

# STRIDE TREGLOWN



## Environmental Statement: Chapter 7 – Ecology

Ellel Holiday Village, Lancaster

*Ellel*

Ellel Holiday Village LLP

## 7. Ecology

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### 7.1. Introduction

#### Background

7.1.1 Haycock and Jay Associates Ltd was commissioned by Ellel Holiday Village LLP to undertake an Ecological Impact Assessment (EclA) of the proposed scheme at land at Home Farm, Ellel, Lancaster.

7.1.2 This EclA Report is written by Karl Harrison BSc (Hons) MCIEEM. Karl is a Senior Ecologist with over 7 years' experience in ecological consultancy.

7.1.3 The site comprises land at Home Farm, Ellel as indicated on Figure 7.3, (hereafter referred to as 'the site').

#### Site Context

7.1.4 The 70ha site comprises open pasture fields intersected by woodland, hedgerows, ditches and ponds. An area of fen and rush pasture is present in the centre of the site.

7.1.5 The site is bounded by the Preston Lancaster Road (A6) to the east and the Glasson Branch of the Lancaster Canal to the north, with pastoral farmland and the buildings of Home Farm to the south and further pasture to the west. The Lancaster Canal traverses the site in the centre running north to south.

7.1.6 The M6 motorway, running north to south, is present 350m to the east of the site boundary. The wider area comprises open countryside; a mosaic of arable and pastoral fields intersected by hedgerows, with frequent blocks of woodland and waterbodies.

#### Purpose of Report

7.1.7 This report identifies, quantifies and evaluates potential effects of development-related or other proposed actions on habitats, species and ecosystems.

7.1.8 The purpose of the report is detailed below:

- Identify ecological receptors and consider all potentially significant ecological effects associated with the proposed development;
- To consider potentially significant ecological effects on ecological receptors;
- Set out mitigation measures required to ensure compliance with nature conservation legislation;
- Identify how mitigation measures will/could be secured;
- Identify appropriate enhancement measures; and,
- Set out the requirements for post-construction monitoring.

## 7.2. Legislation and Policy Context

### Statutory Designated Sites

- 7.2.1 Statutory designated sites considered in this assessment are areas which are protected by legislation due to their biodiversity value, therefore there is a legal obligation to safeguard them.

### Internationally Designated Sites

- 7.2.2 Sites of Community Importance (SCIs), which are established under the European Union Habitats Directive (92/43/EEC), are the pre-requisite step for establishing Special Areas of Conservation (SACs), once approved by the European Commission. SCIs, SACs and Possible SACs aim to create a network of important conservation sites to protect the rare and vulnerable habitats and species (excluding birds) listed on Annex I and II of the Directive.
- 7.2.3 Special Protection Areas (SPA) and Potential SPA are protected sites classified by the European Union Birds Directive (2009/147/EC) in order to conserve rare and vulnerable birds listed on Annex I of the Directive.
- 7.2.4 SACs and SPAs collectively form the UK contribution to the Natura 2000 network of internationally important conservation sites.
- 7.2.5 Ramsar sites are internationally important wetlands which are designated under the UNESCO Convention on Wetlands (Ramsar Convention), to retain their conservation importance including provision of habitat for waterfowl.

### Nationally Designated Sites

- 7.2.6 Sites of Special Scientific Interest (SSSI) are notified under the Wildlife and Countryside Act 1981 (as amended) with increased protection under the Countryside and Rights of Way Act (2000), and Natural Environment and Rural Communities Act (2006). These sites are designated to protect rare and important UK species, habitats and geological and physiographical features, and underpin other national and international nature conservation designations.

### Non-Statutory Designated Sites

- 7.2.7 Non-statutory designated sites are those of 'substantive nature conservation value' which local authorities are obliged to protect, in accordance with local policy contributing to the achievement of local and national biodiversity targets
- 7.2.8 In Lancashire, Local Wildlife Sites are known as Biological Heritage Sites (BHSs), which is the term for sites of ecological importance on a local scale. These sites are protected from development likely to result in an adverse effect. BHSs are assessed against agreed selection guidelines.

### Priority Habitats and Species

- 7.2.9 The UK Biodiversity Action Plan (BAP) sets out national priority species and habitats for conservation. Although now succeeded by the 'UK Post-2010 Biodiversity Framework', the UKBAP priorities and targets are retained under the Natural Environment and Rural Communities Act 2006 (NERC Act) and as such are considered during the planning process. Species and Habitats of Principal Importance are listed in Section 41 of NERC Act.
- 7.2.10 In addition, species and habitat action plans and priority species and habitats are set out in Local BAPs. The Local BAP for the site is the 'Lancashire Local Biodiversity Action Plan', (Lancashire BAP) which includes action plans for 11 habitats and a number of plant and animal species.

### Hedgerows

- 7.2.11 Hedgerows are protected under the Hedgerows Regulations 1997, which outlines criteria for which 'countryside' and 'important' hedgerows are designated. Contravention of this legislation, notably the damage or removal of a protected hedgerow, can result in penalties of up to £5,000.
- 7.2.12 Most hedgerows in rural settings satisfy the criteria for 'countryside' hedgerow status, which requires them to be of a certain length and/or located adjacent to a countryside feature.
- 7.2.13 For a hedgerow to achieve 'important' status it must be of a particular age and satisfy other qualifying criteria, which includes, historical importance, its ecological importance or the number of native hedgerow species it contains.
- 7.2.14 Hedgerows are also a UK BAP priority habitat and a Habitat of Principal Importance listed on Section 41 of NERC Act 2006.

### Plants

- 7.2.15 With certain exceptions, plants listed on Schedule 5 of The Conservation of Habitats and Species Regulations 2017 (as amended) and Schedule 8 of the Wildlife and Countryside Act 1981 (as amended) are protected, therefore it is an offence to:
- Deliberately pick, collect, cut, uproot or destroy a plant listed on those Schedules; or,
  - Be in possession or control of, transport, sell, exchange or offer to sell or exchange any live or dead plants listed on those Schedules, or any part of them or their derivatives.
- 7.2.16 It is also an offence to intentionally uproot a wild plant not listed on those Schedules, if not an authorised person.

### Great Crested Newt

- 7.2.17 Great crested newts (*Triturus cristatus*) are listed on Annexes II and IV of the EC Habitats Directive and Appendix II of the Bern Convention. They are protected under Schedule 2 of The Conservation of Habitats and Species Regulations 2017, and Schedule 5 of the Wildlife & Countryside Act 1981 (as amended). Great crested newt are also listed under the Natural Environment and Rural Communities Act (2006).
- 7.2.18 Taken together, this legislation makes it an offence to:
- Deliberately capture or intentionally take a great crested newt;
  - Deliberately or intentionally kill or injure a great crested newt;
  - To be in possession or control of any live or dead great crested newt or any part of, or anything derived from a great crested newt;
  - Damage or destroy a breeding site or resting place of a great crested newt;
  - Intentionally or recklessly obstruct access to any place that a great crested newt uses for shelter or protection;
  - Intentionally or recklessly disturb a great crested newt while it is occupying a structure or place that it uses for shelter or protection; or,

- Deliberately disturb any great crested newt, in particular any disturbance which is likely to (i) impair their ability to survive, breed, reproduce or to rear or nurture their young; or in the case of hibernating or migratory species, to hibernate or migrate; or (ii) to affect significantly the local distribution or abundance of the species to which they belong.

7.2.19 Great crested newt are also listed as a priority species in the UKBAP and a Species of Principal Importance under Section 41 of NERC Act. Great crested newt have a species action plan on the Lancashire BAP.

#### Nesting Birds

7.2.20 With certain exceptions, all wild birds, their nests and eggs are protected by the Wildlife and Countryside Act 1981 (as amended). Therefore, it is an offence, inter alia, to:

- Intentionally take, damage or destroy the nest of any wild bird while it is in use or being built; or,
- Take or destroy the egg of any wild bird.

7.2.21 Bird species listed on Schedule 1 of the Act receive a higher level of protection under the Wildlife and Countryside Act 1981 (as amended), thus for these species it is also an offence to:

- Disturb any bird while it is nest building, or is at a nest containing eggs or young; or,
- Disturb the dependent young of any such bird.

7.2.22 A number of birds frequently associated with ground, tree and hedgerow nesting are listed as priority species in the UKBAP and are Species of Principal Importance under Section 41 of NERC Act.

7.2.23 The conservation status of bird species in the UK is classified in the 'Birds of Conservation Concern (BoCC)' publication as either Red, Amber or Green, based on recent and historical population decline, breeding status, international importance, status in Europe and other factors.

7.2.24 Black-tailed godwit (*Limosa limosa*), lapwing (*Vanellus vanellus*), reed bunting (*Emberiza schoeniclus*), skylark (*Alauda arvensis*), song thrush (*Turdus philomelos*) and twite (*Linaria flavirostris*) have their own species action plans. In addition, a species action plan is listed for 'Farmland Birds' on the Lancashire BAP; which covers grey partridge (*Perdix perdix*), skylark, yellow wagtail (*Motacilla flava*), tree sparrow (*Passer montanus*), linnets (*Carduelis cannabina*), reed bunting, yellowhammer (*Emberiza citrinella*) and corn bunting (*Miliaria calandra*).

#### Badger

7.2.25 The Protection of Badgers Act 1992 (as amended) consolidates previous legislation (including the Badgers (Further Protection) Act 1991). It makes it a serious offence to intentionally or recklessly:

- Kill, injure or take, or attempt to kill, injure or take a badger (*Meles meles*);
- To damage, destroy or obstruct access to a sett; or,
- To disturb a badger when it is occupying a sett.

7.2.26 Any activities that may lead to violation of legislative laws will require a licence to be obtained from Natural England. Licensing would be required for the following actions:

- Heavy machinery works (generally applied to tracked vehicles) carried out within 30m of an active sett entrance;

- Lighter machinery works (generally applied to wheeled vehicles) particularly for any digging operation within 20m of an active sett entrance; and,
- Light work such as hand digging or scrub clearance within 10m.

#### Bats

- 7.2.27 All species of bats are legally protected, and as such there is a requirement that measures be taken to ensure that contravention of the relevant legislation is avoided. This may include the adoption of mitigation, including a Natural England licence where appropriate.
- 7.2.28 Relevant legislation in England is the Wildlife and Countryside Act 1981 (as amended); the Countryside and Rights of Way Act, 2000; the Natural Environment and Rural Communities Act (NERC, 2006); and the Conservation of Habitats and Species Regulations 2017.
- 7.2.29 The law makes it an offence, inter alia, to:
- Disturb a bat or groups of bats in their roost;
  - Damage or destroy a bat roosting place, even if there are no bats present at the time;
  - Obstruct access to a bat roost; or,
  - To capture, injure or kill a bat or possess, advertise, sell or exchange a bat, or part of a bat dead or alive.
- 7.2.30 Seven species of British bats are listed as priority species in the UKBAP and Species of Principal Importance under Section 41 of NERC Act. The species listed are; the barbastelle (*Barbastella barbastellus*), Bechstein's bat (*Myotis bechsteinii*), noctule (*Nyctalus noctula*), soprano pipistrelle (*Pipistrellus pygmaeus*), brown long-eared bat (*Plecotus auritus*), greater horseshoe (*Rhinolophus ferrumequinum*) and lesser horseshoe (*Rhinolophus hipposideros*).
- 7.2.31 Eight species of bats occur in the Lancashire BAP Species Action Plan including; noctule, Daubenton's, Natterer's (*Myotis nattereri*), whiskered (*Myotis mystacinus*), Brandt's (*Myotis brandtii*), brown long-eared, common pipistrelle (*Pipistrellus pipistrellus*) and soprano pipistrelle.

#### Otter

- 7.2.32 Otter (*Lutra lutra*) are legally protected, and as such there is a requirement for measures to be taken to ensure that contravention of the relevant legislation is avoided. This may require a Natural England licence to authorise otherwise unlawful activity, which would include the adoption of agreed mitigation.
- 7.2.33 The otter is listed on Annex II of the Bern Convention, and Annexes II and IV of the EC Habitats Directive. They are fully protected under Schedule 2 of The Conservation of Habitats and Species Regulations 2017. The regulations make it illegal, inter alia, to:
- Deliberately capture, injure or kill an otter;
  - Deliberately disturb an otter in such a way as to be likely to significantly affect the local distribution or abundance of otters or the ability of any significant group of otters to survive, breed, rear or nurture their young; or,
  - Damage or destroy an otter holt.

7.2.34 The otter is also protected under Section 9(4) of the Wildlife and Countryside Act 1981 meaning that it is also illegal to:

- Intentionally or recklessly disturb any otter whilst it is occupying a holt; or,
- Intentionally or recklessly obstruct access to a holt.

7.2.35 The otter is also listed as a priority species in the UKBAP and a Species of Principal Importance under Section 41 of NERC Act. Otter have a species action plan on the Lancashire BAP.

#### **Water Vole**

7.2.36 Water vole (*Arvicola amphibius*) are fully protected under Schedule 2 of The Conservation of Habitats and Species Regulations 2017 and (as of April 2008) through its inclusion under Section 9 of the Wildlife & Countryside Act 1981 (as amended).

7.2.37 Legal protection makes it an offence to:

- Intentionally kill, injure or take (capture) a water vole;
- Possess or control a live or dead water vole, or any part of a water vole;
- Intentionally or recklessly damage, destroy or obstruct access to any structure or place which water voles use for shelter or protection or disturb water voles while they are using such a place; or,
- Sell, offer for sale or advertise for live or dead water voles.

7.2.38 Offences under Section 9 carry a maximum penalty of a fine not exceeding Level 5 on the standard scale (currently £5,000), imprisonment for up to six months, or both. In addition, the courts may order the forfeiture of any vehicle or other thing that was used to commit the offence.

7.2.39 Water vole are also listed as a priority species in the UKBAP and a Species of Principal Importance under Section 41 of NERC Act. Water vole have a species action plan on the Lancashire BAP.

### **7.3. Methodology**

#### **Scope of Assessment**

7.3.1 The Zone of Influence (Zoi) refers to the area over which any Ecological Feature may be affected by the proposed project and its associated activities (including during construction and once in operation).

7.3.2 The factors influencing the Zoi for the construction phase include:

- All ecological features within the works footprint that will be affected by the change in habitat and site clearance activities;
- Construction activities and increased human activities will affect adjacent habitats and species within them; and,
- Construction activities and increased human activities will affect adjacent designated sites.

7.3.3 The factors influencing the Zoi for the post-development phase include:

- All ecological features within the works footprint that will be affected by the change in habitat and human activities;
- Increased human activities will affect adjacent habitats and species within them;
- Increased human activities will affect nearby locally designated sites; and,
- Increased recreational pressure has potential to affect nationally designated sites within 2.5km and internationally designated sites within 10km.

7.3.4 Based on the criteria outlined above the ZoI for potential ecological receptors, as illustrated in Figure 7.1, is considered to be:

- Internationally designated sites within 10km;
- Nationally designated sites within 2.5km;
- Locally designated sites within 100m;
- Bats within 2km;
- Great crested newt within 500m; and,
- Habitats and species within and immediately adjacent the site boundary.

7.3.5 A scoping opinion was received from Lancaster City Council , which consulted: Lancashire County Council Public Rights of Way; Ramblers Association; British Horse Society; Historic England; Conservation Officer; Lancashire Archaeological Advisory Service; Ellel Parish Council; Thurnham Parish Council; Wyre Borough Council; Environment agency; Lead Local Flood Authority; Greater Manchester Ecology Unit; Environmental Health; United Utilities; City Council Planning Policy; Forest of Bowland Area of Outstanding Natural Beauty Office; Royal Society for the Protection of Birds; City Council Tree Protection Officer; Natural England; Canal and Rivers Trust; County Highways; Highways England; and Marine Management.

7.3.6 Consultation responses from Greater Manchester Ecology Unit (GMEU), Natural England and the Canal and Rivers Trust are included in Appendix 2;

#### Desk Study

7.3.7 The sources of information utilised for desk studies are detailed in Table 3.2 below, and are provided in full in Appendix 7.1 and 7.2.

**Table 7-1: Sources of Information for Desk study**

Source	Date	Information Requested
Lancashire Environmental Records Network (LERN)	7 <sup>th</sup> June 2017	Records of sites of nature conservation and protected and notable species from the last 15 years within 2km of the site boundary
LERN	9 <sup>th</sup> February 2018	Biological Heritage Site Descriptions within 2km of the site boundary
Lancashire Group Badger	9 <sup>th</sup> February 2018	Records of badger within 2km of the site boundary

Source	Date	Information Requested
North Lancashire Bat Group	2 <sup>nd</sup> February 2018	Records of bats within 2km of the site boundary
Lancashire Environmental Records Network (LERN)	4 <sup>th</sup> December 2019	Records of sites of nature conservation and protected and notable species from the last 15 years within 2km of the site boundary
Multi-Agency Geographic Information for the Countryside (MAGIC) (www.magic.gov.uk)	26 <sup>th</sup> September 2020	Statutory designated sites information within 10km Priority Habitat Inventory Mapping National Forest Inventory Priority Species for Countryside Stewardship Targeting NBN Atlas Breeding Areas

### Previous Survey and Assessment

7.3.8 The following ecology surveys relating to this proposal and previous proposals at the site have informed the baseline ecological conditions of this report, with detailed methodologies and results provided in Appendices 7.1-7.4 and 7.6.

