Project Site, to compensate for the effects of loss or disturbance of habitats used by these species; and
 6. Monitor the success of habitat creation, and use of the new habitats by the target species, and take appropriate remedial action if required to ensure that all of the mitigation and compensation requirements are met in the long-term.

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Chapter Three ♦ ECOLOGICAL BASELINE

3.1 Ecological surveys have been carried out at the Site between November 2020 and July 2021, including the following:

- An Extended Phase 1 habitat survey;
- Wintering bird surveys;
- Breeding bird surveys; and,
- Water vole and otter surveys.

3.2 A summary of each survey is included below.

ON-SITE HABITATS

3.3 The Extended Phase 1 habitat survey was undertaken between 14 June and 16 June 2021 by suitably experienced surveyors. Habitats within the Site were categorised and an indicative species-list compiled in order to assign an ecological value to each habitat. The existing habitats are shown on ES Figure 12.62 (Document reference 6.3.12.62).

3.4 The Site mainly comprises intensively managed agricultural habitats of low intrinsic value, but habitats of higher value are present along the margins of fields, particularly on the peripheries of the Site. Habitats present are summarised below.

Arable

3.5 Almost all of the Site is arable farmland. No notable arable weeds were recorded, although black-grass (*Alopecurus myosuroides*) was common in wheat fields. All fields were surrounded by wide grassy margins, as described below.

Arable Field Margins

3.6 All of the arable fields are surrounded by large field margins measuring between 5 and 10m wide. Many of the margins appear to be managed for wildlife, particularly pollinators and birds.

3.7 They are characterised by rough grassland with a number of tall and/or hardy wildflower species indicative of unmanaged or lightly managed ‘waste’ ground, including birds-foot trefoil (*Lotus corniculatus*), common knapweed (*Centaurea nigra*), cow parsley (*Anthriscus sylvestris*), bulbous buttercup (*Ranunculus bulbosus*), grass vetchling (*Lathyrus nissolia*), mayweed sp. (*Anthemis* sp.), cut-leaved cranesbill (*Geranium dissectum*), hemlock (*Conium maculatum*), bristly ox-tongue

(*Helminthotheca echioides*), fat-hen (*Chenopodium album*), black mustard (*Brassica nigra*), black medick (*Medicago lupulina*), common mallow (*Malva sylvestris*), common vetch (*Vicia sativa*), lesser trefoil (*Trifolium dubium*), mugwort (*Artemisia vulgaris*) and red clover (*Trifolium pratense*).

- 3.8 Grasses present included creeping bent (*Agrostis stolonifera*), timothy (*Phleum pratense*), soft brome (*Bromus hordeaceus*), false oat-grass (*Arrhenatherum elatius*), meadow barley (*Hordeum secalinum*), perennial rye-grass (*Lolium perenne*), black-grass, wall barley (*Hordeum murinum*), tall fescue (*Festuca arundinacea*), and crested dog's-tail (*Cynosurus cristatus*). Flowers sown for pollinators including lacy phacelia (*Phacelia tanacetifolia*), sainfoin (*Onobrychis viciifolia*) and salsify (*Tragopogon porriflorus*) were present along many margins.

Brackish Ditches

- 3.9 Most fields are separated by a ditch network, which drains into Capel Fleet to the west. Ditch margins are dominated by sea club-rush (*Bolboschoenus maritimus*), indicating a brackish influence.
- 3.10 Some of the ditches were dry as the land rises slightly to the north, but where wet were dominated by either common reed (*Phragmites australis*) or *Typha* sp. bulrushes.

Bare Ground

- 3.11 Some areas of bare ground are present across the Site, particularly associated with farmyards, storage yards and farm tracks.

Standing Water

- 3.12 A number of ponds are present, mostly associated with widenings of the ditch network. These ponds are fed by the ditches and therefore have a brackish influence. The margins are dominated by sea club-rush and no submerged plants were recorded.

Scrub

- 3.13 Small areas of hawthorn scrub are present across the Site along field margins.

PROTECTED/NOTABLE SPECIES

- 3.14 Species groups considered most likely to be affected by any change of land use within the Site were subject to targeted surveys, as follows.

