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Client: Cumberland Council

Project: Hodbarrow Nature Reserve

Report: Phase II Survey Report

QUALITY ASSURANCE

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1.0 EXECUTIVE SUMMARY

Greengage Environmental Ltd was commissioned to produce a Phase II Survey report by Cumberland Council of a site known as Hodbarrow Nature Reserve, Millom on the South-west coast of Cumbria.

This document is a combined report of the Phase II Surveys carried out to support a planning submission for the site which seeks *"erection of welcome building with café, retail space, staff facilities and cark park, repair and stabilisation works at Hodbarrow Beacon, repair and stabilisation works and installation of 'camera obscura' structure at Towsey Hole Windmill, installation of cladding and new living roof to existing bird hide, erection of new bird hides and viewing platforms, creation of new multi-use pathways with signage, gateway features and street furniture, making good of existing byway (BOAT) along sea wall, enhancement of wildlife habitats, and associated access, landscaping and drainage infrastructure."*

The site incorporates Hodbarrow Nature Reserve as well as a parcel of land immediately north of the nature reserve. The site lies approximately 0.6km south of the town of Millom and 0.8km east of the village of Haverigg. The proposals form a part of the Havverigg and Millom's Town Investment Plan. The plan received a grant from the Governments 'Towns Fund' and aims to foster economic regeneration, stimulate investment, and deliver vital infrastructure back into the towns. The proposals seek to create a multi-sensory experience across the nature reserve through the enhancement of existing ecological features and priority habitats with provision of features of interest in the form of sculptures and art installations that reflect on the unique heritage of the site. The existing site ecology has been at the forefront of considerations during the design stages with proposals seeking to retain the natural feel of Hodbarrow Nature Reserve. The welcome building and formalised paths will increase the accessibility of the site for all, and the aspirations of the project aim to increase the number of visitors from approximately 40,000 annually to 150,000.

The Hodbarrow Nature Reserve site is part of the Morecambe Bay and Duddon Estuary Special Protection Area (SPA), Special Area of Conservation (SAC), Ramsar site and is itself a Site of Special Scientific Interest (SSSI). The wider bay is designated for the presence of internationally important coastal habitats which support internationally and nationally important assemblages of breeding, over-wintering and migratory birds. Other species present include great crested newts (*Triturus cristatus*), natterjack toads (*Epidalea calamita*), rare and nationally scarce invertebrate species and at least one nationally scarce plant. The area proposed for the welcome building and associated car parking lies just outside the boundary of these designations.

The wider Hodbarrow Nature Reserve site extends to 105 hectares (ha) and comprises lagoons, grasslands and scrubland. The site is a former iron mine and since 1986 has been owned and managed by the Royal Society for the Protection of Birds (RSPB). The development boundary does not include the Hodbarrow lagoon. The site boundary does however, include an area to the north extending to approximately 2.1ha comprising hardstanding dense scrub, lowland meadow and calcareous grassland, where the proposed welcome building and associated car parking will be situated. Overall, the site boundary extends to 57.69ha.

This report should be read in conjunction with the (Shadow) Habitats Regulations Assessment: Assessment Of Likely Significant Effect s(ALSE) (ref: J217RP01 Hodbarrow Reserve (s)ALSE

19.05.23 Final w apps) and (Shadow) Habitats Regulations Assessment Appropriate Assessment (AA) (ref: J217RP02 Hodbarrow Reserve (s)AA 19.05.23 Final w apps).

An understanding of the ecological baseline of the site and surroundings is required to fully understand the potential impacts of the proposed development upon the site and wider designations. For the purposes of the reports, the potential construction impacts of the development of the welcome building and associated car parking have been considered separately from the potential operational impacts associated with the increase in visitor numbers, linked to the accessibility improvement works across the wider site. This is reflected in the Phase II methodologies which considers the potential impacts for each ecological receptor to inform survey design and is the reasoning behind the differing survey areas for the Phase II surveys.

Preliminary Ecological Appraisals were undertaken in 2021 and 2022 by Appletons to establish the ecological value of the site and the potential presence of legally protected species and priority habitats (ref: 2363 Hodbarrow PEA Summary Final Report and 2363 Hodbarrow PEA Summary alternative car park site). The following Phase II surveys were recommended in order to inform the development designs and appropriate mitigation, compensation and enhancement actions in light of proposed development works and associated potential impacts.

- National Vegetation Classification (of key areas);
- Amphibians (appropriate waterbodies on site and off-site);
- Reptile (suitable reptile habitat on the welcome building/car park site and suitable habitat within approximately 30m of the main path/BOAT on the reserve); and
- Invertebrate survey (along the paths across the wider site and of the proposed welcome building and car park site).

As the site is a RSPB reserve there are sufficient historical data relating to the bird assemblages on site to inform appropriate mitigation actions and further bird surveys were not recommended.

Key findings from a review of data gathered from the desktop study and the 2021 and 2022 Phase II surveys results have confirmed the following:

- Designations
    - The Hodbarrow Nature Reserve falls within the designated site boundaries of Morecambe Bay and Duddon Estuary SPA, SAC, Ramsar and SSSI and the proposed welcome building development and car park footprint falls immediately outside this boundary to the north-east;
- Habitats
    - Internationally important Annex I habitats on site.
        - Both the proposed welcome building area and the wider site has semi-natural dry grasslands and scrubland facies on calcareous substrates (H6210)
        - The wider side supports Annex 1 H2130 Fixed coastal dunes with herbaceous vegetation (grey dunes) which is listed as one of the qualifying features for the SAC designation;

- Several nationally, regionally and locally important habitats on site;

- Notable plants
  - The habitats present support several internationally, nationally, regionally and locally important plants on site including Irish dandelion (*Taraxacum aesculosum*) and pillwort (*Pilularia globulifera*).
- Invasive Species
  - There are a number of invasive species on the main reserve and on the welcome building/car park site, including cotoneaster spp, variegated yellow archangel, Montbretia, Japanese knotweed and sea buckthorn.
- Birds
  - Hodbarrow reserve supports important breeding bird assemblages such as the breeding colonies of common terns (*Sterna hirundo*), Sandwich terns (*Thalasseus sandvicensis*), little terns (*Sternula albifrons*).
  - Hodbarrow reserves also supports important over-wintering and migratory bird assemblages including include overwintering redshank (*Tringa totanus*), knot (*Calidris canutus*) and passage black tailed godwit (*Limosa limosa*).
  - Both the wider site and the adjacent welcome building site will support a variety of nesting birds during spring/summer in the scrub and trees and on waterbodies.
- Amphibians
  - Likely absence of natterjack toad and great crested newt on site based on survey findings.
  - A confirmed natterjack breeding pond lies approximately 0.57km north-east of the proposed works along the BOAT on the main reserve.
  - The ponds on-site support smooth newt (*Lissotriton vulgaris*), common toad (*Bufo bufo*) and common frog (*Rana temporaria*).
- Reptiles
  - Good populations of common lizard (*Zootoca vivipara*) have been recorded in both the area of proposed welcome building and in habitats surveyed on the wider site.
  - One slow-worm (*Anguis fragilis*) was recorded within the wider site;
  - Common lizard and slow-worm are fairly widespread species in Cumbria, and thus the site is not of particular regional importance due to local rarity.
- Invertebrates;
  - The proposed welcome building supports at least 86 terrestrial invertebrate species, three of which are notable. The proposed welcome building is considered to be of district (low) importance for invertebrates;

- The habitats along the paths across some of the wider site support at least 159 species of terrestrial invertebrates; 26 species (~16%) are regarded as locally common or locally scarce, three (~2%) are currently accorded Nationally Scarce or Section 41 status and one is classed as data deficient. The habitats either side of the paths across the wider site is considered to be of district (low) importance for invertebrates.

As the site is subject to several national and international designations, in accordance with the Habitat and Species Regulations and National Planning Policy Framework (summarised in Appendix C) development proposals should be refused unless it can be established that significant harm to biodiversity can be avoided or adequately mitigated for. With this in mind, the development proposals have considered the qualifying features and general baseline ecology throughout the design process. The development seeks to secure the long-term conservation and enhancement of the habitats and species at site through a sustained commitment to management; the absence of which could risk some of the sensitive habitats due to successional habitat change.

This report should be read in conjunction with the Ecological Impact Assessment (EcIA) (ref: 551959ItMay23FV01_EcIA) which gives the level of predicted impacts of varying scales in the absence of mitigation and the mitigation and compensation actions required to avoid/minimise the impact of the proposed development on each of these ecological receptors.

This report should also be read in conjunction with the Biodiversity Impact Assessment (ref: 551959ItMay23FV01_BIA) which demonstrates that the site will achieve 32.92% Net Gain which exceeds legislative, national and local policy targets. Measurable goals for each objective will be formulated and a monitoring regime designed. Detailed method statements with management prescriptions will then be produced in due course. The information should be presented within a Landscape and Ecological Management Plan which would cover a period of 30 years initially, to secure the biodiversity gains.

2.0 INTRODUCTION

Greengage Environmental Ltd was commissioned to produce a Phase II Protected Species Survey report by Cumberland Council of a site known Hodbarrow Nature Reserve on the South-west coast of Cumbria.

This document is a combined report of the findings of the various ecological surveys undertaken at Hodbarrow and the adjacent welcome building/car park site during 2021 and 2022 by various consultants, and has been produced to support a planning submission for the site which seeks '*Erection of welcome building with café, retail space, staff facilities and cark park, repair and stabilisation works at Hodbarrow Beacon, repair and stabilisation works and installation of 'camera obscura' structure at Towsey Hole Windmill, installation of cladding and new living roof to existing bird hide, erection of new bird hides and viewing platforms, creation of new multi-use pathways with signage, gateway features and street furniture, making good of existing byway (BOAT) along sea wall, enhancement of wildlife habitats, and associated access, landscaping and drainage infrastructure.*'

A desktop review in combination with a suite of Phase II Ecology Surveys was undertaken throughout 2021 and 2022. Given the nature of the habitats present, and the available desk-based survey information and existing baseline data, surveys for the following receptors were undertaken and are documented within this report:

- Botany;
- Amphibians;
- Reptile; and
- Invertebrates.

This report collates all the survey results into one document and should be read in conjunction with the EcIA and BIA which assess the potential effects of the development in the context of the baseline described herein.

2.1 SITE DESCRIPTION

The survey area extends to approximately 57.69 hectares and is centred on National Grid Reference SD 17718 78724, OS Co-ordinates 317718, 478724.

The site is located on the edge of the Duddon Estuary in south-west Cumbria. For the purposes of this report the site has been split into the area proposed for the visitor centre (and associated car parking) and the wider site encompassing the Hodbarrow Nature Reserve. The Hodbarrow Nature Reserve extends to 105ha in total however the lagoon falls outside the planning boundary.

The proposed Welcome Building would be sited on a pocket of land of approximately 2.1ha to the north of the nature reserve which comprises dense scrub, calcareous grassland and an access road which leads to a Household Waste Recycling Centre off-site to the north.

The wider site was once the site of a former iron mine which opened in the early 1860's and closed in 1968. The majority of buildings associated with the mine have been removed however the reserve is scattered with remnants from the mine in the forms of old stone walls, quarries, lighthouses, beacons and the partial remains of an unsuccessful sea wall. In 1905 a successful attempt at a large tidal breakwater was built to protect the ironworks from the sea and still stands today. Following the mines' closure the area behind the seawall was flooded and formed a, now freshwater, lagoon which supports large populations of wintering and breeding wildfowl and waders. The RSPB purchased the site in 1986 and their management practices include scrub clearance and the creation of limestone slag islands within the lagoon which have successfully encouraged and sustained breeding populations of little terns (Sternula albifrons), common terns (Sterna hirundo) and sandwich terns (Thalasseus sandvicensis). The populations of breeding terns and wintering wildfowl contribute to the wider designation of Duddon Estuary and Morcambe Bay Special Protection Area (SPA) and Duddon Estuary Ramsar Site.

The RSPB reserve is part of a popular 3-mile circular walk which takes visitors on paths through the dense willow and bramble scrub, through calcareous grasslands, past the sand dunes and along the sea wall looking out over the lagoon to the north and the Irish sea to the south. The sea wall loops across to a caravan park 0.3km east of Haverigg. The mosaic of habitats on-site support rich and diverse plant communities and assemblages of invertebrates.

2.2 PROPOSALS

This document is a combined report of the Phase II Protected Species surveys carried out and has been produced to support a planning submission for the site which seeks to develop a welcome building, associated car parking and create an accessible route around the nature reserve by formalising existing paths; a project known as the Iron Line.

The development seeks to secure the long-term conservation and enhancement of the habitats and species at site through a sustained commitment to management; the absence of which could create risks for some of the sensitive habitats due to successional habitat change or continued degradation from human trampling.

The development has been assessed through the following two categories:

Welcome building (and associated car parking) development will involve:

- Clearance of existing dense scrub habitat and 156sqm (of 1891sqm) Priority Lowland Meadow habitat to facilitate the development;
- Retention and protection of the remaining lowland meadow and calcareous grassland;
- Development of a welcome building which will comprise a two-story building, the ground floor will include a café, a shop, toilets, staff room. The top floor will give a 360o view of the surrounding landscape. The sloped roof will be a biodiverse roof which will be seeded with a mix of the surrounding habitats;
- The development of an access road for two car parks with a total of 80 spaces;

- The narrowing of an existing road to form a path from a new car park to the Proposed Welcome Building and creation of a biodiverse roof on the welcome building. An area of 2649m2 will be used for new grassland creation including compensation for the loss of priority lowland meadow; and
- The hardstanding will be broken up and removed to other areas of the site. The bare ground will be seeded with a late summer cut of the adjacent calcareous grassland and lowland meadow habitats.

The development of the Wider site seeks:

- Narrowing the existing BOAT to fit one car with occasional passing places;
- Formalise desire lines to be retained through fencing off and laying with a natural, permeable surface;
- The closing off of existing desire lines which are not beneficial for sensitive habitats;
- 17012m^2 of habitat restoration/creation will be available through the formalising and closing of paths;
- Maintenance and repairs to the old lighthouse and beacon;
- Installation of art and education features across the site;
- Improvements to the existing tern island hide and reinforcement of bunding along sea wall; and
- The building of three hides, one overlooking the 'hidden lagoon', one overlooking the old quarry lagoon and the third on the old sea wall.

DESIGN PROCESS

Greengage have liaised with the design team on a weekly basis and engaged with the Council, Natural England and RSPB throughout the process. Greengage have translated the ecological constraints and opportunities to the design team which has been informed by the Phase II survey results and the designs have been adapted throughout the process if any new relevant ecological constraints come to light. The development has followed the mitigation hierarchy throughout the design stage:

- Avoidance- Seek options that avoid harm to ecological features (for example, by locating on an alternative site).
- Mitigation- Negative effects should be avoided or minimised through mitigation measures, either through the design of the project or subsequent measures that can be guaranteed – for example, through a condition or planning obligation.
- Compensation- Where there are significant residual negative ecological effects despite the mitigation proposed, these should be offset by appropriate compensatory measures.
- Enhancement- Seek to provide net benefits for biodiversity over and above requirements for avoidance, mitigation or compensation.

3.0 ECOLOGICAL BASELINE

3.1 DESIGNATIONS

The Hodbarrow Nature Reserve lies within the Morecombe Bay and Duddon Estuary Special Protection Area (SPA), Special Area of Conservation (SAC), Ramsar (designated under the Convention on the Wetlands of International Importance especially as Waterfowl Habitat 1971 – the Ramsar Convention) and Site of Special Scientific Interest (SSSI). The proposed welcome building and car parks lie just outside the boundary of these designations.

Morecombe Bay is a large estuary situated on the northwest English coast in Cumbria and Lancashire. The Bay includes the Duddon Estuary which is formed by the River Duddon and the smaller Kirkby Pool as they open into the Irish Sea at the south-west corner of the Lake District. Morecambe Bay contains a mosaic of coastal habitats covering a total of 61538.23 hectares and supports breeding and overwintering bird assemblages of international importance as well as nationally important numbers of natterjack toads (*Bufo calamita*) and a rich assemblage of wetland plants and invertebrates.

The SPA, SAC and Ramsar sites are part of a system known collectively as Natura 2000 sites. They are designated under Article 6 of the Habitats Directive (92/43/EEC)[1] together with Article 4.1 and 4.2 Wild Birds Directive (2009/147/EC)[2] which aims to protect and improve Europe's most important habitats and species. The terrestrial elements of the Directives are transposed into English law by the Habitats and Species Regulations 2017. Legislation and Policy of relevance to receptors and sites described in this report are outlined in Appendix C.1 The reasons for each designation are described below.

This report should be read in conjunction with the (Shadow) Habitats Regulations Assessment: Assessment Of Likely Significant Effect s(ALSE) (ref: J217RP01 Hodbarrow Reserve (s)ALSE 19.05.23 Final w apps) and (Shadow) Habitats Regulations Assessment: Appropriate Assessment (AA) (ref: J217RP02 Hodbarrow Reserve (s)AA 19.05.23 Final w apps).

Morecombe Bay and Duddon Estuary Special Protection Area[3]

Qualifying species

The site qualifies under Article 4.1 of the Directive (2009/147/EC) as it is used regularly by 1% or more of the Great Britain populations of the following species listed in Annex I in any season:

Table 3.1 Qualifying species at Morecambe Bay and Duddon Estuary

Species	Season	% of population
Whooper swan (*Cygnus Cygnus*)	Non-breeding	1.0% of GB population
Little egret (*Egretta garzetta*)	Non-breeding	3.0% of GB population
European golden plover (*Pluvialis apricaria*)	Non-breeding	1.0% of GB population (1991)

Species	Season	% of population
Bar-tailed Godwit (*Limosa lapponica*)	Non-breeding	8.0% of GB population
Ruff (*Calidris pugnax*)	Non-breeding	1.0% of GB population
Mediterranean gull (*Larus melancephalus*)	Non-breeding	1.0% of GB population
Little tern (*Sternula albifrons*)	Breeding	2.2% of GB population
Sandwich tern (*Sterna sandvicensis*)	Breeding	5.7% of GB population (1992)
Common tern (*Sterna hirundo*)	Breeding	2.0% of GB population (1991)

The site qualifies under Article 4.2 of the Directive (79/409/EEC) as it is used regularly by 1% or more of the biogeographical populations of the following regularly occurring migratory species (other than those listed in Annex I) in any season:

Table 3.2 Annex 2 Migratory species at Morecambe Bay and Duddon Estuary

Species	Season	% of population
Pink-footed goose (*Anser brachyrhynchus*)	Non-breeding	4.5% of biogeographic population
Common shelduck (*Tadorna tadorna*)	Non-breeding	2.0% of biogeographic population
Northern pintail (*Anas acuta*)	Non-breeding	4.2% of biogeographic population
Eurasian oystercatcher (*Haematopus ostralegus*)	Non-breeding	6.8% of biogeographic population
Grey plover (*Pluvialis squatarola*)	Non-breeding	1.0% of biogeographic population (1991)
Common ringed plover (*Charadrius hiaticula*)	Non-breeding	1.4% of biogeographic population
Eurasian curlew (*Numenius arquata*)	Non-breeding	1.5% of biogeographic population
Black-tailed godwit (*Limosa limosa*)	Non-breeding	4.0% of biogeographic population
Ruddy turnstone (*Arenaria interpres*)	Non-breeding	1.0% of biogeographic population
Red knot (*Calidris canutus*)	Non-breeding	7.3% of biogeographic population

Species	Season	% of population
Sanderling (*Calidris alba*)	Non-breeding	3.0% of biogeographic population (1991)
Dunlin (*Calidris alpina alpina*)	Non-breeding	2.0% of biogeographic population
Common redshank (*Tringa totanus*)	Non-breeding	4.6% of biogeographic population
Lesser black-backed gull (*Larus fuscus*)	Non-breeding	1.7% of biogeographic population
Lesser black-backed gull (*Larus fuscus graellsii*)	Breeding	2.7% of biogeographic population
European herring gull (*Larus argentatus argenteus*)	Breeding	1.0% of biogeographic population (1991)

Assemblage qualification

The site qualifies under Article 4.2 of the Directive (2009/147/EC) as it used regularly by over 20,000 seabirds in any season:

At time of the 1997 citation of Morecambe Bay SPA, the area supported 40,672 individual seabirds including: herring gulls, lesser black-backed gulls, Sandwich terns, common terns, and little terns.

The site qualifies under Article 4.2 of the Directive (2009/147/EC) as it used regularly by over 20,000 waterbirds in any season. During the period 2009/10 – 2013/14, the site held a five year peak mean value of 266,751 individual birds. The main components of the assemblage include all of the qualifying features listed above, as well as an additional 19 species present in numbers exceeding 1% of the GB total and / or exceeding 2,000 individuals: great white egret, Eurasian spoonbill, light-bellied brent goose (Nearctic origin), Eurasian wigeon, Eurasian teal, green-winged teal, mallard, ring-necked duck, common eider (non-breeding), common goldeneye, red-breasted merganser, great cormorant, northern lapwing, little stint, spotted redshank, common greenshank, black-headed gull, common (mew) gull and European herring gull (non-breeding).

Morecombe Bay Special Area of Conservation (SAC)[4]

The site qualifies under Article 6 of the habitats directive (92/43/EEC). The primary reason for its international designation includes the following Annex I habitats and Annex II species:

- Annex I Habitats
  - Estuaries
  - Mudflats and sandflats not covered by seawater at low tide
  - Large shallow inlets and bays
  - Perennial vegetation of stony banks
  - Salicornia and other annuals colonizing mud and sand

- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- Shifting dunes along the shoreline with *Ammophila arenaria* (""white dunes"")
- "Fixed coastal dunes with herbaceous vegetation (""grey dunes"")" * Priority feature
- Humid dune slacks

- Annex II Species
  - Great crested newt (*Triturus cristatus*)

The Annex I habitats also present but are not a primary reason for selection of the site include:

- Sandbanks which are slightly covered by sea water all the time;
- Coastal lagoons * Priority feature;
- Reefs;
- Embryonic shifting dunes;
- Atlantic decalcified fixed dunes (*Calluno-Ulicetea*) * Priority feature;
- Dunes with Salix repens ssp. argentea (*Salicion arenariae*).

Duddon Estuary Ramsar[5]

Qualification for Ramsar criteria:

- Supports nationally important numbers of the rare Natterjack toad (Bufo calamita), near the north- western edge of its range (an estimated 18-24% of the British population). Supports a rich assemblage of wetland plants and invertebrates- at least one nationally scarce plant and at least two British Red Data Book invertebrates;
- Supports nationally important numbers of waterfowl during spring and autumn passage
- Internationally important waterfowl assemblage (greater than 20,000 birds);
- Over winter the site regularly supports internationally important populations of Knot (*Calidris cannutus*) Pintail (*Anas acuta*), Redshank (*Tringa totanus*)

Duddon Estuary Site of Special Scientific Interest[6]

The citation includes information expanding on what has been described in relation to Nature 2000 designation. Extracts below have been selected from the SSSI citation to provide a broader picture.

"The Duddon Estuary is of international and national importance for wintering wildfowl and waders and provides a vital link in the chain of west coast estuaries used by migrating birds, as well as being of particular importance as one of a series of estuaries on the north-west coast where the majority of the British population of Natterjack Toads occur."

"The mouth of the estuary forms an extensive flat sand plain, with the sands being very mobile. The mid and upper reaches of the estuary are flanked by saltmarsh and beyond high water are extensive sand dunes on both

the north and south sides of the mouth of the estuary. These sand dune systems are particularly important for a diverse range of community types, supporting a number of rare and uncommon plants, as well as a variety of nationally rare and scarce invertebrate species. The past activities of the mining and iron-making industries have created a number of artificial habitats which have become areas of wildlife interest. These include the slag banks of Askham Pier and Borwick Rails, and the largest coastal lagoon in north-west England at Hodbarrow Lagoon.

Natterjack Toad

The Natterjack Toad is a nationally rare species in Britain and over 95% of the population is associated with 5 estuaries, the Alt, Ribble, Duddon, Esk and Solway. The Duddon Estuary itself is therefore one of the most important areas in Britain for this species and contains between 18–25% of the U.K. population, which in turn is equivalent to 50% of the Cumbrian Natterjack Toad population. The toads breed in ephemeral pools associated with a range of habitats including dune slacks, marshy grassland, bare sand and slag banks, and hibernate and forage in the surrounding semi-natural vegetation, artificial habitats and semi-improved pastures. Particular concentrations occur at Millom Ironworks, Sandscale Haws and the stretch of coast between Sandside and Dunnerholme, but the species is evenly distributed over the whole estuary.

Invertebrates:

As a result of the range of habitats found at North Walney and Sandscale, these two sites are also important for their invertebrate populations, many typical of coastal habitats with a number of rare and nationally scarce species including the digger wasp Psen littoralis, the solitary bee Colletes cunicularis, water beetles associated with brackish waters Octhebius marinus and O. auriculatus, and moths including the Shore Wainscot Mythimna litoralis and the Portland moth Ochropleura praecox.

3.2 HODBARROW NATURE RESERVE

Whilst the above designations give an understanding of the importance of the site combined with the surrounding area, it is important to recognise the individual significance of Hodbarrow Nature Reserve.

The site is managed by the RSPB and a principal aim is to encourage and sustain breeding, overwintering and migratory bird assemblages which make integral contributions towards the wider designations. A successful management intervention was the creation of an island made from slag moved from elsewhere on the reserve to the Hodbarrow lagoon which now supports breeding numbers of little terns, common terns and Sandwich terns, eider, black-headed gulls and occasionally Mediterranean gulls. The slag is considered a stronghold for terns in the UK, with at least four species recorded breeding; at its peak it hosted 15% of the UK population of Sandwich terns. The site also supports a number of wintering/passage waders which contribute towards the SSSI designation and include overwintering redshank, knot and passage black tailed godwit.

A review of the RSPB Hodbarrow Management Plan[7] has also identified important plant species associated with the calcareous grassland on site which include dark red helleborine (*Epipactis atrorubens*), bee orchid (*Ophrys apifera*), pillwort (*Pilularia globulifera*), hound's-tongue (*Cynoglossum officinale*), common cudweed (*Filago vulgaris*), marsh helleborine (*Epipactis palustris*) lesser thyme-

leaved sandwort (*Areanaria leptoclados*), sea spleenwort (*Asplenum marinum*), houndstongue (*Cynoglossum officinale*), early marsh-orchid (*Dactylorhiza incarnata), Desmazeria marina,* ploughman's-spikenard (*Inula conyza*), wild lettuce (*Lactuca virosa*).

The scrub, ponds, grassland mosaic on the site also have records of supporting natterjack toad populations, otter (*Lutra lutra*), dark green fritillary (*Speyeria aglaja*), grayling (*Hipparchia semele*), wall (*Lasiommata megera*), dingy skipper (*Erynnis tages*), Small pearl-bordered fritillary (*Boloria selene*), broad groove-head spider (*Monocephalus castaneipes*), diving beetles (*Ilybius subaeneus, Dytiscus circumflexus*), a whirligig beetle (*Gyrinus caspius*), a water beetle (*Laccobius atrocephalus*), a moss beetle (*Ochthebius punctatus*), weevils (*Trachyphloeus aristatus*, *Sitona lineellus, Alophus triguttatus, Centorhynchus rapae, Anthonomus bituberculatus*), a robber fly (*Philonicus albiceps*), common pillwoodlouse (*Armadillidum vulgare*).

3.3 PRELIMINARY ECOLOGICAL APPRAISAL

Site visits were undertaken by Lucy Gibson Consulting and Appletons throughout May and August 2021 which informed the Preliminary Ecological Appraisal (PEA)[8] of Hodbarrow Nature Reserve, in addition to a desk study of local records of protected/notable species obtained from the RSPB (for the reserve) and from Cumbria Biodiversity Data Centre (for a radius of 2km around the reserve). A PEA was also undertaken in January 2022 to understand the ecological baseline of the area of the proposed welcome building[9] and car park site. The entire sites were surveyed where accessible, with particular focus on the areas that have potential to be impacted by the proposals.

During the PEA, surveyors searched for field signs indicating the presence of protected/notable species and for habitat with the potential to support protected/notable species, including badgers (*Meles meles*), reptiles, bats, nesting birds, amphibians, otters (Lutra lutra), etc. These searches were undertaken during daytime survey visits to record the botanical species and broad habitats present. A summary of these results is provided below and a map with the survey findings is located in Appendix A.1.