**Table 7-2: Previous Ecology Surveys**

Survey	Details
<b>Preliminary Ecological Appraisal and Great Crested Newt Assessment</b>	A Preliminary Ecological Appraisal was undertaken in 2017 to inform previous development proposals at the site. Habitats were characterised according to their Phase 1 Habitat Classification and potential ecological constraints to development proposals were identified. (Appendix 7.1).
<b>Great Crested Newt Presence/Absence Survey</b>	All ponds within the site were subject to eDNA sampling in 2017 to detect the presence of great crested newt. (Appendix 7.1) Further great crested newt presence/absence surveys were undertaken in 2020, comprising traditional pond surveys at ponds within the site, to confirm the continued absence of great crested newt. (Appendix 7.2)
<b>Invertebrate Habitat Assessment, Home Farm</b>	An Invertebrate Habitat Assessment was undertaken in 2018 which assessed the habitats within the site for their potential to support notable and/or priority invertebrate species. (Appendix 7.3)
<b>Preliminary Roost Assessment</b>	A Preliminary Roost Assessment for bats was undertaken at all trees, cliffs and buildings in 2018 for a previous design (which included the site and Home Farm buildings to the south of site). Surveys assessed the bat roost suitability of trees, buildings and cliffs. (Appendix 7.2)
<b>Bat Activity Surveys</b>	Bat Activity Surveys comprising walked transects and static detector monitoring were undertaken in 2018 at the site. Surveys assessed the species and importance of habitats for foraging and commuting bats (Appendix 7.2)
<b>Badger Surveys</b>	A badger walkover survey followed by badger bait marking was undertaken in 2018 to identify the presence of badger setts within the site and adjacent woodlands, determine the number of clans present and characterise their use of the site. (Appendix 7.2)
<b>Breeding Bird Surveys</b>	Breeding Bird Surveys were undertaken in 2018 (which included the site and Home Farm buildings to the south of site). Surveys identified the species present within the site and defined bird territories, where possible. (Appendix 7.2)

Survey	Details
<b>Otter Survey</b>	Otter surveys were undertaken in 2018 at waterbodies within and adjacent the site. The surveys recorded the presence of features with suitability for otter resting sites and evidence of otter activity. (Appendix 7.2)
<b>Water Vole Surveys</b>	Water vole surveys were undertaken in 2018 at waterbodies within and adjacent the site to determine the presence/absence of water vole. (Appendix 7.2)
<b>National Vegetation Classification Survey</b>	A National Vegetation Classification survey was undertaken at woodland blocks within the site (Flat Wood, Carter Wood, Quarry Wood, Plantation 1, Plantation 2) and the Wetland Complex. In addition, Home Farm Wood adjacent the site was also surveyed for a previous design. (Appendix 7.4)
<b>Hedgerow Survey</b>	A Hedgerow Survey was undertaken in 2018 of all hedgerows within the site, in order to assess whether they qualified as 'important hedgerows' and/or priority habitat (Appendix 7.4)
<b>Bat Emergence/ Re-entry Surveys</b>	Bat Emergence/Re-entry Surveys were undertaken at the Home Farm Buildings adjacent the site, to inform a previous design. (Appendix 7.6)

7.3.9 The following ecology reports relating to this proposal are also appended:

- Habitats Regulations Assessment Ellel Holiday Village September 2020 (Appendix 7.5); and
- Defra Metric 2.0 (Appendix 7.7).

#### **Defra Biodiversity Metric 2.0**

7.3.10 In order to provide a quantitative assessment of habitats pre- and post-development to evidence measurable Biodiversity Net Gain for the development, Defra's Biodiversity Metric 2.0 was used to give a 'value' to habitats expressed as Biodiversity Units. Biodiversity Units based on the habitats present are a proxy for the value of biodiversity and must be considered alongside other evidence and species-specific requirements for the site.

7.3.11 In order to input into the Defra Metric and assess the baseline ecological conditions, habitats were translated from Phase 1 Habitat Classification (as per the original PEA) and National Vegetation Classification into UK Habitat Classification, which is required to undertake Biodiversity Net Gain calculations.

7.3.12 Habitats were classified to Level 4 of this classification system, where possible (some habitats are not defined beyond Level 3, such as 'modified grassland').

7.3.13 Habitats are divided into Primary Habitats based on the dominant habitat present, and given Secondary Codes where relevant, using the UK Habitat Classification to assign codes for each. Secondary Codes have been used for habitat mosaics, and recorded relating to management and green infrastructure where this is crucial for clear depiction and communication of habitats present, and avoiding the use of too many codes which may obscure key information. Secondary habitats are not recorded in the Defra Metric, as they form part of the dominant Primary Habitat.

7.3.14 Using the Biodiversity Metric 2.0 calculator and guidance and industry guidance, habitats were valued using Biodiversity Units based on the area of each habitat; type of habitat (its 'distinctiveness'); habitat condition; ecological connectivity and strategic importance.

7.3.15 The condition of habitats was assigned by recording key attributes as specified in the Technical Supplement, and where the same habitat had different conditions, these were recorded and calculated separately.

7.3.16 Following a response to public consultation regarding the Defra Metric 2.0, Natural England have advised that the connectivity tool should not be used and all connectivity has been assumed to be low for consistency.

**Impact Assessment**

7.3.17 EcIA has been carried out with reference to current guidance and is intended to support an outline planning application. As such the footprint and composition of the proposed development will be subject to detailed design. For the purposes of this assessment the Site Layout Plan and Landscape Treatments drawings have been used.

7.3.18 EcIA has assessed identified potential effects on important ecological features as identified through study of baseline ecological conditions.

7.3.19 Potential effects have been identified and assessed in the first instance in the absence of mitigation. Effects have been characterised as either positive or negative, and reference has also made to the duration of the potential effect, i.e. permanent/long-term or temporary.

7.3.20 Any residual effects of the scheme are then assessed for their significance once measures to avoid or mitigate the potential ecological effects have been taken into account. Determination of significance is based on the level with which an effect is considered to reinforce or undermine the biodiversity conservation objectives for the important ecological features identified, with consideration also to the occurrence and importance of similar ecological features.

7.3.21 The value of ecological features has been considered within the following geographical contexts:

**Table 7-3: Criteria used to determine importance of ecological features**

Geographical Context (Level of Importance)	Description
<b>International</b>	Internationally designated sites, e.g. SAC, SPA. Significant populations of an internationally important species
<b>National</b>	Nationally designated sites, e.g. SSSI; UKBAP Priority Habitat, significant populations of a protected species or UKBAP Priority species
<b>Regional</b>	North West (England) - regionally important populations of species or networks of habitats
<b>County</b>	Lancashire - Local Nature Reserves (LNR), Biological Heritage Sites (BHS); Lancashire BAP priority species and habitats
<b>Local</b>	Species mentioned above but present infrequently or in low numbers Habitats mentioned above but small in extent
<b>Site</b>	Development site – Important habitats or species within the application site. Small populations of a locally scarce species
<b>Negligible</b>	Habitats/species of limited ecological importance.

## 7.4. Baseline Ecological Conditions

### Internationally Designated Sites

7.4.1 Four internationally designated sites are present within 10km of the site. Sites are summarised in order of the distance they occur from the site in Table 7.5 below, and illustrated on Figure 7.2. These sites are of international importance.

Table 7-4: Designated Sites

Site Name & Designation	Description	Distance from Site Boundary
Morecambe Bay Ramsar Site	<p>Morecambe Bay lies between the coasts of South Cumbria and Lancashire, and represents the largest continuous intertidal area in Britain. Morecambe Bay comprises the estuaries of five rivers and the accretion of mudflats behind Walney Island. The area is of intertidal mud and sandflats, with associated saltmarshes, shingle beaches and other coastal habitats. It is a component in the chain of west coast estuaries of outstanding importance for passage and overwintering waterfowl (supporting the third-largest number of wintering waterfowl in Britain), and breeding waterfowl, gulls and terns.</p> <p>The site is a staging area for migratory waterfowl including internationally important numbers of passage ringed plover (<i>Charadrius hiaticula</i>).</p>	<b>Located ~2,090m to the north-west.</b>
Morecambe Bay and Duddon Estuary SPA	<p>Morecambe Bay and Duddon Estuary SPA is designated for its breeding and non-breeding bird assemblage, including: Bar-tailed godwit (<i>Limosa lapponica</i>), Non-breeding; Black-tailed godwit (<i>Limosa limosa islandica</i>), Non-breeding; Common tern (<i>Sterna hirundo</i>), Breeding; Curlew (<i>Numenius arquata</i>); Non-breeding; Dunlin (<i>Calidris alpina alpina</i>), Non-breeding; Golden plover (<i>Pluvialis apricaria</i>), Non-breeding; Grey plover (<i>Pluvialis squatarola</i>), Non-breeding; Herring gull (<i>Larus argentatus</i>), Breeding; Knot (<i>Calidris canutus</i>), Non-breeding; Lesser black-backed gull (<i>Larus fuscus</i>), Breeding; Lesser black-backed gull (<i>Larus fuscus</i>), Non-breeding; Little egret (<i>Egretta garzetta</i>), Non-breeding; Little tern (<i>Sternula albifrons</i>), Breeding; Mediterranean gull (<i>Ichthyaetus melanocephalus</i>), Non-breeding; Oystercatcher (<i>Haematopus ostralegus</i>), Non-breeding; Pink-footed goose (<i>Anser brachyrhynchus</i>), Non-breeding; Pintail (<i>Anas acuta</i>), Non-breeding; Redshank (<i>Tringa totanus</i>), Non-breeding; Ringed plover (<i>Charadrius hiaticula</i>), Non-breeding; Ruff (<i>Calidris pugnax</i>), Non-breeding; Sanderling (<i>Calidris alba</i>), Non-breeding; Sandwich tern (<i>Thalasseus sandvicensis</i>), Breeding; Seabird assemblage, Breeding; Shelduck (<i>Tadorna tadorna</i>), Non-breeding; Turnstone (<i>Arenaria interpres</i>), Non-breeding; Waterbird assemblage, Non-breeding and Whooper swan (<i>Cygnus cygnus</i>), Non-breeding.</p>	<b>Located ~2,090m to the north-west and ~2,500m to the south-west</b>
Morecambe Bay SAC	<p>Morecambe Bay SAC is designated for its Annex I habitats and Annex II species including: Estuaries; mudflats and sandflats not covered by seawater at low tide; large shallow inlets and bays; perennial vegetation of stony banks; <i>Salicornia</i> and other annuals colonizing mud and sand; Atlantic salt meadows (<i>Galucopuccinellietalia maritimae</i>); shifting dunes along the shoreline with <i>Ammohila arenaria</i> ("white dunes"); fixed coastal dunes with herbaceous vegetation ("grey dunes"); humid dune slacks; sandbanks which are slightly covered by sea water all the time; coastal lagoons; reefs; embryonic shifting dunes; Atlantic decalcified fixed dunes (<i>Calluno-Ulicetea</i>); dunes with <i>Salix repens</i> ssp. <i>argentea</i> (<i>Salicion arenariae</i>) and great crested newt.</p>	<b>Located ~2,090m to the north-west.</b>

Site Name & Designation	Description	Distance from Site Boundary
Bowland Fells SPA	The Bowland Fells SPA encompasses the main upland block within the area of Lancashire known as the Forest of Bowland. This is an outlier of the Pennine Range situated in the north of the county and to the east of the M6 motorway.  It is designated for its breeding bird assemblage, notably supporting hen harrier ( <i>Circus cyaneus</i> ), merlin ( <i>Falco columbarius</i> ) and lesser black-backed gull ( <i>Larus fuscus graellsii</i> ).	<b>Located ~5,230m and ~6,435m to the south-east and north-east respectively</b>
Calf Hill and Cragg Woods SAC	An area of broad-leaved woodland supporting two Annex 1 habitats: Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles; and, Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> ( <i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicon albae</i> ).	Located ~8,340m north-east of site

### Nationally Designated Sites

7.4.2 One nationally designated site was identified within 2.5km of the site during the desk study, it is described in Table 7.6 below, and illustrated on Figure 7.2. This site is of national importance.

**Table 7-5: Designated Sites**

Site Name & Designation	Description	Distance from Site Boundary
Lune Estuary SSSI	This site is designated for its breeding and foraging bird assemblage, as well as its notable cover of saltmarsh habitat and associated scarce flora.	~2,090m to north-west

### Locally Designated Sites

7.4.3 Two locally designated sites are present within 100m of the site.

7.4.4 Sites are summarised in order of the distance they occur from the site in Table 7.7 below, and illustrated on Figure 7.2. Both sites are of county importance.

**Table 7-6: Locally Designated Sites**

Site Name & Designation	Description	Distance from Site Boundary
Ellel Grange Wood, BHS (Biological Heritage Site)	Ellel Grange Woods comprise national priority habitat Lowland Mixed Deciduous Woodland bordered by pasture.	Within the site boundary
Lancaster Canal, including the Glasson Branch, BHS	Lancaster Canal is the largest water body in Lancaster and supports a diverse range of plant and animal species. The canal supports breeding birds, invertebrates and bats.	Immediately adjacent to the site boundary

### Woodland

7.4.5 Broad-leaved and mixed, semi-natural and plantation woodland is present within the site (Figure 7.3).

**Table 7-7: Woodland Descriptions**

Woodland	Description
Flat Wood	<p>The woodland is a mature plantation with semi-natural characteristics and a canopy featuring English oak (<i>Quercus robur</i>), sycamore (<i>Acer pseudoplatanus</i>), ash (<i>Fraxinus excelsior</i>), beech (<i>Fagus sylvatica</i>), wych elm (<i>Ulmus glabra</i>) and larch (<i>Larix</i> sp.)</p> <p>The woodland is currently unfenced to the north and is heavily used by cattle, evidenced by poaching, dunging and the presence of cattle. There is some evidence of natural regeneration by hawthorn (<i>Crataegus monogyna</i>) and sycamore <i>Acer pseudoplatanus</i>. Deadwood, both standing and resting, is abundant, in part due to death of elm due to Dutch elm disease.</p> <p>The relatively species poor groundflora dominated by English bluebell (<i>Hyacinthoides non-scripta</i>) (an unpalatable species) is considered likely to be influenced by stock grazing.</p> <p>This woodland comprises NVC communities: W10a <i>Quercus robur</i> – <i>Pteridium aquilinum</i> – <i>Rubus fruticosus</i>; and, W8f <i>Fraxinus excelsior</i> – <i>Acer campestre</i> – <i>Mercurialis perennis</i>.</p>
Carter Wood	<p>An area of broad-leaved semi-natural woodland. The canopy is locally dominated by sycamore with English oak prominent in the canopy. An excavated area now flooded is present and woodland to the east of this has a canopy dominated by English oak and more grassy groundflora. This variance is considered likely to be an expression of past utilisation of the woodland where the eastern portion appears to have less disturbed soils and was possibly used as wood pasture until relatively recently, whereas the western portion has well-developed groundflora synonymous with a long-established wood. Borrow pits and excavations create damp areas within the woodland where wet woodland is present.</p> <p>The woodland is fenced against livestock and natural regeneration is abundant dominated by ash. Feeding of pheasant takes place in the wood. Overall, the woodland is well structured, although the deadwood resource is somewhat lacking. The generally north facing aspect and damp areas created through excavation or simply the proximity of the canal create a humid environment favourable for ferns.</p> <p>This woodland comprises NVC communities: W10e <i>Quercus robur</i> – <i>Pteridium aquilinum</i> – <i>Rubus fruticosus</i> woodland <i>Acer pseudoplatanus</i> – <i>Oxalis acetosella</i> sub-community; and, W7a <i>Alnus glutinosa</i> – <i>Fraxinus excelsior</i> – <i>Lysimachia nemorum</i> woodland <i>Urtica dioica</i> sub-community.</p>
Quarry Wood	<p>An area of mixed semi-natural woodland. The canopy is very variable reflecting the woodland's history of use featuring mature Scot's pine <i>Pinus sylvestris</i> and high canopy of ash and English oak. Mature beech and sycamore also occur. Natural regeneration is good, with much ash and rowan (<i>Sorbus aucuparia</i>), however, Turkey oak (<i>Quercus cerris</i>) is also very much in evidence. There were many fallen and damaged trees at the time of the survey presenting a good resource of deadwood, both standing and resting. There appears to be a spring at the base of the quarry face which creates a substantial area of wet woodland and feeds a small beck with associated riparian habitat which flows down to the canal. The groundflora is species-rich and features an abundance of moschatel (<i>Adoxa moschatellina</i>).</p> <p>Whilst the woodland is fenced against livestock, there is evidence of fertiliser drift into the northern part of the woodland which is causing eutrophication and growth of tall ruderal species.</p> <p>This woodland comprises NVC communities: W7a <i>Alnus glutinosa</i> – <i>Fraxinus excelsior</i> – <i>Lysimachia nemorum</i> woodland <i>Urtica dioica</i> sub-community; W8e <i>Fraxinus excelsior</i> – <i>Acer campestre</i> – <i>Mercurialis perennis</i> woodland <i>Geranium robertianum</i> sub-community; and, W7b <i>Alnus glutinosa</i> – <i>Fraxinus excelsior</i> – <i>Lysimachia nemorum</i> woodland <i>Carex remota</i> – <i>Cirsium palustre</i> sub-community.</p>
Plantation 1	<p>An area of mixed plantation woodland. The plantation has a canopy dominated by larch and Scot's pine with self-seeded sycamore and beech. Occasionally within the plantation there are mature specimens of English oak which pre-date the planting of conifers. Many of the larch are wind thrown.</p> <p>The plantation is fenced against livestock and natural regeneration is abundant, there is also much deadwood due to the presence of wind thrown conifers.</p> <p>The woodland groundflora has most affinity with NVC community W10e <i>Quercus robur</i> – <i>Pteridium aquilinum</i> – <i>Rubus fruticosus</i> woodland <i>Acer pseudoplatanus</i> – <i>Oxalis acetosella</i> sub-community.</p>

Plantation 2	<p>The plantation has a canopy dominated by large beech and black pine <i>Pinus nigra</i> with ash and small-leaved lime (<i>Tilia cordata</i>). Sycamore regeneration is well established and forms a portion of the canopy.</p> <p>The plantation is fenced against livestock and natural regeneration is abundant dominated by ash. There is some well-rotted deadwood.</p> <p>The woodland groundflora has most affinity with NVC community W8e <i>Fraxinus excelsior</i> – <i>Acer campestre</i> – <i>Mercurialis perennis</i> woodland <i>Geranium robertianum</i> sub-community.</p>
Plantation 3	<p>An area of broad-leaved plantation woodland comprising horse chestnut, pine, oak, sycamore, beech and ash.</p> <p>The ground flora comprises coarse grasses and common nettle, due to intensive grazing by livestock.</p> <p>This woodland was not subject to NVC survey.</p>
Other woodland	<p>Further areas of woodland are present within the site comprising two strips of mixed semi-natural woodland along the canal embankments in the north of site. In addition, an area of broad-leaved semi-natural woodland is present in the south of site and an area of broad-leaved plantation woodland adjacent Plantation 2.</p> <p>These areas of woodland were not subject to NVC survey.</p>
Wet Woodland (Within Wetland Complex)	<p>A small area of the wetland complex is covered by a canopy of young common alder and willow. As a result of its origin the groundflora is dominated by lesser pond-sedge, but in the shade of common alder this sedge loses vigour and a more open, diverse sward has developed.</p> <p>The woodland groundflora has most affinity with NVC community W5 <i>Alnus glutinosa</i> – <i>Carex paniculata</i> woodland.</p> <p>This woodland qualifies as national priority habitat.</p>

7.4.6 Semi-natural woodland comprises national priority habitat woodland (Lowland Mixed Woodland and Wet Woodland) and is of national importance.