Wintering Birds

- 3.15 Over-wintering birds were considered to be a key constraint for the Site, given its positioning alongside the Swale SPA/Ramsar site/SSSI and other nearby SPA/Ramsar sites.
- 3.16 A summary of the results of wintering bird surveys undertaken at the Site is given below, and a full set of results can be provided on request.

- 3.17 Surveys were undertaken monthly between November 2020 and March 2021 by surveyors with extensive bird survey experience. The methodology used was a hybrid between a farmland bird walkover and vantage point (VP) surveys undertaken from high ground. This involved walking the boundaries of each field and following tramlines to cut across the centre where deemed appropriate. Two hour VPs were timed to incorporate dawn, dusk, high tide and low tide to gain a picture of how the Site is used by larger species, such as raptors, wildfowl and waders.
- 3.18 There was consistently high raptor activity as well as some significant geese flocks (2100+) and large numbers of curlew (75+). There were also a fair number of passerine species (i.e. corn bunting, linnet, reed bunting, skylark). The value of this land is similarly limited by the lack of accessible fresh water, although the importance to geese would have a large bearing on what is possible in terms of enhancements. Peak counts for raptor, wader and waterfowl species are presented in Table 3-1 below.

Table 3-1: Raptor, wader and waterfowl peak counts, Leysdown Marshes 2022-2021

Species	Peak Count
Brent goose	2100
Curlew	97
Dunlin	71
Golden plover	45
Greylag	4
Grey plover	37
Hen harrier	4
Knot	90
Lapwing	5
Mallard	3
Marsh harrier	4
Merlin	1
Mute swan	2
Oystercatcher	210
Redshank	24
Ringed plover	2
Tundra bean goose	13
Turnstone	11
White-fronted goose	121
Wigeon	30

- 3.19 Also present were flocks of corn bunting, skylark, linnet and other declining farmland species associated with the rough grass margins and stubble.

Breeding Birds

- 3.20 The breeding bird survey (BBS) was undertaken with reference to standard methodology, entailing a modified Common Bird Census (CBC) ‘territory mapping’ approach¹. This involved one survey visit per month to each area of the Site between May and July 2021 (i.e. at the height of the breeding bird season for lowland Britain).
- 3.21 The Site was split into two sections and surveyed by two experienced surveyors over one morning. The sections were designed to limit double counting by incorporating adjacent similar habitats within single sections where possible.
- 3.22 Following best practice, the survey visits were timed to start around first light, to coincide with the period of peak activity for birds, most particularly passerine songbird species. Surveys were also undertaken during suitable weather conditions, i.e. days/periods with strong winds and heavy or persistent rain were generally avoided. It is therefore considered that the results are not significantly limited by seasonal or climatic factors.
- 3.23 The survey methodology involved walking to within c.50m of all parts of the Site, where possible, and recording all birds listed within the Birds of Conservation Concern (BoCC) report² and their activity status, with a particular emphasis placed upon those elements considered to relate to, or be indicative of, breeding. This ensured that the survey identified all birds using the margins of the Site, as well as those in the interior.
- 3.24 The BBS was carried out by experienced ornithologists, at an appropriate time of year for the locality, and in suitable weather conditions. It is therefore considered that the results provide a representative overview of the breeding bird interest at the Site.
- 3.25 A summary of the results of the surveys undertaken so far is included below.
- 3.26 Throughout the three surveys, skylark, corn bunting and yellow wagtail were recorded frequently in the fields and their margins. Oystercatcher were also recorded regularly within the arable fields, and also present in significant numbers were reed bunting, lapwing and linnet. There were breeding waterfowl and waders along the ditches and along the margins of the SPA/Ramsar site, including snipe, avocet, mute swan, mallard and shelduck. Reed, sedge and Cetti’s warbler were all present in the vegetated margins of ditches. The large pond in the south-east of the Site supported a range of ducks, including shelduck, mallard, wigeon and the IUCN vulnerable pochard, which is also found breeding at the Kent Project Site. Marsh harriers were recorded frequently along the ditches, particularly in the south of the Site. A species list is given in Table 3-2 below, with pair estimates for species of conservation concern.

¹ British Trust for Ornithology, Common Bird Census. [REDACTED]

² Eaton, M.A., Aebischer, N.J., Brown, A.F., Hearn, R.D., Lock, L., Musgrove, A.J., Noble, D.G., Stroud, D.A. and Gregory, R.D. (2015). *Birds of Conservation Concern 4: the population status of birds in the UK, Channel Islands and Isle of Man*. British Birds, Vol. 108, 708-746.