Habitats

As part of the PEA, a Phase 1 Habitat Survey was conducted following the methodology of the Joint Nature Conservation Committee (JNCC) (2010) *Handbook for Phase 1 Habitat Survey*[10] and the Institute of Environmental Assessment (IEA, 1995)[11]. The following habitats were identified:

Welcome building

- Scrub
  - Dense continuous scrub (A2.1)
  - Scattered scrub (A2.2)
- Grassland
  - Unimproved calcareous grassland (B3.1)
- Open Water

- Standing water (G1)
- Running water (G2)

- Miscellaneous
  - Bare ground/hardstanding (J4)
- Habitat Mosaic
  - Tall ruderal (C3.1) and Dense scrub (A2.1)

Site Wide

- Scrub
  - Dense scrub (A2.1)
  - Scattered scrub (A2.2)
- Grassland
  - Semi-improved neutral grassland (B2.2)
  - Unimproved calcareous grassland (B3.1)
  - Unimproved neutral grassland (B2.1)
  - Semi-improved calcareous grassland (B3.2)
  - Improved Grassland (B4)
- Tall herb and fern
  - Bracken (C1.1)
  - Tall ruderal herb (C3.1)
- Heathland
  - Dry Acid Heath (D1.1)
- Swamp, marginal and inundation
  - Swamp (F1)
- Open Water
  - Open standing water (G1)
  - Wet ditch (G1)
- Coastland
  - Boulders/rocks above high tide mark (H4)
  - Intertidal sand (H1)
  - Maritime cliff and slope, hard cliff & crevice ledge vegetation (H8.1 & H8.3)

  - Maritime coastal grassland (H8.4)
  - Open sand dune (H6.8)
  - Sand dune grassland (H6.5)
  - Sand dune scrub (H6.7)
  - Shingle/gravel above high tide (H3)
  - Strandline vegetation (H5)
- Rock Exposure and Waste
  - Quarry (I1.2)
  - Basic natural inland cliff (I1.1.2)
  - Exposed rock (I1.4)
  - Natural rock exposure (other: basic)
- Miscellaneous
  - Buildings (J3.6)
  - Buildings/structures (J3.6)
  - Ephemeral/short perennial (J1.3)
  - Bare Ground/Hardstanding (J4)
  - Defunct species-poor hedge (J2.2.2)
- Habitat Mosaics
  - Sand dune grassland (H6.5) and Sand dune scrub (H6.7)
  - Scattered scrub (A2.2) and scattered bracken (C1.2)
  - Unimproved neutral grassland (B2.1) & tall ruderal (C3.1)
  - Dense scrub (A2.1) & Unimproved calcareous grassland (B3.1)
  - Bracken (C1.1), Scrub (A2.1) & Tall ruderal (C3.1)
  - Unimproved neutral grassland (B2.1) Tall ruderal (C1.3) & Scrub (A1.2)
  - Unimproved neutral grassland (B2.1) & A2.1 Dense Scrub)
  - Dense Scrub (A2.1), Unimproved calcareous grassland (B3.1) & Tall ruderal (C3.1)

Species

The PEA survey identified the following potential for species:

Proposed Welcome building

- Nesting birds

- The PEA was undertaken outside of nesting bird season but it is likely that birds would use the dense bramble scrub, hawthorns and willows. No further surveys were considered necessary, however impacts on birds are considered within the EcIA and avoidance measures are recommended.

- Foraging bats
  - Likely foraging and commuting along scrub edge habitat, over grassland;
- Roosting bats
  - Majority of trees on site are likely to be small and lacking in potential roost features and/or too densely growing for suitable bat roosting habitat. No further surveys were considered necessary.
- Amphibians
  - Likely to be present in scrub and grassland habitats across the site, and could potentially breed in the ditches near the entrance to the recycling centre.
  - Further survey were recommended, the results of which are presented within this report.
- Reptiles
  - Records of common lizard on site and suitable habitat for common lizard, slow worm and grass-snake exists for tussocky, grassland areas, scrub and mosaics of grassland, scrub and open areas.
  - Further surveys were recommended, the results of which are presented within this report.
- Botany
  - Calcareous grassland exists on site and species of note were incidentally observed during survey work in 2021, such as orchids and quaking grass (*Briza* sp.).
  - Further surveys were recommended, the results of which are presented within this report.
- Badger
  - Likely badger foraging signs and trails were found in grassland near the southern site boundary with pasture, with a trail leading under the boundary fence (see Appendix A.1). No badger hairs were found on the fence where the trail passed through, however, and no latrines were found nearby.
  - Further surveys were not considered necessary, however consideration of badger will be factored into the EcIA.
- Otter
  - It is possible that otters may shelter in dense scrub habitats on site however disturbance levels on site are relatively high due to the access road for the adjacent recycling centre crossing the site, which may deter otters from visiting the site and/or seeking shelter.

- No signs of otter were seen during the PEA visit (although a detailed otter survey was not undertaken). Further surveys were not considered necessary, however consideration of otter will be factored into the EcIA.

- Invertebrates
  - The PEA was undertaken during the winter and therefore invertebrates were not observed during the visit, although numerous anthills were noted in the grassland on site.
  - Invertebrate surveys were recommended, the results of which are summarised within this report.
- Invasive species
  - Cotoneaster sp, listed on under Schedule 9 of the Wildlife and Countryside Act 1981 was also recorded (mapped at Appendix A.1).

Site Wide

- Confirmed presence of nesting birds across the site
  - Numerous pairs of little terns and Sandwich terns observed on the island at the south end of the lagoon;
  - Birds seen and heard during the PEA include wren (*Troglodytes troglodytes*), swallow (*Hirundo rustica*), magpie (*Pica pica*), goldcrest (*Regulus regulus*), herring gull (*Larus argentatus*), chaffinch (*Fringilla coelebs*), blackbird (*Turdus merula*), dunnock (*Prunella modularis*), bullfinch (*Pyrrhula pyrrhula*), goldfinch (*Carduelis carduelis*), oystercatcher (*Haematopus ostralegus*), kestrel (*Falco tinnunculus*), black-headed gull (*Chroicocephalus ridibundus*), mute swan (*Cygnus olor*), robin (*Erithacus rubecula*), woodpigeon (*Columba palumbus*), crow (*Corvus brachyrhynchos*), great tit (*Parus major*), blue tit (*Cyanistes caeruleus*), lesser whitethroat (Sylvia curruca), chiff chaff (Phylloscopus collybita), willow warbler (*Phylloscopus trochilus*), common tern (*Sterna hirundo*), little tern (*Sternula albifrons*), Sandwich tern (*Thalasseus sandvicensis*), cormorant (*Phalacrocoracidae*), eider duck (*Somateria mollissima*), little plover (*Charadrius dubius*), greenfinch (*Chloris chloris*), song thrush (*Turdus philomelos*), blackcap (*Sylvia atricapilla*), greylag goose (*Anser anser*), long-tailed tit, skylark (*Aegithalos caudatus*), lapwing (*Vanellus vanellus*), reed warbler (*Acrocephalus scirpaceus*), moorhen (*Gallinula chloropus*), tufted duck (*Aythya fuligula*), sand martin (*Riparia riparia*), linnet (*Linaria cannabina*), swift (*Apus apus*).
  - Given the extensive existing RSPB data on birds further surveys were not considered necessary, however consideration of birds has been factored into the EcIA.
- Foraging bats
  - Likely potential value for foraging bats associated with scrub edge habitat, over grassland and waterbodies where not too exposed;
- Roosting bats;
  - Buildings

        - Stone structures and cliffs on site have some potential for roosting bats (crevices could provide summer and/or winter roosting opportunities);
        - The disused windmill and lighthouse are likely to be too exposed for roosting bats, being situated on the top of small hills on the coast and therefore have negligible potential for roosting; and
    - Trees
        - Majority of trees on site are likely to be small and lacking in potential roost features and/or too densely growing for suitable bat roosting habitat.
        - Potential roosting features are present among some of the mature trees on site.
    - Given the limited potential for proposals to result in direct impacts on roosting or foraging bats no further surveys were considered necessary, however consideration of bats have been included within the EcIA.
- Amphibians
    - likely present in waterbodies, and across wetland, scrub and grassland habitats across the site.
    - Common frog, froglets and toadlets were seen during PEA visits in rough grass/rush habitat and an adult common frog was seen in wet scrub.
    - Historical records of natterjack toads on site.
    - Surveys were accordingly undertaken to assess presence/likely absence of natterjack toad and great crested newts the results of which are summarised within this report.
- Reptiles
    - Records of common lizard exist on site;
    - Suitable habitat for common lizard, slow-worm and grass snake exists across site associated with large expanses of open tussocky grassland areas, or in mosaics of grassland, bracken, scrub etc. Many suitable reptile refugia are also present on site, e.g. log piles, rubble piles etc.
    - Further reptiles surveys were accordingly undertaken in suitable habitats near the main paths, the results of which are summarised within this report.
- Botany
    - Notable plant species and habitats of importance were identified in the PEA. A National Vegetation Classification survey was recommended along the main paths, the results of which are detailed within this report.
- Badger
    - A partially excavated (likely badger) hole was noted in a large rubble bank near the electricity substation during a PEA visit and A badger pawprint was also seen along the northernmost fence-line (locations provided in Appendix A.1).

- Given the nature of proposals further surveys were not considered necessary, however consideration of badger have been included within the EcIA.

- Otter
  - Possible on site. Suitable foraging habitat associated with the waterbodies which hold prey such as fish and amphibians and suitable shelter exists on site within the dense scrub.
  - no signs of otter were seen during the PEA visits (a detailed otter survey was not undertaken, however) and the site is subject to high disturbance from visitors and dogs which may deter otters from site. Further surveys were not considered necessary, although consideration of construction and operational impacts on otter has been factored within the EcIA.
- Invertebrates
  - Numerous invertebrates were identified during the site visits and include blue damselflies (*Enallagma cyathigerum*), cinnabar moths (*Tyria jacobaeae*) and their caterpillars, orange-tip butterfly (*Anthocharis cardamines*), meadow brown butterfly (*Maniola jurtina*), speckled wood butterfly (*Pararge aegeria*), anthills in grassland.
  - Further invertebrate surveys were recommended along the main paths of the reserve to understand invertebrate assemblages and inform any necessary mitigation. The results from this survey are presented within this report.
- Invasive species
  - *Montbretia sp,* Japanese knotweed (*Fallopia japonica*), variegated yellow archangel (*Lamium galeobdolon*) and *Cotoneaster sp* are listed on under Schedule 9 of the Wildlife and Countryside Act 1981, were also recorded on site.
  - Sea buckthorn bushes ranging in maturity levels were present across the site and is recognised as an invasive species to habitats in the north-west of England (locations mapped at A.1).

3.4 BREEDING BIRDS

An assessment of the importance of the habitats provided by the welcome building and by the wider site for breeding birds has been made below.

Welcome building

Whilst no breeding bird surveys were undertaken in this area, the habitats that birds would nest in include dense bramble (*Rubus fruticosus*) scrub, hawthorn (*Crataegus monogyna*) and willows (*Salix sp*).

According to RSPB records there are breeding warblers including whitethroat and lesser whitethroat on site of which the scrub habitat could support.

The following bird species were noted during the PEA that would likely nest in dense scrub habitat. The status of each has been assessed included within Table 4.7 below as well as their respective conservation

status. As there is no breeding bird data available, the geographic value of the species has been estimated using information gathered from Cumbria Biodiversity Data Centre[12].

Table 3.3 Birds likely to nest within the dense scrub associated with the welcome building

Species	Status	Geographic Value
Greenfinch (Chloris chloris)	(BoCC) Red list Species of Local Conservation Interest	Local
Linnet (Linaria cannabina)	Red	Local
Dunnock (Prunella modularis)	Amber S.41 Species	Local
Song thrush (Turdus philomelos)	Amber S.41 Species	Local
Bullfinch (Pyrrhula pyrrhula)	Amber S.41 Species	Local
Wren (Troglodytes troglodytes)	Amber	Local
White throat (Sylvia communis)	Amber	Local
Willow warbler (Phylloscopus trochilus)	Amber	Local
Other species		
Magpie (Pica pica), chaffinch (Fringilla coelebs), blackbird (Turdus merula), goldfinch (Carduelis carduelis), robin (Erithacus rubecula), woodpigeon (Columba palumbus), crow (Corvus corone), great tit (Parus major), blue tit (Cyanistes caeruleus), chiffchaff (Phylloscopus collybita), blackcap (Sylvia atricapilla), long-tailed tit (Aegithalos caudatus)		Site

Wider Site

RSPB have provided the breeding bird data for the entire historical breeding bird data up to 2022. The number of breeding pairs in 2022 has been provided in the table below. Where no birds were observed in 2022, their peak count within the 10 years prior was given.

Table 3.4 Latest lagoon breeding bird figures provided by RSPB

Species	Status	Estimated number of Breeding Pairs
Lagoon		
2022		

Species	Status	Estimated number of Breeding Pairs
Lapwing (Vanellus vanellus)	Red list S.41 species	10
Herring gull (Larus argentatus)	Red list S.41 species Reason for SPA designation	7
Grasshopper Warbler (Locustella naevia)	Red list	1
Ringed plover (Charadrius hiaticula)	Red list	5
Common tern (Sterna hirundo)	Amber Reason for SPA designation	54
Sandwich tern (Thalasseus sandvicensis)	Amber Reason for SPA designation	589
Little tern (Sternula albifrons)	Amber Reason for SPA designation Schedule 1	44
Lesser black-backed gull (Larus fuscus)	Amber Reason for SPA designation	27
Spoonbill (Platalea leucorodia)	Amber Schedule 1	1
Arctic tern (Sterna paradisaea)	Amber	4
Black-headed gull (Chroicocephalus ridibundus)	Amber	522
Great black backed gull (Larus marinus)	Amber	4

Species	Status	Estimated number of Breeding Pairs
Eider (Somateria mollissima)	Amber	57 island, 9 ski bank
Red-breasted Merganser (Mergus serrator)	Amber	3
Common gull (Larus canus)	Amber	1
Oystercatcher (Haematopus ostralegus)	Amber	13
Greylag Goose (Anser anser)	Amber	1
Mallard (Anas platyrhynchos)	Amber	1 island, 1 ski bank
Moorhen (Gallinula chloropus)	Amber	4
Grey Heron (Ardea cinerea)	Green	3
Little egret (Egretta garzetta)	Green	10
Great crested grebe (Podiceps cristatus)	Green	1
Cormorant (Phalacrocorax carbo)	Green	4
Tufted duck (Aythya fuligula)	Green	4
Canada goose (Branta canadensis)	Introduced	4 lagoon 2 ski bank
Pre-2022		
Redshank (Tringa totanus)	Amber	2 (2012)
Teal (Anas crecca)	Amber	1 (2014)
Gadwall (Mareca strepera)	Amber	1 (2012)
Mediterranean gull (Ichthyaetus melanocephalus)	Amber Schedule 1	0 (2 in 2008)
Tufted Duck (Aythya fuligula)	Green	10 (2015)
Habitats around the reserve		
2022		

Species	Status	Estimated number of Breeding Pairs
Grasshopper Warbler (Locustella naevia)	Red	1
Linnet (Carduelis cannabina)	Red	7
Greenfinch (Chloris chloris)	Red	2
Meadow Pipit (Anthus pratensis)	Amber	1
Wood Pigeon (Columba palumbus)	Amber	5
Dunnock (Prunella modularis)	Amber	2
Whitethroat (Sylvia communis)	Amber	7
Sedge Warbler (Acrocephalus schoenobaenus)	Amber	5
Willow Warbler (Phylloscopus trochilus)	Amber	34
Wren (Troglodytes troglodytes)	Amber	8
Bullfinch (Pyrrhula pyrrhula)	Amber	1
Reed Bunting (Emberiza schoeniclus)	Amber	1
Rock Pipit (Anthus petrosus)	Green	1
Pied Wagtail (Motacilla alba)	Green	2
Robin (Erithacus rubecula)	Green	2
Blackbird (Turdus merula)	Green	5
Blackcap (Sylvia atricapilla)	Green	10
Lesser Whitethroat (Sylvia curruca)	Green	2
Chiffchaff (Phylloscopus collybita)	Green	15
Great Tit (Parus major)	Green	2
Blue Tit (Cyanistes caeruleus)	Green	10
Long-tailed Tit (Aegithalos caudatus)	Green	1
Magpie (Pica pica)	Green	1
Jay (Garrulus glandarius)	Green	1

Species	Status	Estimated number of Breeding Pairs
Chaffinch (Fringilla coelebs)	Green	11
Goldfinch (Carduelis carduelis)	Green	6

1.1 OVERWINTERING BIRDS

Proposed welcome building

The terrestrial habitats associated with the proposed welcome building are not considered to be of value for notable overwintering bird species which typically require large expanses of water.

Wider Site

Notable and rare wintering and passage bird species recorded on the RSPB reserve areas are set out in the table below along with any relevant conservation status.

Table 3.5 Wintering bird assemblages at Hodbarrow (2012-2022)

Species	Conservation Status	Peak Count in Winter 2021/2022 (Peak Count in 10 years)
Black-tailed Godwit (Limosa limosa)	Red LBAP Qualifying species for SPA designation	52
Curlew (Numenius arquata)	Red LBAP Qualifying species for SPA designation	38 (300 in 2019)
Dunlin (Calidris alpina alpina)	Red Qualifying species for SPA designation	151 (600 in 2020)
Ringed plover	Red list Qualifying species for SPA designation	15 (100 in 2016)
Goldeneye (Bucephala clangula)	Red	48 (85 in Mar 2021)
Pochard (Aythya ferina)	Red	2 (48 in 2012)
Scaup (Aythya marila)	Red LBAP	0 (17 in 2017)

Species	Conservation Status	Peak Count in Winter 2021/2022 (Peak Count in 10 years)
Slavonian Grebe (Podiceps auritus)	Red	1 (peak count)
Bar-tailed Godwit (Limosa lapponica)	Amber Qualifying species for SPA designation	0 (1 in March 2021)
Oystercatcher	Amber Qualifying species for SPA designation	42 (522 in 2014)
Grey Plover (Pluvialis squatarola)	Amber Qualifying species for SPA designation	0 (42 in 2019)
Knot (Calidris canutus)	Amber Qualifying species for SPA designation	230 (peak count)
Mediterranean Gull (Larus melancephalus)	Amber Qualifying species for SPA designation	2 (peak count)
Redshank (Tringa totanus)	Amber Qualifying species for SPA designation	270 (2500 in 2020)
Sanderling (Calidris alba)	Amber Qualifying species for SPA designation	23 (peak count)
Turnstone (Arenaria interpres)	Amber Qualifying species for SPA designation	19 (65 in 2012)
Whooper Swan (Cygnus cygnus)	Amber Qualifying species for SPA designation	5 (80 in 2013)
Black-throated Diver (Gavia arctica)	Amber LBAP	1 (peak count)
Black-headed Gull	Amber	622 (peak count)
Arctic tern	Amber	2 (peak count)
Common Guillemot (Uria aalge)	Amber	0 (1 in 2019)
Common gull	Amber	1 (25 in 2012)
Eider	Amber	266 (648 in Mar 2021)

Species	Conservation Status	Peak Count in Winter 2021/2022 (Peak Count in 10 years)
Gadwall	Amber	9 (13 in 2014)
Great Northern Diver (Gavia immer)	Amber	1 (peak count)
Greenshank	Amber	1 (3 in 2020)
Little Tern	Amber	47 (peak count)
Pink-footed Goose (Anser brachyrhynchus)	Amber	0 (300 in 2012)
Pintail (Anas acuta)	Amber	13 (peak count)
Red-breasted Merganser (Mergus serrator)	Amber	50 (79 in 2013)
Sandwich Tern	Amber	589 (1950 in 2018)
Shoveler (Anas clypeata)	Amber	3 (4 in 2019)
Spoonbill	Amber	1 (peak count)
Wigeon (Anas penelope)	Amber	202 (300 in 2020)
Little Egret	Green Qualifying species for SPA designation	10 (71 in 2018)
Golden Plover (Pluvialis apricaria)	Green	620 (647 in 2017)
Goosander (Mergus merganser)	Green	0 (1 in 2017)
Great Crested Grebe	Green	11 (peak count)
Rock Pipit (Anthus petrosus)	Green	1 (peak count)
Garden Warbler (Sylvia borin)	Green	0 (4 in 2015)
Reed Warbler (Acrocephalus scirpaceus)	Green	0 (2 in 2015)
Canada Goose	Introduced	52 (60 in 2019)

4.0 OBJECTIVES & METHODOLOGY

4.1 NATIONAL VEGETATION CLASSIFICATION

The methodology has been extracted from the 2021 and 2022 NVC reports[13],[14].

Aims and Objectives

Habitats (Phase II)

The NVC survey aimed to quantify the condition of habitats and to identify any habitats of importance including:

- Annex I habitats: these are habitats identified under Annex I of the Habitats Directive. All Annex I habitat types must be regarded as being of international-level importance (CIEEM, 2019);
- Habitats of Principal Importance (HPIs): often referred to as 'priority habitats', HPIs include habitats of special importance for conservation as identified under s.41 Natural Environment and Rural Communities (NERC) Act 2006; and
- Local Biodiversity Action Plan (LBAP) habitats: LBAP habitats include habitats which are of special conservation importance within Cumbria.

Important Plants (Phase III)

The survey was undertaken by Joshua Styles BSc AMRSB MCIEEM, and also aimed to identify any protected and notable plants. As per CIEEM (2019), an 'important plant' for the purposes of this report is defined as a species/taxon which is:

- Specially protected: plants protected from picking, uprooting, killing, cutting, possession or sale;
- Priority species: a plant which is recognised as a Species of Principal Importance (SPI) in England under s.41 NERC Act 2006;
- Local priority species: a plant which is recognised as a species of local conservation priority in Cumbria under the LBAP;
- Species of Conservation Importance: a plant which is recognised under the north west Biodiversity Audit as a Species of Conservation Importance for the region of north west England;
- Red-listed species: plants which are red-listed in Great Britain and/or England (Botanical Society Britain & Ireland, 2021 Stroh et al, 2014[15]);
- Nationally rare/scarce: plants which occur at very few locations nationally (<16 for nationally rare taxa, <101 for nationally scarce taxa); and
- Locally rare/scarce: plants which are scarce in the local area/region. These may or may not be included on the Cumbria Rare Plant Register (Porter & Halliday, 2014[16]).

Methodology

Desk Based Survey

Biological records were obtained from the Cumbria Biodiversity Data Centre (CBDC) and reviewed prior to site survey visits. Data was also reviewed across MAGIC, the Natural England designated sites view, BSBI Maps and Halliday (1997).

Site Survey

The NVC survey was undertaken by Joshua Styles BSc AMRSB MCIEEM, and identified baseline habitats and notable plants present in the survey areas (see Figure 4.1) on the following dates:

- Key Areas identified as 20m either site of existing main paths on 25th-26th June 2021 (red line survey boundary)
- The proposed Welcome building Area and 20m either side of existing main paths undertaken 20th to 22nd May 2022 (blue line survey boundary)
- A Phase 3 Notable Plant Survey was also undertaken between 20th-22nd May 2022 (both red and blue line survey boundary).

Figure 4.1 NVC survey boundaries

Phase II Habitats

Phase II habitat survey to the standard of Rodwell (ed.) (1991-2000; 2006)[17].

For terrestrial habitats, where large areas of one stand existed, a total of five targeted quadrat samples (relevés) were deployed across homogeneous stands where possible, which were two metres squared for grasslands and 20 metres squared for scrub communities. Where stand sizes were small or floristic tables with five samples was already taken for the same stand, a singular quadrat sample was sometimes taken; this was done for a range of different grassland, sand dune, swamp and scrub habitat types.

Aquatic habitats contained within the survey area targeted for Phase II habitat survey included a portion of coastal lagoon to the south-east. Due to safety concerns over access to this lagoon, it was viewed only from two discrete locations where access to the water's edge was available and safe. Aquatic vegetation was viewed from the margins of the water body as consent for use of destructive methods via grapnel was not obtained for the purposes of this survey.

Measures for frequency were calculated using the Domin scale (see Table 4.1) dependent upon abundance within any given sample. Where five samples were taken of a stand, a constancy value of I-V was calculated dependent upon the presence of a species through one to five samples. Where stand samples or stand-alone quadrat samples were obtained, a relative constancy value was obtained by dividing samples and/or wider stands into five equal portions and calculating constancy by noting presence of any given species through these portions.

Table 4.1 The Domain Scale

Cover	Domain
91-100%	10
76-90%	9
51-75%	8
34-50%	7
26-33%	6
11-25%	5
4-10%	4
<4% (many individuals)	3
<4% (several individuals)	2
<4% (few individuals)	1

Floristic survey data was analysed via Modular Analysis of Vegetation Information System (MAVIS) and subsequently assessed to identify Habitats of Principal Importance (HPIs) and Annex I habitats aligned with published guidance and their relative floristic importance. Stands were classified to subcommunity level where possible, however, in many cases vegetation was identified to community level only. This was particularly the case where habitats exhibit characters of two or more subcommunities and/or where communities were in a transitional state and/or not typical examples of any given community. Where stand types were encountered across parts of the site which have

previously been surveyed and analysed through MAVIS, supplementary floristic survey data was taken and use of MAVIS was not considered necessary.

A geographic frame of reference for each habitat type was applied from international to local, to give indication of the conservation importance of each habitat on a geographic scale. This was applied in alignment with CIEEM (2019).

Quantum Geographic Information System (QGIS) was used to map all British Plant Communities surveyed at RSPB Hodbarrow and the proposed car park to the north. This NVC map was then used to extrapolate communities which qualify for Annex I habitats alongside Habitats of Principal Importance for England which are individually displayed within Appendix A Figure A.2 NVC results respectively.

Phase 3 Important Plant Survey

Phase 3 important plant survey was undertaken across all survey areas shown within Figure 4.1, including those areas which were subject to NVC survey during 2021. Important plant surveys consisted of comprehensive walkovers on terrestrial habitats using methods aligned with Hill et al (2005)[18]. Where important plant species were identified, notes were taken on their abundance and cover. When species were ubiquitous and widespread within a habitat/stand, a DAFOR score was assigned to that species for the stand. However, where species were not widespread over an area and plants occurred as discrete individuals, OS Grid Reference points were taken using a Garmin etrex 20.

Any unidentifiable material or material where verification was required, where relevant, was photographed and sent to the relevant Botanical Society of Britain and Ireland referee for verification. This was particularly the case for specimens within the genus Taraxacum.

Aquatic environments were surveyed purely using visual methods and without removal of any plant or use of destructive methods such as grapnelling. This presented constraints discussed further within the section below, given that many macrophytes, particularly those across the genera Potamogeton and Chara, require close inspection and potentially verification by the national BSBI referee.

A geographic frame of reference was used to establish the importance of each important plant population using a range of literature, coupled with known distributional data reviewed from BSBI (2022). This was applied in alignment with CIEEM (2019).

Nomenclature for higher plants follows Stace (2019)[19], whilst for bryophytes and charophytes follows Smith (1990 & 2004) and Moore (1986), respectively.

Alongside important plants recorded within the defined survey areas, a number of observations were made which were outside of the scope of this report. However, these observations are considered relevant to the scope of works and have therefore been included within this report for information.

QGIS was used to map the approximate distributions of all important plant species recorded during survey. Maps with distributional data for identified important plants may be found within Appendix A Figure A.2 NVC results.

Condition Assessment

Habitat types were assessed with regards to their condition in alignment with Natural England (2019) which classifies habitats from good to poor. Further detail on the methodology is provided within the BIA.

Constraints

All habitats contained within the survey boundary were mapped to community level with the exception of bare ground across routes including road, bare earth and hardstanding. In addition, areas of agricultural land which are privately owned were not entered and surveyed to the south-east, although it is understood that no impacts to this habitat are likely as a result of the project.

Areas of standing water including Hodbarrow lagoon, and an additional large waterbody were inspected using visual methods only, and destructive methods including deployment of grapnel were not utilised for the purposes of this survey. This was primarily in light of the statutory designations which RSPB Hodbarrow is subject to, alongside safety concern. Pondweeds (*Potamogeton* spp.) alongside charophyte beds were observed within a lagoon to the south-east of the survey areahowever could not be sampled.

Phase II habitat surveys across RSPB Hodbarrow were conducted broadly within an optimal period for the majority of plant species that favour the surveyed habitat types. However, it is likely that some species were unable to be identified due to seasonal or other constraints, particularly including later-flowering taxa. Nonetheless, the survey was led by a highly experienced, FISC 6 botanist who is satisfied with the survey effort and does not consider this to be a significant constraint in the context of the aims and objectives of this report.

Many cryptic taxa, namely including apomictic species under the genera Hieracium, Rubus and Taraxacum could not be identified to species-level due to seasonal constraints. Plants across these genera are only able to be identified in the presence of all relevant vegetative parts, flowers and/or fruits. Furthermore, most species within these genera may only reliably be identified by country experts, of which there are 3 for Hieracium, 6 for Rubus and 1 for Taraxacum (Rich, 2022). It is unrealistic to identify all cryptic taxa on any site, although a special effort was afforded to Taraxacum wherein some identification to species-level was possible at the time of the survey. This limitation has therefore been addressed as far as is reasonably practicable and is not considered to be a significant constraint to this survey and assessment.

While many bryophytes were recorded to species level, the surveyor is not a specialist bryologist and many taxa, particularly those which require microscopic identification, are likely to have been omitted from survey data. However, a reasonable effort was made to identify all non-vascular plants wherever possible, many of which have been recorded within raw floristic data as part of NVC survey (Appendix A Figure A.2 NVC results). This report does not constitute a specialist bryological assessment or an assessment for other visually similar groups, including lichenised fungi.