7.4.7 Plantation woodland within the site is of local priority and is of county importance.

#### Trees

7.4.8 Numerous trees are present within and adjacent to the site, including veteran/proto-veteran, mature and semi-mature specimens. Trees are located at boundaries and scattered within fields (Figure 7.3). Trees appear to have been sensitively managed and support frequent deadwood and decay features.

7.4.9 Tree species include sessile oak (*Quercus petraea*), sycamore, beech, ash, common alder, silver birch (*Betula pendula*), rowan, willow (*Salix* sp.), horse chestnut (*Aesculus hippocastanum*), lime (*Tilia* sp.), holly (*Ilex aquifolium*), Scot's pine and cherry (*Prunus* sp.).

7.4.10 Veteran and proto-veteran trees within the site are considered to be of national importance. Mature and semi-mature trees within and adjacent the site are considered to be of county and local importance respectively.

#### Ditches

7.4.11 Five ditches are present within and adjacent the site, and are described below, with their locations provided at Figure 7.3

**Table 7-8: Ditch details**

Ditch No.	Description
D1	A ditch flowing for approximately 200m along the western site boundary, passing immediately west of Flat Wood, it flows from south-east to north-west. The ditch channel is approximately 2m wide and 3m deep. The water is dominated by watercress ( <i>Rorippa</i> sp.) with a minimum depth of 10cm. The water is clear and the banks comprise grassland and tall ruderal vegetation. A hedgerow is present on the south-west bank.
D2	A ditch situated adjacent to the canal towpath. The banks are dominated by grassland, scrub and trees. The ditch channel is 2m wide and 1.5m deep. The water runs clear and is 10-20cm deep. The section of ditch within the site is approximately 320m long and flows north to south. Macrophytes present include marsh marigold ( <i>Caltha palustris</i> ), floating sweet-grass ( <i>Glyceria fluitans</i> ) and yellow flag-iris ( <i>Iris pseudacorus</i> ).
D3	The northern half of the ditch flows through a waterlogged area of rush-pasture. It flows from north to south and is approximately 50cm deep.  The southern half of the ditch flows from west to east and is a more defined ditch with a channel 2m wide and 1m deep. The water is 20-30cm deep and static. Vegetation includes bittersweet ( <i>Solanum dulcamara</i> ), brooklime ( <i>Veronica beccabunga</i> ) and hemlock water-dropwort ( <i>Oenanthe crocata</i> ).
D5	A field drain along the southern boundary. It is located at the boundary of a grazed field and is heavily cattle-poached. The ditch channel is 1m wide and there is around 5cm standing water. The drain is culverted under the canal.
D6	A small drain which flows from pond P3 in Quarry Wood to the canal adjacent to the site. It is approximately 50cm wide and less than 10cm deep. Vegetation includes yellow flag-iris.

7.4.12 Ditches D1, D5 and D6 are considered to be of site importance due to their management, adjacent land use resulting in eutrophication and low water levels.

7.4.13 Due to the cover of emergent macrophytes, association with a wetland/woodland network and permanent water presence ditches D2 and D3 are considered to be of local importance.

#### Hedgerows

7.4.14 Hedgerows are present at field boundaries within site and adjacent to site boundaries as illustrated on Figure 7.3 and described below. All hedgerows are considered to be national priority habitat, with seven also assessed as being 'Important hedgerows'.

7.4.15 All hedgerows are considered to be of national importance.

**Table 7-9: Hedgerow Details**

Hedgerow Number	Description	Status
H1	Dominant hawthorn, with sycamore, ash and elder ( <i>Sambucus nigra</i> ). Stock-proof, with trees.	Priority habitat
H2	Dominant hawthorn with sycamore. Stock-proof, with trees.	Priority habitat
H3	Dominant hawthorn, with elder. Small defunct hedge	Priority habitat
H4	Dominant hawthorn and blackthorn ( <i>Prunus spinosa</i> ) with elder and hazel ( <i>Corylus avellana</i> ). Stock-proof, with trees.	'Important'; Priority habitat

Hedgerow Number	Description	Status
H5	Dominant hawthorn with elder, poplar ( <i>Populus</i> sp.), ash oak and blackthorn. Defunct, with trees.	'Important'; Priority habitat
H6	Dominant hawthorn with elder, hazel and sycamore and oak. Stock-proof, with trees.	'Important'; Priority habitat
H7	Dominant hawthorn with hazel, ash, elder and holly. Defunct, with trees.	'Important'; Priority habitat
H8	Dominant hawthorn with blackthorn. Stock-proof, with trees.	'Important'; Priority habitat
H9	Dominant hawthorn with oak and sycamore. Stock-proof, with trees.	'Important'; Priority habitat
H10	Dominant hawthorn with hazel, elder and dog-rose ( <i>Rosa canina</i> ). Stock-proof, with trees	Priority habitat
H12	Hawthorn. Defunct, with trees	'Important'; Priority habitat
H13	Hawthorn. Defunct, with trees.	Priority habitat
H14	Dominant hawthorn with blackthorn, elder sycamore and hazel. Defunct.	Priority habitat
H15	Dominant hawthorn with blackthorn, elder and hazel. Defunct, with trees.	Priority habitat
H16	Dominant hawthorn with blackthorn, elder, sycamore and hazel. Defunct, with trees.	Priority habitat
H17	Dominant hawthorn with silver birch, hazel, blackthorn, alder and dog-rose. Stock-proof, with trees.	Priority habitat
H18	Dominant blackthorn with hawthorn, elder and hazel. Stock-proof.	Priority habitat
H20	Dominant hawthorn with blackthorn. Defunct.	Priority habitat
H21	Dominant hawthorn with blackthorn. Defunct.	Priority habitat
<b>H22</b>	<b>Dominant hawthorn with blackthorn. Defunct.</b>	<b>Priority habitat</b>

### Wetland Complex

- 7.4.16 An area of minerotrophic lowland fen bordered by rush pasture is present to the west of Lancaster Canal (Figure 7.3); both are considered to be national priority habitats (Lowland Fen and Purple Moor-grass Rush Pasture). The NVC communities comprise: S7 *Carex acutiformis* swamp; and, M23a *Juncus acutiflorus* – *Galium palustre* rush-pasture *Juncus acutiflorus* sub-community. Hereafter referred to as 'Wetland Complex'.
- 7.4.17 The wetland complex is located between two ditches and the canal towpath. It is fed by water from the adjacent pasture and potentially groundwater. An area of wet woodland is present in the south, where common alder has established.
- 7.4.18 The extent of these habitats within the site comprises <1% of the national area. These habitats are isolated in the local area, with the closest recorded example located ~4.18km to the north-east (Priority Habitat Inventory).
- 7.4.19 Based on the selection criteria for Biological Heritage Sites in Lancashire the wetland complex is considered to satisfy the criteria for selection.

- 7.4.20 Although these habitats are of national and local priority the examples within the site are limited in extent and isolated from similar habitats locally, with the length of the canal adjacent the wetland complex having reinforced banks with little emergent vegetation. As such, the wetland complex is considered to be of county importance.

#### **Scrub**

- 7.4.21 Scrub is limited in extent throughout the site with the majority being situated around ponds, at field boundaries and in the wetland complex in the centre of site. Scrub species include hawthorn, blackthorn, dog-rose, elder, common alder, willow and bramble.
- 7.4.22 Scrub habitat within the site is considered to be of negligible importance, due to its scattered and isolated nature. As such this ecological feature has been scoped out of further assessment.

#### **Semi-improved Natural Grassland**

- 7.4.23 Much of the site comprises semi-improved neutral grassland, where fields have been subject to less intensive grazing regimes evidenced by a more diverse floristic sward. Sward heights vary throughout the site and are influenced by grazing levels, however grazing was evident at all areas. An abundance of coarse grass species, notably perennial rye-grass (*Lolium perenne*) indicates agricultural improvement.
- 7.4.24 Due to its limited species diversity this habitat is not considered to qualify as priority habitat (Lowland Meadows). As it is a common and widespread habitat in the area it is considered to be of site importance.

#### **Improved Grassland**

- 7.4.25 The majority of grassland in the site is intensively grazed and agriculturally improved, it comprises improved grassland. Floristic diversity is low and the grassland is dominated by perennial rye-grass, with Yorkshire fog (*Holcus lanatus*), fescue (*Festuca* sp.) and bent-grass (*Agrostis* sp.) also present.
- 7.4.26 Due to its limited ecological value, widespread nature and agricultural improvement this habitat is considered to be of site importance.

#### **Unimproved Acid Grassland**

- 7.4.27 Two areas of unimproved acid grassland are present within the site, on an uneven area of field in the north and adjacent to a quarried area in the south. These habitats are typical of the priority habitat Lowland Dry Acid Grassland, however they are small in extent. Based on the selection criteria for Biological Heritage Sites in Lancashire the areas of grassland are too small in extent both being <0.5ha in area to qualify.
- 7.4.28 The extent of this habitat within the site comprises <1% of the national extent. The closest recorded example of this habitat in the area is ~5.3km to the south-east.
- 7.4.29 Due to the limited extent and isolated nature of this habitat it is considered to be of local importance.

#### **Inland Rock Outcrop**

- 7.4.30 Two exposed acidic rock cliffs are present within the site, both are located in woodland and appear to have been quarried.
- 7.4.31 Despite being a national priority habitat, both areas of cliff are artificial in origin and there is little flora typical of natural examples of this habitat, as such they are considered to be of local importance.

### Bare Ground

- 7.4.32 Areas of bare ground, comprising compacted earth and tarmac hard standing, are present along vehicle access tracks. This habitat is of negligible importance and has been scoped out of further assessment.

### Walls

- 7.4.33 Mortared stone walls are present along the east site boundary. These are 1-2m high. This habitat is considered to be of negligible importance and has been scoped out of further assessment.

### Ponds

- 7.4.34 Seven ponds are present within the site.
- 7.4.35 Details of the seven ponds within the site, including their descriptions, are provided in the table below and their locations are detailed on Figure 7.3.

**Table 7-10: Pond Descriptions**

Pond	Description
P1	Woodland edge pond, appears to be shallow and is turbid. No aquatic vegetation is present, marginal vegetation is dominated by sweet-grass ( <i>Glyceria</i> sp.).
P2	A field pond surrounded by scrub and trees. Marginal vegetation includes fool's watercress ( <i>Rorippa nasturtium-aquaticum</i> ), sweet-grass, reedmace ( <i>Typha latifolia</i> ), sedges ( <i>Carex</i> sp.) and hemlock water-dropwort ( <i>Oenanthe crocata</i> ). A male smooth newt ( <i>Lissotriton vulgaris</i> ) and dragonfly larvae ( <i>Odonata</i> sp.) were observed in the pond during the survey. The pond margins are cattle-poached.
P3	A woodland pond at the base of a quarry it covers a large area and is very shallow. There is little standing water and this it is dominated by sweet-grass and duckweed ( <i>Lemna</i> sp.). Yellow flag-iris is also present.
P4	A large field pond surrounded by trees and scrub. It appears to be approximately 50cm deep and the water is slightly turbid. No aquatic vegetation is present and marginal vegetation includes sweet-grass and brooklime ( <i>Veronica beccabunga</i> ). The pond margins are also cattle-poached.
P5	A large field pond, the western half is surrounded by scrub and trees and the eastern grassland, comprising predominantly rushes ( <i>Juncus</i> sp.). The water appears to be 50cm deep and turbid. No aquatic vegetation is present and marginal vegetation is dominated by sweet-grass, hemlock water-dropwort and rushes.
P7	A field pond surrounded by trees and scrub. The pond covers a large area however it is shallow with little standing water. Aquatic vegetation includes water starwort ( <i>Callitriche</i> sp.) and duckweed. Marginal vegetation comprises brooklime, sweet-grass and hemlock water-dropwort. The pond margins are also cattle-poached.
P8	A large field pond surrounded by trees and scrub. The bank is cattle-poached and there is no aquatic vegetation. The water appears to be at least 50cm deep and slightly turbid.

- 7.4.36 The seven ponds within the site are either densely shaded, suffer from poaching, are ephemeral and/or support limited submerged macrophytes, therefore are not considered to qualify as national priority habitat. As such they are considered to be of local importance.

### Invertebrates

- 7.4.37 The site includes habitat which may support national and local priority invertebrates, notable habitat comprises deadwood features and wetland, notably lowland fen and rush pasture within the wetland complex (see Appendix 7.3).

7.4.38 A targeted invertebrate survey to ascertain the presence/likely absence of priority species was not undertaken, however for the purposes of this assessment it is anticipated that the notable habitats identified support national and local priority species. As such the invertebrate assemblage is considered to be of no greater than national importance.

#### Great Crested Newt

7.4.39 There are records of great crested newt in the wider area (~960m north-west and ~1290m south-east).

7.4.40 Seven ponds are present within the site, with further ponds present within the ZoI (500m).

**Table 7-11: Further ponds within ZoI**

Pond	Description	Location
P6	GCN absence confirmed during surveys	~30m south-west of site
P9	Confirmed to be a continuation of ditch D2 and unsuitable for supporting amphibians.	~10m to the south
P10	A large lake within woodland.	~30m to the south-west
P11	A pond within the grounds of Ellel Lodge	~38m to the south-west
P12	A field pond within pasture.	~50m to the north-east
P13	A field pond within pasture.	~76m to the north-east
P14	An active slurry pit.	~120m to the west
P15	A small woodland pond.	~151m to the west
P16	Not assessed.	~235m to the west
P17	Not assessed.	~298m to the west
P18	Not assessed.	~306m to the west
P19	Not assessed.	~454m to the west
P20	Not assessed.	~455m to the west
P21	Not assessed.	~457m to the north
P22	Not assessed.	~476m to the east
P23	Not assessed.	~485m to the west
P24	Not assessed.	~493m to the east

7.4.41 Ponds within the site (P1-5, P7-8) were subject to eDNA survey in 2017 and presence/absence pond surveys in 2020. All surveys have returned negative results for the presence of great crested newts. As such the presence of this species within the site is not anticipated and this species is not considered further in this assessment.

#### Nesting Birds

7.4.42 Breeding bird surveys were undertaken in 2018 (Appendix 7.2) with the results summarised below.

- 7.4.43 Surveys confirmed the presence of three Schedule 1 species: greylag goose (*Anser anser*); kingfisher (*Alcedo atthis*); and, hobby (*Falco subbuteo*). Kingfisher have frequently been observed foraging along the canal, however no suitable nesting habitat is present within the site. A single pair of greylag geese were observed flying over the site, no evidence of nesting within the site has been observed during breeding bird or other surveys within the site. Hobby are considered to be a possible breeder within the site, with suitable habitat in the form of old corvid nests in trees/woodland/hedgerows.
- 7.4.44 In addition, barn owl (*Tyto alba*) were observed foraging within fields near Home Farm buildings. Suitable nesting habitat is present within the site such as holes in mature/veteran trees.
- 7.4.45 Although Schedule 1 species have been recorded, and nesting opportunities suitable for hobby and barn owl are present within the site, no nesting by these species has been confirmed
- 7.4.46 Breeding bird surveys undertaken in 2018 identified 46 species of birds either confirmed as breeding (14), probable breeders (21) and possible breeders (11) within the site. These included priority species, and those listed as red, amber and green (BoCC). Results are summarised below.

**Table 7-12: Breeding birds results summary**

Species	Breeding Status	Details
Mistle thrush ( <i>Turdus viscivorus</i> )	Confirmed	Red List species. Recent fledglings observed within the site and singing males regularly recorded. Estimated that two territories are present within the site.
Song thrush	Probable	Red List species, UK BAP species, Lancashire BAP species (Song thrush species action plan). Singing males regularly recorded within the site. Estimated that five territories are present within the site.
Starling ( <i>Sturnus vulgaris</i> )	Confirmed	Red List species, UK BAP species. Three active nests identified in farm buildings adjacent the site, and likely that more are present.
Dunnock ( <i>Prunella modularis</i> )	Probable	Amber List species, UK BAP species. Singing males regularly recorded, estimated that five territories are present within the site although isolated sightings were made in other locations within the site.
Kestrel ( <i>Falco tinnunculus</i> )	Confirmed	Amber List species. An active nest with young chicks confirmed in farm building adjacent site at Home Farm. A family of birds was also observed in the south-east of the site. Estimated that two territories are present within the site.
Mallard ( <i>Anas platyrhynchos</i> )	Probable	Amber List species. Pairs regularly observed within the site. Estimated that minimum of two territories present.
Mute swan ( <i>Cygnus olor</i> )	Confirmed	Amber List species. Active nest identified at canal along northern boundary of site.
Oystercatcher ( <i>Haematopus ostralegus</i> )	Probable	Amber List species. Observed defending territory on three occasions in field towards the centre of the site. No active nest was confirmed. Territory possibly abandoned after introduction of stock towards the end of the survey.
Reed bunting	Probable	Amber List species, UK BAP species, Lancashire BAP species (farmland birds species action plan; reed bunting species action plan). Singing males regularly recorded. Estimated that two territories are present within the site, associated with wetland habitat and marginal vegetation alongside the canals.