Table 3-2: Breeding Bird Survey Results, Leysdown Marshes 2021

Species	BoCC Status	Breeding Status	Estimated Population/Other Notes
Blackcap	Green	Possible	Occasional singing males in scrub.
Corn bunting	Red	Probable	10-12 pairs. Recorded frequently within field margins.
Chaffinch	Green	Possible	Single individual recorded in north of site.
Coot	Green	Confirmed	Infrequent individuals along ditches, including one with juveniles.
Cetti's warbler	Green/Sch.1	Probable	Small number of singing males along western ditch.
Little egret	Green	Non-breeding	Small numbers of foraging individuals.
Gadwall	Amber	Possible	1 pair. Recorded along ditch.
Great black-backed gull	Amber	Non-breeding	Single flyover.
Greylag	Amber	Non-breeding	Small group recorded on single visit.
Grey heron	Green	Non-breeding	Small numbers of foraging individuals.
House sparrow	Red	Non-breeding	Small group associated with holiday park to the north.
Kestrel	Amber	Non-breeding	Small number of individuals recorded hunting over the site.
Lapwing	Red	Possible	1-2 pairs. Two individuals recorded, one next to the waterbodies in the centre of the site, one within an arable field.
Linnet	Red	Probable	5-9 pairs. Recorded within fallow land and within scrub.
Little owl	No status	Non-breeding	Single individual recorded.
Mallard	Amber	Possible	4-7 pairs.
Moorhen	Green	Possible	Small numbers recorded along ditches.
Meadow pipit	Amber	Possible	1-2 pairs. Two individuals recorded during May visit.
Marsh harrier	Amber/Sch.1	Possible	1-2 pairs. Regular activity along ditches and field margins.
Mute swan	Green	Confirmed	1 pair. Nest recorded in south-eastern corner of the site.
Oystercatcher	Amber	Confirmed	7-8 pairs. Regular activity across arable land and next to ponds.
Grey partridge	Red	Probable	2-3 pairs. Pairs recorded within suitable habitat on two occasions.

Species	BoCC Status	Breeding Status	Estimated Population/Other Notes
Pochard	Red/IUCN vulnerable	Probable	1 or more pairs. Small group recorded on site's western boundary during June visit.
Reed bunting	Amber	Probable	10-13 pairs. Recorded frequently along ditches and field boundaries.
Redshank	Amber	Possible	1 pair. Single individual recorded on field boundary on one visit.
Red-legged partridge	No status	Probable	Recorded frequently across site. Likely released.
Reed warbler	Green	Probable	Recorded commonly along ditches.
Skylark	Red	Confirmed	20-25 pairs. Very common across the site.
Starling	Red	Non-breeding	No suitable breeding habitat, small groups recorded foraging on all visits.
Swift	Amber	Non-breeding	No suitable breeding habitat, small groups recorded foraging on all visits.
Shelduck	Amber	Confirmed	7-9 pairs. Family groups recorded across the site on two visits.
Sedge warbler	Green	Probable	Recorded commonly along ditches.
Whitethroat	Green	Probable	Infrequent along field boundaries where scrub present.
Yellow wagtail	Red	Confirmed	10-12 pairs. Recorded frequently within field margins.

Water Vole and Otter

3.27 A possible water vole latrine was recorded during the Extended Phase 1 survey in June 2021. The first water vole and otter survey visit was carried out in the final week of June and the second survey visit in September 2021. The survey involved walking the edges of ditches across the Site and recording evidence of the presence/absence of both water voles and otters.

3.28 Further evidence of water voles was found across the Site in the form of latrines, feeding signs and burrows. In addition, a likely otter spraint was recorded in ditch D2 (in the south east corner of the Site) during the June survey and several potential otter slides were recorded in ditches during the September survey, although access to every ditch bank was not possible due to dense vegetation.

Reptiles

3.29 The field margins and scrub were all considered suitable for reptiles. Three survey visits were undertaken across October and early November 2021. A medium population of common lizard and a small population of slow worms were identified within the Site, with a peak count of six and two respectively. The majority of common lizards were recorded along ditch D12, though reptiles were recorded across the whole of the Site.