Limitations arose with regards to a condition assessment of an additional area of coastal lagoon under the category of ‘Lakes’. Hydrological, biological, chemical and physical characteristics could not be thoroughly assessed by way of water testing, assessment of fish assemblages and other factors for

example, and condition of the lake has been ascertained via a combination of interpretation of existing guidance, and professional judgement in light of the identified floristic and habitat value.

The shapefiles containing the GPS data for the NVC survey were corrupted and accurate mapping was unable to be re-created for the purposes of this report. Therefore, a PDF of the original maps has been provided instead within Appendix A Figure A.2 NVC results.

4.2 AMPHIBIANS

Amphibian surveys were undertaken by Tyrer Ecological Consultants Ltd in May and June 2021[20] and April and May 2022[21].

Aims and Objectives

The objectives of the surveys were to:

- Determine presence or likely absence of Natterjack toads and/or GCN at the site over an initial four surveys during an optimal period of the year for detecting the animals;
- Assess the habitat value of the site for Natterjack toad / GCN respectively
- Gather baseline data that may inform a more robust impact assessment for later phases of the project,
- Determine if Natterjack toads will be affected by the proposals for a new car park,
- Determine if Natterjack toads will be affected by the wider proposals at RSPB Hodbarrow,
- Assess the habitat value of the proposed new car park site and its zone of influence for Natterjack toad
- From the survey results provide an appraisal of potential risks and implications,
- Identify measures likely to be required in line with the mitigation hierarchy (i.e. impact avoidance > minimisation > mitigation > compensation)
- Advise on mitigation and/or enhancement.

Methodology

Tyrer Ecological Consultants Ltd followed an adopted methodology based on the Natterjack Handbook[22].

The 2021 presence/likely absence surveys for natterjack toads and GCN comprised a total of four site 'walkovers' that involved four transects between May and June 2021. Other areas were surveyed based on favourable habitat conditions. Dense woodland and scrub was generally scanned but the more open habitats were favoured when torching. Additionally, three semi-permanent ponds at RSPB Hodbarrow were surveyed closely (see Figure 4.2 below).

The 2022 surveys involved walked transects and a pond inspection for natterjack toads on 4 occasions in April and May 2022 following a two-week period of rainfall to enable the lead surveyor to identify

key areas. The walkovers included inspection of ponds, pools and waterbodies and local environs that included a meticulous search for 3-4 hours per survey from sunset on each of the surveys.

A total of 7 Key Areas were identified, along with a known breeding pool (see Figure 4.2). Additionally, three ponds at RSPB Hodbarrow were re-surveyed closely. 2022 survey effort aimed both to update the 2021 results and to cover a crucial missed optimal window for surveying Natterjack toad (April/early May); in considering the new planning proposals, the 2022 surveys would cover a wider geographic area than that which was achieved in 2021.

During both years, the first survey was preceded by a 2-hour diurnal reconnaissance survey to allow the lead surveyor to identify all ponds/pools/unmapped water bodies on site, determine key areas of focus based on suitable habitats, and plan key transect routes for nocturnal work.

Figure 4.2 Map of approximate key areas and ponds and transects

Suitable water body margins were surveyed where access permitted, and/or where disturbance impacts to breeding birds could be conclusively avoided given the sensitive nature of the site to breeding bird's assemblages, and coinciding timings of the survey. The surveys involved the following techniques dependent on the type of habitat present i.e dense woodland and scrub was generally scanned but the more open habitats were favoured when torching.

A total of eight site 'walkovers' in 2021 and 2022 were carried out that involved repeat transects adopting the following methods:

- Torchlight use: This technique involved a visual search for Natterjack toads in key areas including margins of suitable water bodies. High-powered torches (x2 Clu-lite Deluxe CB2's) were used after nightfall. Along tracks and habitat edges the beam was shone ahead of the surveyor sweeping side to side on occasion with care not to shine into sensitive areas concerning breeding birds (for example, Tern/wader nesting areas). Pond/pool perimeters were walked carefully and methodically taking care to record animals seen. To maximise the reliability of this technique, all torch surveys were conducted on evenings where the air temperature exceeded 5°C, when amphibians are generally considered being most active.
- Refuge/Terrestrial search: Natterjacks and Great Crested Newts rest under refuge areas such as rocks, debris, itemised rubble etc. Where it was safe to do so, smaller items were turned over / loosely dismantled to inspect these areas for evidence of the target species.
- Egg strings, tadpoles and toadlets search: Suitable ephemeral pools and ponds were inspected for egg strings or tadpoles of Natterjack toads, as well as eggs/efts of GCN where access permits. Where tadpoles were found the surveyor attempted to identify the target to species level, though this is not always a reliable ID method as it is difficult to visually differentiate Natterjack and Common Toad tadpoles.
- Listening for Natterjack calls: Reasonable silence was applied throughout the surveys to enable surveyors to listen for calling toads.

Constraints

The 2021 survey effort began mid-May, which missed a considerable portion of the optimal survey window for detecting Natterjack toads (April to July typically, then September for toadlets dispersal), particularly for identifying areas with calling males and spawn strings in water. This constraint has been addressed by undertaking surveys in 2022.

Weather in late April/May 2021 were wetter than average which provides highly favourable survey conditions though temperatures were cooler than average. The comparable weather patterns through mid-May to mid-June were much drier and hotter resulting in drying out of ephemeral pools.

As RSPB Hodbarrow is a RSPB reserve, care was taken to avoid torch light disturbance to breeding birds, particularly those utilising the islands around the viewing hub in the south of the site along the Yellow transect. It was clear this area contains 'pool' areas around the margins of the island, which could be perceived as suitable for Natterjack toad, which therefore presents a minor survey constraint as surveyors did not inspect the pools for risk of an offence / disturbing breeding birds.

The 2022 survey effort began mid-April after a consistent period of heavy rainfall during March and early April, thus within an optimal survey window for finding and assessing the value of ephemeral pools / open water environments for Natterjack toads. The first two surveys in April 2022 located a number of pools that were earmarked as Key Areas with potential for supporting Natterjack breeding as long as the water bodies did not dry out. However, by the third survey in May 11th 2022 following a two week spell of dry and warm weather, most of the pools within all Key Areas had dried out.

The margins of all large lakes on site were only surveyed where access permits, and/or where disturbance impacts to breeding birds could be conclusively avoided given the sensitive nature of the site to breeding bird's assemblages, and coinciding timings of the survey.

Due to proximity to deep waters, high rock interfaces, capped mine shafts, and other risks covered in the project risk assessment, surveyors maintained a sensible distance away from the edge of the deep lakes on RSPB Hodbarrow. Whilst Natterjacks are highly unlikely to use large lakes for breeding, this did restrict the areas available for torching to safer, more readily accessible areas, which creates a low potential for missing animals using the perimeters of lakes for commuting.

Table 4.2 Constraints specific to each survey area

Map reference	Survey undertaken	Constraints
Pond 1	2021 and 2022	2021: Significant turbidity was encountered at this waterbody from survey 1 through to survey 4, which limited the effectiveness of the torching method here. 2022: Nearly dry during survey 2 when it was first visited; by surveys 3-4 it held less than 15m of water of a depth <5cm.
Pond 2	2021 and 2022	2021: Approximately 90% of the pond was accessible; 10% to the northern border was inaccessible due to dense scrub. 2022: Approximately 90% was accessible; 10% to the northern border was inaccessible due to dense scrub.
Pond 3	2021 and 2022	2021: Approximately 50% of the pond was accessible; 50% to the north-west and north-eastern border was inaccessible due to presence of scrub. Additionally, at this pond, surface algae became increasingly prolific as the survey effort went on and temperatures increased, and as the pond receded inwards, it became increasingly difficult to survey it effectively due to macrophyte cover. 2022: Approximately 80% was accessible; 20% to the north-west and north-eastern border was inaccessible due to presence of scrub. Additionally, at this pond, surface algae became increasingly prolific as the survey effort went on and temperatures increased, and as the pond receded inwards, it became increasingly difficult to survey it effectively due to macrophyte cover.
Transect 1	2021	No significant constraints were experienced.
Transect 2	2021	One of the transects during survey 2 anti-social recreational activity limited the surveyor team to 25% of the transect in the north. No other constraints were experienced.

Map reference	Survey undertaken	Constraints
Transect 3	2021	No significant constraints were experienced.
Transect 4	2021	As RSPB Hodbarrow is a RSPB reserve, care was taken to avoid torch light disturbance to breeding birds, particularly those utilising the islands around the viewing hub in the south of the site along the Yellow transect. It was clear this area contains 'pool' areas around the margins of the island, which could be perceived as suitable for Natterjack toad, which therefore presents a minor survey constraint as surveyors did not inspect the pools for risk of an offence / disturbing breeding birds.
Key Areas 1	2022	No constraints though the large pool in this area was vast, discoloured/turbid and chemical-laden, and dried out by surveys 3 and 4.
Key Areas 2	2022	No constraints though the small pool in this area was discoloured / turbid and chemical-laden and dried out by surveys 3 and 4.
Key Areas 3	2022	No constraints though the small pool in this area was discoloured / turbid and chemical-laden and dried out by surveys 3 and 4.
Key Area 4	2022	Had no constraints, the ditch retained water throughout the survey effort and had a high volume of macrophytes.
Key Area 5	2022	No constraints though the large pool in this area was discoloured / turbid and chemical-laden and dried out by surveys 3 and 4.
Key Area 6	2022	Had sporadic shallow pools within this area are within heavily shaded ditches aside the track, and dense scrub and tall rank vegetation which limited access in-part, though this is not considered a significant constraint
Key Area 7	2022	had no constraints, large pool retained water throughout the survey effort. Foul smelling but crystal clear.
Known NT Breeding Pool	2022	only accessed during survey 2, and only 40% of the eastern margin was investigated, to avoid unnecessary disturbance to Natterjack toads and breeding birds, and, because it is understood to be visited throughout the breeding season by

Map reference	Survey undertaken	Constraints
		ARC UK surveyors. Retained water throughout the survey effort but reduced in volume / size as the surveys went on.

Following the completion of the surveys, whilst the given limitations as stated apply and accepting that general limitations and access issues can affect survey results, given how most of the site was visited in 2021 as well as 2022 totalling 8 surveys completed by experienced surveyors, in considering all of the factors no significant issues were experienced that could compromise the integrity of the results, conclusions and recommendations in the amphibian report and in good practice the amphibian survey can be relied upon as a sufficient scientific investigation with sound impact assessment/ recommendations to support the proposed planning application.

4.3 REPTILES

Lucy Gibson Consulting and Appletons undertook a reptile survey in March and June 2022[23].

Aims and Objectives

The aim of the reptile survey was to:

- Confirm the presence / likely absence of different reptile species utilising the site;
- Where reptile species are confirmed as present, asses the reptile population size class;
- Advise on any implications reptiles would have on the proposals; and
- Where appropriate advise on reptile mitigation and habitat management.

Methodology

A population size class survey for reptiles was undertaken by Lucy Gibson Consulting and Appletons in accordance with the best practice methodology detailed in the Herpetofauna Workers Manual[24]. An initial assessment of the potential reptile habitat characteristics was undertaken, in order to identify features and habitats of potential value to reptile species.

The survey was split into two areas the proposed welcome building area and the wider site. Survey transects through the site were identified to ensure all suitable habitats were covered by the survey across the welcome building site and near the main paths on the wider site. Checks of any natural refugia present within the survey areas along the transects, such as log piles or rubble piles, were undertaken.

A series of 270 c.50cm x 50cm artificial refugia made of both roofing felt and corrugated tin in roughly equal numbers were deployed in pairs (one tin with one felt) wherever possible within suitable habitat in the survey areas on Hodbarrow Reserve and on the proposed car park site, at least ten days prior to the first survey visit in order to facilitate detection of reptiles. Approximately 8.3ha of suitable reptile

habitat along the main routes through the reserve were surveyed, and approximately 1.6ha of suitable reptile habitat in the proposed car park site was surveyed for reptiles. The habitats present in these areas mainly comprised a mosaic of calcareous grassland/lowland meadow/sand dunes with bramble/gorse/hawthorn scrub. The density of refugia deployed across the survey areas on the reserve was approximately 29 refugia/hectare of suitable reptile habitat, and across the proposed welcome building site was approximately 20 refugia/hectare of suitable reptile habitat.

Eleven survey visits were undertaken between March and June 2022 to inspect natural and artificial refugia for reptiles, in suitable weather conditions (between 9-18oC, dry, low wind).

Potential basking spots for reptiles were surveyed by Direct Observation Survey from a distance using binoculars.

Transects were walked in different directions and started in different areas between visits, in order to avoid temporal bias affecting the results.

Constraints

During the reptile survey, members of the public disturbed or moved the artificial reptile refugia at times. However, this was not considered to be a major constraint as the refugia were placed at a relatively high density (20-29 refugia/hectare).

The weather during the reptile survey was mixed and temperatures were generally lower than average at the time of year with some survey visits undertaken with occasional un-forecasted showers of rain. However, the majority of survey visits were undertaken during suitable weather conditions and reptiles were recorded during every visit therefore the weather is not considered to be a significant restraint.

No significant constraints that stand to impact conclusions drawn in this report therefore presented themselves.

4.4 INVERTEBRATES

The invertebrates surveys were carried out in May, June and July 2021[25] focusing on buffer zones by the main paths and April and May 2022[26] focusing on the welcome building and car parking area.

Aims and Objectives

The survey was undertaken to determine whether any species of conservation interest may be affected by the development. Those species of conservation interest would fall within the following categories:

Nationally scarce

The Nationally Scarce category applies to species recorded from between 16 and 100 hectads since 1980. It was previously known as Nationally Notable for invertebrates, and divided into List A (species in Great Britain thought to occur between 15 and 30 10km squares) and B (between 31 and 100 10km squares). Modern reviews use this category, as NbB and NbA are being phased out.

Nationally scarce (notable B).

Taxa which do not fall within RDB categories but which are nonetheless uncommon in Great Britain and thought to occur in between 31 and 100 10km squares of the Ordnance Survey grid or, for less well recorded groups, between eight and twenty vice counties. A species with Notable A or B status has not been reviewed for some years as neither term is used in recent reviews.

Section 41

Sections 41 (England) and Sections 42 (Wales) of the Natural Environment and Rural Communities Act 2006 require the listing of species of principal importance for the purpose of conserving biodiversity and therefore need to be taken into consideration by a public body when performing any of its functions with a view to conserving biodiversity.

And whether the site meets the criteria as an invertebrate site of significance.

Methodology

Three visits were undertaken in May, June and July 2021 to survey 20m buffers along the main paths on the wider site and three visits were made in April and May 2022 which focused on the welcome building. The methods used or the assessment are those recommended in the Natural England guidance document *Surveying Terrestrial and Freshwater Invertebrates for Conservation Evaluation*[27]. Standard field techniques were employed to sample the invertebrate fauna across the area proposed for the welcome building including:

- Hand searching. Turning over stones and other objects on the ground. This can be useful in finding nocturnal ground beetles, rove beetles, millipedes, centipedes.
- Sieving. Consists of breaking up rotten wood, or taking handfuls of leaf / grass litter or moss and sieving the material into a white tray. It is a useful method for sampling smaller Coleoptera species.
- Sweep netting. The major technique in invertebrate survey work. Besides general sweeping of vegetation it can be used as a 'spot targeting' technique for flying insects such as bees and hoverflies.
- Beating. Similar to sweeping but more focused on lower branches of trees and bushes. It consists of holding a beating tray or net under branches which are then hit sharply with a stick to dislodge insects. It is useful in obtaining arboreal species, including many beetles and true bugs.
- Pitfall traps. These are plastic vending cups set in the ground and containing a small amount of anti-freeze as a preservative. They are useful for sampling a wide range of ground dwelling invertebrates that may be time-consuming to sample in other ways.

Over 2021 and 2022, a total of 15 pitfall traps were set in various parts of the site (See Figure 4.3).

Figure 4.3 Locations of pitfall traps

The online Patheon database tool[28] was used to analyse invertebrate sample data. If an assemblage or suite of assemblages are found to be in favourable condition this would indicate that the site is likely to be of significant importance for invertebrates. The criteria for defining invertebrate sites of significance follows the Plant (2009) are described within the table below:

Table 4.3 The Plant (2009) criteria for sites of significance for invertebrates

Importance	Description	Minimum Qualifying Criteria
International (high) importance	European important site (i.e. SAC)	Internationally important invertebrate populations present or containing RDB1 (Endangered) species or containing any species protected under European legislation or containing habitats that are threatened or rare at the European level (including but not exclusively so, habitats listed on the EU Habitats Directive)
National (high) importance	UK important site	Achieving SSSI invertebrate criteria (Ratcliffe, 1989) or containing RDB2 (Vulnerable) or containing viable population of RDB3 (Rare) species protected under UK legislation or containing

Importance	Description	Minimum Qualifying Criteria
		habitats that are threatened or rare nationally (Great Britain).
Regional (medium) importance (for border sites, both regions must be taken into consideration)	Site with populations of invertebrates or invertebrate habitats considered scarce or rare or threatened in north-west England	Habitat that is scarce or threatened in the region or that has, or is reasonably expected to have, the presence of an assemblage of invertebrates including at least 10 Nationally Notable species or at least 10 species listed as Regionally Notable for the English Nature region in question in the Recorder database or elsewhere or a combination of these categories amounting to 10 species in total.
County (for border sites, both counties must be taken into account)	Site with populations of invertebrates or invertebrate habitats considered scarce or rare or threatened in the county in question	Habitat that is scarce or threatened in the county and/or which contains or is reasonably expected to contain an assemblage of invertebrates that includes viable populations of at least five Nationally Notable species or viable populations of at least five species regarded as Regionally Scarce by the county records centres and/or field club.
District	Site with populations of invertebrates or invertebrate habitats considered scarce or rare or threatened in the administrative District	A rather vague definition of habitats falling below county significance level, but which may be of greater significance than merely Local. They include sites for which Nationally Notable species in the range from 1 to 4 examples are reasonably expected but not yet necessarily recorded and where this omission is considered likely to be partly due to under-recording.
Local	Site with populations of invertebrates or invertebrate habitats considered scarce or rare or threatened in the affected and neighbouring Parishes (except Scotland, where the local area may best be defined as being within a radius of 5 kilometres	Habitats or species unique or of some other significance within the local area.

Importance	Description	Minimum Qualifying Criteria
Importance within the context of the site only		Although almost no area is completely without significance these are the areas with nothing more than expected "background" populations of common species and the occasional Nationally Local species.

Constraints

During the 2021 surveys it had been intended to use pan traps for the duration of visits but decided against as there were many visitors to the area. Pitfall trap 1 (PT1 on Figure 4.3) had been set among trees at the edge of the path but was found destroyed (probably by a dog) and so was re-set further from the path on the opposite side. No pitfall traps were installed along the route of the upper path because there were fewer suitable sites.

For the 2022 welcome building surveys 3 visits were made in April and May whereas they would normally be carried out over a longer period. Natural England guidelines specify that an 'average' site, which is between 10 and 50 hectares, should have between 3 and 7 days of field work. Further work in June would have added further species to the list but it is unlikely that results would make any difference to the rating therefore, this is not considered a significant constraint.

Pitfall trap three was found to have been removed during the 2022 survey and was replaced in a different position. This was not highlighted as a significant constraint.

4.5 SURVEYORS

The surveys were completed by a team of experienced surveyors. Key personnel including report author and report reviewer are set out below.

Morgan Taylor, who reviewed this document, has a bachelors and masters degree in Marine Biology (MSci Hons), a Natural England CL17 Bat Survey Level 2 Class Licence (2015-7369-CLS-CLS) and CL10 Dormouse Survey Licence (2017-30817-CLS-CLS). Morgan is a Chartered Environmentalist, Full member of CIEEM and has over 11 years' experience in ecological surveying, having undertaken assessments of numerous development sites of this type. He leads the Ecology team at Greengage.

Laura Thomas, who prepared this document, has an undergraduate degree in Biology (BSc Hons) and a Master's degree in Evolutionary and Behavioural Ecology, holds a Natural England Bat Survey Level 1 Class Licence (2021-10098-CL17-BAT) and is a Graduate member of CIEEM. Laura has over 6 years' experience in the commercial sector.

Lucy Gibson (MCIEEM), who co-ordinated all of the ecological survey work with Appletons, led and who carried out some of the surveys (for the PEA and reptile surveys), has a MSc in conservation and is a full Member of the Chartered Institute of Ecology and Environmental Management (CIEEM and holds a Natural England Bat Mitigation Class Licence. Lucy has over seventeen years' professional ecological consultancy, specialising in protected species surveys, mitigation and licensing.

Lorraine McKee (ACIEEM) of Appletons, who carried out the PEA and reptile survey, has over 10 years' experience as an ecologist and is an Associate member of the CIEEM. She has a background in practical survey work and as an Ecological Clerk of Works. She holds both a Level 1 Bat License and a Level 1 Great Crested Newt License and her survey experience includes Preliminary Ecological Appraisals/UKHab and invasive species surveys as well as surveying for protected species and preparing mitigation strategies for licencing purposes with a specialism in badgers.

Joshua Styles BSc AMRSB MCIEEM, who carried out the NVC survey, is a highly experienced, certified FISC 6 botanist and ecologist with over 15 years' botanical recording experience. Joshua has a wealth of experience in undertaking specialist botanical survey and is also licensed in England for the specially protected plants Floating Water-plantain (Luronium natans) and Field Wormwood (Artemisia campestris). Joshua also sits on the CIEEM north-west committee and the Botanical Society of Britain and Ireland (BSBI) Training and Education Committee and is a member of the BSBI and British Bryological Society (BBS).

M. Pritchard ACIEEM, who led the amphibian surveys, works as senior ecologist at Tyrer Ecological Consultants Ltd and holds a protected species survey licence for Natterjack toad (2021-55107-SCI-SCI). He has over five years of experience and has undertook extensive training and demonstrated key competence in species ID, known ecology, and ecological impact assessment.

K. Wilding CEnv MIEMA ACIEEM, who also undertook amphibian surveys is a principal level ecologist of 14 years and director of Tyrer Ecological Consultants Ltd. She has a broad range of skills and has demonstrated key competence in species ID, known ecology, and ecological impact assessment.

Mr. J. Pescod Qualifying CIEEM, who undertook amphibian surveys, is a consultant ecologist of four years, with extensive training and key experience in surveying for the named species, including on commercial schemes. Accredited agent on the Great Crested Newt: CL08 Class 1 licence (2018-34062-CLS-CLS) and Natterjack toad licence (2020-48549-SCI-SCI) of Mr. M. Pritchard ACIEEM.

Ms. E. Thomas, who undertook the amphibian surveys, is a seasonal ecologist in her first year at Tyrer Ecological with early experience of undertaking surveys for British herpetofauna.

Mr. L. Moat, who undertook the amphibian surveys, is a highly experienced freelance surveyor of 15 years working as a sub-contractor for Tyrer Ecological Consultants Ltd. Has a Great Crested Newt - CL08 Level 1 licence (201512345-CLS-CLS) and has demonstrated key competencies in in species ID, known ecology, and ecological impact assessment.

T. Hesketh, who undertook the amphibian surveys, is an experienced Junior Ecologist with 2 years professional training and experience; holding a BSc in Biology and MSc in Conservation Management a course accredited by CIEEM.

K. Judson, BSc (Hons.), MSc., who undertook the amphibian surveys is a Qualifying member of CIEEM and an experienced Junior Ecologist.

Don Stenhouse MSc, FRES is a fellow of the Royal Entomological Society and Curator of Natural Science at Bolton Museum. He specialises in invertebrate identification, particularly Coleoptera, and

has carried out work for a wide range of clients across the UK. He led the invertebrate survey and was accompanied by Joanna Lewis.

This report was written by Laura Thomas and reviewed and verified by Morgan Taylor who confirms in writing (see the QA sheet at the front of this report) that the report is in line with the following:

- Represents sound industry practice;
- Reports and recommends correctly, truthfully and objectively;
- Is appropriate given the local site conditions and scope of works proposed; and
- Avoids invalid, biased and exaggerated statements.

4.6 CONSTRAINTS

Overall, no significant constraints stand to impact conclusions drawn in this report. The constraints relevant to each survey are set out within the relevant sections above.

5.0 RESULTS

5.1 NATIONAL VEGETATION CLASSIFICATION RESULTS

Proposed Welcome building

The following NVC communities were recorded on the site and are described below. Further detail on each of NVC classifications is presented in Appendix A Figure A.2 NVC results and a full description of habitats is provided in Appendix B.1.

Table 5.1 gives the NVC communities and their national and regional distribution.

Table 5.1 Proposed welcome building NVC communities.

NVC Classification (Code)	Status	Level of Importance
Festuca ovina – Carlina vulgaris / (CG1)	Annex 1 habitat: Semi-natural dry grasslands and scrubland facies on calcareous substrates (H6210)	International
	HPI: Lowland Calcareous Grassland	
	LBAP: Calcareous Grasslands	
Briza media – Brachypodium sylvaticum grassland	Annex 1 habitat- Semi-natural dry grasslands and scrubland facies on calcareous substrates (H6210)	International
	HPI: Lowland Calcareous Grassland	
	LBAP Calcareous Grassland	
Arrhenatherum elatius grassland *Centaurea nigra* sub-community (MG1e)	HPI: Lowland Meadow	Regional
	LBAP Hay Meadows and Lowland Pastures	
Eleocharis palustris swamp – *Eleocharis palustris* sub-community (S19a)	HPI: Ponds	Regional
Holcus lanatus – Juncus effusus rush-pasture	N/a	Local

NVC Classification (Code)	Status	Level of Importance
Juncus inflexus sub-community (MG10b)		
Other habitats (that do not qualify for priority status)		
Eleocharis palustris swamp – Eleocharis palustris sub-community (S19a)		
W23c *Ulex europaeus – Rubus fruticosus* scrub – *Teucrium scorodonia* sub-community (W23c)		
W24 *Rubus fruticosus – Holcus lanatus* underscrub.		

A total of 7 important plant species were observed during surveys within this area including taxa of Regional to local conservation importance. An overview of these species, their location, abundance and conservation importance can be found in Table 5.2.

Table 5.2 Important Plant Species within the welcome building area

Species	Conservation Status	Importance
Common cudweed *Filago germanica*	• Near-Threatened in England • Rare across the region of north-west England • Cumbria RPR	Regional importance
Fern-grass *Catapodium rigidum*	• North-west England • Local in Cumbria	
Wild marjoram *Origanum vulgare*	• Least Concern in England • Local as a native plant in Cumbria	County importance
Carline thistle *Carlina vulgaris*	• Near-threatened in England • Local in Cumbria	Local importance
Eyebright *Euphrasia sp.* Likely to be E. nemorosa or E. confusa	• Near-Threatened or Vulnerable in England • Widespread in Cumbria	
Quaking-grass *Briza media*	• Near-threatened in England • Widespread locally	
Wild strawberry *Fragaria vesca*	• Near-threatened in England and widespread	

Wider site

The following NVC communities were recorded within the 20m buffer either side paths on site and are described below. Further detail on each of NVC classifications is presented in Appendix A Figure A.2 NVC results and Appendix B.1.

Table 5.1gives the NVC communities and their national and regional distribution.

Table 5.3 NVC communities, status and level of importance within the 20m buffer either side existing paths on site

NVC Classification (Code)	Status	Level of Importance
Arrhenatherum elatius *grassland/* Brachypodium pinnatum *grassland* (MG1/CG4)	Annex 1: H6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia)	International
	HPI: Lowland Calcareous Grassland	
	LBAP: Calcareous Grasslands	
Cynosurus cristatus – Centaurea nigra / Avenula pubescens grassland / (MG5/ CG6)	Annex 1: H6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia)	International
	HPI Lowland Calcareous Grassland and Lowland Meadows	
	LBAP: Hay Meadows and Lowland Pastures and LBAP: Calcareous Grasslands	
Festuca ovina–Carlina vulgaris/Lolium perenne-Cynosurus cristatus grassland (CG1 /MG6)	Annex 1: H6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia)	International
	HPI: Lowland Calcareous Grassland	
	LBAP: Calcareous Grasslands	
Lolium perenne-Cynosurus cristatus grassland (CG6)	Annex 1: H6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia)	International
	HPI: Lowland Calcareous Grassland	
	LBAP: Calcareous Grasslands	
Festuca ovina–Carlina vulgaris / (CG1)	Annex 1: Semi-natural dry grasslands and scrubland facies on calcareous substrates (H6210)	International
	HPI: Lowland Calcareous Grassland	

NVC Classification (Code)	Status	Level of Importance
	LBAP: Calcareous Grasslands	
Ammophila arenaria–Festuca rubra semi-fixed dune community (SD7)	Annex 1 H2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)	International
	HPI: Coastal Sand Dunes	
Festuca rubra–Galium verum fixed dune grassland (SD8)	Annex 1 H2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)	International
	HPI: Coastal Sand Dunes	
Arrhenatherum elatius grassland *Centaurea nigra* sub-community (MG1e)	HPI: Lowland Meadow	Regional
	LBAP Hay Meadows and Lowland Pastures	
Potamogeton pectinalus-Myriophyllum spicatum community (A11)	HPI: Eutrophic Standing Waters	Regional
Eleocharis palustris swamp-*Eleocharis palustris* sub-community (S19a)	HPI: Ponds	Regional
Other habitats		
Arrhenatherum elatius grassland *Festuca rubra* sub-community (MG1a)		
Lolium ley (MG7)		
Equisetum fluviatile swamp (S10a)		
Ulex europaeus–Rubus fruticosus scrub–*Teucrium scorodonia* sub-community (W23c)		
Rubus fruticosus – Holcus lanatus underscrub (W24)		
Pteridium aquilinum- Rubus fruticosus underscrub *Teucrium scorodonia* sub-community (W25b)		
Argentina anserina–Carex nigra dune slack– *Carex flacca* sub-community (SD17b)		
Lagoon		

A total of 30 important plant species were observed during surveys within this area including taxa of international to local conservation importance. An overview of these species, their location, abundance and conservation importance can be found in Table 5.4.