Species	Breeding Status	Details
Stock dove ( <i>Columba oenas</i> )	Probable	Amber List species. Calling males regularly recorded. Estimated that three territories are present within the site.
Willow warbler ( <i>Phylloscopus trochilus</i> )	Confirmed	Amber List species. Adults carrying food observed within the site. Single territory close to canal in the north-east of the site and other isolated sightings within the site.
Blackbird ( <i>Turdus merula</i> )	Probable	Green List species.
Blackcap ( <i>Sylvia atricapilla</i> )	Probable	Green List species.
Black-headed gull ( <i>Chroicocephalus ridibundus</i> )	Non-breeder	Green List species.
Blue tit ( <i>Cyanistes caeruleus</i> )	Confirmed	Green List species.
Buzzard ( <i>Buteo buteo</i> )	Probable	Green List species.
Carrion crow ( <i>Corvus corone</i> )	Probable	Green List species.
Chaffinch ( <i>Fringilla coelebs</i> )	Probable	Green List species.
Chiffchaff ( <i>Phylloscopus collybita</i> )	Probable	Green List species.
Coal tit ( <i>Periparus ater</i> )	Probable	Green List species.
Collard dove ( <i>Streptopelia decaocto</i> )	Confirmed	Green List species.
Goldcrest ( <i>Regulus regulus</i> )	Possible	Green List species.
Goldfinch ( <i>Carduelis carduelis</i> )	Probable	Green List species.
Goosander ( <i>Mergus merganser</i> )	Possible	Green List species.
Great tit ( <i>Parus major</i> )	Confirmed	Green List species.
Greater spotted woodpecker ( <i>Dendrocopos major</i> )	Probable	Green List species.
Jackdaw ( <i>Corvus monedula</i> )	Confirmed	Green List species.
Jay ( <i>Garrulus glandarius</i> )	Possible	Green List species.
Long-tailed tit ( <i>Aegithalos caudatus</i> )	Confirmed	Green List species.

Species	Breeding Status	Details
Magpie ( <i>Pica pica</i> )	Probable	Green List species.
Moorhen ( <i>Gallinula chloropus</i> )	Probable	Green List species.
Nuthatch ( <i>Sitta europaea</i> )	Confirmed	Green List species.
Pheasant ( <i>Phasianus colchicus</i> )	Confirmed	Green List species.
Pied wagtail ( <i>Motacilla alba</i> )	Probable	Green List species.
Robin ( <i>Erithacus rubecula</i> )	Probable	Green List species.
Rook ( <i>Corvus frugilegus</i> )	Confirmed	Green List species.
Siskin ( <i>Carduelis spinus</i> )	Possible	Green List species.
Treecreeper ( <i>Certhia familiaris</i> )	Probable	Green List species.
Whitethroat ( <i>Sylvia communis</i> )	Possible	Green List species.
Woodpigeon ( <i>Columba palumbus</i> )	Probable	Green List species.
Wren ( <i>Troglodytes troglodytes</i> )	Probable	Green List species.

7.4.47 The nesting bird assemblage is considered to be typical of the area and habitats present within the site. Although protected and priority species have been recorded within the site the assemblage is considered to be of local importance due to the widespread nature of the site's habitats within the local area.

#### Foraging Birds

7.4.48 Trees, hedgerows and scrub provide foraging opportunities for a range of bird species throughout the year. In addition, open semi-natural grassland within the site provides opportunities for foraging birds, notably overwintering species.

7.4.49 In addition to bird species identified as confirmed/probable/possible breeders, bird surveys recorded the presence of priority and/or red/amber list species curlew, lapwing, lesser redpoll, lesser black-backed gull, shelduck, house martin and black-headed gull.

7.4.50 Wintering bird surveys began in September 2020 and are ongoing. The desk study returned records of species which typically forage in open grassland such as linnet (*Linaria cannabina*) and starling (*Sturnus vulgaris*).

7.4.51 Habitats within the site are common and widespread in the area, as such the foraging resource within the site is considered to be of local importance.

### **Badger**

- 7.4.52 A single badger clan has a territory which falls within the site, and is considered to extend beyond the site. Two setts, classified as main setts, within the site as well as subsidiary, outlier and inactive sets dispersed throughout the site.
- 7.4.53 As the site supports a single badger clan which is considered to rely on the habitats within the site as a key part of its foraging resource, this ecological feature is considered to be of local importance.

### **Foraging and Commuting Bats**

- 7.4.54 Bat activity surveys were undertaken across the season in 2018. The surveys recorded common pipistrelle, soprano pipistrelle, Myotis sp., Nyctalus sp., brown long-eared, Pipistrellus sp. and Nathusius' pipistrelle (Pipistrellus nathusii). Activity levels were higher along the canal, at woodland edge, near ponds, along hedgerows and near Home Farm buildings.
- 7.4.55 Activity observed highlights that woodland edge, hedgerows and wetland features within the site are utilised by a range of bat species on a frequent basis. As such it is considered that the site supports foraging and commuting of county importance.

### **Roosting Bats – Trees**

- 7.4.56 Trees, tree groups and woodland were subject to a ground-level roost assessment in January 2017. 103 trees, 46 tree groups and further trees at all woodland within and adjacent the site were identified as supporting features with bat roost suitability.
- 7.4.57 As a commitment to the retention of all trees with bat roost suitability was agreed at an early stage, no further survey was undertaken to determine the importance of bats roosting within trees at the site. Based on the activity surveys undertaken at the site it is assumed that the site supports a roosting bat assemblage of no greater than county importance.

### **Roosting Bats – Home Farm Buildings**

- 7.4.58 Building inspections and bat emergence/re-entry surveys undertaken in 2018 at the Home Farm buildings adjacent to the site identified roosts in nine of the buildings, with suitability identified at all the stone/masonry buildings.
- 7.4.59 Although the buildings do not form a part of this application, they are considered to be within the Zone of Influence due to their proximity to the site.
- 7.4.60 The majority of roosts identified appeared to be day roosts used by individual/small numbers of bats. Although a maternity roost was not confirmed, it is considered likely that Building 9 could support a maternity roost of common and/or soprano pipistrelle. As such for the purposes of this assessment a maternity roost by common/soprano pipistrelle bats is assumed.
- 7.4.61 As the species roosting within the site are common and widespread within the county, bat roosts within the Home Farm Buildings are considered to be of local importance.

### **Otter**

- 7.4.62 Otter walkover surveys undertaken in 2018 confirmed the presence of otter at the two stretches of canal adjacent to the site, otter spraint and feeding remains were found at various locations within riparian vegetation. No evidence of otter activity was identified at other waterbodies within the site.

7.4.63 Vegetation cover and features suitable for use as resting sites were identified in woodland and marginal vegetation. However, habitat within the site were considered to be sub-optimal for use as natal dens due to the limited shelter and frequent disturbance due to public footpaths/the canal towpath.

7.4.64 The site provides foraging and resting opportunities for otter moving through the site, as such the site is considered to be of local importance for this species.

#### Water Vole

7.4.65 Water vole presence/absence surveys undertaken in 2018, confirmed the likely absence of water vole in the site, in addition the waterbodies within the site were assessed as being sub-optimal for this species, as such the presence of this species within the site is not anticipated, and water vole have been scoped out.

#### Hedgehog

7.4.66 Two records of hedgehog were identified during the desk study and habitats within the site, such as woodland, hedgerows, scrub and grassland are of suitability for this species.

7.4.67 No hedgehog were observed during any surveys within the site, however the presence of this national priority and highly mobile species is assumed. Where present this national priority species is likely to be at low numbers, as such this ecological feature is considered to be of local importance.

#### Brown Hare

7.4.68 Brown hare were observed on a frequent basis within the site, with three adults being observed on one occasion.

7.4.69 As the site is considered to contribute to supporting a small population of national priority brown hare, the site is considered to be of local importance for this species.

#### Baseline Ecological Conditions Summary

7.4.70 Baseline Ecological Conditions and the rationale for scoping out features is provided below;

**Table 7-13: Baseline Ecological Conditions Summary**

Ecological Feature	Baseline Ecological Condition/Rationale for Scoping Out	Geographical Importance
Morecambe Bay Ramsar site	Located ~2,090m to the north-west.	<b>International</b>
Morecambe Bay and Duddon Estuary SPA	Located ~2,090m to the north-west and ~2,500m to the south-west	<b>International</b>
Morecambe Bay SAC	Located ~2,090m to the north-west.	<b>International</b>
Bowland Fells SPA	Located ~5,230m and ~6,435m to the south-east and north-east.	<b>International</b>
Calf Hill and Cragg Woods SAC	Located ~8,340m north-east of site. A Habitat Regulations Assessment (HRA) concluded that there would be no likely significant effects on Internationally designated sites, as such this feature has been scoped out of further assessment.	<b>International</b>

Ecological Feature	Baseline Ecological Condition/Rationale for Scoping Out	Geographical Importance
Lune Estuary SSSI	~2,100m to north-west. This site is designated for its breeding and foraging bird assemblage, as well as its notable cover of saltmarsh habitat and associated scarce flora.	<b>National</b>
Ellel Grange Woods, BHS (Biological Heritage Site)	This BHS is located within the site and areas fall within the works footprint. Due to its protection at a county level it is considered to be of county importance.	<b>County</b>
Lancaster Canal BHS	Immediately adjacent the site.	<b>County</b>
Woodland	Semi-natural woodland comprises national priority habitat woodland (Lowland Mixed Woodland and Wet Woodland) and is of national importance.  Plantation woodland within the site is of local priority and is of county importance.	<b>National (Semi-natural)</b> <b>County (Plantation)</b>
Trees	Veteran/Mature trees present within the site	<b>National, county and local (veteran/proto-veteran, mature and semi-mature respectively)</b>
Ditches	Six ditches within the site.	<b>Local (D2 &amp; D3). Site (D1, D5 &amp; D6)</b>
Hedgerows	20 priority habitat hedgerows, seven of which were assessed as being 'Important'.	<b>National</b>
Wetland Complex	Comprising priority habitats Lowland Fen and Rush Pasture. Based on the selection criteria for Biological Heritage Sites in Lancashire the wetland complex satisfies the criteria for selection.  Although these habitats are of national priority the examples within the site are limited in extent and isolated from similar habitats locally. As such, the wetland complex is considered to be of county level importance.	<b>County</b>
Scrub	Scrub habitat within the site is considered to be of negligible importance  as such this ecological feature has been scoped out of further assessment.	<b>n/a</b>
Semi-improved neutral grassland	Due to its limited species diversity and it being a common and widespread habitat in the area it is considered to be of site importance.	<b>Site</b>
Improved grassland	Due to its limited ecological value, widespread nature and agricultural improvement this habitat is considered to be of site importance.	<b>Site</b>
Unimproved acid grassland	Due to the limited extent and isolated nature of this habitat it is considered to be of local importance only.	<b>Local</b>

Ecological Feature	Baseline Ecological Condition/Rationale for Scoping Out	Geographical Importance
Inland Rock Outcrop	Two exposed acidic rock cliffs are present within the site, both are located in woodland and appear to have been quarried. Despite being a priority habitat, both areas of cliff are artificial in origin and there is little flora typical of natural examples of this habitat, as such they are considered to be of local importance only.	Local
Bare ground	This habitat is of negligible importance and has been scoped out of assessment.	n/a
Walls	This habitat is of negligible importance and has been scoped out of assessment.	n/a
Ponds	Seven ponds are present within the site. The seven ponds within the site are densely shaded, suffer from poaching, are ephemeral and/or support limited macrophytes, therefore are not considered to qualify as national priority habitat. As such they are considered to be of local importance.	Local
Invertebrates	A targeted invertebrate survey to ascertain the presence/likely absence of priority species was not undertaken, however for the purposes of this assessment it is anticipated that the suitable features identified support priority species. As such the invertebrate assemblage is considered to be of no greater than national importance.	National
Great crested newt	Ponds within the site have been subject to eDNA survey in 2017 and presence/absence in 2020. All surveys have returned negative results for the presence of great crested newts. As such the presence of this species within the site is not anticipated.	N/a
Nesting birds	The nesting bird assemblage is considered to be typical of the area and habitats present within the site. Although protected and priority species have been recorded within the site the assemblage is considered to be of local importance due to the widespread nature of the site's habitats within the local area	Local
Foraging birds	Habitats within the site provide opportunities for foraging birds, notably winter species, however these habitats are common and widespread in the areas, as such the foraging resource within the site is considered to be of local importance.	Local
Badgers	The site supports a badger clan which is considered to rely on the habitats within the site as a key part of its foraging resource, this ecological feature is considered to be of local importance.	Local
Foraging and commuting bats	Activity observed highlights that woodland edge, hedgerows and wetland features within the site are utilised by a range of bat species on a frequent basis. As such it is considered that the site supports foraging and commuting of county importance.	County
Roosting bats - trees	Trees within the site support features with bat roost suitability. As a commitment to the retention of all trees with bat roost suitability was agreed at an early stage, no further survey was undertaken to determine the importance of bats roosting within trees at the site. Based on the activity surveys undertaken at the site it is assumed that the site supports a roosting bat assemblage of no greater than county importance.	County

Ecological Feature	Baseline Ecological Condition/Rationale for Scoping Out	Geographical Importance
Roosting bats – Home Farm buildings	<p>Building inspections and bat emergence/re-entry surveys undertaken in 2018 at the Home Farm buildings identified roosts in nine of the building.</p> <p>Although the Home Farm buildings do not form a part of this application, they are considered to be within the Zone of Influence due to their proximity to the site.</p> <p>As the species roosting within the site are common and widespread within the county, bat roosts within the Home Farm Buildings are considered to be of local importance.</p>	Local
Otter	The site provides foraging and resting opportunities for otter moving through the site, as such the site is considered to be of local importance for this species.	Local
Water vole	Water vole presence/absence surveys undertaken in 2018, confirmed the likely absence of water vole in the site, in addition the waterbodies within the site were assessed as being sub-optimal for this species, as such the presence of this species within the site is not anticipated, and water vole have been scoped out.	N/a
Hedgehog	No hedgehog were observed during any surveys within the site, however the presence of this national priority and highly mobile species is assumed. Where present this species is likely to be at low numbers, as such this ecological feature is assumed to be of local importance.	Local
Brown hare	<b>The site supports up to three adult brown hares, as such the site is considered to be of local importance for this species.</b>	Local

## 7.5. Assessment of Effects and Mitigation Measures

### Internationally Designated Sites

7.5.1 The development has been assessed through a Shadow Habitats Regulations Assessment (HRA) and Appropriate Assessment (Appendix 7.5) whereby likely significant effects have been quantified and sufficient mitigation put in place, to ensure that there will be no significant residual effect on internationally designated sites.

7.5.2 As such these Ecological Features have not been considered further within this Ecological Impact Assessment, although the potential impacts and mitigation measures are summarised below.

#### Potential Impacts

##### *Construction Phase*

7.5.3 No construction phase impacts are anticipated.

##### *Post-Construction / In-Operation*

7.5.4 Increased recreational disturbance has potential to cause disturbance to receptors of Morecambe Bay and Duddon Estuary SPA, through an increase in: walkers; dog walkers; cyclists; and, anglers.

## Mitigation Measures

### *Post-Construction / In-Operation*

- 7.5.5 Mitigation measures comprise raising awareness to site visitors through the publication and distribution of guest information packs, which highlight the sensitivity of these features and promotes responsible access to them.

### Significance of Residual Effects

- 7.5.6 The Habitats Regulations Assessment and Appropriate Assessment concluded that with the mitigation measures there will be no significant residual effect on internationally designated sites.

## **Lune Estuary SSSI**

### Potential Impacts

#### *Construction phase*

- 7.5.7 No construction phase impacts are anticipated.

#### *Post-Construction / In-Operation*

- 7.5.8 In operation an increase in visitor numbers has the potential to result in an increased recreational pressure on this nationally designated site, designated for its extensive cover of saltmarsh habitat, and associated scarce flora. Visitors to the site can easily access the Lune Estuary from site on foot via public rights of way, notably along the canal towpath, and by vehicle.
- 7.5.9 An increase in visitor numbers has the potential to degrade habitats and notable plant species, however the habitats and floral species for which this site is designated are primarily influenced by land management not public access. As such an increase in visitor numbers primary using established footpaths and rights of way are not considered to result in a significant effect on the Favourable status of this SSSI.
- 7.5.10 The significant effects of increased recreational pressure on the breeding bird assemblage has been assessed as part of the Habitats Regulations Assessment and no further mitigation measures are considered necessary.

## **Ellel Grange Woods BHS**

### Potential Impacts

#### *Construction Phase*

- 7.5.11 Creation of a footbridge over the canal, in the south of site, will result in the loss of habitat within its footprint, the indicative plans suggest that ~2,600m<sup>2</sup> of this BHS could be impacted by the footbridge and associated footpaths.
- 7.5.12 Contractors have the potential to damage/destroy habitats outside the working area notably trees through collisions and undertaking works within Root Protection Areas (RPA).

#### *Post-Construction / In-Operation*

- 7.5.13 During operation a new footpath will increase access by the general public and site visitors, which has the potential to result in permanent disturbance of the BHS through:

- Soil compaction and root damage;
- Bark damage and climbing of trees; and;
- Destruction of ground flora through picking and trampling.

#### Mitigation Measures

##### *Construction phase*

- 7.5.14 Prior to works within the Ellel Grange Woods BHS and adjacent habitats, tree protection measures will be installed at all retained trees in line with BS 5837:2012, along with appropriate briefing of contractors during site inductions. These measures will minimise the risk of damage during construction works.
- 7.5.15 The footpath will be installed using a no-dig method within tree RPAs, in order to prevent damage to retained trees.

##### *Post-Construction / In-Operation*

- 7.5.16 Ellel Grange Woods BHS will be managed as a sensitive/wild area for biodiversity, which will be communicated to visitors through interpretation boards at the edge of the BHS. Site visitors will be discouraged from leaving designated footpaths through the use of soft fencing (e.g. wooden bollard and rope).

#### Significance of Residual Impacts

- 7.5.17 The mitigation measures will minimise the risk of impact on Ellel Grange Woods BHS beyond the footprint of works and during operation however, the permanent loss of natural habitat within the BHS (3.57% of total area), will result in a permanent negative significant residual effect.

### **Lancaster Canal BHS**

#### Potential Impacts

##### *Construction Phase*

- 7.5.18 No works are proposed within the canal or at its towpaths, however construction activities may result in temporary impact on habitats associated with the canal through contractors accessing habitats on foot and with vehicles/machinery.
- 7.5.19 The creation of a footbridge over the canal has the potential to temporarily impact on the canal and species which it supports.
- 7.5.20 Construction activities have the potential to temporarily impact on the canal water quality through pollution incidents near the canal or waterbodies which connect into it.