Chapter Four ◆ PROPOSED HABITATS

- 4.1 This chapter describes the habitats that are proposed to be created/enhanced within the Site. The final design is subject to inputs from engineering specialists.
- 4.2 The existing habitats are reasonably uniform across the Site because the topography is generally flat. There is a slight incline in the northernmost field, resulting in the northern boundary of the Site being slightly elevated. The relatively small area of elevated land limits its potential to contribute to further Conservation Objectives. The Site will therefore be dominated by predominantly wet habitats.
- 4.3 An illustrative layout of the proposed habitats at the Site is shown on ES Figure 12.64 (Document reference 6.3.12.64). The approximate habitat extents set out below is based on this illustrative layout and could therefore be subject to some variation at the detailed design stage.

PREDOMINANTLY WET HABITATS

- 4.4 The land currently is mostly dry due to extensive draining, although historically formed part of the extensive saltmarshes along the east coast of England. The proposed strategy will require the raising of the water table through the blocking of drainage channels. This will be carried out with input from drainage engineers and through consultation with the relevant statutory bodies. A range of habitats will be formed through initial intervention, raising the water table and ongoing management.
- 4.5 With reference to the ECF objectives summarised in Chapter 2 above, the specific habitats/species targeted by proposed habitat creation in this part of the Site are as follows:
- Objective 1 (SPA mitigation) – coastal/floodplain grazing marsh (CFGM) and reedbed habitat suitable for wintering waterfowl and wading birds;
 - Objective 2 (SSSI compensation) – rare vascular plants associated with coastal grazing marsh; assemblages of invertebrates associated with open water on disturbed mineral sediments, and saltmarsh and transitional brackish marsh; and the assemblage of breeding birds associated with lowland open waters and their margins, lowland fen and lowland damp grassland;
 - Objective 3 (notable/priority habitat compensation) – CFGM; water bodies and swamp/reedbed;
 - Objective 4 (EPS compensation) – bat foraging habitat; and
 - Objective 5 (WCA and S41 species compensation) – reptiles and amphibians.

Coastal/Floodplain Grazing Marsh (106.41 ha)

- 4.6 A large proportion of the predominantly wet parts of the Site will form new CFGM habitat. These will be as species-rich as possible and will be divided by foot drains, channels and scrapes to form a diverse mosaic. Existing field margins will be incorporated into these grazing marshes.

Seasonal and Permanent Pools (5.77 ha)

- 4.7 Large areas will be created, forming a range of permanent and seasonal pools. These will create roosting and foraging opportunities for large flocks of wildfowl and waders. Islands will be created in the centre of pools to create refuge opportunities in the winter and breeding opportunities for waders during spring/summer.

Ditches and Foot-Drains (2.4 ha)

- 4.8 Existing ditches will be partially blocked to slow the movement of water from the Site and raise the water table, without reducing the amount of ditch habitat available.
- 4.9 The existing ditch network will be supplemented through the creation of foot drains. The primary function of the foot-drains will be to transport water into the middle of larger fields, but they will also provide breeding opportunities for ducks such as pochard.

Reedbed (7.15 ha)

- 4.10 The lowest lying land will be used to create extensive reedbeds. These reedbeds will extend from the ditch network and will include areas of open water, islands and a range of wetter and drier habitat.

Chapter Five ◆ ESTABLISHMENT, MANAGEMENT AND MONITORING

- 5.1 The measures required to establish and manage the habitats outlined above are detailed below, along with prescriptions to monitor the success of compensation works and ensure that the objectives are met for the lifetime of the Project.

ESTABLISHMENT OF CREATED HABITATS

Coastal/Floodplain Grazing Marsh

- 5.2 Areas of arable land that will be converted to CFGM will be prepared as described above under “*Soil Preparation*” and then seeded with an appropriate seed mix for the location.

Seasonal and Permanent Pools

- 5.3 Pools will be established as described above, however, pools in the low-lying land should be considerably larger in order to be suitable to attract wildfowl and wader species. Pools of approximately 0.2-1ha in size are considered appropriate, and larger pools should include islands.
- 5.4 Islands within pools should be covered with a thick layer of gravel to suppress vegetation growth and encourage nesting by wader species.