Table 5.4 Important Plant Species within 20m of the existing paths

Species	Conservation Status	Importance
Irish dandelion* Taraxacum aesculosum	• Nationally rare in Britain • Critically Endangered for England	High (international level importance)
Pillwort Pilularia globulifera	• Nationally scarce in Britain • Vulnerable in England • S.41 species • Listed on Cumbria Rare Plant Register (RPR)	High (national importance)
Moonwort Botrychium lunaria s.s.	• Vulnerable in England; • Scarce in Cumbria and North West England • S.41 Species	High (regional importance)
Small-fruited yellow sedge (Carex oederi)	• Nationally scarce in Britain • Least Concern in England • Rare in the region of north-west England Scarce on the Cumbria RPR	
Thread-leaved water-crowfoot (Ranunculus trichophyllos)	• Least Concern in England • Rare within the region of north-west England	
Fennel pondweed (Potamogeton pectinatus)	• Least Concern in England • Rare species in Cumbria	County importance
Spiked water milfoil (Myriophyllum spicatum)	• Least Concern in England	
Eyebright sp. (Euphrasia nemorosa/confusa)	• Near-Threatened or Vulnerable in England • Widespread in Cumbria	
Few-flowered spike-rush (Eleocharis quinqueflora)	• Least Concern in England • SCI plant for north-west England	
Flea Sedge (Carex pulicaris)	• Near-threatened in England • Widespread and local in Cumbria	
Heath speedwell (Veronica officinalis)	• Near-threatened in England • Widespread in Cumbria	

Species	Conservation Status	Importance
Lesser spearwort (Ranunculus flammula)	• Least Concern in England • Widespread but local Cumbria, • SCI plant for north-west England	Local importance
Marsh pennywort (Hydrocotyle vulgaris)	• Near-threatened in England • Widespread in Cumbria	
Northern marsh orchid (Dactylorhiza purpurella)	• Widespread in Cumbria and Northern Britain • SCI within north-west England	
Tormentil (Potentilla erecta)	• Near-threatened in England and widespread.	
Eyebright sp. (Euphrasia nemorosa/confusa)	• Near-Threatened or Vulnerable in England • Widespread in Cumbria	
Wild strawberry (Fragaria vesca)	• Near Threatened in England and widespread	

Incidental findings

*Irish Dandelion was identified outside the survey boundary adjacent to the road to the household waste recycling centre.

The NVC identified two important insects were observed during surveys including a population of Dingy Skipper (*Erynnis tages*), and a pot beetle (*Cryptocephalus aureolus*). It is considered very likely that macrofungi with a similar level of conservation and/or statutory significance could exist across these high-value habitats, particularly including CHEGD and other groups of macrofungi.

Conclusions

Analysis of floristic survey data across the identified survey area at RSPB Hodbarrow and over the northern proposed car park area revealed a number of habitats and plants of international, national and local conservation priority over 2021 and 2022.

Where habitats of high floristic importance have been identified, the mitigation hierarchy should be adhered to and avoidance pursued, particularly for those habitats which are of international-level conservation importance. This report should be read in conjunction with the shadow HRA, EcIA and BIA which identify potential impacts and how the development has sought to avoid and mitigate these impacts. A strategy for the potential impacts on irreplaceable habitats has also been described within these reports and the Local Planning Authority as the competent authority should be consulted to confirm they are in agreement with the assessments.

5.2 AMPHIBIANS

The amphibian survey took place in May and June 2021 and April and May 2022 during suitable weather conditions (see tables Table 5.5 and Table 5.6).

Table 5.5 2021 Auxiliary Survey Data

	19/05/2021	26/05/2021	08/06/2021	15/06/2021
Sunset	21:17	21:28	21:43	21:48
Survey period	21:15 - 01:17	21:30 - 01:28	21:40 - 01:40	21:45 - 01:45
Conditions	Dry, Clear and Crisp, 0% Cloud, Wind 3/12	Dry, Clear, 80% Cloud, Wind 2/12	Dry, humid, clear, 45% Cloud, Wind 3/12	Dry, humid, clear, 50% Cloud, Wind 3/12
Start Temp	11	12	18	15.5
End Temp	7	10	14	12

Table 5.6 2022 Auxiliary Survey Data

Survey visit	14/04/2022	21/04/2022	11/05/2022	22/05/2022
Sunset	20:14	20:27	21:04	21:23

Survey visit	14/04/2022	21/04/2022	11/05/2022	22/05/2022
Survey period	18:05 - 23:00	18:30 - 23:00	20:00 - 23:20	20:30 - 23:15
Conditions	Dry, Overcast & cloudy, 80 - 100% cloud, breezy	Dry, Cloudy to clear, 25% cloud, breezy	Wet, post-rain, humid and cloudy 85% cloud, calm	Wet, rain into overcast, humid, 80% cloud, calm
Start Temp	12.5oC	15oC	12oC	14.5oC
End Temp	11oC	11oC	10.5oC	12.5oC

Table 5.7 and Table 5.8below represent the findings from surveys carried out at each accessible and suitable pond. A full description can be found in Appendix B.2. Refer to Figure 4.2 above for locations of transects, ponds and key areas.

2021 Results

Table 5.7 Summary of 2021 Amphibian survey results

Location	Results Summary
Transect 1	During surveys 1 and 2 natterjack toads were heard calling from land to the north-east off site which is coastal floodplain & sheep grazed marsh (Figure 4.2 Map of approximate key areas and ponds and transects) Closer inspection of this area from within the site boundary identified the floodplain hosts ephemeral pools. No Natterjack toads were heard during the third and fourth surveys and it is likely the pools had dried up. No Natterjacks were physically seen during any of the surveys along this transect.
	Other species: x17 Common toads x5 Common frogs along this transect always within immediate reach of the bordering scrub and vegetation either side of the vehicle track proposed for works.
Transect 2	During surveys 1 and 2 natterjack toads were heard calling from land to the north east off site which is coastal floodplain & sheep grazed marsh (see Figure 4.2 Map of approximate key areas and ponds and transects). No Natterjack toads were heard during the third and fourth surveys. No Natterjacks were physically seen during any of the surveys along this transect.
	Other species: x16 Common toads, x10 Common frogs typically within the sand dunes and immediate reach of the bordering vegetation either side of the dirt tracks. Two Common toads were also recorded in rock pools in the south-east of the site.
Transect 3	On this transect during surveys 1 and 2, Natterjack toads were heard calling from immediate adjacent land to the north-east which is coastal floodplain & sheep grazed

Location	Results Summary
	marsh (Figure 4.2 Map of approximate key areas and ponds and transects). Closer inspection of this area from within the site boundary identified this area hosts a number of ephemeral pools, particularly during surveys 1 and 2. No Natterjack toads were heard during the third andfourth surveys. No Natterjacks were physically seen during any of the surveys along this transect.
	Common frogs and Common toads were recorded along this transect typically within immediate reach of the bordering vegetation either side of the dirt track in small numbers mainly around the nearby Ponds 1, 2 and 3 (x2 Common toads, x2 Common frogs).
Transect 4	No Natterjacks were heard or physically seen during any of the surveys along this transect.
	Other species observed: A lone Common toad was recorded along the transect near to the sand dunes in the east of the route.
Pond 1	Absence of Natterjack toad and GCN during all surveys
	Other species observed: x1 Smooth newt (sub-adult) observed on survey 3, and x11 Common toads, x7 Common frogs and increase in invertebrates during survey 4.
Pond 2	Absence of Natterjack toad and GCN during all surveys
	Other species observed: Survey 1: 12 Smooth newts (juveniles), toad tadpoles (40-50) Survey 2: 10 Smooth newts (juveniles), toad tadpoles (20-30) Survey 3: 3 Smooth newt adults (1 male, 2 females), x7 Common frogs, toad tadpoles (3). Increase in invertebrates including *Odonata* sp. Survey 4: 4 Smooth newt adults (1 male, 3 females), 4 Common frogs, 3 Common toads observed. Increase in invertebrates including *Odonata* sp.
Pond 3	Absence of Natterjack toad and GCN during all surveys
Pond 4	Survey 1: 65 Smooth newts (mixed), toad tadpoles (300-400) Survey 2: 70 Smooth newts (mixed), toad tadpoles (60-70) Survey 3: 42 Smooth newts (mixed), 19 Common frogs, 4 Common toads. Increase in invertebrates including *Odonata* sp.. Notably drier. Increase in invertebrates including *Odonata* sp. Survey 4: Smooth newts efts (50-60) and 1 adult, 14 Common frogs, 17 Common toads. Increase in invertebrates including Odonata. Notably drier. Increase in invertebrates including Odonata sp.

2022 Results summary

Table 5.8 Summary of 2022 Amphibian survey results

Location	Summary
Key Area 1 SD184785	During survey 1, male natterjacks were heard but none located. Survey 2 observed two adult males and one adult female Natterjack toad found in the pool of Key Area 1 suggests attempted breeding, though again no spawn was found to confirm. By surveys 3 and 4 no data could be collected as the pools had dried up.
Key Areas 2 & 3 – SD184786 & SD184787	Surveys 1 and 2 Males could be heard calling from the generally vicinity at night but none located. By surveys 3 and 4 no data could be collected as the pools had dried up
Key Area 4 – SD18317895	No spawn strings or natterjack adults were encountered during any surveys and no males were heard calling from this area.
Key Area 5 – SD18317895	During surveys 1 and 2 no spawn strings or adults were encountered, no males were heard calling from this pool. By surveys 3 and 4 no data could be collected as the pools had dried up
Key Area 6 – SD179790	During survey 1 no spawn strings found, no animals seen or heard in this area. Survey 2 most of the area was dry and by survey 3 and 4 no data could be collected as the pools had dried up
Key Area 7 – SD175790	No spawn strings or adult Natterjack toads were encountered during any surveys and no males were heard calling from this area.
	Other species: During survey 3 identified dense numbers (circa 800-900) of Common toad (a competitor species) tadpoles in various shoals, and hand capture of twenty maturing tadpoles. Several adult Common toads were encountered along the road of RSPB Hodbarrow.
Known NT Breeding Pool ('Red Hills Pool 3') - SD187789	Only visited during survey 2 to avoid unnecessary disturbance. A total of four Natterjack toad spawn strings were encountered confirming use for breeding. Natterjack males were heard calling from this area by night during every survey.
Pond 1 (SD17807844)	No natterjack strings, tadpoles were encountered, or males heard calling at night
	Other species: 10 maturing tadpoles with all believed to be Common toad tadpoles.
Pond 2 (SD17827851)	No natterjack strings, tadpoles were encountered, or males heard calling at night.
	Other species: Contains Pillwort and a host of other notable plant diversity.

Location	Summary
	Common frog and sub-adult Smooth newts were encountered, and circa 200 tadpoles strongly attributed to Common toad and Common frog. 10 maturing tadpoles with all sampled believed to be Common toad tadpoles
Pond 3 SD17867851	No natterjack strings, tadpoles were encountered, or males heard calling at night.
	Other species: Common frog and sub-adult Smooth newts were encountered, and circa 100 tadpoles strongly attributed to Common toad and Common frog. 10 maturing tadpoles with all sampled believed to be Common toad tadpoles.

On site

On the basis of the survey findings, there was no evidence of breeding natterjack toads or great crested newts in ponds on site, and no natterjack toads/GCN were observed on the reserve or on the welcome building site during survey work. It was considered that contributing factors to the absence of natterjack toads within the three ponds on site is likely due to the lack of a fence allowing impacts from dogs entering the water alongside competition from common toad.

The proposals are highly unlikely to cause any habitat loss (permanent or temporary), habitat fragmentation, isolation or damage to habitat of GCN's (both aquatic and/or terrestrial), and risk of impacts to any GCN's through disturbance/injury/death to this species are negligible following the survey results.

It should be stated that an abundance of Common toad was encountered throughout key areas during the surveys. Additionally, an abundance of Common frog and Smooth newt seen in ponds during surveys increases the competition for important niche habitat. The presence of competitor amphibian species decreases the value of the site for less voracious Natterjack toads which do not compete favourably for the same limited resources, for breeding / recruitment and hunting.

The habitats where the proposed welcome building will be located is considered unsuitable as Natterjack toad habitat and it is considered that the proposals are unlikely to result in any terrestrial habitat loss for Natterjack toad. Notwithstanding, reasonable precautions will be necessary to ensure no European Protected Species, or other priority species, are protected during works to the paths on the main reserve and during works on the welcome building site.

Site surroundings

Three adult Natterjack toad were encountered at Key Area 1, an area off site to the east of RSPB Hodbarrow where Natterjack males have been heard calling over two years of surveys when the area holds water.

5.3 REPTILES

Site Assessment

The site assessment identified suitable foraging, basking and refuge habitat for reptiles associated with the central and southern areas as well as the sea wall which provide an open mosaic of habitats including calcareous grassland, scrub, tall ruderal vegetation and sand dunes. There is suitable hibernation habitat in the form of large rubble piles and slag heaps and dead wood piles. There is likely an abundance of prey species such as invertebrates for common lizards and small amphibians for snakes and good connectivity to suitable habitat in the wider area such as slag heaps, grazing marsh. However, the site is frequently disturbed along main routes by pedestrians, dogs and reptiles may be subject to predation from foxes, birds of prey and domestic pets from the caravan park and town of Millom.

The welcome building/car park site also supported suitable reptile habitat, mainly associated with the grassland and dense scrub edges. This area is less disturbed by people and dogs than the habitat along the paths in the main reserve.

Proposed welcome building

Refugia were distributed across the proposed the welcome building and car park site at a density of 20 refugia/per hectare. Following a period of bedding in the refugia were checked on eleven occasions between 31st March and 10th June 2022

The reptile survey results of specific relevance to the application site are summarised in Table 5.9 below. The results are mapped in Figure A.3 Reptile results

Table 5.9 Reptile survey results at the proposed welcome building and associated car parking area

	Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6	Visit 7	Visit 8	Visit 9	Visit 10	Visit 11
Date	31.03.22	21.04.22	27.04.22	04.05.22	11.05.22	13.05.22	17.05.22	19.05.22	24.05.22	30.05.22	10.06.22
Temperature (°C)	13	13-18	11-14	12-14	13-16	12-13	16-18	14-15	14-17	11-16	17-19
Weather	Dry Slight breeze 30% Cloud cover	Dry Breezy 10-85% High cloud	Dry Breezy 60-95% Cloud cover	Dry (interrupted by shower) Breezy 90-100% Cloud cover (bright)	Dry (interrupted by light showers) Breezy 60-100% Cloud cover	Dry Breezy 100% Cloud cover (bright)	Dry (recent rain) Slight breeze 90% (high cloud)	Dry Slight breeze 60-85% (high cloud)	Dry Breezy 60% Cloud Cover	Dry (recent rain) Slight breeze 100-50% Cloud cover	Dry Breezy 5-50% Cloud cover
Total Common lizard count (adults and sub adults)	4	12	5	2	2	4	19	3	9	9	2

Wider site

Refugia were distributed across suitable areas of habitat mainly within c.30m of the main paths on the reserve at a density of 29 refugia/hectare Following a period of bedding in, the refugia were then checked on eleven occasions between 29th March 2022 and 10th June 2022,

The reptile survey results of specific relevance to the application site are summarised in Table 5.1 below. The results are mapped in Appendix A Figure A.3

Table 5.10 Reptile survey results across the reserve including sea wall

	Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6	Visit 7	Visit 8	Visit 9	Visit 10	Visit 11
Date	29.03.22	21.04.22	27.04.22	04.05.22	11.05.22	13.05.22	17.05.22	19.05.22	24.05.22	30.05.22	10.06.22
Temperature (°C)	12-16	13-18	11-14	12-14	13-16	12-13	16-18	14-15	14-17	11-16	17-19
Weather	Dry (interrupted by shower) Slight breeze 50-70% Cloud cover	Dry Breezy 10-85% High cloud	Dry Breezy 60-95% Cloud cover	Dry (interrupted by shower) Breezy 90-100% Cloud cover (bright)	Dry (interrupted by light showers) Breezy 60-100% Cloud cover	Dry Breezy 100% Cloud cover (bright)	Dry (recent rain) Slight breeze 90% (high cloud)	Dry Slight breeze 60-85% (high cloud)	Dry Breezy 60% Cloud Cover	Dry (recent rain) Slight breeze 100-50% Cloud cover	Dry Breezy 5-50% Cloud cover
Total Common	9	6	14	11	21	11	18	25	24	17	10
Slow worm	0	0	0	0	0	0	0	0	1	0	0

A peak count of 25 adult/sub-adult common lizards were observed during the survey visit on 19th May 2022 and a peak count of 19 adults/sub-adults were recorded on the car park site during the survey visit on 17th May 2022.

Incidental sightings

Throughout the surveys across both areas common toad (*Bufo bufo*), common frog (*Rana temporaria*) and field vole (*Microtus agrestis*) were observed underneath or near artificial refugia. A dead common shrew (Sorex araneus) was found near a refugia on the reserve during a survey visit and sloughed common lizard skins were occasionally found during the survey.

Conclusion

Figures in Table 5.5 and 5.6 are based on the maximum number of adults during one visit when refugia are up to 10/hectare. The Key Reptile Register Scoring System[29] (see Table 5.7) allows for the assessing the value of the site to reptile species and to determine whether it is considered a key site within the UK based upon the number of species recorded on site and the peak adult count for each species. The density estimate of each species can also be found, by dividing the area surveyed by the peak count of each species, to give a number per hectare for each species. The www.gov guidelines state that both counts and densities can be misleading in some circumstances, but for reptiles a count is likely to be less misleading than a density estimate (Sewell et al, 2013). Therefore, it is considered that a count is the most appropriate way to present the survey results in this instance.

Table 5.11 Key Reptile Register Scoring System

	Low Population Score 1	Good Population Score 2	Exceptional Population Score 3
Slow worm	<5	5-20	>20
Common lizard	<5	5-20	>20
Grass snake	<5	5-10	>10

Given that the refugia were placed at a higher density than 10/hectare the peak numbers for the wider reserve were divided by three and the proposed welcome building site has been divided by two. This gives a respective peak counts as 8.3 common lizards for the wider site and 9.5 common lizards for the proposed welcome building resulting in both locations support a 'good population of common lizards, in accordance with guidance from the scoring system above.

A peak count of 1 slow worm was observed on the wider site survey, equating to a low population based on the key reptile scoring system, and this species was determined likely-absent from the proposed car park area.

Froglife (1999) define a Key Reptile Site as one that meets any of the following criteria:

- Site supports at least three reptile species;
- Site supports two snake species;

- Site supports an 'exceptional population' of one reptile species (see Table 5.11);
- Site supports an assemblage of species accumulatively scoring at least 4 (see Table 5.11);
- Site does not satisfy Points 1-4 but is of particular regional importance due to local rarity; or,
- Site supports populations of smooth snake or sand lizard.

Appendix A Figure A.3 shows the location where individuals were found during the survey on the main reserve and on the welcome building/car park site. It should be noted that there is no significant geographical barrier preventing dispersal/movement between these two survey areas and it is likely the common lizard populations on the wider site and the car park site are functionally linked. As shown on Figure A.3, three survey areas are the largest 'hotspots' for common lizard (i.e. where lizards were encountered on 8-10 of the 11 survey visits); the proposed car park site (grassland scrub mosaic habitats in Area D), in the south of the reserve near the start of the sea wall (grassland scrub mosaic habitat in Area C) and on the sea wall near the bird hide (sand dune scrub mosaic habitat in Area A).

Common lizard and slow-worm are fairly widespread species in Cumbria, and thus the sites are not of particular regional importance due to local rarity and the sites do not qualify as Key Reptile Sites based on the survey findings. However, due to the presence of good populations of common lizard on Hodbarrow reserve and on the proposed car park site, and the presence of a low population of slow-worm on Hodbarrow RSPB reserve on the basis of the survey work undertaken, mitigation measures will be required during and post-works to ensure risks of harm and injury to reptiles are avoided wherever possible.

5.4 INVERTEBRATES

Welcome building

A total of 86 terrestrial invertebrate species were recorded across the proposed welcome building and car park area to the north in 2022. An additional s41 species, dingy skipper was recorded during the NVC survey. 13 species (~15%) are regarded as locally common or locally scarce and the following 3 (~3%) notable species:

- *Amara curta Dejean* beetle Nationally Scarce
- *Orthochaetes setiger* weevil Nationally Scarce (Notable B)
- *Erynnis tages* dingy skipper Section 41 species of principal importance.

Further detail of the 'Status' is also provided in the Invertebrates Methodology above. A full list of species is provided in Appendix B.3.

The invertebrate assemblage types are labelled in terms that relate to their favoured habitats in order to make them accessible to non-specialists. Specific assemblage types (SATs) are characterised by ecologically restricted species and are generally only expressed in lists from sites with conservation value. Table 5.12 details the proportion of specialist species found at each habitat to assess the reported condition of the habitat.

Table 5.12 Rare and notable species recorded within the proposed welcome building area

Broad Biotope	Habitat	No of Species	% representation	Conservation status	SQI
Open habitats	Tall sward & scrub	40	2	1 Nb Orthochaetes setiger; Erynnis tages Sec 41	107
Open habitats	Short sward & bare ground	8	<1	1 NS Amara curta	
Tree-associated	Shaded woodland floor	7	<1		
Wetland	Marshland	5	<1		
Tree-associated	Arboreal	4	<1		
Tree-associated	Decaying wood	3	<1		
Wetland	Acid & sedge peats	2	<1		

Broad Biotope	Habitat	No of Species	% representation	Conservation status	SQI
Wetland	Running water	1	<1		
Tree-associated	Wet woodland	1	<1		

Conclusion

Most species taken during the survey were associated with tall sward, scrub and bare ground. The SQI shows a score of 107 which is fairly low as Natural England suggest 150 to be the approximate threshold corresponding to a site supporting a regionally important invertebrate fauna. Given the size of the site and low plant diversity the low score could be expected even had the work been carried out across all seasons.

By consulting Plant[30] and based on the number of notable species, it can be seen that the Millom site is not highly rated. It appears to be of district (low) importance.

Wider Site

In total 159 species of terrestrial invertebrate were identified by observation or collection and subsequent examination under a microscope. 129 of the species recorded (~81%) are without a status, being widely distributed and common, 26 species (~16%) are regarded as locally common or locally scarce, three (~2%) are currently accorded Nationally Scarce or Section 41 status and one is classed as data deficient. A full species list can be found in Appendix B.3.

Table 5.13 Rare and notable species recorded across the wider site

Broad Biotope	Habitat	No of Species	% representation	Conservation status	SQI
Open habitats	Tall sward & scrub	81	3	Notable Attactagenus plumbeus; Nationally Scarce - Saprinus aeneus	104
Open habitats	Short sward & bare ground	25	2	Section 41 priority species - Coenonympha nymphula Data Deficient Cernuella virgata	100
Tree-associated	Arboreal	9	<1	N/A	

Broad Biotope	Habitat	No of Species	% representation	Conservation status	SQI
Wetland	Marshland	6	<1	N/A	
Tree-associated	Shaded woodland floor	6	<1	N/A	
Wetland	Acid & sedge peats	3	<1	N/A	
Tree-associated	Decaying wood	3	<1	N/A	
Coastal	Saltmarsh	1	<1	N/A	

This result shows that most species taken during the survey were associated with the grassland and bare ground. The SQI more usefully shows scores of 100 and 104 which is fairly low compared with Natural Englands threshold (150) to be considered as a site supporting a regionally important invertebrate fauna.

By consulting Plant and based on the number of notable species, it can be seen that the surveyed habitats within the RSPB Hodbarrow site are not highly rated. They appear to be of district (low) importance.

6.0 SUMMARY & CONCLUSION

Greengage was commissioned by Cumberland Council to produce this Phase II Ecology survey report for a site known as Hodbarrow Nature Reserve in Cumbria in order to collate and present the findings of various ecological surveys undertaken on Hodbarrow Nature Reserve and the adjacent welcome building/car park site to establish the ecological value of this site and its potential to support notable and/or legally protected species.

Key findings from a review of data gathered from the desktop study and the 2021 and 2022 Phase II surveys results are set out below:

- Designations
  - The Hodbarrow Nature Reserve falls within the designated site boundaries of Morecambe Bay and Duddon Estuary SPA, SAC, Ramsar and SSSI and the proposed welcome building development footprint falls immediately outside this boundary to the north-east;
- Habitats
  - Internationally important Annex I habitats on site.
    - Both the proposed welcome building area and the wider site has semi-natural dry grasslands and scrubland facies on calcareous substrates (H6210)
    - The wider side supports Annex 1 H2130 Fixed coastal dunes with herbaceous vegetation (grey dunes) which is listed as one of the qualifying features for the SAC designation;
  - Several nationally, regionally and locally important habitats on site;
- Notable plants
  - The habitats present support several internationally, nationally, regionally and locally important plants on site including Irish dandelion (*Taraxacum aesculosum*) and pillwort (*Pilularia globulifera*).
- Invasive Species
  - There are a number of invasive species on the main reserve and on the welcome building/car park site, including cotoneaster spp, variegated yellow archangel, Montbretia, Japanese knotweed and sea buckthorn.
- Birds
  - Hodbarrow reserve supports important breeding bird assemblages such as the breeding colonies of common terns (*Sterna hirundo*), Sandwich terns (*Thalasseus sandvicensis*), little terns (*Sternula albifrons*).
  - The site also supports important over-wintering and migratory bird assemblages including include overwintering redshank (*Tringa totanus*), knot (*Calidris canutus*) and passage black tailed godwit (*Limosa limosa*).

- Both the wider site and the adjacent welcome building site support a variety of nesting birds during spring/summer in the scrub and trees and on waterbodies.

- Amphibians
  - Likely absence of natterjack toads and great crested newts on site based on survey findings..
  - A confirmed natterjack breeding pond lies approximately 0.57km north-east of proposed works on the BOAT.
  - The ponds on-site support smooth newts (*Lissotriton vulgaris*), common toads (*Bufo bufo*) and common frogs (*Rana temporaria*).
- Reptiles
  - Good populations of common lizard (*Zootoca vivipara*) have been recorded in both the area of proposed welcome building and in habitats surveyed on the wider site.
  - One slow-worm (*Anguis fragilis*) was recorded within the wider site;
  - Common lizard and slow-worm are fairly widespread species in Cumbria, and thus the site is not of particular regional importance due to local rarity.
- Invertebrates;
  - The proposed welcome building supports at least 86 terrestrial invertebrate species, three of which are notable. The proposed welcome building is considered to be of district (low) importance for invertebrates;
  - The habitats along the paths across some of the wider site support at least 159 species of terrestrial invertebrates; 26 species (~16%) are regarded as locally common or locally scarce, three (~2%) are currently accorded Nationally Scarce or Section 41 status and one is classed as data deficient. The habitats either side of the paths across the wider site is considered to be of district (low) importance for invertebrates.

These survey findings have been used to inform a separate Ecological Impact Assessment for the proposed development.