##### *Post-Construction / In-Operation*

- 7.5.21 The planting of trees/scrub at the canal edge will result in the permanent shading and loss of marginal vegetation, which may limit the opportunities for fauna which utilise this vegetation for foraging and/or refuge.
- 7.5.22 There will be a permanent increase in visitors to the site who will likely use canal towpaths and habitats adjacent the canal, resulting in an increase in disturbance.

- 7.5.23 Surface water drainage systems have the potential to result in pollution of the canal through surface water run-off.

#### Mitigation Measures

##### *Construction Phase*

- 7.5.24 Where works are anticipated close to Lancaster Canal BHS, then fencing will be used to prevent access by contractors and vehicles/machinery, along with appropriate briefing of contractors during site inductions. All works in close proximity to the canal or habitats which may drain into it will be undertaken with consideration to Pollution Prevention Guidance in order to minimise risk of a pollution incident.
- 7.5.25 The installation of the footbridge, which will comprise a pre-constructed span, will be designed to minimise disturbance, and its duration, on fauna which utilise the canal.

##### *Post-Construction / In-Operation*

- 7.5.26 Sustainable Drainage Systems (SuDS) will be utilised at the site, which will filter pollutants from surface water run-off prior to it flowing into the canal or associated waterbodies.
- 7.5.27 New planting at the canal will be offset from the canal edge by 5m to minimise the shading effect on marginal vegetation, and allow marginal vegetation to persist. In addition, management of the canal edge vegetation will be undertaken annually to discourage the establishment of dense scrub.
- 7.5.28 The south bank of the canal along the north boundary of site will be managed as a sensitive/wild area for biodiversity, which will be communicated to visitors through interpretation boards. Access by people and pets will be discouraged in this area through fencing along the south side of woodland adjacent the canal.

#### Significance of Residual Effects

- 7.5.29 Adherence to the mitigation measures outlined above will minimise the risk of impact on Lancaster Canal BHS, and will not compromise the function of this designated site, retaining wild areas for fauna to refuge. Taking the mitigation measures into account, no significant residual effect is anticipated.

### **Woodland**

#### Potential Impacts

##### *Construction Phase*

- 7.5.30 The proposals include the erection of six raised 'tree houses' (~20m<sup>2</sup> each, totalling ~160m<sup>2</sup>) within Flat Wood; and, the erection of an immersive wildlife experience 'cantilevered structure' (~150m<sup>2</sup>) in Quarry Wood. Although these will be located within natural gaps in woodland and there will be no loss in canopy there will be a permanent loss of ground flora beneath these structures within national priority woodland.
- 7.5.31 In addition, a ~420m<sup>2</sup> area of Plantation 1 will be lost to incorporate the new Marketplace building.
- 7.5.32 Contractors have the potential to temporarily damage and/or permanently destroy retained trees/habitat through accessing the site to erect these structures, through collisions and undertaking works within root protection areas (RPA).

##### *Post-Construction / In-Operation*

- 7.5.33 During operation there will be an increase in access to woodland by the general public, resulting in disturbance of this habitat through:

- Use of access routes to tree houses;
- The creation of footpaths and informal routes through woodland;
- Soil compaction and root damage; and,
- Bark damage and climbing of trees.

#### Mitigation Measures

##### *Construction Phase*

- 7.5.34 Prior to commencement of works tree protection measures will be installed at the edge of woodland in line with BS 5837:2012, along with appropriate briefing of contractors during site inductions.
- 7.5.35 Tree houses are to be created in existing natural clearings, whilst the immersive wildlife experience building will be located in a natural gap created by a recently windthrown tree. The erection of buildings within woodland will be designed to minimise any impact to adjacent trees, notably excavation and/or soil compaction within root protection areas.
- 7.5.36 The Marketplace building will be designed to minimise the impact on the woodland and will aim to reduce the number of trees which will be impacted.

##### *Post-Construction / In-Operation*

- 7.5.37 Access for tree houses and footpaths through woodland in Flat Wood will be located to avoid significant ground flora/trees and will be created using a no-dig method within tree RPAs, in order to prevent damage to retained trees. Site visitors will be encouraged to stick to paths through the use of soft fencing (e.g. wooden bollard and rope).
- 7.5.38 Quarry Wood, Carter Wood, Plantations 1, 2 and 3 and Ellel Grange Wood BHS will be managed as sensitive/wild areas for biodiversity, which will be communicated through interpretation boards and the fencing of these habitats (e.g. post and wire).

#### Significance of Residual Effects

- 7.5.39 The mitigation measures will minimise the risk of impact on woodland habitat beyond the footprint of works and during operation.
- 7.5.40 There will be a permanent loss of national priority woodland (0.03ha) and local priority plantation woodland (0.04ha), which will result in a negative significant residual effect.

#### Trees

##### Potential Impacts

##### *Construction Phase*

- 7.5.41 All veteran, mature and semi-mature trees within the site will be retained.
- 7.5.42 Construction activities have the potential to temporarily disturb / permanently damage retained trees through collisions and undertaking works within root protection areas (RPA).

*Post-Construction / In-Operation*

- 7.5.43 During operation access by the general public will increase, resulting in permanent disturbance of retained trees through:
- Soil compaction and root damage; and,
  - Bark damage and climbing of trees.
- 7.5.44 Due to an increased human presence within the site, management of trees, to remove deadwood and failing trees has the potential to impact upon the trees within the site.

Mitigation Measures

*Construction Phase*

- 7.5.45 Prior to commencement of works tree protection measures will be installed at all retained trees in line with BS 5837:2012, along with appropriate briefing of contractors during site inductions.
- 7.5.46 Footpaths will be installed using a no-dig method within tree RPAs, in order to prevent damage to adjacent retained trees.

*Post-construction / In-Operation*

- 7.5.47 An arboricultural survey will be undertaken to inform a management plan for trees within site, the objectives of management should be to ensure the retention and longevity of trees whilst retaining deadwood features. Priority should be given to discouraging access by people over the removal of deadwood on grounds of safety. Where trees are identified as unsafe and/or sensitive, visitor access will be discouraged through interpretation boards and soft fencing (e.g. wooden bollard and rope).

Significance of Residual Effects

- 7.5.48 The mitigation measures will minimise the risk of impact on retained trees, as such no significant residual effect is anticipated.

**Ditches**

Potential Impacts

*Construction phase*

- 7.5.49 All ditches within the site are located beyond the footprint of works, with the exception of the three sections of boardwalk which cross Ditches 2 and 3 in the wetland complex. Works at these locations have the potential to damage this habitat.
- 7.5.50 Construction activities have the potential to result in temporary impact through pollution incidents and works in close proximity to ditches.

*Post-Construction / In-Operation*

- 7.5.51 Surface drains are anticipated to feed in to the existing ditch network, as such it is anticipated that there will be an increased risk of permanent and temporary pollution during operation of the site.

7.5.52 Ditches currently receive surface water high in nutrients from agricultural improvement of adjacent grassland, the change in management will permanently decrease the amount of nutrients entering watercourses from the site.

#### Mitigation Measures

##### *Construction Phase*

7.5.53 The installation of the boardwalk in the wetland complex will be sensitive at the location of Ditches 2 and 3, it will bridge over the ditches at these crossing points and avoid siting supports at the ditch banks.

7.5.54 All works in close proximity to the ditches or habitats which may drain into them will be undertaken sensitively and with consideration to Pollution Prevention Guidance in order to prevent a pollution incident.

##### *Post-Construction / In-Operation*

7.5.55 Sustainable Drainage Systems (SuDS) will be utilised at the site, which will filter pollutants from surface water run-off prior to it flowing into the existing ditch network.

#### Significance of Residual Effects

7.5.56 Ditches will be retained and protected with the mitigation measures outlined, as such no significant residual effect is anticipated.

### **Hedgerows**

#### Potential Impacts

##### *Construction Phase*

7.5.57 Access tracks will primarily utilise existing hedgerow gaps, however, to facilitate vehicle and pedestrian access into and within the site, sections of hedgerow will be removed as follows:

- ~30m section of H1 to facilitate new spur off roundabout;
- ~6m section of H5 (an 'important' hedgerow) to facilitate an access track;
- ~4m section of H10 to facilitate a footpath.

7.5.58 The creation of footpaths/access tracks within root protection areas of hedgerows has the potential to damage this habitat.

7.5.59 Contractors have the potential to damage/destroy retained hedgerows through collisions and undertaking works within root protection areas (RPA).

##### *Post-Construction / In-Operation*

7.5.60 Poor management of hedgerows has the potential to permanently damage this habitat.

## Mitigation Measures

### *Construction Phase*

- 7.5.61 Prior to works within the site tree protection measures will be installed at all retained hedgerows in line with BS 5837:2012, along with appropriate briefing of contractors during site inductions. These measures will minimise the risk of damage during construction works.
- 7.5.62 The footpaths and access tracks will be installed using a no-dig method within hedgerow RPAs, in order to prevent damage to roots.

### *Post-Construction / In-Operation*

- 7.5.63 Hedgerow management will be undertaken annually to retain hedgerows as features for biodiversity, management will comprise the cutting of hedgerows in late winter and the replanting of failed sections with native species of local provenance.

### Significance of Residual Effects

- 7.5.64 The majority of hedgerows within the site will be retained and protected, however a total of ~40m of hedgerow habitat will be permanently lost including a ~6m section of 'important' hedgerow'. As this will comprise a permanent loss of ~1% of the total hedgerow habitat within the site a negative significant residual effect is anticipated.

## **Wetland Complex**

### Potential Impacts

#### *Construction Phase*

- 7.5.65 The creation of a boardwalk (~2,200m<sup>2</sup> area), will result in the permanent shading of habitat beneath it, resulting in a loss of vegetation cover. In addition, the creation of a footpath/footbridge in the south of this habitat will result in the permanent loss of an area of (~350m<sup>2</sup>) of habitat, and disturbance of adjacent habitat. In total ~9% of the wetland complex will be permanently impacted.
- 7.5.66 Construction activities have the potential to temporarily disturb habitat, within the works footprint and adjacent habitat through contractors accessing with machinery/vehicles and the risk of pollution incidents.

#### *Post-Construction / In-Operation*

- 7.5.67 As the proposed surface water drainage will utilise the existing drainage network it is anticipated that there will be no change in hydrology at this habitat.
- 7.5.68 Water quality is anticipated to improve due to a change in adjacent land use from improved agricultural pasture, however the new land use may result in pollution incidents which may temporarily or permanently disturb this habitat.
- 7.5.69 Materials used in the construction and maintenance of the boardwalk may release pollutants into the wetland complex, temporarily/permanently damaging this habitat.
- 7.5.70 During operation access by the general public, has the potential to damage this habitat through littering, trampling, introducing undesirable species and the creation of informal footpaths.

## Mitigation Measures

### *Construction Phase*

- 7.5.71 Construction of the boardwalk and footpath will be undertaken without vehicles accessing the habitat, and accessing along the boardwalk route in order to minimise the disturbance to adjacent habitats. The boardwalk will be constructed using long-lasting biologically inert materials (i.e. avoiding treated timbers etc.) and maintenance will be designed to be sensitive to the habitat.

### *Post-Construction / In-Operation*

- 7.5.72 The development will utilise SuDs to manage surface water, which will minimise the risk of pollution into the wetland complex.
- 7.5.73 With the exception of the boardwalk and footpaths visitors will be discouraged from accessing wetland habitat through the use of fencing (e.g. post and wire) and communication using interpretation boards.

### Significance of Residual Effects

- 7.5.74 The mitigation measures will minimise the risk of disturbance of habitats beyond the footprint of the boardwalk and footpath, however there will still be a permanent loss of ~2,550m<sup>2</sup> (~9% of total habitat) of priority habitat, which will result in a negative significant residual effect.

## **Semi-improved Neutral Grassland**

### Potential Impacts

#### *Construction Phase*

- 7.5.75 The development will result in the permanent loss of 16.33ha of semi-improved neutral grassland out of a total resource of 21.93 ha (~75%).
- 7.5.76 Access by contractors and machinery has the potential to impact on the ~5.6ha of retained semi-improved neutral grassland.

#### *Post-Construction / In-Operation*

- 7.5.77 Site management has the potential to degrade grassland habitat through intensive management to promote an amenity function, whilst an increase in visitor numbers will increase soil compaction and the risk of spreading undesirable species. Lack of management of grassland has the potential to allow coarse species and scrub to establish.
- 7.5.78 The historic improvement of habitats within the site is likely to have resulted in a high nutrient content of soils, which will promote more competitive species and limit the diversity of grassland habitat.

## Mitigation Measures

### *Construction Phase*

- 7.5.79 Areas of retained habitat will be fenced and contractor access will be prevented to minimise the risk of disturbance of this habitat.

*Post-Construction / In-Operation*

- 7.5.80 Visitor access into retained grassland will be managed by mowing informal paths through the grassland and retaining other areas with a long sward encouraging visitors to use the paths. The location of paths will be altered annually to allow informal paths to recover.
- 7.5.81 Retained grassland will be managed to promote diversity through twice a year hay cut with arisings removed in mid-July and late September.

Significance of Residual Effects

- 7.5.82 Mitigation measures will ensure the protection of the retained 5.6ha of habitat.
- 7.5.83** The permanent loss of ~75% of this habitat will result in a negative significant residual effect.

**Improved Grassland**

Potential Impacts

*Construction Phase*

- 7.5.84 The development will result in the permanent loss of 27.06ha of improved grassland, all of this habitat, within the site.

Significance of Residual Effects

- 7.5.85 The permanent loss of this habitat will result in a negative significant residual effect.

**Unimproved Acid Grassland**

Potential Impacts

*Construction Phase*

- 7.5.86 Access by vehicles/machinery, storage of materials and contractor access in retained habitat has the potential to temporarily disturb this habitat.

*Post-Construction / In-Operation*

- 7.5.87 Two footpaths are proposed through this habitat which has the potential to permanently degrade this habitat through soil compaction.
- 7.5.88 Site management has the potential to degrade grassland habitat through intensive management to promote an amenity function, whilst an increase in visitor numbers will increase soil compaction and the risk of spreading undesirable species. Lack of management of grassland has the potential to allow scrub habitat to form, in a natural succession.

Mitigation Measures

*Construction Phase*

- 7.5.89 Areas of retained habitat will be fenced and contractor access will be prevented to minimise the risk of disturbance of this habitat.

*Post-Construction / In-Operation*

- 7.5.90 Visitor access into retained grassland will be managed during the growing season by mowing informal paths through the grassland and retaining other areas with a long sward encouraging visitors to use the paths. The location of paths will be altered annually to allow habitat to recover.
- 7.5.91 Retained grassland will be managed to promote diversity through twice a year hay cut with arisings removed in mid-July and late September.

Significance of Residual Effects

- 7.5.92 Mitigation measures will ensure protection of acid grassland within the site as such no significant residual effect is anticipated.

**Inland Rock Outcrop**

Potential Impacts

*Construction Phase*

- 7.5.93 Erection of the immersive wildlife experience within Quarry Wood, which is designed to cantilever and overhang the rock face, has the potential to damage/disturb this section of cliff.
- 7.5.94 Works to 'clean' cliffs where unsafe or unstable sections are present in publicly accessible areas, has the potential to damage this habitat, where significant sections require removal or reinforcement.

*Post-Construction / In-Operation*

- 7.5.95 Public access at cliff tops and cliff faces has the potential to damage/disturb habitats, where individuals trigger rock fall and/or throw rocks at/off cliff.

Mitigation Measures

*Construction Phase*

- 7.5.96 Prior to the installation of the immersive wildlife experience building a structural assessment of the cliff will be undertaken and the building will be designed and erected in such a way as to prevent any impact to the structural integrity of the cliff.

*Post-Construction / In-Operation*

- 7.5.97 Public access to the base and edge of cliffs will be prevented using fencing and to avoid the requirement for managing unstable/unsafe sections of the cliff.

Significance of Residual Impacts

- 7.5.98 In line with the mitigation measures outlined above no significant residual effect is anticipated on this ecological feature.

## **Ponds**

### Potential Impacts

#### *Construction Phase*

- 7.5.99 All ponds will be retained with the exception of Pond 8, which will be expanded as part of the scheme. The expansion of Pond 8 will result in the temporary disturbance of this habitat (~775m<sup>2</sup>, ~27% of the total area of this habitat within the site).
- 7.5.100 Access by vehicles/machinery, storage of materials and contractor access in proximity to ponds has the potential to disturb this habitat.

#### *Post-Construction / In-Operation*

- 7.5.101 A reduction in poaching by livestock will improve the marginal vegetation within ponds and reduce the siltation levels, which will improve the water quality. Eventually, a lack of livestock browsing and poaching will result in ponds becoming more shaded by scrub habitat and drying out.
- 7.5.102 A change in management of adjacent habitat, notably a reduction in agricultural improvement, will reduce the nutrient enrichment of ponds which should improve water quality. Where surface drains feed in to existing ponds it will result in an increased risk of pollution during operation of the site.

### Mitigation Measures

#### *Construction Phase*

- 7.5.103 Ponds will be fenced and contractor access will be prevented to minimise the risk of disturbance of this habitat.
- 7.5.104 Works at Pond 8 will be designed to minimise the impact of works on the retained areas of pond, through appropriate timing and sensitive work methodology.

#### *Post-Construction / In-Operation*

- 7.5.105 The use of SuDs will limit the risk of pollution entering watercourses.

### Significance of Residual Effects

- 7.5.106 The mitigation measures outlined will ensure there is no significant residual effect.

## **Invertebrates**

### Potential Impacts

#### *Construction Phase*

- 7.5.107 Disturbance of the wetland complex to create a boardwalk and footpath will reduce the opportunities for priority invertebrate species which rely on this habitat.
- 7.5.108 The net loss of grassland, notably semi-improved neutral grassland, will reduce the opportunities for common and widespread invertebrates.

*Post-Construction / In-Operation*

- 7.5.109 Felling and management of trees to reduce deadwood will reduce the opportunities available for priority invertebrate species which rely on this habitat.
- 7.5.110 The installation of artificial lighting at a currently predominantly unlit site, will impact on nocturnal invertebrates, by increasing predation and/or discouraging them from normal life cycles.