Ditches and Foot-Drains

- 5.5 New ditches will be created in order to provide new habitat for water voles. These ditches should have steep banks and will contain minimal junctions with other ditches.
- 5.6 New and existing drains should be blocked at regular intervals using rocks or wooden dams. These dams should not be designed to completely stop water flow but to increase the water table.
- 5.7 Foot-drains, connected to the main ditch network, at least one point will be created across larger fields in order to allow water from ditches to travel into the middle of fields.

Reedbed

- 5.8 Reedbeds will be formed on the lowest lying areas of land adjoining ditches already supporting common reed. Land should be re-profiled to allow inundation for long periods of the year. Where the reedbed extends further from ditches, seeds should be manually transplanted to aid establishment.

MANAGEMENT OF CREATED AND ENHANCED HABITATS

Coastal/Floodplain Grazing Marsh

- 5.9 CFGM should be lightly grazed by cows or horses to control grass and scrub growth. Sheep should be avoided as they create an even sward and suppress wildflower growth.
- 5.10 In order to maximise value to grazing geese, sward depth should be managed to achieve a length of approximately 6cm in October. This should be done through careful control of stocking and an appropriate grazing plan.
- 5.11 Stock density throughout the spring and early-summer should be sufficiently low to allow the use of grassland by breeding waders, such as redshank and curlew.

Seasonal and Permanent Pools

- 5.12 Removal of reeds may be necessary to maintain areas of open water in shallower pools. This should be done on a rotational basis to avoid the loss of large areas of habitat in any one year. Some scrub should be allowed to establish in order to provide roosting opportunities for species such as Cetti's warbler.

Ditches and Foot-Drains

- 5.13 Ditch-side vegetation should be removed on a rotational basis as needed to avoid the total loss of open water. No one ditch should be cut more regularly than every 3 years.

Reedbed

- 5.14 Reedbed should be rotationally cut to avoid the encroachment of scrub into drier areas. No more than 20% of the on-site reedbed should be cut in any one year and areas supporting Schedule 1 species, such as bearded tit, Cetti's warbler and marsh harrier.

MONITORING

Monitoring Objectives

- 5.15 Monitoring of the mitigation habitat will be carried out at regular intervals. The purpose of this monitoring will be to ensure the following:
1. Habitats have established well/are establishing as expected and approximately in the stated proportions;
 2. Management prescriptions are appropriate and enabling progress towards Site Specific Compensation Objectives identified in Chapter 2 of this report; and
 3. Target species, i.e. those identified in the Site Specific Compensation Objectives, are utilising restored/enhanced habitats as expected and work completed is sufficient to mitigate the loss of habitat on the Kent Project Site.

Monitoring Methodology

- 5.16 Based on the target habitat/species relevant to the Site at Harty Marshes, the following monitoring surveys should take place at appropriate intervals following completion of the habitat creation/enhancement works:
- Extended Phase 1 Habitat Survey and Botanical Survey;
 - Wintering birds;
 - Breeding birds;
 - Invertebrates;
 - Bat (foraging);
 - Water voles and otters;
 - Reptiles; and
 - Amphibians.
- 5.17 The frequency and timings of these monitoring surveys should follow that set out in Section 7 of the ECF.
- 5.18 These surveys will aim to determine any population trends as a result of mitigation works on the Site, and therefore methodology should remain the same on each visit.
- 5.19 Results of monitoring surveys should be used to inform the ongoing management of the Site. If one or more of the Compensation Objectives are not being met, the management plan should be adjusted accordingly.

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Chapter Six ◆ SUMMARY AND CONCLUSIONS

- 6.1 The Site at Leysdown Marshes has been determined to support important breeding and wintering bird populations and water voles. It is adjacent to internationally important nature designations and contains a number of important habitats, including the ditch network and narrow areas of coastal/floodplain grazing marsh along their margins.
- 6.2 It is considered possible through soft engineering and appropriate ongoing management to significantly increase the nature conservation value of the Site for all species currently present, and to provide opportunities for species negatively impacted by the Proposed Development on the Kent Project Site.
- 6.3 Therefore, Leysdown Marshes is considered capable of providing partial compensation for all of the Conservation Objectives listed in Section 2 of this report.

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Annex EDP X
Additional Compensation Site Details (to be added in future issues)

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