APPENDIX A SITE MAPS AND SURVEY RESULTS

Figure A.1 Preliminary Ecological Appraisal map

THE IRON LINE

- Wet ditch_polyline
- Waterbody_region
- Variegated yellow archangel_point
- Unknown habitat_region
- SwampFen_region
- Semi-improved grassland_region
- Sea buckthorn_point
- Scrub_region
- Scattered scrub_point
- Quarry_region
- Natural rock exposure (other)_region
- MosaicH67H65_Dune Scrub/Grassland
- MosaicB21C31A12 Neutral Grassland/Tall Ruderal/Scrub
- MosaicA21B31_Scrub/Calcareous Grassland
- Mosaic TR Bracken 50-50_region
- Mosaic Scrub TR Grass_region
- Mosaic C31 and B21_Tall ruderal/Neutral Grassland
- Mosaic C31 and A21_Tall ruderal/scrub
- Mosaic C11 A12 C31_Bracken/Scrub/Tall ruderal
- Mosaic B21a21_Neutral grassland/Scrub
- Montbretia_point
- Japanese knotweed_region
- J22 Species Poor Hedgerow_polyline
- J2_5 Wall_polyline
- Inland cliff_region
- Inaccessible_region
- Hard standing_region
- H84 Coastal Grassland_region
- H83 crevice and ledge veg_region
- H81 Maritime cliff_region
- H68 Open Dune_region
- H67 Dune scrub_region
- H65 Dune grassland_region
- H5 strandline vegetation_region
- H4 Boulders_region
- H3 Shingle Gravel above high tide_region
- H1 intertidal sand_region
- G1 Standing water and G2 Running water_polyline
- Ephemeral_region
- D1_1 Dry acid heath_region
- Cotoneaster_point
- Calcareous grassland_region
- C31 Tall ruderal_region
- Building_structure_region
- Bracken_region
- B32 SI Calc grass_region
- B21 Unimproved neutral grassland_region
- B4 Improved grassland_region
- potential badger hole

Title: Figure A.1

Habitat Shapefiles provided by: Appletons

Project number: 551959
Sources: Google Satellite

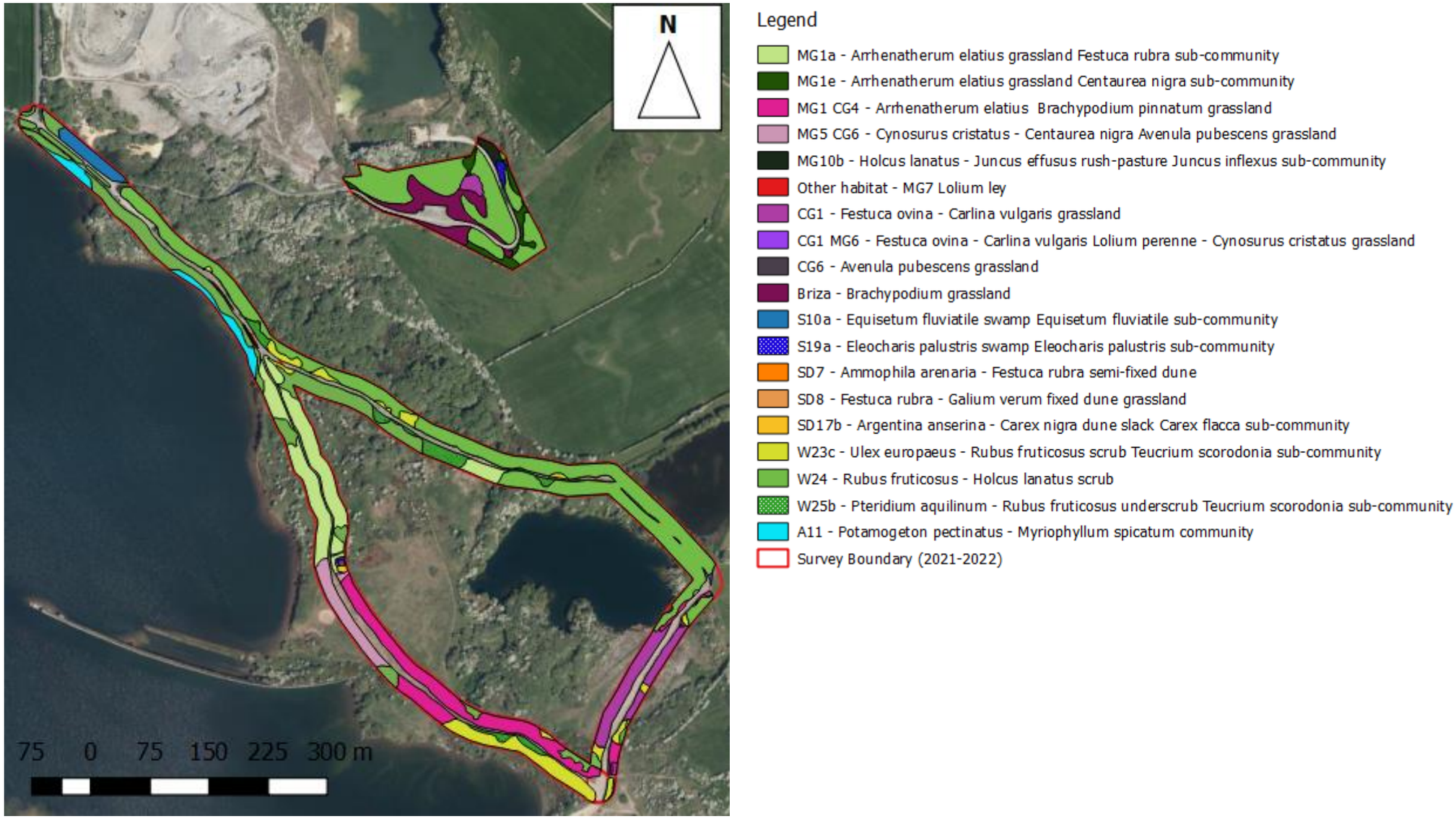
Greengage

0 0.25 0.5 0.75 1 km

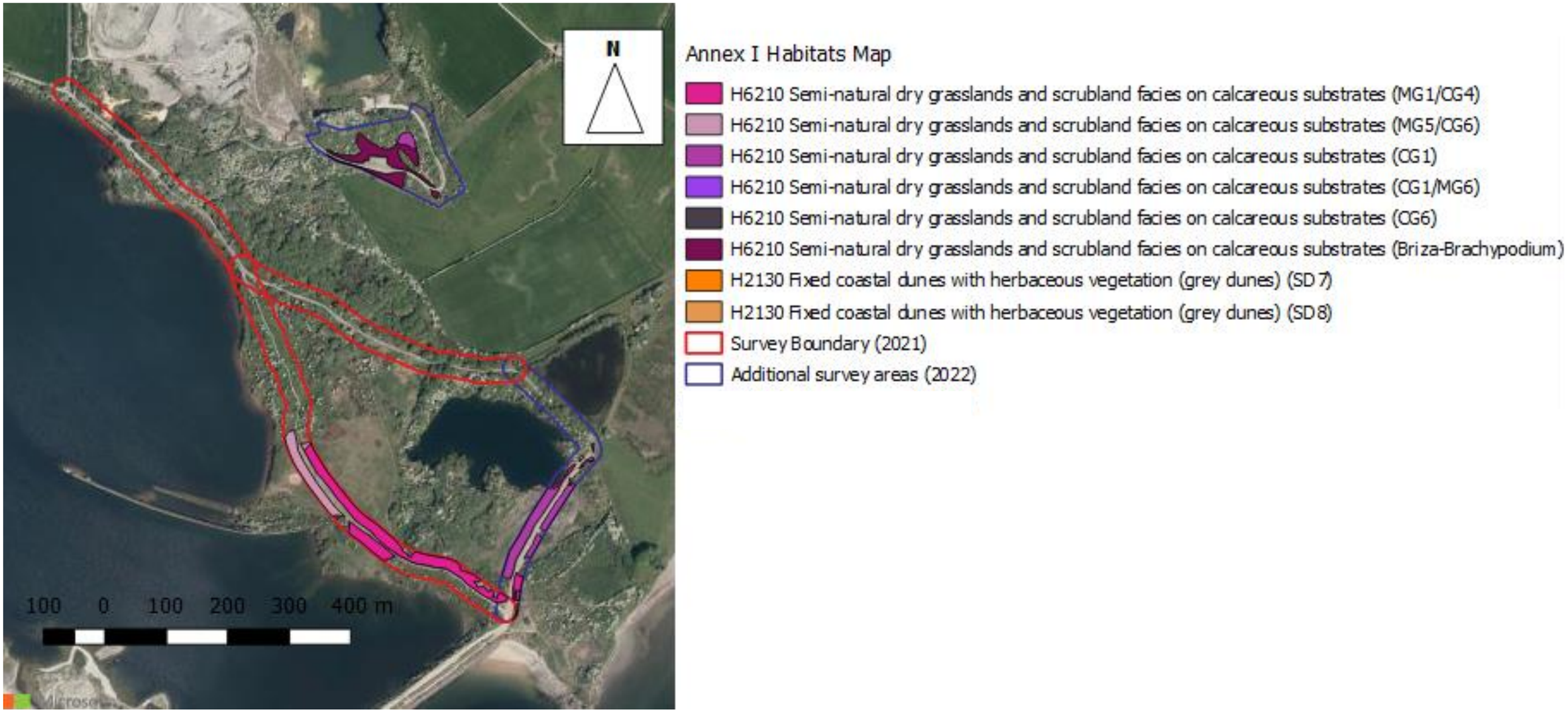
N

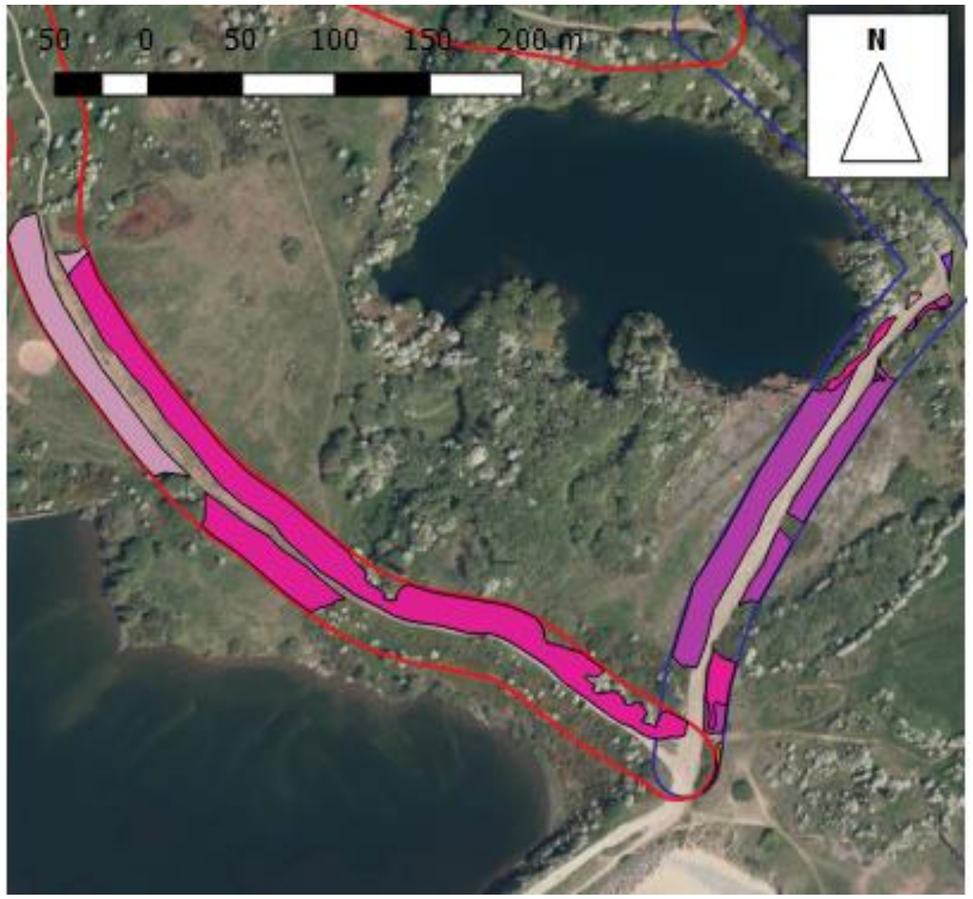
Figure A.2 NVC results

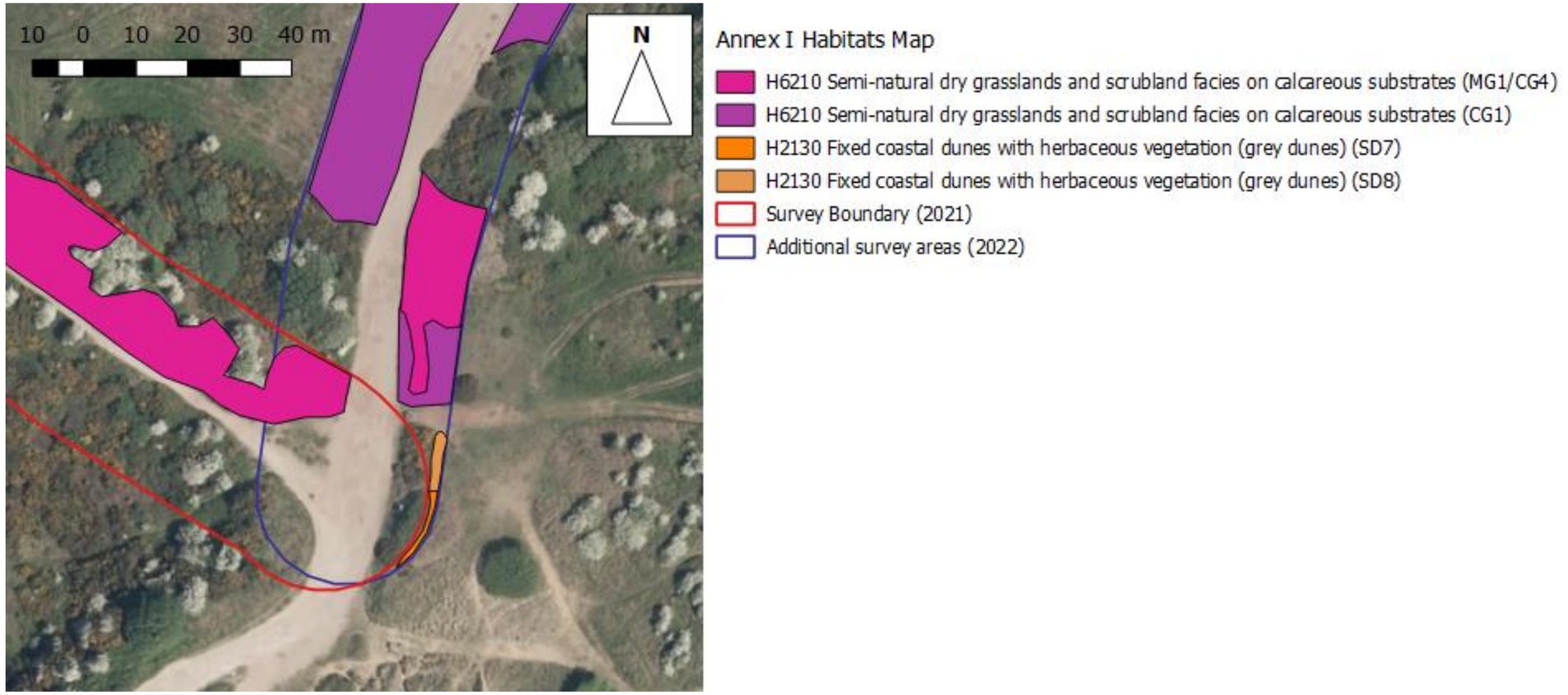
Appendix V: Phase 2 (NVC) Habitat Maps



Appendix III: Annex I Habitats Maps



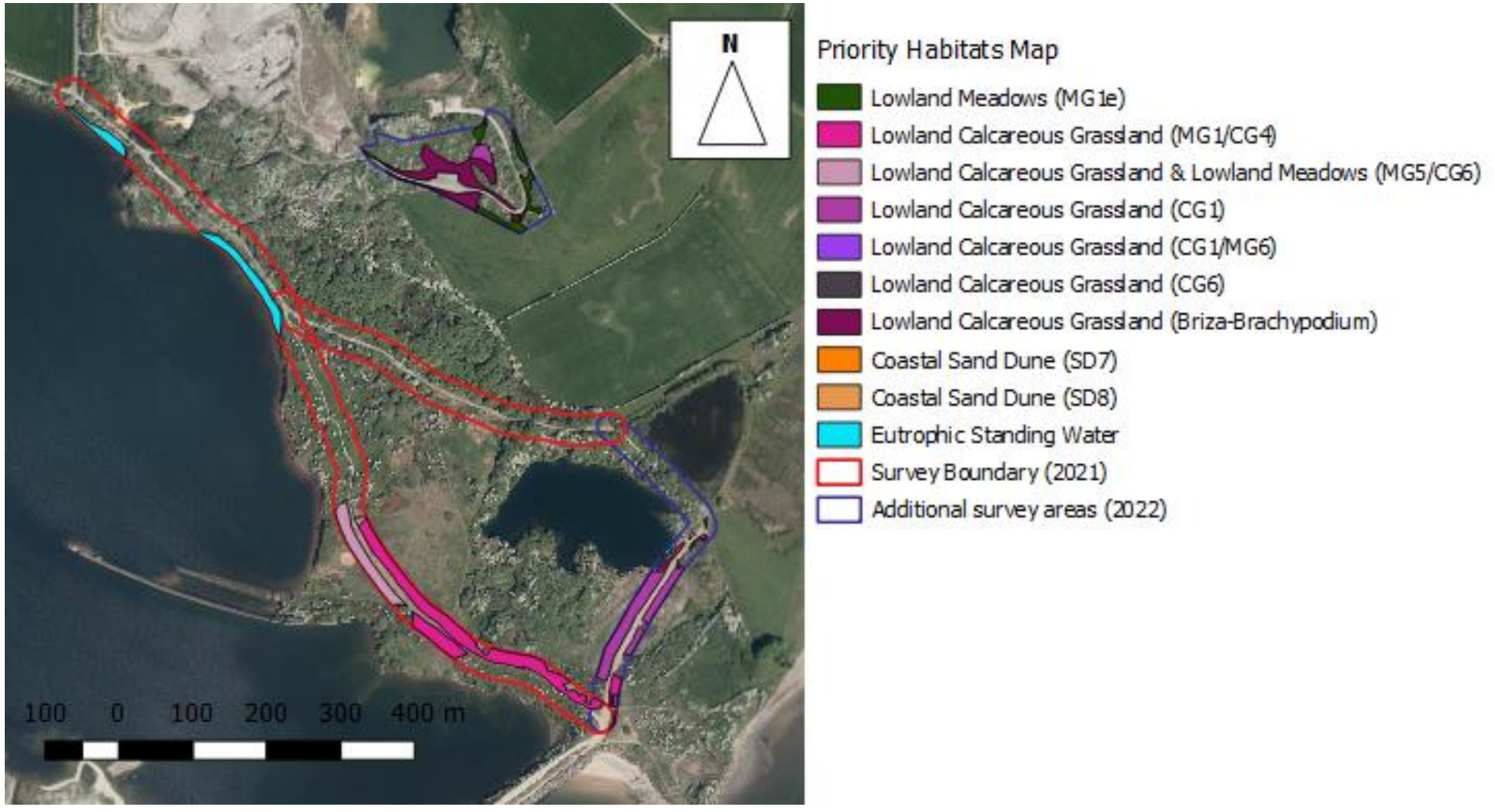

50 0 50 100 150 200 m
N
Annex I Habitats Map
H6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (MG1/CG4)
H6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (MG5/CG6)
H6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (CG1)
H6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (CG1/MG6)
H6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (CG6)
H2130 Fixed coastal dunes with herbaceous vegetation (grey dunes) (SD7)
H2130 Fixed coastal dunes with herbaceous vegetation (grey dunes) (SD8)
Survey Boundary (2021)
Additional survey area (2022)


10 0 10 20 30 40 m
N
Annex I Habitats Map
H6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (MG1/CG4)
H6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (CG1)
H2130 Fixed coastal dunes with herbaceous vegetation (grey dunes) (SD7)
H2130 Fixed coastal dunes with herbaceous vegetation (grey dunes) (SD8)
Survey Boundary (2021)
Additional survey areas (2022)

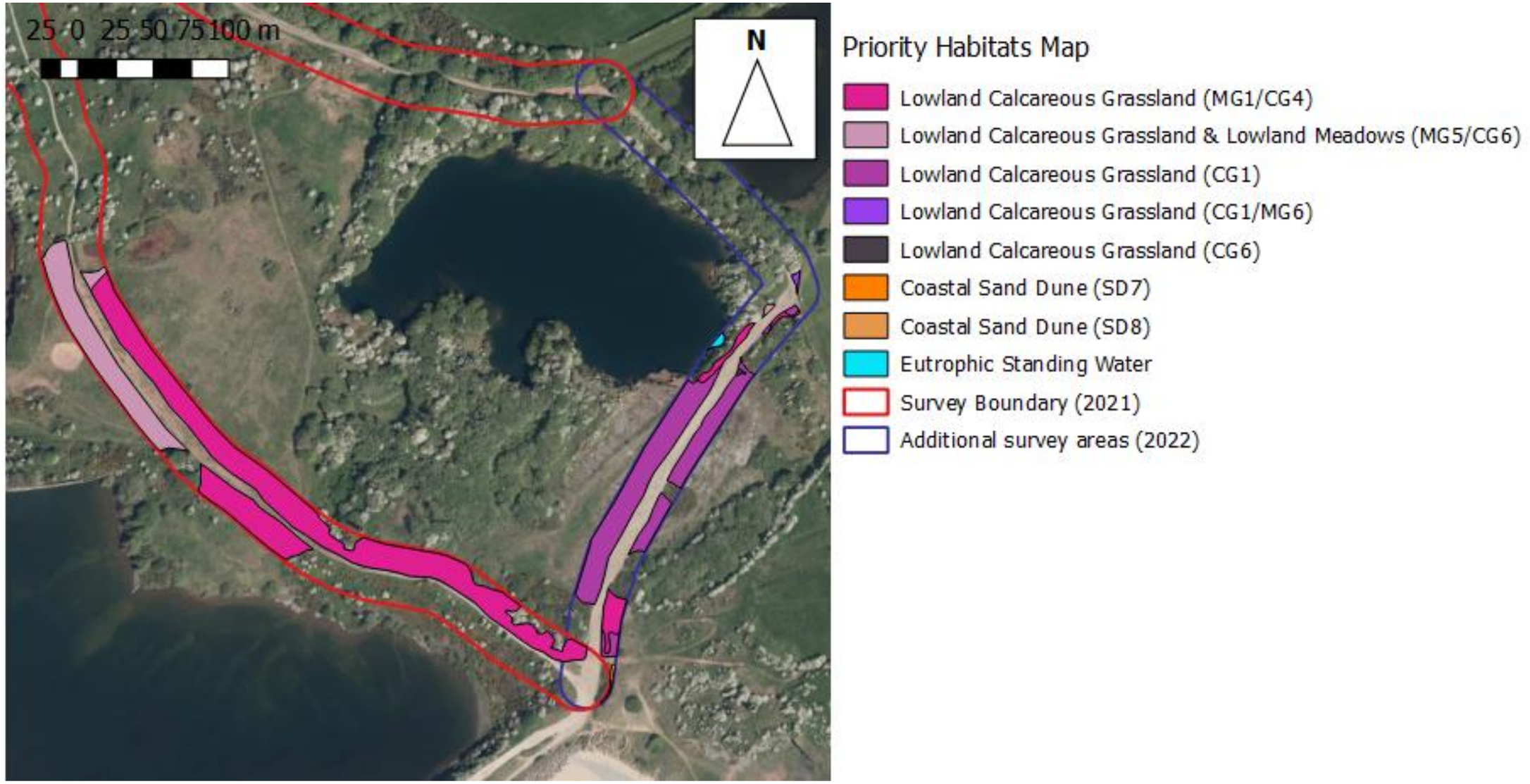
Annex I Habitat Map

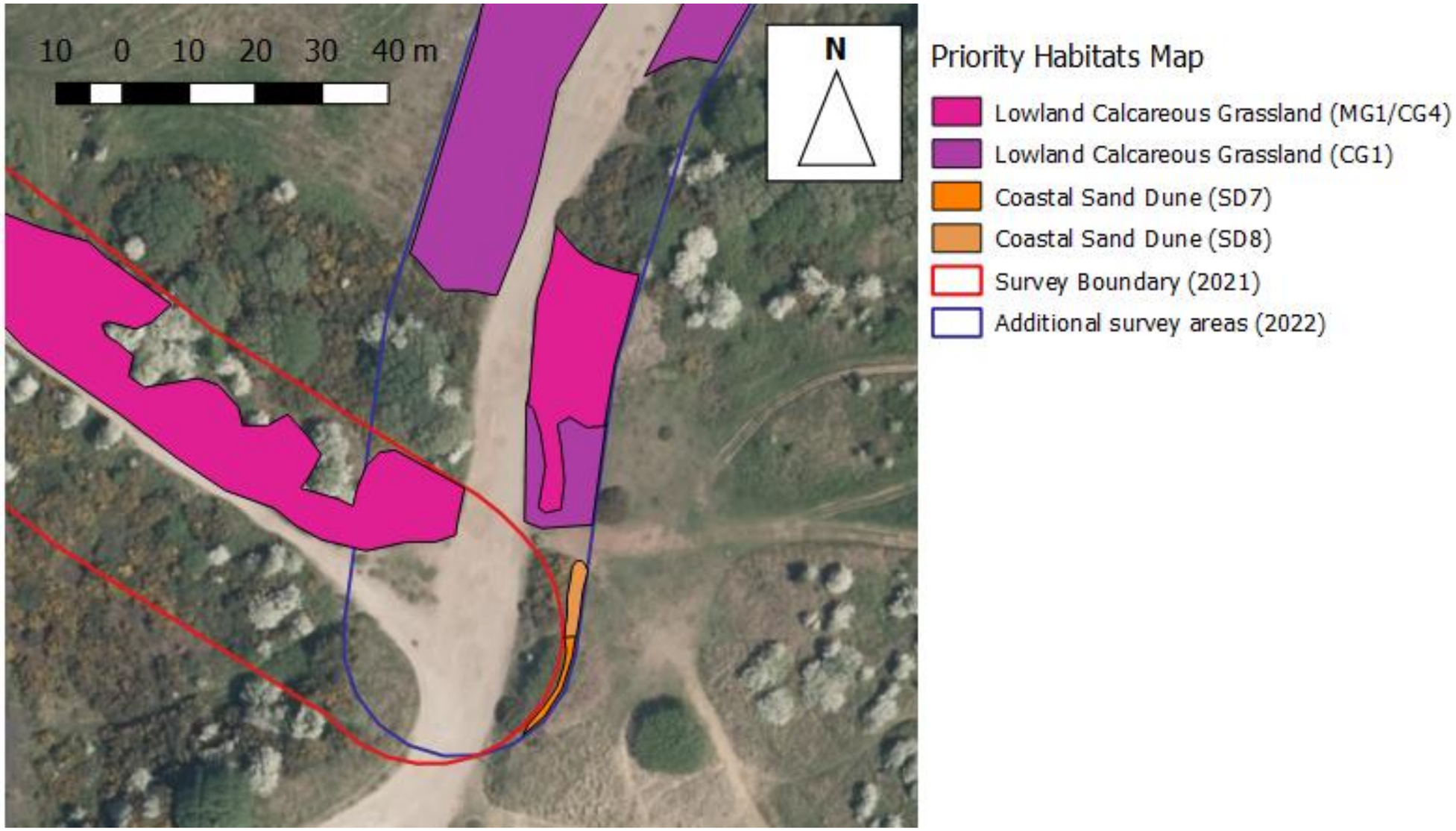
- H6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (CG1)
- H6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Briza-Brachypodium)
- Additional survey area (2022)

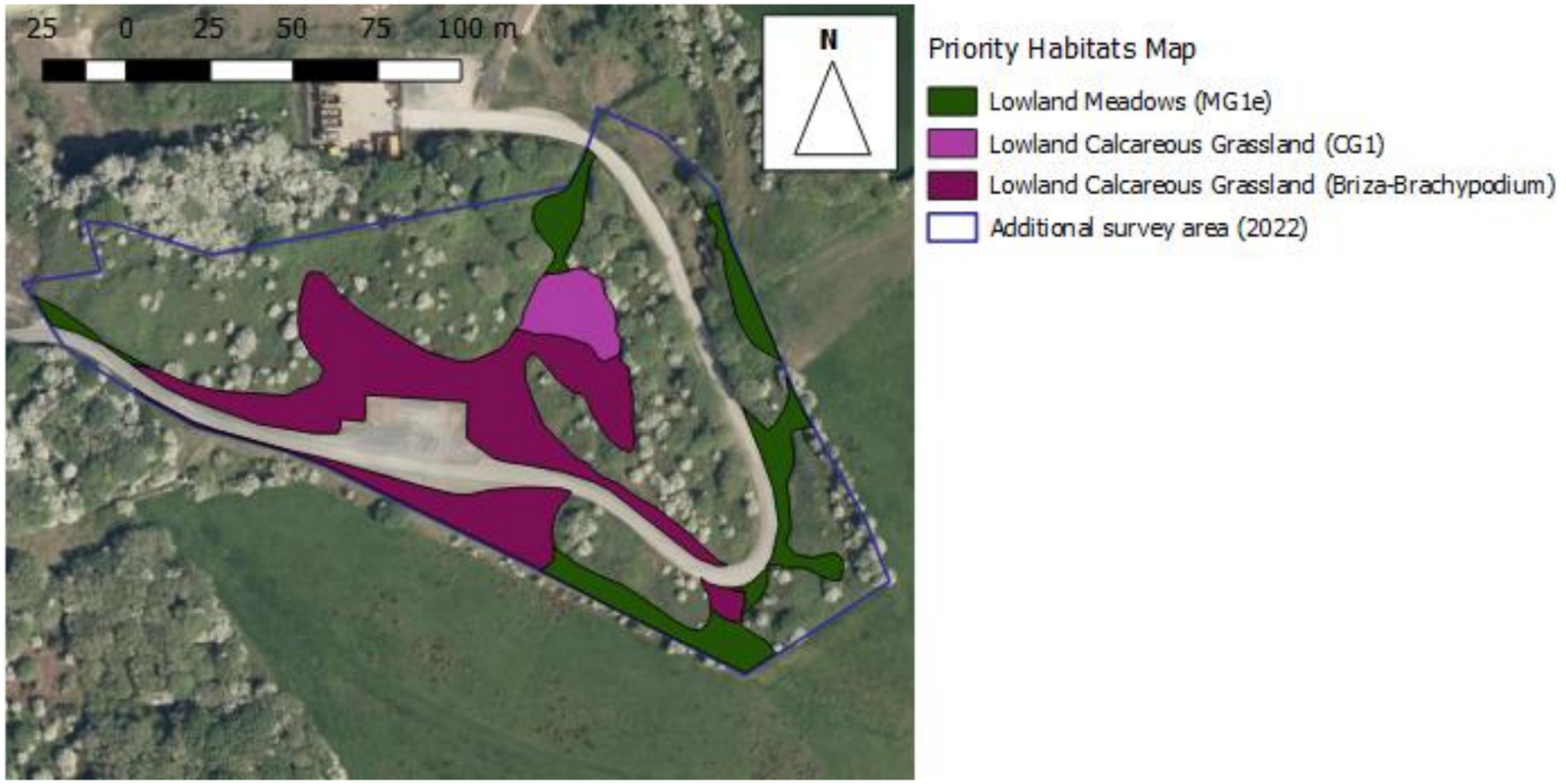
Appendix IV: Priority Habitats Maps




25 0 25 50 75 100 m
N
Priority Habitats Map
Eutrophic Standing Water (A11)
Survey Boundary (2021)