Mitigation Measures

*Construction Phase*

- 7.5.111 Habitats to be retained, notably grassland, wetland, ponds and mature/veteran trees, will be fenced and contractor access will be prevented to minimise the risk of disturbance of invertebrates using these habitats.
- 7.5.112 Construction of the boardwalk and footpath will be undertaken without vehicles accessing the habitat, and accessing along the boardwalk route in order to minimise the disturbance to adjacent habitats. The boardwalk will be constructed using long-lasting biologically inert materials (i.e. avoiding treated timbers etc.) and cleaning will not use chemicals.

*Post-Construction / In-Operation*

- 7.5.113 Management of trees and woodland will seek to retain deadwood features, restricting public access at unsafe trees instead of managing them.
- 7.5.114 The lighting scheme for the site has been designed with consideration to nocturnal wildlife, the following measures (Ellel External Lighting Concept R1) have been incorporated to mitigate the impact of artificial lighting;
- Sensor operated controls – so lighting is only switched on when required;
  - Downlight only – lighting will be pointed down to reduce light spill;
  - Dark zones – lighting areas are located adjacent to linear vegetation, which will screen lighting to create a 'dark zone' on the opposite side; and,
  - Sensitive Zones – lighting has been designed to minimize and avoid lighting at sensitive zones, including woodland edge, Lancaster canal and hedgerows.

Significance of Residual Effects

- 7.5.115 The mitigation measures will minimise the risk of impact on invertebrates in retained habitats, however there will still be a loss of habitat during construction and whilst new habitats establish. This is considered to result in a negative significant residual effect.

**Nesting Birds**

Potential Impacts

*Construction Phase*

- 7.5.116 Site clearance and construction activities will result in the loss of suitable nesting habitat and destruction of nests.

- 7.5.117 Construction activities have the potential to disturb/deter nesting birds in habitats adjacent the working areas.

*Post-Construction / In-Operation*

- 7.5.118 Increased visitor access to the site has the potential to disturb/deter nesting birds in retained habitats and habitats beyond the site.
- 7.5.119 The loss/reduction of breeding bird territories within the site will put pressure on territories adjacent to the site.
- 7.5.120 New habitat creation will take time to establish in order for it to provide suitability for nesting birds.

Mitigation Measures

*Construction Phase*

- 7.5.121 To minimise the risk of destroying active nests, site preparation works, including vegetation clearance, tree management and site clearance, will be undertaken outside the nesting bird period (March to August inclusive). Where this timing is not possible, then a pre-works inspection of the site will be carried out by a suitably qualified Ecologist. If active nests are found, then work to those areas will be delayed until after dependent young have fledged.
- 7.5.122 Habitats to be retained, notably trees, hedgerows, woodland, wetland and waterbodies, will be fenced during construction to minimise disturbance of nesting birds within these habitats during construction activities, by preventing access.

*Post-Construction / In-Operation*

- 7.5.123 Visitor access into dense vegetation notably scrub, hedgerows, wetland and waterbodies will be discouraged through the use of fencing (e.g. wooden post and rope).

Significance of Residual Effects

- 7.5.124 Although the mitigation measures outlined will minimise the risk of destroying nests and disturbance of nesting birds in retained/adjacent habitats, there will still be a temporary loss of habitat whilst new habitat creation establishes. This will result in a negative significant residual effect.

**Foraging Birds**

Potential Impacts

*Construction Phase*

- 7.5.125 Construction activities will result in the loss of foraging habitat, notably open grassland, which will reduce the foraging resource available for birds.

*Post-Construction / In-Operation*

- 7.5.126 Increased visitor access to the site has the potential to disturb/deter foraging birds in retained habitats and habitats beyond the site.
- 7.5.127 The reduction in foraging resource within the site will result in increased pressure on the foraging resource in the local area.

7.5.128 New habitat creation will take time to establish in order for it to provide suitability for foraging birds.

#### Mitigation Measures

##### *Construction Phase*

7.5.129 Habitats to be retained, notably trees, hedgerows, woodland, wetland and waterbodies, will be fenced during construction to minimise disturbance of foraging birds within these habitats during construction activities, by preventing access.

##### *Post-Construction / In-Operation*

7.5.130 Visitor access into scrub, hedgerows, wetland and waterbodies will be discouraged through the use of fencing (e.g. wooden post and rope).

#### Significance of Residual Effects

7.5.131 Although mitigation measures will reduce the disturbance of birds foraging in retained and adjacent habitats, there will still be disturbance. A temporary loss of habitat, whilst new habitat creation establishes, and a permanent loss of open grassland habitat will also occur. The disturbance and loss of habitat will result in a negative significant residual effect.

### **Badgers**

#### Potential Impacts

##### *Construction Phase*

7.5.132 Construction within 30m of badger setts has the potential to damage setts and/or disturb badgers within setts.

7.5.133 Open excavations have the potential to trap badgers which may be moving through the site during construction.

7.5.134 Disturbance during construction within the site may result in an increase in badger deaths from road collisions due to a restriction on their territory and pressure to forage in areas beyond the site.

7.5.135 Loss of foraging habitat will restrict the foraging resource available in this territory and will have a knock-on effect on this clan and adjacent clans, through a squeezing on foraging resource. This may result in an increase in deaths from road collisions, as badgers further disperse to forage.

##### *Post-Construction / In-Operation*

7.5.136 Operation of the site will result in an increase of traffic from vehicles, which will result in an increased likelihood of deaths from road collisions.

7.5.137 Increased visitor numbers at the site will result in an increased likelihood of disturbance/damage of setts, due to people accessing areas close to sett entrances.

7.5.138 Increased human presence, and the likely increase in dogs accessing the site, may discourage badgers from foraging within the site.

## Mitigation Measures

### *Construction Phase*

- 7.5.139 Prior to the start of works the current location of all badger sett entrances will be confirmed by a suitably qualified Ecologist, a 30m buffer will be established around all sett entrances and no construction activities will be undertaken within these areas. The monitoring of badgers at the site will be undertaken every 3 months during the construction period and 30m exclusion zones established where new sett entrances are identified. Exclusion zones will be fenced (e.g. Heras) to discourage contractors from accessing these areas.
- 7.5.140 Where any excavations are to be left open overnight then a ramp will be created to allow badgers which fall into excavations to escape from them, in addition contractors will visually check open excavations prior to commencing works at them.

### Significance of Residual Effects

- 7.5.141 Although mitigation measures will minimise the risk of destruction of setts or disturbance of badgers using the site, the temporary loss of habitat during construction may encourage an increase in badger dispersal resulting in deaths from road collisions, this has the potential to result in a negative significant residual effect.

### **Foraging and Commuting bats**

#### Potential Impacts

### *Construction Phase*

- 7.5.142 Key habitats and habitat connectivity will be retained such as woodland edge, wetland and linear features. Although there will be a net loss in grassland habitat, which will reduce the resource for foraging and commuting bats.
- 7.5.143 Artificial lighting of key habitats during construction, (e.g. security and task lighting), will disturb bats from using key features and has the potential to sever foraging and commuting routes.

### *Post-Construction / In-Operation*

- 7.5.144 The introduction of artificial lighting at a currently unlit site to facilitate access and for security, will increase light spillage which will deter bats from foraging within habitats, reduce habitat connectivity across the site and reduce prey resource by encouraging nocturnal invertebrates into lit areas.
- 7.5.145 The increased human presence and vehicle movements may disturb foraging and commuting bats due to increases in noise and light levels in areas around lodges, footpaths and adjacent habitats.

## Mitigation Measures

### *Construction Phase*

- 7.5.146 Where artificial security lighting is required at the site during construction this will be sensor-operated, low-level and will not be directed towards vegetation.

### *Post-Construction / In-Operation*

- 7.5.147 The lighting scheme has been designed with consideration to nocturnal wildlife, the following measures (Ellel External Lighting Concept R1) have been incorporated to mitigate the impact of artificial lighting:

- Light specifications – The lighting design utilises low lux products, specifically in high traffic zones the use of Philips Clearfield which outputs in the red lighting spectrum;
- Sensor operated controls – so lighting is only switched on only when required;
- Downlight only – lighting will be pointed down to reduce light spill;
- Dark zones – lighting areas are located adjacent to linear vegetation, which will screen lighting to create a 'dark zone' on the opposite side; and,
- Sensitive Zones – lighting has been designed to minimize and avoid lighting at sensitive zones, including woodland edge, Lancaster canal and hedgerows.

#### Significance of Residual Effects

- 7.5.148 The temporary loss of grassland habitat, whilst new habitat creation establishes, is not anticipated to have a significant effect.
- 7.5.149 Although mitigation measures will minimise the extent, areas of key habitat will still be subject to light spillage and noise disturbance, which has the potential to discourage bats, resulting in a negative significant residual effect.

#### Roosting Bats – Trees

##### Potential Impacts

##### *Construction Phase*

- 7.5.150 Construction activities in close proximity to trees have the potential to damage or disturb roosting bats, where present.

##### *Post-construction / In-Operation*

- 7.5.151 Light spillage onto bat roost entrances or key flight lines, has the potential to disturb bats or deter bats from using tree roosts.
- 7.5.152 Due to an increased human presence within the site, management of trees, to remove deadwood and failing trees has the potential to impact upon the trees within the site.

##### Mitigation Measures

##### *Construction Phase*

- 7.5.153 All trees identified as having bat roost suitability will be retained and protected within the scheme design. Prior to works commencing tree protection measures will be installed at all retained trees in line with BS 5837:2012, along with appropriate briefing of contractors during site inductions. These measures will minimise the risk of damage during construction works.

##### *Post-Construction / In-Operation*

- 7.5.154 The lighting scheme has been designed with consideration to nocturnal wildlife, the following measures (Ellel External Lighting Concept R1) have been incorporated to mitigate the impact of artificial lighting:
- Light specifications – The lighting design utilises low lux products, specifically in high traffic zones the use of Philips Clearfield which outputs in the red lighting spectrum;

- Sensor operated controls – so lighting is only switched on only when required;
- Downlight only – lighting will be pointed down to reduce light spill;
- Dark zones – lighting areas are located adjacent to linear vegetation, which will screen lighting to create a 'dark zone' on the opposite side; and,
- Sensitive Zones – lighting has been designed to minimize and avoid lighting at sensitive zones, including trees with bat roost suitability.

7.5.155 An arboricultural survey will be undertaken to inform a management plan for trees within site, the objectives of management should be to ensure the retention and longevity of trees whilst retaining deadwood features. Priority should be given to discouraging access by people over the removal of deadwood on grounds of safety. Where trees are identified as unsafe and/or sensitive, surveys will be undertaken to determine the presence/absence of roosting bats prior to the works being undertaken.

#### Significance of Residual Effects

7.5.156 With adherence to the above mitigation measures the risk of impact on bats roosting within trees at the site will be minimised as such no significant residual effect is anticipated.

#### Roosting Bats – Home Farm Buildings

##### Potential Impacts

##### *Construction Phase*

7.5.157 No works are proposed at the Home Farm Buildings, however construction activities, including disturbance from noise, vibrations and/or artificial lighting, in close proximity to roosts has the potential to disturb roosting bats.

##### *Post-Construction / In-Operation*

7.5.158 An increased human presence in close proximity to roosts will disturb/deter roosting bats, through noise and vibrations.

7.5.159 Installation of artificial lighting near roost entrances and key flight lines will disturb/deter roosting bats.

##### Mitigation Measures

##### *Construction Phase*

7.5.160 Bat emergence/re-entry surveys will be repeated at the Home Farm Buildings to characterise the roosts and determine the current roosting locations and important flight lines prior to the commencement of and during works.

##### *Post-Construction / In-Operation*

7.5.161 The lighting scheme has been designed with consideration to nocturnal wildlife, the following measures (Ellel External Lighting Concept R1) have been incorporated to mitigate the impact of artificial lighting:

- Light specifications – The lighting design utilises low lux products, specifically in high traffic zones the use of Philips Clearfield which outputs in the red lighting spectrum;
- Sensor operated controls – so lighting is only switched on only when required;

- Downlight only – lighting will be pointed down to reduce light spill;
- Dark zones – lighting areas are located adjacent to linear vegetation, which will screen lighting to create a 'dark zone' on the opposite side; and,
- Sensitive Zones – lighting has been designed to minimize and avoid lighting at sensitive zones.

7.5.162 Visitor access into and around Home Farm buildings will be prevented through the use of fencing (e.g. post and wire).

#### Significance of Residual Effects

7.5.163 The mitigation measures outlined above will minimise the risk of disturbance on bat roosts and important flight lines, which will ensure the favourable conservation status of bats is maintained at the Home Farm Buildings, as such no significant residual effects are anticipated.

### Otter

#### Potential Impacts

##### Construction Phase

7.5.164 No works are proposed at habitat which was identified as being suitable for use as otter resting sites.

7.5.165 Construction activities will result in the disturbance of otter moving through the site away from waterbodies.

7.5.166 Otter may become trapped in open excavations during construction.

##### Pst-Construction / In-Operation

7.5.167 An increased human and dog presence and the use of artificial lighting within the site has potential to deter otter from resting in features/habitat adjacent the Lancaster Canal and disturb/deter otter moving through the site.

7.5.168 Increased vehicle movements through the site have the potential to kill/injure otter moving through the site through collisions.

#### Mitigation Measures

##### Construction Phase

7.5.169 Habitats to be retained, notably woodland, wetland and waterbodies, will be fenced during construction to minimise disturbance of otter resting within these habitats during construction activities.

7.5.170 Where any excavations are to be left open overnight then a ramp will be created to allow otter which fall into excavations to escape from them, in addition contractors will visually check open excavations prior to commencing works at them.

##### Post-Construction / In-Operation

7.5.171 Vehicle movements within the site will be restricted with visitors encouraged to utilise bicycles/buggies and access on foot. Vehicle speed will be managed through the pedestrian-focused site, through speed limits and speed control features, which will minimise the risk of road collisions with otter.

- 7.5.172 The south bank of the canal along the north boundary of site will be managed as a sensitive/wild area for biodiversity, which will be communicated to visitors through interpretation boards. Access by people and pets will be discouraged in this area through fencing (e.g. post and wire) along the south side of woodland adjacent the canal.

Significance of Residual Effects

- 7.5.173 Adherence to the mitigation measures will ensure that the risk of disturbance to otter is minimised during construction and in operation, as such no significant residual effect is anticipated.

**Hedgehog**

Potential Impacts

*Construction Phase*

- 7.5.174 Vegetation clearance has the potential to kill/injure hedgehog.
- 7.5.175 The loss of grassland habitat will reduce the foraging resource available to local hedgehogs.

*Post-Construction / In-Operation*

- 7.5.176 An increased human and dog presence within the site will disturb hedgehog foraging and refuging within the site.
- 7.5.177 Increased vehicle movements through the site have the potential to kill/injure hedgehog moving through the site through collisions.

Mitigation Measures

- 7.5.178 Vegetation clearance at stands of dense vegetation e.g. scrub/tall grass, will be undertaken outside of the hibernation period (November to March) and will be preceded by a search for the presence of hedgehog.
- 7.5.179 Vehicle movements within the site will be restricted with visitors encouraged to utilise bicycles/buggies and access on foot. Vehicle speed will be managed through the pedestrian-focused site, through speed limits and speed control features, which will minimise the risk of road collisions with hedgehog.

Significance of Residual Effects

- 7.5.180 Mitigation measures will minimise the risk of disturbance to hedgehog and the local conservation status will be maintained, as such no significant residual effect is anticipated.

**Brown Hare**

Potential Impacts

*Construction Phase*

- 7.5.181 Construction activities have the potential to kill/injure brown hare and their leverets, where present within the working area.
- 7.5.182 The loss of grassland habitat and disturbance during construction will deter brown hare from foraging and breeding within the site and adjacent habitats.

*Post-Construction / In-Operation*

- 7.5.183 An increased human and dog presence within the site will disturb brown hare foraging and breeding within the site and adjacent habitats.
- 7.5.184 Increased vehicle movements through the site have the potential to kill/injure brown hare moving through the site through collisions.

Mitigation Measures

- 7.5.185 Site clearance will be timed to avoid the brown hare breeding season (March to July inclusive), where this is not possible then a search of habitat for the presence of leverets will be undertaken. Where leverets are identified works will not be undertaken until leverets are independent.
- 7.5.186 Vehicle movements within the site will be restricted with visitors encouraged to utilise bicycles/buggies and access on foot. Vehicle speed will be managed through the pedestrian-focused site, through speed limits and speed control features, which will minimise the risk of road collisions with hedgehog.

Significance of Residual Impacts

- 7.5.187 Although the mitigation measures will minimise the risk of killing/injuring brown hare the loss of open grassland habitat within the site will result in the loss of this species at the site, which will result in a negative significant residual effect.

Summary Table

**Table7-14: Summary of Impacts, Mitigation and Residual Effects**

Ecological Feature	Construction Impacts	In Operation Impacts	Mitigation	Residual Effects
Morecambe Bay Ramsar site	None	A Habitat Regulations Assessment (HRA) concluded that there would be no likely significant effects on Internationally designated sites, as such this feature has been scoped out of further assessment.	n/a	<b>None</b>
Morecambe Bay and Duddon Estuary SPA	None	An HRA concluded that there would be no likely significant effects on Internationally designated sites, as such this feature has been scoped out of further assessment.	n/a	<b>None</b>

Ecological Feature	Construction Impacts	In Operation Impacts	Mitigation	Residual Effects
Morecambe Bay SAC	None	An HRA concluded that there would be no likely significant effects on Internationally designated sites, as such this feature has been scoped out of further assessment.	n/a	<b>None</b>
Bowland Fells SPA	None	An HRA concluded that there would be no likely significant effects on Internationally designated sites, as such this feature has been scoped out of further assessment.	n/a	<b>None</b>
Calf Hill and Cragg Woods SAC	None	An HRA concluded that there would be no likely significant effects on Internationally designated sites, as such this feature has been scoped out of further assessment.	n/a	<b>None</b>
Lune Estuary SSSI	None	An increase in recreational pressure is not anticipated to result in a significant residual effect.	n/a	<b>None</b>
Ellel Grange Woods, BHS (Biological Heritage Site)	<p>Permanent loss of habitat (~2,620m<sup>2</sup>) to create footpath/bridge.</p> <p>Temporary damage of habitats beyond the works footprint during construction.</p>	Disturbance of habitats from an increase in visitor access.	<p>Tree protection measures to be installed, including no-dig working methodology in Root Protection Areas (RPA).</p> <p>Discouraging visitor access to sensitive areas through the use of interpretation boards and fencing.</p>	<b>Permanent loss of ~3.75% of habitat within the BHS will result in a permanent negative significant residual effect.</b>

Ecological Feature	Construction Impacts	In Operation Impacts	Mitigation	Residual Effects
Lancaster Canal BHS	<p>Potential for pollution and accidental disturbance during construction.</p> <p>Temporary disturbance of fauna during footbridge creation.</p>	<p>Loss of marginal habitat through planting screening along canal edge.</p> <p>Increased levels of disturbance from visitor access along towpaths and surface water run off pollution.</p>	<p>Works at or near the canal will be undertaken sensitively and in line with pollution prevention guidance.</p> <p>SuDS will filter surface water before it reaches the canal.</p> <p>A 5m margin will be maintained between screening and the canal edge.</p> <p>Visitor access to the canal banks away from existing tow-paths will be discouraged.</p>	<b>No significant residual effect anticipated.</b>
Woodland	<p>Permanent loss of 0.03ha of Flat Wood and Quarry Wood and a permanent loss of 0.04ha of Plantation 1.</p> <p>Risk of temporary disturbance/permanent damage of retained habitats/trees during construction.</p>	<p>Increased visitor access and site management will result in permanent disturbance of habitats.</p> <p>Reduction in grazing pressure will allow more diverse ground flora to establish in Flat Wood and Plantation 3.</p>	<p>Tree protection measures to be installed, including no-dig working methodology in RPAs.</p> <p>The erection of buildings within woodland will be designed to minimise impact to adjacent trees.</p> <p>Visitor management will discourage access to sensitive areas through the use of interpretation boards and fencing.</p>	<b>There will be a permanent loss of national priority woodland (0.03ha) and local priority plantation woodland (0.04ha), which will result in a negative significant residual effect.</b>
Trees	<p>Potential damage of retained trees through collisions and works within root protection areas.</p>	<p>Increased visitor access and poor site management will result in the damage/loss of trees.</p>	<p>Tree protection measures to be installed, including no-dig working methodology in RPAs.</p> <p>A management plan for trees within the site will be produced. Priority should be given to discouraging access by people over the removal of deadwood on grounds of safety.</p>	<b>No significant residual effect anticipated.</b>

Ecological Feature	Construction Impacts	In Operation Impacts	Mitigation	Residual Effects
Ditches	<p>Temporary disturbance of D2 &amp; D3 during construction of boardwalk.</p> <p>Temporary pollution/disturbance of ditches during construction and in operation.</p>	<p>Increased risk of pollution during operation of the site.</p> <p>A change in management will decrease the amount of nutrients entering watercourses.</p>	<p>Sensitive working methodology during construction of boardwalk and in close proximity to ditches.</p> <p>Working methodology in line with pollution prevention guidance.</p> <p>SuDS to be used which will filter surface water pollutants.</p>	<p><b>No significant residual effect anticipated.</b></p>
Hedgerows	<p>Three sections of hedgerow (totalling ~40m) will be permanently lost to facilitate access into and within the site.</p> <p>Construction activities have the potential to temporarily disturb/permanently damage this habitat.</p>	<p>Poor management of hedgerows has the potential to permanently damage this habitat.</p>	<p>Tree protection measures to be installed at retained hedgerows, including no-dig working methodology in RPAs.</p> <p>Hedgerow management will be undertaken annually to retain hedgerows as features for biodiversity.</p>	<p><b>The majority of hedgerows within the site will be retained and protected, however a permanent loss of ~1% of the total hedgerow habitat within the site will result in a negative significant residual effect.</b></p>
Wetland Complex	<p>The creation of a boardwalk and footpath will result in the permanent loss of an area of ~2,550m<sup>2</sup> of habitat.</p> <p>Construction activities have the potential to temporarily disturb habitat, within the works footprint and adjacent habitat.</p>	<p>Risk of pollution from building materials and surface water run-off.</p> <p>Visitor access has the potential to disturb this habitat.</p>	<p>Boardwalk and footpath construction will be undertaken without vehicles accessing wetland complex.</p> <p>Construction materials used will be long lasting and biologically inert.</p> <p>The drainage strategy will utilise SuDs which will minimise the risk of pollution.</p> <p>Visitor management will discourage access away from designated boardwalk/footpaths through this habitat.</p>	<p><b>There will be a permanent loss of ~2,550m<sup>2</sup> (~9% of total habitat) of priority habitat, which will result in a negative significant residual effect.</b></p>

Ecological Feature	Construction Impacts	In Operation Impacts	Mitigation	Residual Effects
Semi-improved neutral grassland	The development will result in the permanent loss of ~75% of this habitat. Construction activities have the potential to impact on the 5.6ha of retained habitat.	Poor management and increased visitor access will result in the permanent loss of the 5.6ha of retained habitat.	Contractor access into retained grassland will be prevented, with fencing. Visitor access into retained grassland will be managed during the growing season by rotational mowing of informal paths through the grassland to allow high traffic areas to recover. Retained grassland will be managed to promote diversity.	<b>The permanent loss of ~75% of this habitat will result in a negative significant residual effect.</b>
Improved grassland	The development will result in the permanent loss of 27.06ha (all of this habitat type) within the site.	n/a	n/a	<b>The permanent loss of this habitat will result in a negative significant residual effect.</b>
Unimproved acid grassland	Construction activities have the potential to temporarily disturb retained habitat.	Two footpaths are proposed though this habitat which has the potential to permanently degrade this habitat through soil compaction. Poor management and increased visitor access will result in the permanent loss of this habitat.	Access during construction to be prevented using fencing. Visitor access into retained grassland will be managed during the growing season by rotational mowing of informal paths through the grassland the location of paths will be altered annually to allow high traffic areas to recover. Retained grassland will be managed to promote diversity	<b>No significant residual effect is anticipated.</b>
Inland Rock Outcrop	Erection of the immersive wildlife experience within Quarry Wood has the potential to damage/disturb this section of cliff. Works to 'clean' cliffs where unsafe or unstable sections are present in publicly accessible areas, has the potential to damage this habitat.	Public access at cliff tops and cliff faces has the potential to damage/disturb habitats.	Structural assessment of cliff to inform building design which will not compromise structural integrity. Public access to the cliff will be prevented through fencing.	<b>No significant residual effect anticipated.</b>

Ecological Feature	Construction Impacts	In Operation Impacts	Mitigation	Residual Effects
Ponds	<p>The expansion of Pond 8 will result in the temporary disturbance of this habitat.</p> <p>Access by vehicles/machinery, storage of materials and contractor access has the potential to disturb this habitat.</p>	<p>Site drainage may impact on ponds through pollution.</p> <p>Poor management has the potential to permanently degrade this habitat.</p>	<p>Ponds will be fenced and contractor access will be prevented to minimise the risk of disturbance of this habitat.</p> <p>Works at Pond 8 will be designed to minimise the impact of works on the retained areas of pond.</p> <p>The use of SuDs will limit the risk of pollution entering watercourses.</p>	<p><b>No significant residual effect is anticipated.</b></p>
Invertebrates	<p>Disturbance of the wetland complex will reduce the opportunities for priority invertebrate species which rely on this habitat.</p> <p>The net loss of grassland, notably semi-improved neutral grassland, will reduce the opportunities for invertebrates.</p>	<p>Felling and management of trees to reduce deadwood will reduce the opportunities available for priority invertebrate species.</p> <p>The installation of artificial lighting will impact on nocturnal invertebrates.</p>	<p>Construction activities and visitor access to sensitive habitats will be managed to minimise impact beyond the works footprint.</p> <p>Management of trees and woodland will retain deadwood features.</p> <p>The lighting scheme has been designed to be sensitive to nocturnal wildlife.</p>	<p><b>There will still be a loss of habitat during construction and whilst new habitats establish. This is considered to result in a negative significant residual effect.</b></p>
Nesting birds	<p>Site clearance and construction activities will result in the loss of suitable nesting habitat and destruction of nests.</p> <p>Construction activities have the potential to disturb/deter nesting birds in habitats adjacent the working areas.</p>	<p>Increased visitor presence at the site will disturb/deter nesting birds.</p> <p>The loss of breeding territories within the site will put further pressure on territories beyond the site.</p> <p>New habitat creation will take time to establish in order for it to provide suitability for nesting birds.</p>	<p>Timing of site preparation to avoid nesting bird period, or inspection of habitats to confirm the absence of nesting birds.</p> <p>Protection of habitats to be retained during construction through appropriate fencing.</p> <p>Appropriate visitor communication and management to minimise impact in sensitive areas.</p>	<p><b>There will still be a temporary loss of habitat whilst new habitat creation establishes. This will result in a negative significant residual effect.</b></p>

Ecological Feature	Construction Impacts	In Operation Impacts	Mitigation	Residual Effects
Foraging birds	Construction activities will result in the loss of foraging habitat, which will reduce the foraging resource available for local birds.	Increased visitor presence at the site will disturb/deter foraging birds. The reduction in foraging resource within the site will result in increased pressure on the foraging resource in the local area. New habitat creation will take time to establish in order for it to provide suitability for foraging birds.	Protection of habitats to be retained during construction and in operation through appropriate fencing and signage. Appropriate visitor communication and management to minimise impact in sensitive areas.	<b>A temporary loss of habitat, whilst new habitat creation establishes, and a permanent loss of open grassland habitat will occur, which will result in a negative significant residual effect.</b>
Badgers	Damage/destruction of setts where construction activities will be located within 30m of sett entrances. Increased badger deaths from road collisions due to loss of habitat and disturbance during construction. Trapping of badgers in open excavations.	Increased badger deaths from road collisions due to disturbance during operation.	30m exclusion zones to be established around all sett entrances, frequent monitoring to identify new sett entrances. Contractors will ensure that excavations are covered overnight or a suitable ramp created to allow badgers to escape. Vehicle movements through the site are to be restricted and traffic calming measures will be utilised to reduce the speed of vehicles. Visitor management to discourage accessing badger sett areas.	<b>The temporary loss of habitat during construction has the potential to increase deaths from road collisions, which will result in a negative significant residual effect.</b>

Ecological Feature	Construction Impacts	In Operation Impacts	Mitigation	Residual Effects
Foraging and commuting bats	<p>Loss of foraging habitat.</p> <p>Artificial lighting during construction will disturb/deter bats within the site and reduce the foraging resource.</p>	<p>Artificial lighting in operation will disturb/deter bats within the site and reduce the foraging resource.</p> <p>Increased human presence at the site will disturb/deter foraging and commuting bats.</p>	<p>Where artificial security lighting is required at the site during construction this will be sensor-operated, low-level and will not be directed towards vegetation.</p> <p>The lighting scheme has been designed to be sensitive to nocturnal wildlife.</p>	<p><b>Areas of key habitat will still be subject to light spillage and noise disturbance, which has the potential to discourage bats, resulting in a negative significant residual effect.</b></p>
Roosting bats - trees	<p>Construction activities in close proximity to trees have the potential to damage or disturb roosting bats, where present</p>	<p>Light spillage onto bat roost entrances or key commuting routes, has the potential to disturb bats or deter bats from using tree roosts.</p> <p>Increased disturbance from human activity has the potential to disturb bats or deter bats from using roosts.</p> <p>Site preparation which involves the felling/pruning of trees has the potential to destroy bat roosts and kill/injure bats roosting within them.</p>	<p>All trees with bat roost suitability are to be retained and protected. Tree management will aim to retain suitable roosting features.</p> <p>The lighting scheme has been designed to be sensitive to nocturnal wildlife.</p> <p>Appropriate visitor communication and management to minimise impact in sensitive areas</p>	<p><b>No significant residual effect anticipated.</b></p>

Ecological Feature	Construction Impacts	In Operation Impacts	Mitigation	Residual Effects
Roosting bats – Home Farm buildings	Construction activities, including disturbance from noise, vibrations and/or artificial lighting, in close proximity to roosts has the potential to disturb roosting bats.	An increased human presence in close proximity to roosts will disturb/deter roosting bats, through noise and vibrations. Installation of artificial lighting near roost entrances and key flight lines will disturb/deter roosting bats.	Surveys will be repeated prior to and during construction to identify current roost locations and flight lines. The lighting scheme has been designed to be sensitive to nocturnal wildlife. Visitor access into and around Home Farm buildings will be prevented through the use of fencing (e.g. post and wire).	<b>No significant residual effects are anticipated.</b>
Otter	Construction activities will result in the disturbance of otter moving through the site away from waterbodies. Otter may become trapped in open excavations during construction.	An increased human and dog presence and the use of artificial lighting within the site will disturb otter. Increased vehicle movements through the site have the potential to kill/injure otter moving through the site through collisions.	Habitats to be retained will be fenced during construction to prevent access by contractors. Excavations will be covered or a ramp created to allow otter to escape. Visitor access will be managed to discourage access to sensitive habitats for otter. Vehicles movements will be managed to reduce speed and limit access.	<b>No significant residual effect anticipated.</b>
Hedgehog	Vegetation clearance has the potential to kill/injure hedgehog. The loss of grassland habitat will reduce the foraging resource available to local hedgehogs.	An increased human and dog presence within the site will disturb hedgehog foraging and refuging within the site. Increased vehicle movements through the site have the potential to kill/injure hedgehog moving through the site through collisions.	Vegetation clearance at dense stands to be undertaken outside of hibernation period and preceded by a check for hedgehog. Visitor access will be managed to discourage access to sensitive habitats for hedgehog. Vehicles movements will be managed to reduce speed and limit access.	<b>No significant residual effect anticipated.</b>

Ecological Feature	Construction Impacts	In Operation Impacts	Mitigation	Residual Effects
<b>Brown hare</b>	<p>Construction activities have the potential to kill/injure brown hare and their leverets, where present within the working area.</p> <p>The loss of grassland habitat and disturbance during construction will deter brown hare from foraging and breeding within the site and adjacent habitats.</p>	<p>An increased human and dog presence within the site will disturb brown hare foraging and breeding within the site and adjacent habitats.</p> <p>Increased vehicle movements through the site have the potential to kill/injure brown hare moving through the site through collisions.</p> <p>The loss of foraging and breeding habitat will increase the pressure on territories beyond the site.</p>	<p>Site clearance will be undertaken outside of the breeding period, or will be preceded by a check for dependent leverets will be undertaken.</p> <p>Visitor access will be managed to discourage access to sensitive habitats for brown hare.</p> <p>Vehicles movements will be managed to reduce speed and limit access.</p>	<p>The loss of open grassland habitat within the site will result in the loss of this species at the site, which will result in a negative significant residual effect.</p>

## 7.6. Compensation

### Ellel Grange Woods BHS

7.6.1 In order to compensate for the loss of ~0.2ha of Ellel Grange Woods BHS to create the footpath/footbridge, the area of Plantation 2 (currently part of the BHS) will be extended to the west by 0.15ha. This will improve the connectivity between the two parts of this BHS separated by the canal and will ensure a more continuous canopy. As there will be no actual loss of woodland within the BHS, this is considered to adequately compensate for the loss of natural habitat, as such no significant residual effect is anticipated on Ellel Grange Woods BHS.

### Woodland

7.6.2 In order to compensate for the loss of national (0.03ha) and local (0.04ha) priority woodland habitat 0.67ha of new woodland habitat (Lowland Mixed Deciduous Woodland) will be created within the site.

7.6.3 In order to compensate for the short-term loss of habitat, whilst newly created woodland establishes, woodland ground-flora will be encouraged in retained woodland. This will comprise:

- A reduction in grazing in Flat Wood (1.39ha) and Plantation 3 (0.85ha); and,
- The translocation of the 0.03ha of ground flora from within the footprint of woodland to be lost to be spread in Flat Wood and Plantation 3.

7.6.4 The new woodland creation and accelerated establishment of diverse woodland ground flora will compensate for the loss of woodland habitat, as such no significant residual effect is anticipated.

#### **Hedgerows**

7.6.5 In order to compensate for the loss of ~40m of hedgerow to facilitate access, 80m of new hedgerow will be provided within the new site design. This will comprise using native hedge species of local provenance. As a result, no significant residual effect is anticipated.

#### **Wetland Complex**

7.6.6 In order to compensate for the loss of ~0.25ha of Wetland Complex (Lowland Fen and Rush Pasture) 2.5ha of new wetland habitat will be created, this will comprise Floodplain Wetland Mosaic (Coastal Floodplain Grazing Marsh) in the west of site, which will be managed for biodiversity. This habitat creation will ensure there is no significant residual effect on this ecological feature.

#### **Semi-Improved Neutral Grassland**

7.6.7 In order to compensate for the loss of 16.33ha of grassland, 13.4ha of neutral grassland (other neutral grassland) will be created in the site. Although there will be a net loss in area of this habitat (2.93ha) the neutral grassland to be created within the site will be of higher floristic diversity and will be managed for biodiversity. New grassland will comprise a neutral meadow seed mix (Emorsgate EM3 or cut and collect from a suitable local donor site) on appropriately prepared topsoil. This habitat will be unmanaged with the exception of two cuts per year (mid-July and late September) with the arisings removed. As such it is considered that there will be no significant residual effect on this ecological feature.

#### **Improved Grassland**

7.6.8 The loss of 27ha of improved grassland, will not be compensated for within the site. As such there will be an enduring negative significant residual effect on this feature.

#### **Invertebrates**

7.6.9 New and retained grassland habitat will be of higher floristic diversity and managed more sensitively which will result in greater opportunities for invertebrates than previous management, despite the net loss of this habitat.

7.6.10 In addition, the completed site will incorporate the creation of areas of new habitat of higher value to invertebrates than the intensive pasture, notably new woodland, trees, wetland, hedgerows and SuDs.

7.6.11 The new habitat and more sensitive management of habitats within the site will compensate for the temporary effect on invertebrates within the site and will ensure there is no significant residual effect on this ecological feature.

#### **Nesting Birds**

7.6.12 In order to compensate for the temporary effect on nesting birds through disturbance to/loss of habitat during construction, new habitat will be created, notably woodland, trees, scrub, wetland, hedgerows, and ponds. Although the new habitat will not be established in the short-term.

7.6.13 To compensate for the short-term effect nest boxes will be erected at suitable trees and within woodland:

- 50 Schwegler 1b (or similar) boxes with 32mm and 26mm diameter holes – to provide nesting for small birds;

- 3 Eco Barn Owl Nest Boxes (or similar); and,
- 20 Schwegler Nesting Baskets for Large Birds (or similar) – to provide opportunities for owls, hobby and corvids.