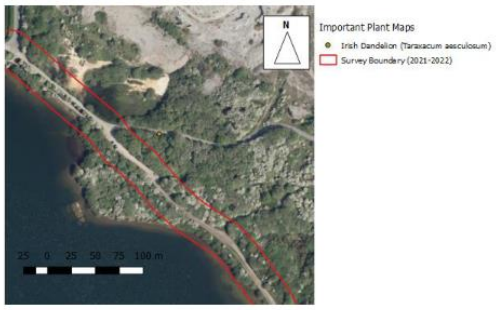

25 0 25 50 75 100 m
N
Priority Habitats Map
Lowland Calcareous Grassland (MG1/CG4)
Lowland Calcareous Grassland & Lowland Meadows (MG5/CG6)
Lowland Calcareous Grassland (CG1)
Lowland Calcareous Grassland (CG1/MG6)
Lowland Calcareous Grassland (CG6)
Coastal Sand Dune (SD7)
Coastal Sand Dune (SD8)
Eutrophic Standing Water
Survey Boundary (2021)
Additional survey areas (2022)


10 0 10 20 30 40 m
N
Priority Habitats Map
Lowland Calcareous Grassland (MG1/CG4)
Lowland Calcareous Grassland (CG1)
Coastal Sand Dune (SD7)
Coastal Sand Dune (SD8)
Survey Boundary (2021)
Additional survey areas (2022)


25 0 25 50 75 100 m
N
Priority Habitats Map
Lowland Meadows (MG1e)
Lowland Calcareous Grassland (CG1)
Lowland Calcareous Grassland (Briza-Brachypodium)
Additional survey area (2022)

Important plants identified in NVC reports

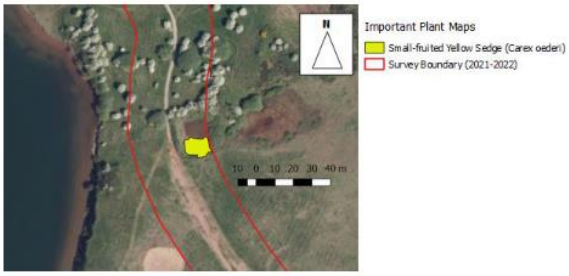
Irish Dandelion (*Taraxacum aesculosum*)



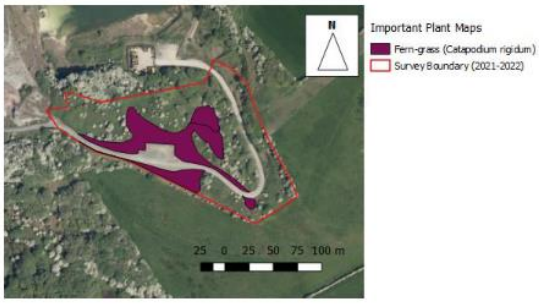
Moonwort (*Botrychium lunaria*)

Pillwort (*Pilularia globulifera*)

Small-fruited Yellow-sedge (*Carex oederi*)

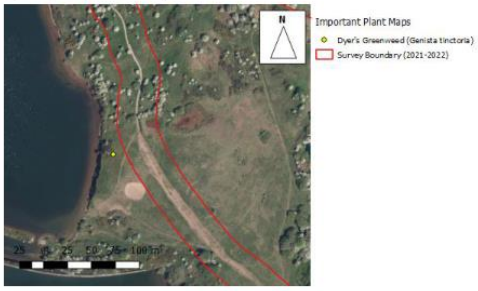


Fern-grass (*Catapodium rigidum*)

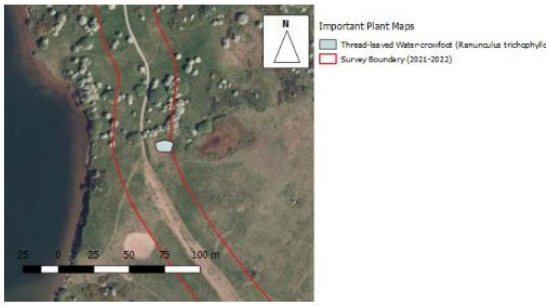


Slender Spike-rush (*Eleocharis uniglumis*)

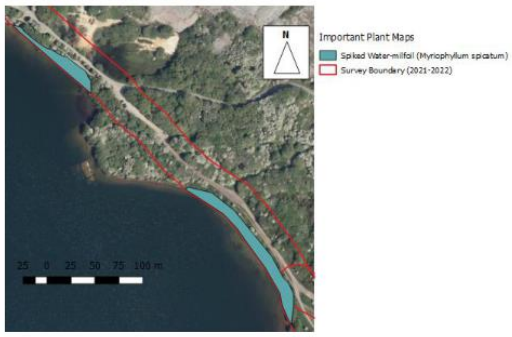
Dyer's Greenweed (*Genista tinctoria*)



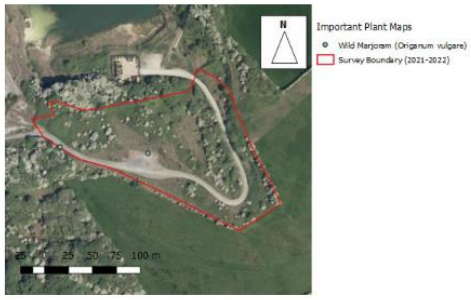
Thread-leaved Water-crowfoot (*Ranunculus trichophyllos*)



Spiked Water-milfoil (*Myriophyllum spicatum*)

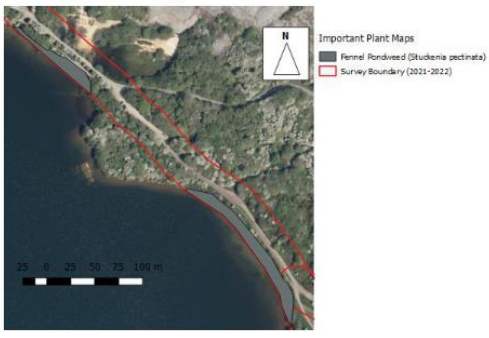


Wild Marjoram (*Origanum vulgare*)

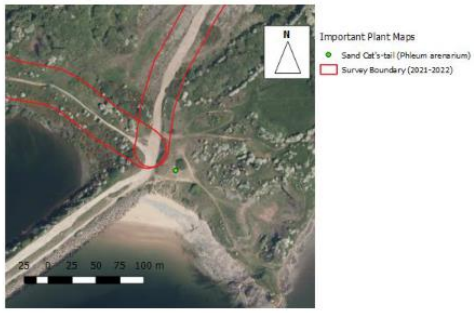


Creeping Willow (*Salix repens* var. *argentea*)

Fennel Pondweed (*Stuckenia pectinata*)



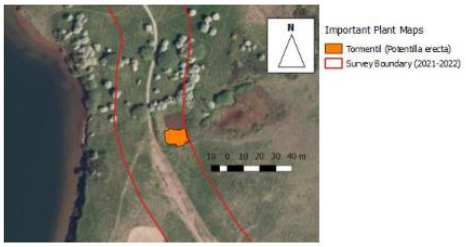
Sand Cat's-tail (*Phleum arenarium*)



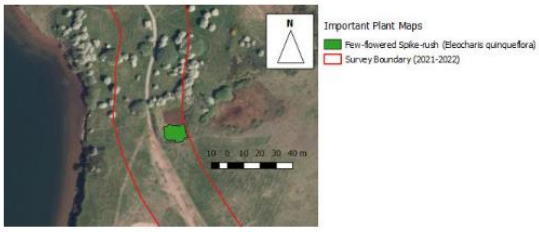
Blue Fleabane (*Erigeron acris*)

a Dandelion (*Taraxacum naevosiforme*)

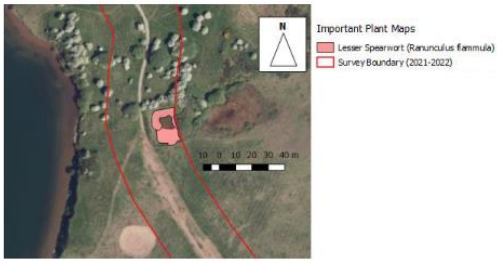
Tormentil (*Potentilla erecta*)



Few-flowered Spike-rush (*Eleocharis quinqueflora*)

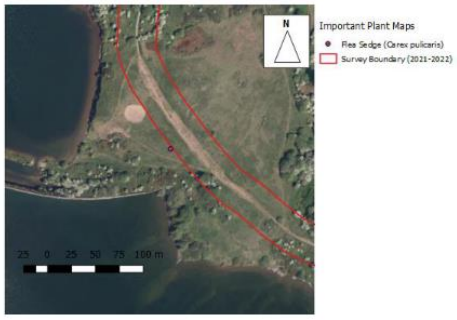


Lesser Spearwort (*Ranunculus flammula*)

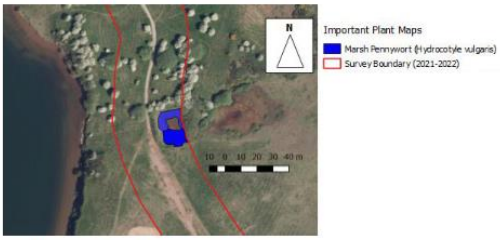


Matt-grass (*Nardus stricta*)

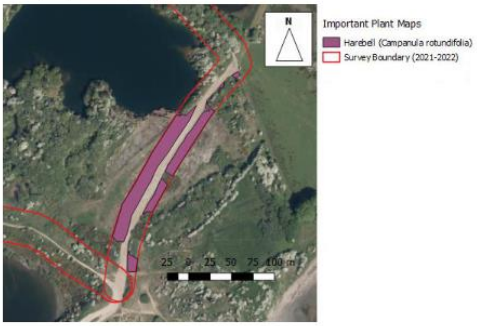
Flea Sedge (*Carex pulicaris*)



Marsh Pennywort (*Hydrocotyle vulgaris*)



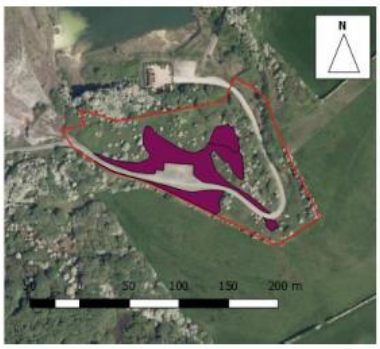
Harebell (*Campanula rotundifolia*)



Carline Thistle (*Carlina vulgaris*)

Wild Strawberry (*Fragaria vesca*)

Eyebright (*Euphrasia* sp.)



Quaking-grass (*Briza media*)

Northern Marsh-orchid (*Dactylorhiza purpurella*)

Heath Speedwell (*Veronica officinalis*)

Figure A.3 Reptile results

Numbers correspond to the number of visits where common lizard were present

- 1
- 2 - 3
- 4 - 5
- 6 - 7
- 8 - 10
- Slow worm
- Refugia deployment areas

Project	RSPB Hodbarrow		
Title	Reptile survey results		
Client	Copeland Borough Council		
Date	05.07.2022	Scale	1:6,000@A3
Drawn	PP	Drawing No	Figure 1
Checked	LG	Revision	0

Landscape Institute

Appleton [illegible]
Web: www.appleton.co.uk Email: [illegible]@appleton.co.uk

APPENDIX B DETAILED SURVEY RESULTS

B.1 NVC DESCRIPTIONS

2021 results

MG1a – Arrhenatherum elatius grassland – Festuca rubra sub-community

MAVIS analysis found that there was reasonable goodness of fit with the MG1a community for samples taken at RSPB Hodbarrow, at 63.1% (1 d.p) certainty. This habitat type is characterised by the high abundance of graminoides, particularly including the rank grasses False Oat-grass (Arrhenatherum elatius) and Cock's-foot (Dactylis glomerata), with Red Fescue (Festuca rubra) being a constant feature of the community. Whilst some dicotyledons are constant features of this community, namely Ribwort Plantain (Plantago lanceolata) and Meadow Vetchling (Lathyrus pratensis), these occur in comparatively low abundance. This is a grassland community that is above all indicative of ungrazed habitats and is transitional between grassland and woodland and is common and widespread throughout Britain within a wide range of environments, encompassing road verges, churchyards, railway embankments and on other neglected land (Rodwell (ed.), 1992).

MG1a grasslands are widespread across the northern and southern factions of the survey area and typically occur in transitional areas with an abundance of invading shrubs such as Hawthorn (Crataegus monogyna) and Gorse, and other scrub such as Bramble (Rubus fruticosus agg.) adjacent and/or intergrading into the grassland.

MG 1 / CG4 -Arrhenatherum elatius / Brachypodium pinnatum grassland

MAVIS analysis found a fair fit between both MG1(53.3% (1 d.p) certainty) and CG4 (50.8% (1 d.p) certainty), whilst areas of this grassland surveyed evidently had a base influence and had affinities to both communities, with an abundance of calcicoles. This habitat is characterised by the constancy of rank grasses, namely False Oat-grass and Cock's-foot, in association with a high diversity of calcicolous species typical of a CG4 community, namely including Sheep's Fescue (Festuca ovina agg.), Glaucous Sedge (Carexflacca), Rough Hawkbit (Leontodon hispidus) and Yellow Oat-grass (Trisetum flavescens), alongside frequent Fairy Flax (Unum catharticum), Sweet Vernal grass (Anthoxanthum odoratum), Common Bird's-foot Trefoil (Lotus corniculatus) and with some Downy Oat-grass (Avenula pubescens). Although there are affinities to an MG1 community due to a lack of grazing and/or a low density of grazing animals in the area, the high abundance of calcicoles and herbs would indicate closer affinities to a CG assemblage. This grassland type was only found to the south-east of the survey area alongside an established informal pathway.

Whilst MG1 grasslands are common and widespread transitional habitats throughout Britain, CG4 and related grasslands occur locally, often over chalk and limestone and qualify for the following HPIs

- s.41 Lowland Calcareous Grassland (2. JNCC, 2008)
- LBAP Calcareous Grasslands (CBP, 2001)

In addition, calcareous grasslands across the communities CG1-CG9 qualify for the Annex I habitat H6210 'Semi-natural dry grasslands and scrubland facies on calcareous substrates(Festuco• Brometalia)' (EC, 2013).

MG5 / CG6 -- Cynosurus cristatus - Centaurea nigra / Avenula pubescens grassland

MAVIS analysis of this habitat type and interpretation offield data found close affinities to both MG5 and CG6 grassland communities with 47.5% (1 d.p) certainty for MG5 and 45.8% (1 d.p) for CG6. The habitat itself is developed over a heavy clay soil with an apparent base influence indicated by the high abundance of calcicoles and other plants adapted to circumneutral soils. The community is characterised by a mix of species typically associated with MG5 and CG6 communities, which includes an abundance of Yorkshire-fog (Holcus lanatus), Meadow Buttercup (Ranunculus acris), Common Bent (Agrostis capillaris) and Red Clover (Trifolium pratense) more often associated with MG5, and a constancy of Downy Oat-grass, Rough Hawkbit, Glaucous Sedge, Fairy Flax, Heath-grass (Danthonia decumbens) and the moss Pseudoscleropodium purum more usually associated with CG6 grasslands.

MG5 grasslands are typical of circumneutral brown soils throughout the lowlands of Britain and are often characteristic of unimproved areas, being frequently associated with traditional hay meadow. By contrast, CG6 grasslands usually develop over relatively moist, neutral to calcareous soils usually overlying limestone (Rodwell (ed.), 1992). The base enriched clays across surveyed areas where this habitat type occurs is likely to account for this interesting mixture of MG5 and CG6 grasslands.

MG5 and CG6 grasslands are uncommon and typically fragmentary in nature and are both subjected to a number of conservation designations, and qualify for the following HPIs:

- s.41 Lowland Meadows (1. JNCC, 2008)
- LBAP Hay Meadows and Lowland Pastures

Calcareous grasslands encompassing the communities CG1-CG9 also qualify for the Annex I habitat H6210.

MG7a - Lolium perenne -- Trifolium repens leys

Although no MAVIS analysis was undertaken across the small areas of this habitat type, the character and community type could be assigned without quadrat/stand sample data which would not add meaningfulness to the identification of this community type. MG7a grassland is dominated by a mixture of Perennial Rye-grass (Lolium perenne) and White Clover (Trifolium repens) with Great Plantain (Plantago major) and is a common and widespread habitat type, particularly throughout the lowlands across agriculturally enriched pasture.

S10a - Equisetum fluviatile swamp - Equisetum fluviatile sub-community

MAVIS analysis found a fair fit with this community type for areas of swamp dominated by Water Horsetail, at 50.4% (1 d.p) certainty. As a habitat, this is dominated by Water Horsetail which is the main constituent of the community, with few herbs in any abundance; some Tufted Forget• me-not (Myosotis laxa) and Yellow Flag Iris (Iris pseudacorus) exists within the sample taken of this community,

alongside a constancy of the moss Calliergonella cuspidata. Northern Marsh Orchid (Dactylorhiza purpurella) also exists in very low abundance within this habitat type outside of the survey boundary.

S10a swamp is widespread and relatively common throughout Britain, although being more common within the north and west (Rodwell (ed.), 1995).

S19a Eleocharis palustris swamp - Eleocharis palustris sub-community

MAVIS analysis found a relatively poor fit with this community at 43.9% (1 d.p) certainty, likely attributable to the abundance of Sea Clubrush (Bolboschoenus maritimus) and other plants not typical of this habitat type within the stand sample, including Thread-leaved Water-crowfoot (Ranunculus trichophyllos). S19a is a community most typical of fen and swamp zonations in open water transitions, and is characterised by the abundance of Common Spike-rush (Eleocharis palustris) and a relatively low abundance of other species, including Lesser Spearwort (Ranunculus flammula) and Common Water-plantain (Alisma plantago-aquatica) (Rodwell (ed.), 1995).

Whilst this habitat is categorised as a swamp community, it occurs within areas of open water alongside a variety of important and red-listed species. Pillwort was also recorded at and/or at close proximity to this community within the pond to the east last in 2014 by Natural England, although not seen during these surveys. As this pond carries high floristic importance given the number of red-listed and other important taxa recorded, it qualifies for the following HPI:

- s.41 Ponds (3. JNCC, 2008)

SD17b Argentina anserina - Carex nigra dune slack - Carex flacca sub-community

MAVIS analysis found a relatively poor fit with the SD17b community at 45.9% certainty. This is likely attributable to disturbance from members of the general public which appears to have resulted in a short, compacted sward dominated by a variety of graminoides and forbs. Areas of marshy grassland most closely approximating to SD17b occur further east across a closed water body and represent more typical examples of this community type with a dominance of Common Sedge (Carex nigra), Silverweed (Argentina anserina) and the moss Calliergonella cuspidata, alongside frequent Creeping Buttercup, White Clover and Creeping Bent (Agrostis stolonifera).

Silverweed - Common Sedge dune slacks are a scarce habitat type throughout Britain and typically confined to dune systems over in-blown sand, and is particularly characteristic of dune slacks within the north of Britain where this is the commonest and most extensive vegetation type within slacks (Rodwell (ed.), 2000). Areas of surveyed SD17b slack-type vegetation within the survey area were relatively limited in extent, however, had a large number of important species identified to be extant within the sward. These include nationally scarce Small-fruited Yellow Sedge (Carex oederi), regionally important Few-flowered Spike-rush (Eleocharis quinqueflora) and Marsh Pennywort (Hydrocotyle vulgaris) with Tormentil (Potentilla erecta), both red-list Near-Threatened in England (Stroh et al, 2014). Pillwort was also formerly recorded in/adjacent to this habitat type to the east of the survey area.

Whilst areas of SD17b - type vegetation are of demonstrably high importance to a number of nationally to locally important plants, due to its presence on heavy soils away from a sand dune system, it does not qualify for LBAP, s.41 or Annex I status.

W23c Ulex europaeus - Rubus fruticosus scrub -- Teucrium scorodonia sub-community

MAVIS analysis found a reasonable fit with W23c scrub for both a stand and singular quadrat sample, at 52.1% (1 d.p) and 50.2%(1 d.p) certainty, respectively. W23c is a dense community, dominated by a closed Gorse and Bramble canopy, with Wood Sage (Teucrium scorodonia), Bracken, Foxglove (Digitalis purpurea) and Red Campion (Silene dioica) more characteristic of open places within the community, alongside occasional coarse grasses such as Cock's-foot.

Gorse - Bramble scrub occurs across a variety of habitat types, including within grasslands, heaths, as underscrubs of woodlands and as scrub on marginal agricultural land. It is a common and widespread community of both lowland and upland Britain (Rodwell (ed.), 1991).

W24 Rubus fruticosus - Holcus lanatus underscrub

MAVIS analysis found that community data obtained during the survey for this habitat type most closely approximated to W24 scrub, albeit being a poor fit at 40.5% (1 d.p) certainty. This is likely attributable to the dominance of Grey Willow (Salix cinerea) and Hawthorn within the community.

W24 underscrub is a common and widespread habitat that frequently develops over abandoned and neglected ground across Britain, and within the survey area most commonly occurs across areas of rubble to the north of the site adjacent to the northern formal pathway.

W2Sb Pteridium aquilinum - Rubus fruticosus underscrub -- Teucrium scorodonia sub-community

Analysis through MAVIS found a reasonable fit with this community type at 51.7% (1 d.p) certainty. This habitat is characterised by a constancy of Bracken that is also at a high frequency within the sward (frequency 6-10), with constant Bramble at lower frequency (1-8). The Wood Sage sub-community is the most species-poor of the W25 sub-communities and has a low abundance of herbs within the sward, primarily including coarse grasses such as Cock's-foot and Yorkshire-fog.

This community is common and widespread throughout lowland Britain and is characteristic of circumneutral to mildly acidic soils, often found in close association with woodlands.

All Potamogeton pectinatus - Myriophyllum spicatum community

MAVIS analysis found a reasonable fit with the All community type at 55.8% (1 d.p) certainty, and is characterised by both Fennel Pondweed (Potamogeton pectinatus) and Spiked Water Milfoil (Myriophyllum spicatum), both uncommon in Cumbria. Also observed within the Hod barrow lagoon where this community occurs is a locally high abundance of stoneworts (Chara spp.), whilst nationally rare Convergent Stonewort (C. connivens) is also known from this lagoon (8$BI, 2021). Curled Pondweed (P. crispus) also occurs at low frequency within observed stands of vegetation.

In addition to aquatic macrophytes seen across identified sampling transects, nationally scarce Pillwort is known across margins of the lagoon away outside ofthe survey area.

All is a vegetation type that is widespread, although localised throughout lowland England, and may form in flowing or standing waters that are mesotrophic to eutrophic. The presence of both Fennel Pondweed, Spiked Water Milfoil and Convergent Stonewort at the Hodbarrow lagoon also fulfil the appropriate criteria for the s.41 HPI 'Eutrophic Standing Waters' (4 JNCC, 2008; UKBG, 1998).

2022 results

CG1 – Festuca ovina – Carlina vulgaris grassland

MAVIS analysis found a relatively poor fit with CG1e grassland (44.5% (1 d.p) certainty), which is likely attributable to the apparent rarity of Crested Hair-grass (Koeleria macrantha) and abundance of Hawkweed (Hieracium cf. grandidens) across sampled CG1-type grassland. Therefore, CG1 grassland has been categorised to community-level only. It is characterised by an abundance of calcicoles, including Carline Thistle (Carlina vulgaris), with Mouse-ear-hawkweed (Pilosella officinarum), Wild Thyme (Thymus polytrichus) and Glaucous Sedge (Carex flacca). Sheep's fescue (Festuca ovina) was a constant feature of the sward, alongside Rough Hawkbit (Leontodon hispidus), Common Bird's-foot Trefoil (Lotus corniculatus), a Hawkweed and Stubble-moss (Weissia spp.), whilst a range of other mosses were also frequent throughout the sward. These may include the mosses Hypnum lacunosum, Homalothecium lutescens and Ditrichum gracile. Alongside the abundance of calcicoles, this sward is consistently sparse, with an abundance of bare, rocky ground and generally low cover of graminoides. CG1 grassland was located to the south-east of the Hodbarrow reserve and within the proposed car park area to the north.

CG1 grassland is a rare habitat nationally, with scattered sites occurring on harder limestones and chalk most frequently around the south and west coasts of Britain. CG1-type grassland qualifies for the following priority habitat types:

- s.41 Lowland Calcareous Grassland (2. JNCC, 2008)
- LBAP Calcareous Grasslands (CBP, 2001)

In addition, calcareous grasslands across the communities CG1-CG9 qualify for the Annex I habitat H6210 'Semi-natural dry grasslands and scrubland facies on calcareous substrates (FestucoBrometalia)' (EC, 2013).

Therefore, all CG1 grassland must be considered to be of international-level importance.

CG1 / MG6 – Festuca ovina – Carlina vulgaris / Lolium perenne – Cynosurus cristatus grassland

MAVIS analysis again found a relatively poor fit with CG1 grassland (44.5% (1 d.p) certainty), which is likely attributable to the affinities with MG6-type grassland within this sward which is located in a small corner to the south-east, abutting an adjacent sheep-grazed pasture. Whilst this sward presented typical characteristics of CG1, including a relative constancy of Sheep's Fescue, Mouse-ear-hawkweed,

Wild Thyme, Glaucous Sedge and Common Bird's-foot Trefoil, Crested Dog's- tail (Cynosurus cristatus) with Perennial Rye-grass (Lolium perenne) also formed a constant feature

of the sward. This is likely to be attributed to enrichment of CG1-type grassland from the adjacent pasture; this sward has therefore been assigned as transitional between CG1 and MG6, although a diverse assemblage of calciolous plants remains to be a prominent feature of the sward. Furthermore, species richness within the sample greatly exceeds the expected richness of an MG6- type grassland. Rodwell (1992) on average records between 13 and 14 taxa per sample within an MG6 grassland, and between 22-35 for a CG1 sward. In a sample from this community, a total of 26 taxa were recorded, twice that expected from an MG6 grassland.

Although recipient to a degree of enrichment, likely from the adjacent sheep-grazed pasture, this community type remains to have close ties to a CG1 grassland, with a diverse range of calcicolous species forming a conspicuous component of the sward. Therefore, this habitat type is considered to qualify for the following priority habitat types:

- s.41 Lowland Calcareous Grassland (2. JNCC, 2008)
- LBAP Calcareous Grasslands (CBP, 2001)

In addition, calcareous grasslands across the communities CG1-CG9 qualify for the Annex I habitat H6210 'Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia)' (EC, 2013). Given that this stand has close ties to CG1, it is appraised to fall under this Annex I category and should therefore be considered to be of international-level importance.

CG6 – Avenula pubescens grassland

MAVIS analysis of this habitat type found a relatively poor fit with a CG6 grassland at 37.4% (1 d.p) certainty. The habitat itself has developed over a small area within what is otherwise CG1 to the south-east, and appears transitional in some respect between the two communities. CG6 grassland

is dominated by Downy Oat-grass (Avenula pubescens), alongside a range of calcicoles which form frequent to rare components of the sward, such as Common Bird's-foot Trefoil, Mouse-ear- hawkweed, Restharrow (Ononis repens), Glaucous Sedge and the mosses Homalothecium lutescens and Ctenidium molluscum. Whilst CG6 grassland shows affinities to the Dactylis glomerata – Briza media sub-community, many of the species characteristic of this sub-community such as Devil's-bit Scabious (Succisa pratensis), Quaking-grass (Briza media) and Cock's-foot (Dactylis glomerata) were absent. Given the apparent transitional nature of this habitat and lack of species particularly characteristic of any named sub-community, this stand has been classified to community-level only.

CG6 grasslands are a nationally very scarce habitat occurring at scattered localities throughout Britain on lowland limestones and chalk. It qualifies for the following priority habitat types:

- s.41 Lowland Calcareous Grassland (2. JNCC, 2008)
- LBAP Calcareous Grasslands (CBP, 2001)

In addition, calcareous grasslands across the communities CG1-CG9 qualify for the Annex I habitat H6210 'Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-

Brometalia)' (EC, 2013). Therefore, all CG6 grassland must be considered to be of international-level importance.

Briza media – Brachypodium sylvaticum grassland

MAVIS analysis of this grassland type found a relatively poor fit with CG3 grassland at 43.8% (1 d.p) certainty. However, the majority of plants which should characterise this community are absent within the sward or at very low abundance, namely Upright Brome (Bromus erectus), Salad Burnet (Poterium sanguisorba), Harebell (Campanula rotundifolia) and Squinancywort (Asperula cynanchica). Furthermore, CG3 grasslands are only known to occur within the south and east of Britain on chalk and oolite. Therefore, given that this grassland which is characterised by an abundance of Quaking-grass and False Brome (Brachypodium sylvaticum) is not well-affiliated with any recognised NVC community, it has simply been assigned the name of Briza media – Brachypodium sylvaticum grassland. Additional species which form constant components of this stand type include Rough Hawkbit, Common Bird's-foot Trefoil, Common Knapweed (Centaurea nigra), Glaucous Sedge and the mosses Homalothecium lutescens and Ctenidium molluscum, all of which indicate a strongly calcareous influence. Furthermore, this habitat type is reasonably species- rich, with an average of 15 species recorded per sample, with the majority of these with a very low tolerance to nutrient enrichment.

Briza – Brachypodium grassland has only been observed within the northern proposed car park area and shows affiliations with CG1 grassland which it grades into in areas, alongside MG1e-type grassland, and occurs over limestone slag from former quarrying activities in the area. Given that this habitat type has developed over limestone, grades into CG1 grassland and is made up of calcicolous plants with a generally very low tolerance to nutrient enrichment, it is considered to

qualify for the following priority habitat types following criteria established within the LBAP, by JNCC and the former UKBAP:

- s.41 Lowland Calcareous Grassland (2. JNCC, 2008)
- LBAP Calcareous Grasslands (CBP, 2001)

Although the Briza – Brachypodium grassland cannot be placed into a recognisable NVC category, the Interpretation Manual of EU Habitats (EC, 2013) gives that the Annex I H6210 Semi- natural dry grasslands and scrubland facies on calcareous substrates(Festuco-Brometalia) may not only correspond to the main NVC categories in Britain, but is also characterised by a range of plants, some of which are recorded for this stand type including Carline Thistle and Rough Hawkbit. Following criteria established by EC (2013), Briza – Brachypodium grasslands to the north have been appraised to fulfil the description for the Annex I habitat H6210, and should therefore be considered to be of international-level importance.

MG1e – Arrhenatherum elatius grassland Centaurea nigra sub-community

MAVIS analysis found a reasonable fit with this community at 57.3% (1 d.p) certainty. MG1 grasslands form on a range of sites, including species-rich grasslands, abandoned agricultural land and waste

ground. The critical aspect which results in the formation of MG1 grasslands is an absence of grazing/cutting. However, where False Oat-grass (Arrhenatherum elatius) grasslands originate

from enriched and often low-value habitats, they form species-poor stands. Richer stands of MG1 descended from species-rich grasslands include the Meadowsweet (Filipendula ulmaria), Wild Parsnip (Pastinaca sativa) and Black Knapweed sub-communities.

Stands of MG1e within the survey area are located within unmanaged areas within the northern proposed car park, and are characterised by an abundance of both False Oat-grass, Common Knapweed, Cock's-foot (Dactylis glomerata) and Red Fescue (Festuca rubra). A broad range of forbs exist within the sward, particularly including Common Bird's-foot Trefoil, Common Vetch (Vicia sativa), Yarrow (Achillea millefolium) and Meadow Vetchling (Lathyrus pratensis), which occur as constant to frequent components of the sward.

Although all MG1 grasslands were formerly excluded from the definition of the Habitat of Principal Importance 'Lowland Meadows' (1. JNCC, 2008), MG1 grasslands across the Common Knapweed, Meadowsweet and Wild Parsnip sub-communities are now included (Jefferson et al,

2019). Therefore, all areas of MG1e fulfil criteria for the following priority habitat types:

- S.41 Lowland Meadows (Jefferson et al, 2019; 1. JNCC, 2008)
- LBAP Hay Meadows and Lowland Pastures (CBP, 2011)

Lowland Meadows are a rare habitat nationally with 15,000ha estimated to remain nationally. A total of approximately 0.135ha of MG1e exists across the northern car park site, whilst the minimum stand area likely to be designated SSSI (national importance) stands at 0.5ha. Given the rarity and conservation importance of this habitat type, it is considered to be of high conservation value and should be viewed to be of at least regional importance.

MG10b – Holcus lanatus – Juncus effusus rush-pasture Juncus inflexus sub-community

MAVIS analysis of this habitat type found a relatively poor fit with a MG10b grassland at 40.78% (1 d.p) certainty, which is likely to be attributable to the abundance of Glaucous Sedge which was a dominant component of the vegetation, alongside Hard Rush (Juncus inflexus) and Yorkshire-fog (Holcus lanatus). While this grassland is best affiliated with an MG10b grassland, it appears to be highly atypical and transitional to a wet woodland type, with Grey Willow (Salix cinerea) forming a frequent component of the vegetation within only a small area to the north of the proposed car park area. Furthermore, Hard Rush does not form a particularly conspicuous component of the vegetation as might be expected is typical for this community.

MG10 grasslands form, quite often as mosaics, in a range of damp habitats. Where they develop on more acidic substrates, they are typically characterised by an abundance of both Soft Rush (Juncus effusus) and Yorkshire-fog. However, where substrates are more calcicolous, Soft Rush is usually replaced by Hard Rush as is the case here.

MG10 grasslands are a widespread community type across the British lowlands and do not appear to fall under priority habitat category with regards to national Habitats of Principal Importance or those which fall within the Cumbria Biodiversity Action Plan.

SD7 – Ammophila arenaria – Festuca rubra semi-fixed dune community

MAVIS analysis of qualitative quadrat data for this habitat type found a reasonable fit with this community type, at 54.1% (1 d.p) certainty. This community type is characterised by an abundance of Marram (Ammophila arenaria) in combination with Red Fescue (Festuca rubra agg.), whilst Bracken (Pteridium aquilinum), Thyme-leaved Sandwort (Arenaria serpyllifolia), Common Bird's-foot Trefoil and Mouse-ear-hawkweed form constant to frequent features of this community type.

SD7 semi-fixed dune vegetation is the characteristic vegetation type of less mobile yellow dunes across the coasts of Britain, developing where accretion of sand has slowed. It often occurs with more mature fixed-dune communities, including the SD8 Festuca rubra – Galium verum fixed dune community, which has been recorded to the immediate north of this area which is recorded over a small portion of the survey area to the far south-east.

SD7 are a widespread but localised habitat in Britain and are covered by the following priority habitat types:

- s.41 Coastal Sand Dunes (3. JNCC, 2008)
- LBAP Coastal Sand Dune (inc. dune grass, heath, scrub and strandline) (CBP, 2011)

In addition to these priority habitat types, SD7-type sand dune is covered by the Annex I habitat H2130 Fixed dunes with herbaceous vegetation ('grey dunes') and should therefore be considered to be of international-level importance.

SD8 – Festuca rubra – Galium verum fixed dune community

MAVIS analysis gives a relatively poor fit with an SD8-type community at 45.6 (1 d.p) certainty, which is likely to be attributable to the position of this habitat in the south-eastern corner of the survey area, which later transitions to CG1-type and related grasslands in the south-east as wind- blown sand grades to base-rich clays and limestone. Many species which occur in the small stand of SD8-type vegetation are shared by adjacent CG communities.

SD8 is a community which occurs on more mature but still calcareous fixed dune compared to SD7, and is a community-type characterised less by tall grasses such as Marram with few herbaceous species, but more by a rich assemblage of smaller dune grasses and herbs. It is widespread but local around the coasts of Britain and occurs on suitable stable dunes and coastal sandy plains. At RSPB Hodbarrow where this community was identified, it is characterised by an abundance of Common Bird's-foot Trefoil, Lady's Bedstraw (Galium verum), Mouse-ear-hawkweed, Red Fescue, Wild Thyme, Early Hair-grass (Aira praecox), Field Wood-rush (Luzula campestris) and Sand Sedge (Carex arenaria). Meanwhile, a large range of other herbs also occur across the sward. A total of 32 plants were recorded from a single SD8 sample which was the richest quadrat sample taken.

Areas of SD8-type fixed dune identified qualify for the following priority habitat types:

- s.41 Coastal Sand Dunes (3. JNCC, 2008)
- LBAP Coastal Sand Dune (inc. dune grass, heath, scrub and strandline) (CBP, 2011)

In addition to the priority habitat types above, SD8 fixed dune also qualifies, in similarity to SD7, for the Annex I habitat H2130 Fixed dunes with herbaceous vegetation ('grey dunes') and should therefore be considered to be of international-level importance.

Other habitats

A range of other habitat types were identified across the 2022 NVC survey areas which includes:

- MG1 / CG4 – Arrhenatherum elatius / Brachypodium pinnatum grassland;
- MG5 / CG6 – Cynosurus cristatus – Centaurea nigra / Avenula pubescens grassland;
- S19a Eleocharis palustris swamp – Eleocharis palustris sub-community;
- W23c Ulex europaeus – Rubus fruticosus scrub – Teucrium scorodonia sub-community; and
- W24 Rubus fruticosus – Holcus lanatus underscrub.

Where appropriate, supplementary quadrat data was obtained for these vegetation stands. Descriptions for all these stands matches those provided within the previous 2021 report and no floristic description for any of these communities was therefore considered appropriate here.

A lagoon to the south-east was partially included within the 2022 NVC survey area. No qualitative survey data could be obtained from this waterbody, however, Pondweeds (Potamogeton spp.) and charophyte beds were observed from within this waterbody. It has been assumed that this waterbody would be similar in character to the adjacent Hodbarrow coastal lagoon and would be likely to fulfil relevant criteria for the priority habitat 'Eutrophic Standing Waters' (4 JNCC, 2008; UKBG, 1998), although no NVC community could be directly assigned to this waterbody. It is possible that both of these lagoons would fulfil criteria for the Annex I habitat H1150 *Coastal lagoons, however, no indicators of brackish conditions were identified and this habitat type could not conclusively be identified during surveys.

B.2 AMPHIBIAN SURVEY RESULTS

2021

Transect 1

On this transect during surveys 1 and 2, male Natterjack toads were heard calling from adjacent land to the east which is coastal floodplain & sheep grazed marsh at National Grid Reference: SD184785 (see Star in Figures 6.1 - 6.3). Closer inspection of this area from within the site boundary identified the floodplain hosts ephemeral pools, present during surveys 1 and 2. No Natterjack toads were heard during the third and fourth surveys and it is likely the pools had dried up. No Natterjacks were physically seen during any of the surveys along this transect.

Common frogs and Common toads were recorded along this transect always within immediate reach of the bordering scrub and vegetation either side of the vehicle track proposed for works, most abundant during survey 4 (x17 Common toads, x5 Common frogs).

Transect 2

On this transect during surveys 1 and 2, Natterjack toads were heard calling from immediate adjacent land to the north-east which is coastal floodplain & sheep grazed marsh at National Grid Reference: SD184785 (see Star in Figures 6.1 - 6.2). Closer inspection of this area from within the site boundary identified this area hosts a number of ephemeral pools, particularly during surveys 1 and 2. No Natterjack toads were heard during the third and fourth surveys. No Natterjacks were physically seen during any of the surveys along this transect.

Common frogs and Common toads were recorded along this transect, typically within the sand dunes and immediate reach of the bordering vegetation either side of the dirt tracks, most abundant during survey 4 (x16 Common toads, x10 Common frogs). Two Common toads were also recorded in rock pools in the south-east of the site.

Transect 3

On this transect during surveys 1 and 2, Natterjack toads were heard calling from land to the north-east off site which is coastal floodplain & sheep grazed marsh at National Grid Reference: SD184785 (see Star in Figures 6.1 - 6.2). Closer inspection of this area from within the site boundary identified this area hosts a number of ephemeral pools, particularly during surveys 1 and 2. No Natterjack toads were heard during the third and fourth surveys. No Natterjacks were physically seen during any of the surveys along this transect. Common frogs and Common toads were recorded along this transect typically within immediate reach of the bordering vegetation either side of the dirt track in small numbers mainly around the nearby Ponds 1, 2 and 3 (x2 Common toads, x2 Common frogs).

Transect 4

No Natterjacks were heard or physically seen during any of the surveys along this transect. A lone Common toad was recorded along the transect near to the sand dunes in the east of the route, no amphibians heard or seen around the lighthouse/bird hide.

General torching with refuge search - No Natterjacks were heard or physically seen during any of the surveys. Additionally, no GCN's were observed at any stage on land or below refuge. During survey 2, up to fifty five Smooth newts (mainly sub-adults and juveniles) were recorded within wet woodland ephemeral pools at National Grid Reference: SD18067836.

Pond 1- National Grid Reference: SD17807844

- Survey 1 notes - 0 amphibians observed
- Survey 2 notes - 0 amphibians observed
- Survey 3 notes - x1 Smooth newt (sub-adult)
- Survey 4 notes - x11 Comm toads, x7 Common frogs. Increase in invertebrates

Absence of Natterjack toad and GCN during all surveys

Pond 2 - National Grid Reference: SD17827851

- Survey 1 notes - x12 Smooth newts (juveniles), toad tadpoles (40-50)
- Survey 2 notes - x10 Smooth newts (juveniles), toad tadpoles (20-30)
- Survey 3 notes - x3 Smooth newt adults (x1 male, x2 females), x7 Common frogs, toad tadpoles. Increase in invertebrates including Odonata
- Survey 4 notes - x4 Smooth newt adults (x1 male, x3 females), x4 Common frogs, x3 Common toads observed. Increase in invertebrates including Odonata
- Absence of Natterjack toad and GCN during all surveys

Pond 3 - National Grid Reference: SD17867851

- Survey 1 notes - x65 Smooth newts (mixed), toad tadpoles (300-400)
- Survey 2 notes - x70 Smooth newts (mixed), toad tadpoles (60-70)
- Survey 3 notes - x42 Smooth newts (mixed), x19 Common frogs, x4 Common toads. Increase in invertebrates including Odonata. Notably drier. Increase in invertebrates including Odonata Survey 4 notes - Smooth newts efts (50-60) and x1 adult, x14 Common frogs, x17 Common toads. Increase in invertebrates including Odonata. Notably drier. Increase in invertebrates including Odonata
- Absence of Natterjack toad and GCN during all surveys

2022

Key Area 1 – SD184785

During the 2021 surveys 1 and 2, male Natterjack toads were heard calling from this area by surveyors from the eastern boundary footpath of RSPB Hodbarrow, thus, Key Area 1 was a prime focus point of the 2022 surveys with efforts made to establish if it was a breeding pool.

It is a large area of sheep grazed coastal floodplain and marsh with locally dominant rushes that was holding a large volume of ephemeral water to at least 30cm depth during the 2022 surveys 1 and 2. During the first and second surveys, the water body margin was searched for spawn strings with none found; the water was notably full of chemicals and foul odours, with an abundance of sheep waste (detritus and young sheep dock/tails). The chemicals in the water are likely a consequence of sheep dipping residue entering the water table from sheep wool when the animals enter the pool, and, possibly, from the chemicals in sheep waste/urine from worming.

Male Natterjack toads were again heard this year during survey 1 and 2 but none were physically located. During survey 2, two adult males and one adult female Natterjack toad was/were foundin the pool of Key Area 1 confirming both sexes use the pool during the breeding season, and calling males would suggest attempted breeding, though again no spawn was found to confirm it as a breeding pool.

By surveys 3-4, less than 20 days from male and female Natterjacks being encountered in this area, Key Area 1 had completely dried up.

Key Areas 2 & 3 – SD184786 & SD184787

Two separate but similar sized ephemeral water bodies north of Key Area 1, thus, also located within sheep grazed coastal floodplain and marsh land, though with locally dominant Common spike-rush; each was holding a reasonable volume of water to at least 20cm depth during surveys 1 and 2. No spawn strings or adults were encountered during two checks, though males could be heard calling from the generally vicinity at night during surveys 1 and 2, attributed and confirmed at Key Area 1, Key Areas 2 & 3 are similar but smaller and do not hold as great a volume of water. By surveys 3-4, both water bodies had completely dried up.

Key Area 4 – SD18317895

A stretch of unshaded ditch near a continuous linear hedgerow that retained deep water throughout the surveys and had a high volume of macrophytes including Floating Sweet-grass; no spawn strings or NT adults were encountered during any surveys and no males were heard calling from this area.

Key Area 5 – SD18317895

A snaking extent of ephemeral pool water south of the farmhouse at Red Hills. Had locally dominant Common Spike-rush and Floating Sweet-grass was occasional. Held a reasonable volume of water to at least 20cm depth during surveys 1 and 2; no spawn strings or adults were encountered, no males were heard calling from this pool, and by surveys 3-4, Key Area 5 had completely dried up.

Key Area 6 – SD179790

A series of ditches and inundation water within shallow pits of dense vegetation aside the hardstanding access track leading into the recycling centre, part of which falls within the development boundary of the proposed new car park. All local ditches / pits are heavily shaded, shallow, and the area is isolated given its encapsulation from the wider ephemeral pool network by the surrounding vertical rock faces, large quarry lake and dense scrub. This area is considered unsuitable for Natterjack toads. Most of the area was dry by survey 2, and completely dry by surveys 3-4. No spawn strings found, no animals seen or heard in this area.

Key Area 7 – SD175790

A large crystal-clear, foul-smelling pool south of Redhills Raceway track; surrounded by dense Willow / Hawthorn scrub it abuts the boundary of RSPB Hodbarrow and was partly surveyed in 2021 given its proximity to RSPB Hodbarrow. Key Area 7 was adjudged to be capable of hosting NT, but no animals were heard calling from this area in 2021 or during any of the 2022 surveys; close inspection of the water body during survey 3 identified dense numbers (circa 800-900) of Common toad tadpoles in various shoals, and hand capture of twenty maturing tadpoles did not identify any Natterjack toad amongst the numbers encountered. Several adult Common toads were encountered along the road of RSPB Hodbarrow during nocturnal torching, and hundreds of Common toad adults were encountered

during the 2021 surveys on RSPB Hodbarrow generally speaking. The presence of a direct amphibious, robust competitor species for the same breeding and feeding resources is likely one of several direct impacts affecting Natterjack toads locally. No spawn strings or adult Natterjack toads were encountered during any surveys at Key area 7 in 2021/22 and no males were heard calling from this area.

Known NT Breeding Pool ('Red Hills Pool 3') - SD187789

Data search results provided by Lucy Gibson Consulting / Appletons attests to evidence over many years of recording by ARC UK that the pool at this Grid Reference is the stronghold for the breeding Natterjack toad population on the Millom coast. It was visited only once throughout the 2022 survey effort, during Survey 2, to avoid unnecessary disturbance (see Limitations). The pool is large with a deep region that rarely dries out in the north and shallower area that often dries to the south, likely to only completely dry out in periods of heavy drought; it contains a significant and important abundance of botanical diversity with many important species encountered.

Notably, the pool is completely fenced and thus protected from sheep accessing it. During the investigation which only covered the eastern margin of the pool, a total of four Natterjack toad spawn strings were encountered confirming use for breeding in 2022. The pool was not visited after the diurnal visit, but Natterjack males were heard calling from this area by night during all four surveys

B.3 FULL INVERTEBRATE SPECIES LIST

2021 Wider Site

Order	Taxon	Vernacular name	Status
Aranaeae - spiders			
Clubionidae	Cheiracanthium erraticum	sac spider	None
Lycosidae	Pardosa nigriceps	wolf spider	None
Lycosidae	Pirata hygrophilus	wolf spider	None
Salticidae	Heliophanus flavipes	jumping spider	None
Salticidae	Euophrys frontalis	jumping spider	None
Tetragnathidae	Pachygnatha degeeri	long-jawed orb weaver	None
Tetragnathidae	Tetragnatha extensa	long-jawed orb weaver	None
Theridiidae	Anelosimus vittatus	spider	None
Theridiidae	Theridion pallens	spider	None
Thomisidae	Ozyptila praticola	crab spider	None
Thomisidae	Ozyptila trux	crab spider	None
Thomisidae	Xysticus cristatus	crab spider	None
Coleoptera - beetles			

Order	Taxon	Vernacular name	Status
Apionidae	Eutrichapion viciae	vetch seed weevil	None
Apionidae	Exapion ulicis	gorse seed weevil	None
Apionidae	Oxystoma craccae	seed weevil	Local
Apionidae	Protapion apricans	clover seed weevil	None
Apionidae	Protapion assimile	clover seed weevil	None
Apionidae	Protapion fulvipes	seed weevil	None
Cantharidae	Rhagonycha limbata	soldier beetle	None
Cantharidae	Rhagonycha testacea	soldier beetle	None
Carabidae	Abax parallelepipedus	ground beetle	None
Carabidae	Amara aenea	ground beetle	None
Carabidae	Amara bifrons	ground beetle	Local
Carabidae	Amara communis	ground beetle	Local
Carabidae	Amara lunicollis	ground beetle	Local
Carabidae	Calathus erratus	ground beetle	None
Carabidae	Calathus fuscipes	ground beetle	None
Carabidae	Calathus melanocephalus	ground beetle	None
Carabidae	Harpalus latus	ground beetle	None
Carabidae	Harpalus rubripes	ground beetle	Local
Carabidae	Harpalus tardus	ground beetle	Local
Carabidae	Nebria brevicollis	ground beetle	None
Carabidae	Notiophilus aquaticus	ground beetle	Local
Carabidae	Notiophilus biguttatus	ground beetle	None
Carabidae	Notiophilus substriatus	ground beetle	Local
Carabidae	Olisthopus rotundatus	ground beetle	Local
Carabidae	Pterostichus madidus	ground beetle	None
Carabidae	Pterostichus niger	ground beetle	None
Carabidae	Pterostichus vernalis	ground beetle	Local
Carabidae	Syntomus foveatus	ground beetle	None
Chrysomelidae	Altica lythri	leaf beetle	None
Chrysomelidae	Altica palustris	leaf beetle	None
Chrysomelidae	Chrysolina staphylea	leaf beetle	Local
Chrysomelidae	Crepidodera aurea	flea beetle	None
Chrysomelidae	Crepidodera fulvicornis	flea beetle	None

Order	Taxon	Vernacular name	Status
Chrysomelidae	Galerucella lineola	leaf beetle	None
Chrysomelidae	Phyllotreta nemorum	turnip flea beetle	None
Coccinellidae	Nephus redtenbacheri	ladybird	None
Coccinellidae	Coccinella septempunctata	ladybird	None
Cryptophagidae	Micrambe ulicis	fungus beetle	None
Curculionidae	Andrion regensteinense	weevil	None
Curculionidae	Attactagenus plumbeus	weevil	NS
Curculionidae	Hypera nigrirostris	weevil	None
Curculionidae	Hypera suspiciosa	weevil	Local
Curculionidae	Mecinus pascuorum	weevil	None
Curculionidae	Otiorhynchus ligneus	weevil	None
Curculionidae	Otiorhynchus singularis	weevil	None
Curculionidae	Parathelcus pollinarius	weevil	None
Curculionidae	Philopedon plagiatum	weevil	Local
Curculionidae	Phyllobius oblongus	weevil	None
Curculionidae	Phyllobius pyri	weevil	None
Curculionidae	Phyllobius roboretanus	weevil	None
Curculionidae	Romualdius angustisetulus	weevil	Local
Curculionidae	Sitona obsoletus	weevil	None
Curculionidae	Strophosoma melanogrammum	weevil	None
Curculionidae	Trichosirocalus troglodytes	weevil	None
Dryopidae	Dryops ernesti	long-toed water beetle	Local
Elateridae	Agriotes obscurus	click beetle	None
Elateridae	Athous haemorrhoidalis	click beetle	None
Histeridae	Saprinus aeneus	clown beetle	NS
Leiodidae	Leiodes badia	fungus beetle	Local
Nitidulidae	Meligethes aeneus	pollen beetle	None

Order	Taxon	Vernacular name	Status
Nitidulidae	Meligethes carinulatus	pollen beetle	None
Oedemeridae	Oedemera lurida	false blister beetle	Local
Ptiliidae	Ptenidium nitidum	featherwing beetle	None
Scarabaeidae	Hoplia philanthus	Welsh chafer	Local
Scraptiidae	Anaspis frontalis	false flower beetle	None
Scraptiidae	Anaspis maculata	false flower beetle	None
Scraptiidae	Anaspis rufilabris	false flower beetle	None
Staphylinidae	Aleochara lanuginosa	rove beetle	None
Staphylinidae	Drusilla canaliculata	rove beetle	None
Staphylinidae	Falagrioma thoracica	rove beetle	Local
Staphylinidae	Ocypus brunnipes	rove beetle	None
Staphylinidae	Pella limbata	rove beetle	Local
Staphylinidae	Philonthus carbonarius	rove beetle	None
Staphylinidae	Philonthus marginatus	rove beetle	None
Staphylinidae	Quedius scintillans	rove beetle	None
Staphylinidae	Sepedophilus marshami	rove beetle	None
Staphylinidae	Stenus brunnipes	rove beetle	None
Staphylinidae	Stenus clavicornis	rove beetle	None
Staphylinidae	Tachyporus dispar	rove beetle	None
Staphylinidae	Tasgius melanarius	rove beetle	None
Staphylinidae	Xantholinus gallicus	rove beetle	Local
Staphylinidae	Xantholinus longiventris	rove beetle	None
Diptera - flies			
Bibionidae	Bibio marci	St Marks fly	None
Bibionidae	Dilophus femoratus	milky-winged feverfly	None
Dolichopodidae	Poecilobothrus nobilitatus.	semaphore fly	None
Syrphidae	Melanostoma scalare	hoverfly	None
Syrphidae	Platycheirus albimanus	hoverfly	None
Syrphidae	Scaeva pyrastri	pied hoverfly	None
Tabanidae	Haematopota pluvialis	notch-horned cleg	None
Tipulidae	Tipula paludosa	crane fly	None
Ulidiidae	Herina lugubris	picture-wing fly	Local

Order	Taxon	Vernacular name	Status
Hemiptera - true bugs			
Aphrophoridae	Philaenus spumarius	common froghopper	None
Berytidae	Berytinus minor	stiltbug	None
Cicadellidae	Anoscopus histrionicus	leaf hopper	Local
Cixiidae	Cixius simplex	lacehopper	Local
Delphacidae	Criomorphus albomarginatus	planthopper	None
Lygaeidae	Nysius thymi	ground bug	None
Lygaeidae	Scolopostethus affinis	ground bug	None
Lygaeidae	Scolopostethus thomsoni	seed bug	None
Miridae	Closterotomus norwegicus	potato capsid	None
Miridae	Grypocoris stysi	plant bug	None
Miridae	Liocoris tripustulatus	nettle bug	None
Miridae	Oncotylus viridiflavus	plant bug	Local
Miridae	Orthops campestris	mirid bug	None
Miridae	Plagiognathus arbustorum	mirid bug	None
Miridae	Stenodema laevigata	grass bug	None
Miridae	Stenotus binotatus	grass bug	None
Pentatomidae	Elasmostethus interstinctus	parent bug	None
Rhopalidae	Myrmus miriformis	rhopalid bug	None
Saldidae	Saldula saltatoria	shore bug	None
Hymenoptera - bees, wasps, ants			
Apidae	Bombus hypnorum	tree bumblebee	None
Apidae	Bombus lucorum / terrestris	bumblebee	None
Crabronidae	Crabro cribrarius	digger wasp	None
Formicidae	Lasius flavus	yellow meadow ant	None
Formicidae	Lasius niger	brown garden ant	None
Formicidae	Myrmica ruginodis	red ant	None
Formicidae	Myrmica scabrinodis	red ant	None

Order	Taxon	Vernacular name	Status
Halictidae	Lasioglossum leucopus	white-footed furrow bee	None
Isopoda - woodlice			
Armadillidiidae	Armadillidium vulgare	pill woodlouse	None
Oniscidae	Oniscus asellus	common shiny woodlouse	None
Philosciidae	Philoscia muscorum	common striped woodlouse	None
Platyarthridae	Platyarthrus hoffmannseggii	blind woodlouse	None
Porcellionidae	Porcellio scaber	common rough woodlouse	None
Julida	Julidae	Ommatoiulus sabulosus	striped millipede
Julida	Julidae	Ophyiulus pilosus	hairy snake millipede
Julida	Julidae	Tachypodoiulus niger	white-legged snake millipede
Lepidoptera - butteflies			
Hesperiidae	Thymelicus sylvestris	small skipper	None
Lasiocampidae	Euthrix potatoria	drinker moth	None
Lycaenidae	Polyommatus icarus	common blue butterfly	None
Nymphalidae	Coenonympha pamphilus	small heath	Sec 41
Nymphalidae	Maniola jurtina	meadow brown	None
Pieridae	Anthocharis cardamines	orange tip butterfly	None
Zygaenidae	Zygaena filipendulae	six-spot burnet moth	None
Odonata - dragonflies and damselflies			
Aeshnidae	Aeshna cyanea	Southern hawker	None
Coenagrionidae	Enallagma cyathigerum	common blue damselfly	None
Libellulidae	Libellula quadrimaculata	four-spotted chaser	None
Opiliones - harvestmen			