7.6.14 This will offset the loss of opportunities for nesting birds at the site, as such there will be no significant residual effect on nesting birds.

#### Foraging Birds

7.6.15 In order to compensate for the temporary effect on foraging birds the development will incorporate areas of new habitat notably woodland, trees, scrub, hedgerow, SuDS and ponds. In time, this will result in a net increase in foraging opportunities for species which utilise these habitats, as such no significant residual effect is anticipated on these species.

7.6.16 5.6ha of retained grassland and 13.4ha of new grassland will be managed for biodiversity, maximising the foraging resource it provides. In addition, 4.9ha of Floodplain Wetland Mosaic will be created, which will largely incorporate grassland and will be managed as a sensitive/wild area for biodiversity. Although there will still be a net loss of open grassland habitat (25.09ha deficit), it is considered that the greater foraging resource provided by more sensitively managed grassland will compensate for the net loss in habitat. As such no significant residual effect is anticipated on these species.

#### Badgers

7.6.17 In order to compensate for the predicted temporary effect to badger during construction the development will incorporate areas of new habitat notably woodland, trees, scrub, hedgerow and grassland. This will ensure a long-term increase in foraging resource for the badger clan within the site and there will be no significant residual effect on badger.

#### Foraging and Commuting Birds

7.6.18 In order to compensate for the loss of foraging and commuting habitat due to increased light levels the development will incorporate areas of new habitat in dark areas, notably woodland, trees, hedgerows, wetland and ponds, which will increase the foraging and commuting resource for bats locally. As such a negative significant residual effect is not anticipated.

#### Brown Hare

7.6.19 The effect on brown hare due to the loss of relatively undisturbed open grassland habitat cannot be compensated for within the site, and there will be an enduring negative significant residual effect.

#### Summary Table

**Table 7-15: Summary of Compensation**

Ecological Feature	Geographical Importance	Compensation
Ellel Grange Woods, BHS (Biological Heritage Site)	County	Plantation 3 will be extended to the west by ~0.15ha. This will improve the connectivity between the two parts of this BHS and will ensure a more continuous canopy. As such no significant residual effect is anticipated.

Ecological Feature	Geographical Importance	Compensation
Woodland	National (Semi-natural) County (Plantation)	0.67ha of new woodland habitat will be created. Whilst woodland establishes woodland ground flora will be encouraged in existing woodland. As such no significant residual effect is anticipated.
Hedgerows	National	80m of new hedgerow will be provided within the new site design. As a result, no significant residual effect is anticipated.
Wetland Complex	County	2.5ha of new wetland habitat will be created, this will comprise a Floodplain Wetland Mosaic This new habitat creation will ensure that there is no significant residual effect.
Semi-improved neutral grassland	Site	13.4ha of neutral grassland (other neutral grassland) will be provided in the site and will be managed for diversity. As such no significant residual effect is anticipated.
Improved grassland	Site	There will still be a negative significant residual effect.
Invertebrates	National	The new habitat and more sensitive management of habitats within the site will compensate for the temporary impact on invertebrates within the site and will ensure there is no significant residual effect on this ecological feature
Nesting birds	Local	New habitat will be created which will increase nesting opportunities in the long-term. Whilst new habitat is established artificial nests and nest boxes will be erected in the site. This will increase the opportunities for nesting birds at the site, as such there will be no significant residual effect.
Foraging birds	Local	The development will incorporate large areas of new habitat New grassland will provide a greater foraging resource, as such it is considered to compensate for the net loss of habitat. As such no significant residual effect is anticipated.
Badgers	Local	The development will incorporate areas of new habitat notably woodland, trees, scrub, hedgerow and grassland. This will ensure a long-term increase in foraging resource for the badger clan within the site and there will be no significant residual effect on badger
Foraging and commuting bats	County	The development will incorporate areas of new habitat in dark areas, notably woodland, trees, hedgerows, wetland and ponds, which will increase the foraging and commuting resource for bats locally. As such no significant residual effect is anticipated.
Brown hare	Local	The effect on brown hare due to the loss of relatively undisturbed open grassland habitat cannot be compensated for within the site, and there will be an enduring negative significant residual effect.

## 7.7. Biodiversity Enhancement

### Biodiversity Enhancement and Management Plan

- 7.7.1 In order to ensure the success of enhancement measures and to steer future site management objectives a Biodiversity Enhancement and Management Plan (BEMP) will be produced which will be updated every five years for at least 30 years following construction. It will include annual reporting to the Local Authority Ecologist. The BEMP will outline how enhancement measures will be created and maintained and who will be responsible for ensuring their long-term success. It will also set in place monitoring surveys and review of survey results against management objectives.

### Ellel Grange Woods BHS

- 7.7.2 A management plan will be produced for woodland within the site, this will incorporate the areas of Ellel Grange Wood BHS which fall within the site boundary. The objectives will be to monitor, maintain and enhance the woodland resource within the site to ensure the long-term enhancement of this ecological feature, which will also enhance the BHS.

### Lancaster Canal BHS

- 7.7.3 A management plan will be produced for the canal edge within the site, it will outline measures to enhance the marginal vegetation at the canal edge. Management objectives will include the management of scrub to prevent it from taking over and opening up areas to allow emergent vegetation to establish. The management will encourage vegetation which provides refuge for fauna which use the canal.

### Woodland

- 7.7.4 In addition to compensation for loss of habitat in Ellel Grange Wood BHS and loss of woodland habitat, a further 4.48ha of new woodland habitat (2.88ha Lowland Mixed Deciduous Woodland and 1.6ha Wet Woodland) will be provided within the site to enhance this feature.
- 7.7.5 A management plan will be produced for existing and new woodland within the site. The objectives will be to monitor, maintain and enhance the woodland resource within the site to ensure the long-term enhancement of this ecological feature. Notably in existing woodland this will focus on the establishment of a diverse woodland ground flora.

### Trees

- 7.7.6 An arboricultural assessment of trees will be undertaken which will identify management objectives to maintain, protect and enhance the trees within the site. Site management will implement the management ensuring the enhancement of this feature and utilise the results to inform visitor management at the site where discouraging access by visitors will be favoured over management of deadwood/decay features.

### Ditches

- 7.7.7 The development will incorporate 0.8ha of SuDs which will be periodically managed to prevent the establishment of scrub. SuDS features also have biodiversity value providing wetland connectivity across the site with concomitant benefits for a range of ecological features.

### Hedgerows

- 7.7.8 ~1,950m of new hedgerow habitat will be provided within the site to enhance this habitat.

- 7.7.9 Management of new and existing hedgerows will aim to create dense and stock-proof field boundaries with associated verge grassland ground flora. The 'gapping-up' of gaps in the hedgerow will utilise native species of local provenance.

#### **Wetland Complex**

- 7.7.10 In addition to the 2.5ha of new wetland habitat a further 2.4ha of habitat will be created. This will comprise floodplain grazing marsh to the north of Flat Wood. This feature will be designed and managed to provide wet linear scrapes with extensive areas of periodically inundated grassland. Management will comprise either low intensity grazing or an annual hay cut in late-summer.

#### **Scrub**

- 7.7.11 Development of the site will entail creation of 7.3ha of new scrub habitat, much of which will be provided in large blocks of continuous habitat, which will comprise a mixture of native species of local provenance. It will be managed to encourage heterogeneity promoting a variety of ages, and densities with open areas/glades created within the vegetation.

#### **Unimproved Acid Grassland**

- 7.7.12 Acid grassland will be managed to promote floristic diversity and there will be reduced grazing pressure on this habitat. Management will be limited to two hay cuts per year (mid-July and late-September) with the arisings removed.

#### **Ponds**

- 7.7.13 Development will incorporate a net increase in pond habitat (1.1ha) and ponds will be subject to management to further enhance this ecological feature.

- 7.7.14 Ponds will be designed and managed for biodiversity, using the following principles:

- Ponds will feature a range of depths, with areas extending to at least 1.5m deep to ensure permanent water;
- Pond margins will have a shallow gradient/shelves to encourage the establishment of macrophytes;
- Ponds will be left to vegetate from the existing seedbank and colonisation by local species;
- Terrestrial habitat up to 5m around the pond will comprise a mixture of low-lying scrub and rough grassland;
- At least 50% of the shoreline will be fenced off to prevent access; and,
- Management of the ponds will seek to minimise shoreline shading from overhanging scrub/trees and remove undesirable species.

#### **Invertebrates**

- 7.7.15 habitat piles will be created within the site, comprising the stacking of logs, brash and stones, these will be located in areas of new woodland, scrub and wetland.
- 7.7.16 The change in management of grassland and net increase in wetland habitat alongside large areas of new habitat such as woodland, trees, scrub and hedgerows will enhance the site for invertebrates.

### **Nesting Birds**

- 7.7.17 The net gain in woodland, trees, scrub, wetland and hedgerow habitat will enhance the nesting opportunities for species which utilise these habitats.
- 7.7.18 In order to enhance the nesting opportunities at the site for species which nest in buildings integral bird boxes will be incorporated into the design of 25% of new buildings, comprising:
- Sparrow terraces (Schwegler 1SP Sparrow box or similar);
  - Starling boxes (WoodStone Starling Nest Box or similar); and,
  - Swift boxes (WoodStone Build-in Swift nest box B).
- 7.7.19 The net increase in habitat, and increased nesting opportunities provided in new buildings and woodland will enhance the site for nesting birds.

### **Foraging Birds**

- 7.7.20 The net increase in habitat notably, hedgerows, scrub, woodland, ponds and wetland habitat will enhance the foraging resource for species which utilise these habitats.
- 7.7.21 The compensation measures will ensure there is no negative significant residual effect on species which utilise open grassland, however it is noted that the development will not result in an enhancement for these species.

### **Badger**

- 7.7.22 The change in management of the habitats within the site, moving away from pasture and promoting floristic diversity will result in a greater invertebrate prey assemblage which will enhance the foraging opportunities for badger within the site.

### **Foraging and Commuting Bats**

- 7.7.23 The new habitat creation and change in habitat management will result in a net increase in foraging and commuting opportunities for local bats, which will enhance the site for foraging and commuting bats.

### **Roosting Bats – Trees**

- 7.7.24 The site management will encourage the development and retention of deadwood features, which will allow roosting features to form in existing trees.
- 7.7.25 In addition, new roosting features will be provided within the site, through:
- 50 Schwegler 2F Bat Boxes (or similar) will be erected on suitable scattered trees and/or at trees within woodland; and,
  - 20 Schwegler 1FW Bat Hibernation Box (or similar), will be erected on suitable trees within woodland; and,
- 7.7.26 The encouragement of natural roosting features and additional artificial roosting features will enhance the roosting opportunities at trees within the site.

### Roosting Bats – Buildings

- 7.7.27 Roosting features within the site will be enhanced through the incorporation of Integral bat boxes into the design of 25% of new buildings within the site (Habibat Bat Box 001 or similar).
- 7.7.28 The increase in roosting features available in new buildings within the site will enhance the site for roosting bats.

### Otter

- 7.7.29 The new habitat creation, notably a net increase in wetland habitat, with good connectivity to Lancaster Canal and other watercourse will increase the foraging and refuging opportunities for otter at the site.
- 7.7.30 In addition, two artificial otter holts will be constructed in areas away from visitor access, one in Carter's Wood and the other in the new floodplain wetland complex, in the west of site.
- 7.7.31 The increase in foraging opportunities and availability of potential resting sites will enhance the site for otter.

### Hedgehog

- 7.7.32 The new habitat creation, notably woodland scrub, hedgerows and grassland will result in enhancement for hedgehog.

### Summary Table

**Table7-16: Summary of Biodiversity Enhancement Measures**

Ecological Feature	Geographical Importance	Enhancement
Ellel Grange Woods, BHS (Biological Heritage Site)	County	A management plan will be produced. The objectives will be to monitor, maintain and enhance the woodland resource within the site.
Lancaster Canal BHS	County	A management plan will be produced for the canal edge within the site, it will outline measures to enhance the marginal vegetation at the canal edge.
Woodland	National (Semi-natural) County (Plantation)	A further 4.48ha of new woodland habitat will be provided within the site to enhance this feature. A management plan will be produced for existing and new woodland within the site.
Trees	National, county and local (veteran/proto-veteran, mature and semi-mature respectively)	An arboricultural assessment of trees will be undertaken which will identify management objectives to maintain, protect and enhance the trees within the site.
Ditches	Local (D2 & D3). Site (D1, D5 & D6)	The development will incorporate 0.8ha of SuDs.

Ecological Feature	Geographical Importance	Enhancement
Hedgerows	National	~1,950m of new hedgerow habitat will be provided within the site to enhance this habitat.  Management of hedgerows at the site will be with the objective of creating dense and stock-proof field boundaries, with associated verge grassland ground flora.
Wetland Complex	County	A further 2.4ha of habitat will be created. This will comprise coastal and floodplain grazing marsh.
Scrub	n/a	The creation of 7.3ha new scrub habitat in large blocks will enhance this habitat.
Unimproved acid grassland	Local	The Lowland Dry Acid Grassland will be managed to promote floristic diversity and there will be a reduced grazing pressure on this habitat.
Ponds	Local	1.1ha new pond habitat will be created and managed for biodiversity.
Invertebrates	National	The change in management of grassland and new habitat such as habitat piles, wetland, woodland, scrub and hedgerows will enhance the site for invertebrates.
Nesting birds	Local	The net increase in habitat, and increased nesting opportunities provided in new buildings and woodland will enhance the site for nesting birds.
Foraging birds	Local	The net increase in habitat notably, hedgerows, scrub, woodland, ponds and wetland habitat will enhance the foraging resource for species which utilise these habitats.  Although a net loss of open grassland habitat will be offset, foraging opportunities for species which utilise these habitats will not be enhanced.
Badger	Local	The change in management of the habitats within the site, moving away from pasture and promoting floristic diversity will result in a greater invertebrate prey assemblage which will enhance the foraging opportunities.

Ecological Feature	Geographical Importance	Enhancement
Foraging and commuting bats	County	The new habitat creation and change in habitat management will result in a net increase in foraging and commuting opportunities for local bats.
Roosting bats - trees	County	The encouragement of natural roosting features and provision of additional artificial roosting features will enhance the roosting opportunities.
Roosting bats – Home Farm buildings	Local	The provision of roosting features available in new buildings within the site will enhance the site for roosting bats.
Otter	Local	The increase in foraging opportunities and availability of potential resting sites will enhance the site for otter.
Hedgehog	Local	The new habitat creation, notably woodland scrub, hedgerows and grassland will result in enhancement for hedgehog

## 7.8. DEFRA Metric 2.0

7.8.1 The output of the Defra Metric has been provided at Appendix 7.7 and is summarised below.

**Table 7-17: Summary Results of the Biodiversity Metric 2.0 Calculation Tool**

	Baseline Units	Retained Units	Lost Units	Created Units	Net Project Biodiversity Units	Percentage Gain
Habitat	288.36	168	120.29	160.20	39.91	13.84%
Hedgerow	23.12	22.80	0.32	9.11	8.79	38.00%
River	28.12	0.48	0	0	0	0.0%

## 7.9. Conclusion

7.9.1 Following a suite of ecology surveys, the proposed Ellel Holiday Village has been designed to avoid potential effects on ecological features and, where effects cannot be avoided, to minimise effects on ecological features.

- 7.9.2 The following ecological features were scoped in to assessment: Morecambe Bay Ramsar Site; Morecambe Bay and Duddon Estuary SPA; Morecambe Bay SAC; Bowland Fells SPA; Calf Hill & Cragg Woods SAC; Lune Estuary SSSI; Ellel Grange Woods BHS; Lancaster Canal BHS; semi-natural woodland (Lowland Mixed Deciduous Woodland and Wet Woodland) and plantation woodland; trees; ditches; hedgerows; wetland complex (Lowland Fen and Rush Pasture); neutral semi-improved grassland; improved grassland; unimproved acid grassland (Lowland Dry Acid Grassland); inland rock outcrop; ponds; invertebrates; nesting birds; foraging birds; badgers; foraging and commuting bats; roosting bats (trees and Home Farm buildings); otter; hedgehog; and, brown hare.
- 7.9.3 Mitigation measures have been designed to reduce effects on these ecological features during construction and in operation. Taking into account mitigation measures to minimise negative effects, negative significant residual effects are still anticipated for the following ecological features: Ellel Grange Wood BHS; woodland; hedgerows; wetland complex (Lowland Fen and Rush Pasture); neutral semi-improved grassland; improved grassland; invertebrates; nesting birds; foraging birds; badgers; foraging and commuting bats; and, brown hare.
- 7.9.4 For these features measures have been designed to compensate for the residual significant effects which could not be mitigated. Despite compensation measures, negative significant residual effects are still anticipated on the following ecological features: improved grassland; and, brown hare. Improved grassland and brown hare are considered to be of site importance, being common and widespread in the local area.
- 7.9.5 Although there will be no significant residual effects on semi-improved neutral grassland, inland rock outcrop and foraging birds (species favouring open grassland only), the development will not result in enhancement of these features.
- 7.9.6 Development proposals will result in enhancement of the following ecological features: Ellel Grange Woods BHS; Lancaster Canal BHS; semi-natural woodland (Lowland Mixed Deciduous Woodland and Wet Woodland) and plantation woodland; trees; ditches; hedgerows; wetland complex (Lowland Fen and Rush Pasture); unimproved acid grassland (Lowland Dry Acid Grassland); ponds; invertebrates; nesting birds; foraging birds; badgers; foraging and commuting bats; roosting bats (trees and Home Farm buildings); otter and hedgehog.
- 7.9.7 In parallel to this EclA the Defra 2.0 Biodiversity Calculator has been used to assess the habitat value in biodiversity units before and after development and to calculate the change as a percentage. The result is Biodiversity Net Gain of: Habitat units, 39.91 (13.84%); Hedgerow units 8.79 (38%) and, River units 0 (0%).
- 7.9.8 Although negative significant residual effects are anticipated on improved grassland and brown hare, the development will result in enhancement of ecology overall, due to the extensive areas of new habitat being created. This is further evidenced by the result of the Defra 2.0 Biodiversity Calculator.