Order	Taxon	Vernacular name	Status
Nemastomatidae	Nemastoma bimaculatum	two-spotted harvestman	None
Phalangiidae	Phalangium opilio	harvestman	None
Orthoptera - grasshoppers and crickets			
Acrididae	Chorthippus brunneus	field grasshopper	None
Acrididae	Omocestus viridulus	common green grasshopper	None
Tetrigidae	Tetrix undulata	common ground-hopper	None
Polydesmida - flat-backed millipedes			
Polydesmida			
Polydesmidae	Polydesmus angustus	flat-backed millipede	None
Pulmonata - lunged snails			
Helicidae	Cepaea nemoralis	brown-lipped snail	None
Helicidae	Cernuella virgata	striped snail	DD
Oxychilidae	Oxychilus cellarius	cellar snail	None
Oxychilidae	Oxychilus draparnaudi	true glass snail	Local
Helicidae	Cepaea nemoralis	brown-lipped snail	None
Helicidae	Cernuella virgata	striped snail	DD
Oxychilidae	Oxychilus cellarius	cellar snail	None
Oxychilidae	Oxychilus draparnaudi	true glass snail	Local
Stylommatophora - lunged snails			
Geomitridae	Xeroplexa intersecta	wrinkled snail	None

2022 Welcome building

Order	Family	Taxon	Vernacular name	Sample name	Gridref	Date	Abundance
Coleoptera	Curculionidae	Sitona suturalis	weevil	Hand searching	SD1800779017	20/04/2022	1
Coleoptera	Apionidae	Exapion ulicis	seed weevil	Hand searching	SD1800779017	20/04/2022	2
Coleoptera	Cryptophagidae	Micrambe ulicis	Cryptophagid beetle	Hand searching	SD1800779017	20/04/2022	2
Coleoptera	Staphylinidae	Geostiba circellaris	rove beetle	Hand searching	SD1800779017	20/04/2022	1
Coleoptera	Chrysomelidae	Longitarsus sp	flea beetle	Hand searching	SD1800779017	20/04/2022	1f
Coleoptera	Staphylinidae	Ochthephilum fracticorne	rove beetle	Hand searching	SD1800779017	20/04/2022	2m
Lepidoptera	Nymphalidae	Aglais io	peacock butterfly	Field observation	SD180790	20/04/2022	1
Lepidoptera	Nymphalidae	Pararge aegeria	speckled wood	Field observation	SD180790	20/04/2022	2
Lepidoptera	Pieridae	Anthocharis cardamines	orange tip	Field observation	SD180790	20/04/2022	freq
Coleoptera	Carabidae	Bradycellus sharpi	ground beetle	Hand searching	SD179789	20/04/2022	2
Coleoptera	Chrysomelidae	Altica palustris	leaf beetle	Sweeping	SD179789	20/04/2022	freq

Order	Family	Taxon	Vernacular name	Sample name	Gridref	Date	Abundance
Coleoptera	Coccinellidae	Coccinella undecimpunctata	11-spot ladybird	Sweeping	SD180788	20/04/2022	1
Coleoptera	Apionidae	Exapion ulicis	seed weevil	Hand searching	SD180788	20/04/2022	2
Coleoptera	Cryptophagidae	Micrambe ulicis	Cryptophagid beetle	Hand searching	SD180788	20/04/2022	2
Coleoptera	Staphylinidae	Drusilla canaliculata	rove beetle	Hand searching	SD180788	20/04/2022	1
Coleoptera	Chrysomelidae	Lochmaea crataegi	hawthorn leaf beetle	Sweeping	SD1804078894	20/04/2022	2
Hymenoptera	Formicidae	Myrmica rubra	red ant	Hand searching	SD180790	20/04/2022	freq
Hymenoptera	Formicidae	Lasius flavus	yellow meadow ant	Hand searching	SD180790	20/04/2022	abundant
Hymenoptera	Formicidae	Lasius niger	black ant	Hand searching	SD180790	20/04/2022	abundant
Hemiptera	Pentatomidae	Elasmostethus interstinctus	birch shieldbug	Sweeping	SD1803679024	20/04/2022	1
Hemiptera	Pentatomidae	Palomena prasina	green shieldbug	Sweeping	SD1803679024	20/04/2022	2
Coleoptera	Hydrophilidae	Anacaena globulus	water scavenger beetle	Hand searching	SD1803679024	20/04/2022	3

Order	Family	Taxon	Vernacular name	Sample name	Gridref	Date	Abundance
Squamata	Lacertidae	Zootoca vivipara	common lizard	Field observation	SD179789	20/04/2022	1
Pulmonata	Limacidae	Deroceras species	keeled slug	Pitfall 1	SD1800779017	11/05/2022	10
Coleoptera	Staphylinidae	Anotylus rugosus	rove beetle	Pitfall 1	SD1800779017	11/05/2022	1
Isopoda	Philosciidae	Philoscia muscorum	common striped woodlouse	Pitfall 1	SD1800779017	11/05/2022	3
Julida	Julidae	Ophyiulus pilosus	hairy millipede	Pitfall 1	SD1800779017	11/05/2022	2m, 1f
Coleoptera	Hydrophilidae	Anacaena globulus	water scavenger beetle	Pitfall 1	SD1800779017	11/05/2022	1
Pulmonata	Oxychilidae	Oxychilus alliarius	garlic snail	Pitfall 1	SD1800779017	11/05/2022	1
Coleoptera	Staphylinidae	Tachyporus nitidulus	rove beetle	Pitfall 1	SD1800779017	11/05/2022	1
Coleoptera	Staphylinidae	Lesteva sicula	rove beetle	Pitfall 1	SD1800779017	11/05/2022	1
Polydesmida	Polydesmidae	Polydesmus angustus	flat-backed millipede	Pitfall 2	SD1804078894	11/05/2022	3
Isopoda	Philosciidae	Philoscia muscorum	common striped woodlouse	Pitfall 2	SD1804078894		1
Julida	Julidae	Cylindroiulus punctatus	round millipede	Pitfall 2	SD1804078894	11/05/2022	1

Order	Family	Taxon	Vernacular name	Sample name	Gridref	Date	Abundance
Coleoptera	Leiodidae	Catops fuscus	carrion beetle	Pitfall 2	SD1804078894	11/05/2022	
Pulmonata	Helicidae	Cepaea nemoralis	brown-lipped snail	Pitfall 4	SD1796878928	11/05/2022	1
Coleoptera	Carabidae	Pterostichus madidus	ground beetle	Pitfall 4	SD1796878928	11/05/2022	1
Coleoptera	Silphidae	Phosphuga atrata	carrion beetle	Pitfall 4	SD1796878928	11/05/2022	1
Aranaeae	Thomisidae	Xysticus cristatus	crab spider	Pitfall 4	SD1796878928	11/05/2022	2
Isopoda	Armadillidiidae	Armadillidium vulgare	pill woodlouse	Pitfall 4	SD1796878928	11/05/2022	1
Polydesmida	Polydesmidae	Polydesmus angustus	flat-backed millipede	Pitfall 4	SD1796878928	11/05/2022	1m
Hymenoptera	Formicidae	Lasius flavus	yellow meadow ant	Pitfall 4	SD1796878928	11/05/2022	1, worker
Coleoptera	Staphylinidae	Ocypus aeneocephalus	rove beetle	Pitfall 4	SD1796878928	11/05/2022	1m,1f
Coleoptera	Carabidae	Amara curta	ground beetle	Pitfall 4	SD1796878928	11/05/2022	1f
Coleoptera	Carabidae	Nebria brevicollis	ground beetle	Pitfall 5	SD1793078956	11/05/2022	4
Coleoptera	Elateridae	Agriotes obscurus	click beetle	Pitfall 5	SD1793078956	11/05/2022	1
Aranaeae	Thomisidae	Xysticus cristatus	crab spider	Pitfall 5	SD1793078956	11/05/2022	1m
Isopoda	Armadillidiidae	Armadillidium vulgare	pill woodlouse	Pitfall 5	SD1793078956	11/05/2022	2

Order	Family	Taxon	Vernacular name	Sample name	Gridref	Date	Abundance
Diptera	Bibionidae	Bibio marci	St Marks fly	Pitfall 5	SD1793078956	11/05/2022	1
Hymenoptera	Formicidae	Lasius flavus	yellow meadow ant	Pitfall 5	SD1793078956	11/05/2022	1, worker
Hymenoptera	Formicidae	Lasius niger	black ant	Pitfall 5	SD1793078956	11/05/2022	10, workers
Coleoptera	Staphylinidae	Drusilla canaliculata	rove beetle	Pitfall 5	SD1793078956	11/05/2022	1
Coleoptera	Coccinellidae	Rhyzobius litura	ladtbird	Pitfall 5	SD1793078956	11/05/2022	1
Coleoptera	Carabidae	Agonum muelleri	ground beetle	Pitfall 5	SD1793078956	11/05/2022	3
Coleoptera	Curculionidae	Orthochaetes setiger	weevil	Pitfall 5	SD1793078956	11/05/2022	1
Coleoptera	Byrrhidae	Cytilus sericeus	pill beetle	Pitfall 5	SD1793078956	11/05/2022	1
Aranaeae	Lycosidae	indet species	spider	Pitfall 5	SD1793078956	11/05/2022	15
Lepidoptera	Pieridae	Anthocharis cardamines	orange tip	Field observation	SD180790	11/05/2022	5m, 1f
Odonata	Coenagriidae	Enallagma cyathigerum	common blue damselfly	Field observation	SD1800779017	11/05/2022	1m, 1f
Squamata	Lacertidae	Zootoca vivipara	common lizard	Field observation	SD180790	11/05/2022	3
Anura	Bufonidae	Bufo bufo	common toad	Field observation	SD180790	11/05/2022	1
Hemiptera	Lygaeidae	Peritrechus nubilus	Lygaeid bug	Sieving	SD180790	11/05/2022	1
Hemiptera	Miridae	Leptopterna species	grass bug	Sieving	SD180790	11/05/2022	2, nymphs

Order	Family	Taxon	Vernacular name	Sample name	Gridref	Date	Abundance
Coleoptera	Chrysomelidae	Cryptocephalus aureolus	leaf beetle	Sweeping	SD1799778986	11/05/2022	1m
Coleoptera	Curculionidae	Andrion regensteinense	weevil	Sweeping	SD180790	11/05/2022	2
Diptera	Syrphidae	Platycheirus clypeatus	hoverfly	Sweeping	SD180790	11/05/2022	1m
Coleoptera	Curculionidae	Anthonomus pedicularius	weevil	Sweeping	SD180790	11/05/2022	1
Coleoptera	Apionidae	Exapion ulicis	seed weevil	Sweeping	SD180790	11/05/2022	1
Coleoptera	Chrysomelidae	Galerucella lineola	seed weevil	Sweeping	SD180790	11/05/2022	1
Hemiptera	Anthocoridae	Anthocoris species	flower bug	Sweeping	SD180790	11/05/2022	1
Coleoptera	Chrysomelidae	Crepidodera fulvicornis	leaf beetle	Beating	SD180790	11/05/2022	1
Coleoptera	Chrysomelidae	Chaetocnema hortensis	leaf beetle	Beating	SD180790	11/05/2022	1
Coleoptera	Kateretidae	Brachypterus glaber	pollen beetle	Sweeping	SD180790	11/05/2022	1
Coleoptera	Scraptiidae	Anaspis pulicaria?	false flower beetle	Beating	SD180790	11/05/2022	1f
Coleoptera	Scraptiidae	Anaspis maculata	false flower beetle	Beating	SD180790	11/05/2022	1f
Coleoptera	Nitidulidae	Meligethes carinulatus	pollen beetle	Beating	SD180790	11/05/2022	1f
Isopoda	Trichoniscidae	Trichoniscus pusillus sensu lato	pygmy woodlouse	Sieving	SD180790	11/05/2022	1

Order	Family	Taxon	Vernacular name	Sample name	Gridref	Date	Abundance
Hymenoptera	Formicidae	Lasius flavus	yellow meadow ant	Pitfall 1	SD1800779017	29/05/2022	3, workers
Hymenoptera	Formicidae	Lasius niger	black ant	Pitfall 1	SD1800779017	29/05/2022	1, woker
Pulmonata	Limacidae	Deroceras species	keeled slug	Pitfall 1	SD1800779017	29/05/2022	4
Julida	Julidae	Ophyiulus pilosus	hairy millipede	Pitfall 1	SD1800779017	29/05/2022	1, imm
Aranaeae	Thomisidae	Ozyptila trux	crab spider	Pitfall 1	SD1800779017	29/05/2022	1m
Isopoda	Philosciidae	Philoscia muscorum	common striped woodlouse	Pitfall 2	SD1804078894	29/05/2022	10
Hymenoptera	Formicidae	Lasius flavus	yellow meadow ant	Pitfall 2	SD1804078894	29/05/2022	1, worker
Hymenoptera	Formicidae	Lasius niger	black ant	Pitfall 2	SD1804078894	29/05/2022	1, worker
Polydesmida	Polydesmidae	Polydesmus angustus	flat-backed millipede	Pitfall 2	SD1804078894	29/05/2022	2m, 1f
Hemiptera	Cixiidae	indet Cixius species	plathopper	Pitfall 2	SD1804078894	29/05/2022	1f
Hymenoptera	Apidae	Bombus lucorum/terrestris	bumblebee	Pitfall 2	SD1804078894	29/05/2022	1, worker
Aranaeae	Dysderidae	Dysdera erythrina	woodlouse eating spider	Pitfall 3	SD1799978972	29/05/2022	2f

Order	Family	Taxon	Vernacular name	Sample name	Gridref	Date	Abundance
Isopoda	Philosciidae	Philoscia muscorum	common striped woodlouse	Pitfall 3	SD1799978972	29/05/2022	22
Hymenoptera	Formicidae	Lasius niger	black ant	Pitfall 3	SD1799978972	29/05/2022	5, workers
Polydesmida	Polydesmidae	Polydesmus angustus	flat-backed millipede	Pitfall 3	SD1799978972	29/05/2022	1m
Coleoptera	Carabidae	Pterostichus madidus	ground beetle	Pitfall 4	SD1796878928	29/05/2022	1
Aranaeae	Thomisidae	Xysticus cristatus	crab spider	Pitfall 4	SD1796878928	29/05/2022	1f
Isopoda	Armadillidiidae	Armadillidium vulgare	pill woodlouse	Pitfall 4	SD1796878928	29/05/2022	1
Hymenoptera	Formicidae	Lasius flavus	yellow meadow ant	Pitfall 4	SD1796878928	29/05/2022	1, worker
Opiliones	Phalangiidae	Phalangium opilio	harvestman	Pitfall 4	SD1796878928	29/05/2022	1f
Coleoptera	Carabidae	Nebria brevicollis	ground beetle	Pitfall 5	SD1793078956	29/05/2022	1f
Coleoptera	Elateridae	Agriotes obscurus	click beetle	Pitfall 5	SD1793078956	29/05/2022	1
Hymenoptera	Formicidae	Lasius niger	black ant	Pitfall 5	SD1793078956	29/05/2022	1w
Odonata	Coenagriidae	Enallagma cyathigerum	common blue damselfly	Field observation	SD180790	29/05/2022	several
Coleoptera	Curculionidae	Phyllobius roboretanus	weevil	Sweeping	SD180790	29/05/2022	abundant

Order	Family	Taxon	Vernacular name	Sample name	Gridref	Date	Abundance
Coleoptera	Oedemeridae	Oedemera lurida	Oedemerid beetle	Field observation	SD180790	29/05/2022	frequent
Hymenoptera	Colletidae	Hylaeus hyalinatus	hairy-yellow face bee	Field observation	SD180790	29/05/2022	1m
Hymenoptera	Apidae	Bombus pascuorum	common carder bee	Field observation	SD180790	29/05/2022	several
Hymenoptera	Apidae	Bombus lapidarius	red-tailed bumblebee	Field observation	SD180790	29/05/2022	several
Hymenoptera	Vespidae	Vespula species	wasp	Field observation	SD180790	29/05/2022	1, worker
Coleoptera	Chrysomelidae	Cryptocephalus aureolus	leaf beetle	Field observation	SD180790	29/05/2022	5
Coleoptera	Curculionidae	Cionus scrophulariae	figwort weevil	Sweeping	SD180790	29/05/2022	1
Urodela	Salamandriidae	Lissotriton vulgaris	smooth newt	Field observation	SD180790	29/05/2022	1, juvenile
Coleoptera	Curculionidae	Mecinus pascuorum	weevil	Sweeping	SD180790	29/05/2022	1
Aranaeae	Tetragnathidae	indet Tetragnatha species	long-jawed ord-weaver	Sweeping	SD180790	29/05/2022	1f, imm
Coleoptera	Coccinellidae	Subcoccinella vigintiquattuorpunctata	24-spot ladybird	Sweeping	SD180790	29/05/2022	1
Aranaeae	Salticidae	Heliophanus flavipes	jumping spider	Sieving	SD180790	29/05/2022	1f

Order	Family	Taxon	Vernacular name	Sample name	Gridref	Date	Abundance
Pulmonata	Vitrinidae	Vitrina pellucida	winter semi-slug	Hand searching	SD180790	29/05/2022	1
Pulmonata	Hygromiidae	Zenobiellina subrufescens	brown snail	Hand searching	SD180790	29/05/2022	1
Coleoptera	Chrysomelidae	Altica palustris	leaf beetle	Hand searching	SD180790	29/05/2022	2f
Coleoptera	Curculionidae	Mecinus pyraster	weevil	Hand searching	SD180790	29/05/2022	1m
Coleoptera	Staphylinidae	Bryaxis curtisii	rove beetle	Hand searching	SD180790	29/05/2022	1m
Coleoptera	Staphylinidae	Lobrathium multipunctum	rove beetle	Hand searching	SD180790	29/05/2022	1
Coleoptera	Chrysomelidae	Bruchus loti	leaf beetle	Hand searching	SD180790	29/05/2022	1
Hemiptera	Anthocoridae	Anthocoris nemorum	flower bug	Hand searching	SD180790	29/05/2022	1
Coleoptera	Apionidae	Oxystoma subulatum	seed weevil	Hand searching	SD180790	29/05/2022	1f
Coleoptera	Curculionidae	Sitona suturalis	weevil	Hand searching	SD180790	29/05/2022	2
Coleoptera	Curculionidae	Trichosirocalus troglodytes	weevil	Hand searching	SD180790	29/05/2022	1

Order	Family	Taxon	Vernacular name	Sample name	Gridref	Date	Abundance
Coleoptera	Curculionidae	Otiorhynchus ligneus	weevil	Hand searching	SD180790	29/05/2022	2
Coleoptera	Nitidulidae	Meligethes carinulatus	pollen beetle	Hand searching	SD180790	29/05/2022	1m
Coleoptera	Scirtidae	Contacyphon padi	marsh beetle	Hand searching	SD180790	29/05/2022	1m
Coleoptera	Chrysomelidae	Galerucella lineola	leaf beetle	Sweeping	SD180790	29/05/2022	1
Coleoptera	Cantharidae	Cantharis flavilabris	soldier beetle	Sweeping	SD180790	29/05/2022	1
Diptera	Tipulidae	Tipula oleracea	cranefly	Sweeping	SD180790	29/05/2022	1
Hemiptera	Tingidae	Acalypta parvula	lacebug	Hand searching	SD180790	29/05/2022	1
Isopoda	Platyarthridae	Platyarthrus hoffmannseggii	blind woodlouse	Hand searching	SD180790	29/05/2022	1
Julida	Julidae	Tachypodoiulus niger	black millipede	Hand searching	SD180790	29/05/2022	1
Opiliones	Nemastomatidae	Nemastoma bimaculatum	two-spot harvestman	Hand searching	SD180790	29/05/2022	1
Lepidoptera	Hesperiidae	Erynnis tages	dingy skipper	Field observation	SD180790	May 2022	freq

APPENDIX C RELEVANT LEGISLATION AND POLICY

C.1 LEGISLATION

Current key legislation relating to ecology includes The Environment Act[31] Wildlife and Countryside Act 1981 (as amended)[32]; The Conservation of Habitats and Species Regulations 2019 ('Habitats & Species Regulations')[33], The Countryside and Rights of Way Act 2000 (CRoW Act)[34], and The Natural Environment and Rural Communities Act, 2006[35].

The Environment Act, 2021

The Environment Act, 2021 will mandate the requirement for new development in England to deliver a minimum 10% biodiversity net gain (BNG), as measured by the agreed metric (the current relevant version being the Natural England metric 3.0), secured through planning condition as standard (as per schedule 14 of the Act). Approach to the delivery of BNG must follow the mitigation hierarchy, with avoidance of impact and on-site compensation/gains prioritised, ahead of the use of offsite biodiversity unit offsets, or the purchase of biodiversity credits.

The Act introduces the condition that no development may begin unless a biodiversity net gain plan has been submitted and approved by the local planning authority (LPA).

The Act also amends requirements of the NERC Act, 2006, adding the need to not just conserve, but enhance biodiversity through planning projects. Furthermore, it introduces the need for the LPA to have regard to relevant local nature recovery strategies and relevant species/protected site conservation strategies, when making their decision.

Under the Act, the enhancements must be maintained for at least 30 years.

The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019

The Conservation of Habitats & Species Regulations replace The Conservation (Natural Habitats, etc.) Regulations 1994 (as amended)[36], and transpose Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Fauna and Flora ('EU Habitats Directive')[37], and Council Directive 79/409/EEC on the Conservation of Wild Birds ('Birds Directive')[38] into UK law (in conjunction with the Wildlife and Countryside Act).

Regulation 43 and 47 respectively of the Conservation of Habitats & Species Regulations makes it an offence (subject to exceptions) to deliberately capture, kill, disturb, or trade in the animals listed in Schedule 2 (European protected species of animals), or pick, collect, cut, uproot, destroy, or trade in the plants listed in Schedule 5 (European protected species of plant). Development that would contravene the protection afforded to European protected species requires a derogation (in the form of a licence) from the provisions of the Habitats Directive.

Regulation 63 (1) states: 'A competent authority, before deciding to undertake, or give any consent, permission or other authorisation for, a plan or project which —

(a) is likely to have a significant effect on a European site or a European offshore marine site (either alone or in combination with other plans or projects); and

(b) is not directly connected with or necessary to the management of that site;

must make an appropriate assessment of the implications for that site in view of that site's conservation objectives.'

Wildlife and Countryside Act 1981 (as amended)

The Wildlife and Countryside Act 1981 (as amended) is the principal mechanism for the legislative protection of wildlife in Great Britain. This legislation is the means by which the Convention on the Conservation of European Wildlife and Natural Habitats[39] (the 'Bern Convention') and the Birds Directive and EU Habitats Directive are implemented in Great Britain.

The Countryside and Rights of Way Act 2000

The Wildlife and Countryside Act has been updated by the CRoW Act. The CRoW Act amends the law relating to nature conservation and protection of wildlife. In relation to threatened species it strengthens the legal protection and adds the word 'reckless' to the offences of damaging, disturbing, or obstructing access to any structure or place a protected species uses for shelter or protection, and disturbing any protected species whilst it is occupying a structure or place it uses for shelter or protection.

The Natural Environment and Rural Communities Act 2006

The Natural Environment and Rural Communities Act 2006 states that every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity. Biodiversity Action Plans provide a framework for prioritising conservation actions for biodiversity.

Section 41 of the Natural Environment and Rural Communities Act requires the Secretary of State to publish a list of species of flora and fauna and habitats considered to be of principal importance for the purpose of conserving biodiversity. The list, a result of the most comprehensive analysis ever undertaken in the UK, currently contains 1,149 species, including for example, hedgehog (Erinaceus europaeus), and 65 habitats that were listed as priorities for conservation action under the now defunct UK Biodiversity Action Plan[40] (UK BAP). Despite the devolution of the UK BAP and succession of the UK Post-2010 Biodiversity Framework[41] (and Biodiversity 2020 strategy[42] in England), as a response to the Convention on Biological Diversity's (CBD's) Strategic Plan for Biodiversity 2011-2020[43] and EU Biodiversity Strategy (EUBS)[44], this list (now referred to as the list of Species and Habitats of Principal Importance in England) will be used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under section 41 of the Natural Environment and Rural Communities Act 2006 'to have regard' to the conservation of biodiversity in England, when carrying out their normal functions.

Biodiversity Action Plans

Non-statutory Biodiversity Action Plans (BAPs) have been prepared on a local and regional scale throughout the UK over the past 15 years. Such plans provide a mechanism for implementing the government's broad strategy for conserving and enhancing the most endangered ('priority') habitats and species in the UK for the next 20 years. As described above the UK BAP was succeeded in England by Biodiversity 2020 although the list of priority habitats and species remains valid as the list of Species of Principal Importance for Nature Conservation.

Regional and local BAPs are still valid however and continue to be updated and produced.

Detail on the relevant BAPs for this site are provided in the main text of this report.

Legislation Relating to Nesting Birds

Nesting birds, with certain exceptions, are protected from intentional killing, destruction of nests and destruction/taking of eggs under the Wildlife and Countryside Act 1981 (as amended) and the CRoW Act. Any clearance of dense vegetation should therefore be undertaken outside of the nesting bird season, taken to run conservatively from March to August (inclusive), unless an ecologist confirms the absence of active nests prior to clearance.

Legislation Relating to Bats

All UK bats and their roosts are protected by law. Since the first legislation was introduced in 1981, which gave strong legal protection to all bat species and their roosts in England, Scotland and Wales, additional legislation and amendments have been implemented throughout the UK.

Six of the 18 British species of bat have Biodiversity Action Plans (BAPs) assigned to them, which highlights the importance of specific habitats to species, details of the threats they face and proposes measures to aid in the reduction of population declines.

Although habitats that are important for bats are not legally protected, care should be taken when dealing with the modification or development of an area if aspects of it are deemed important to bats such as flight corridors and foraging areas.

The Wildlife & Countryside Act 1981 (WCA) was the first legislation to provide protection for all bats and their roosts in England, Scotland and Wales (earlier legislation gave protection to horseshoe bats only.)

All eighteen British bat species are listed in Schedule 5 of the Wildlife and Countryside Act, 1981 and under Annexe IV of the Habitats Directive, 1992 as a European protected species. They are therefore fully protected under Section 9 of the 1981 Act and under Regulation 43 of the Conservation of Habitats and Species Regulations 2017, which transposes the Habitats Directive into UK law. Consequently, it is an offence to:

- Deliberately capture, injure or kill a bat;
- Intentionally or recklessly disturb a bat in its roost or deliberately disturb a group of bats;

- Damage or destroy a bat roosting place (even if bats are not occupying the roost at the time);
- Possess or advertise/sell/exchange a bat (dead or alive) or any part of a bat; and
- Intentionally or recklessly obstruct access to a bat roost.

This legislation applies to all bat life stages.

The implications of the above in relation to the proposals are that where it is necessary during construction to remove trees, buildings or structures in which bats roost, it must first be determined that work is compulsory and if so, appropriate licenses must be obtained from Natural England.

Legislation Relating to Reptiles

All species of reptile native to the UK are protected to some degree under national and/or international legislation, which provides mechanisms to protect the species, their habitats and sites occupied by the species.

Sand lizards and smooth snakes are European protected species and are afforded full protection under Section 9 of the Wildlife and Countryside Act 1981 and Regulation 43 of the Conservation of Habitats and Species Regulations 2017. However, these species are rare and highly localised. Their occurrence is not considered as relevant in this instance, as the ranges and specialist habitats of these species do not occur at this site.

The remaining widespread species of native reptiles (adder, grass snake, slow worm and viviparous lizard) are protected under part of Section 9(1) and all of Section 9(5) of the Wildlife and Countryside Act 1981. They are protected against intentional killing and injury and against sale, transporting for sale etc. The habitat of these species is not protected. However, in terms of development, disturbing or destroying reptile habitat during the course of development activities while reptiles are present is likely to lead to an offence under the Wildlife and Countryside Act 1981. It is therefore important to identify the presence of these species within a potential development site. If any of these species are confirmed, all reasonable measures must then be taken to ensure the species are removed to avoid the threat of injury or death associated with development activities.

Each species of native reptile has specific habitat requirements but general shared features include a structurally diverse habitat that provides for shelter, basking, foraging and hibernating.

All reptiles are BAP species and as such are also of material consideration in the planning process due to the NPPF.

Legislation Relating to Natterjack Toads

Natterjack Toads are a European Protected Species (EPS) listed under Schedule 2 of the Conservation of Habitats and Species Regulations 2019 (EU Exit) (as amended), and Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), as well as recognised as a species of national conservation importance under section 41 (s.41) of the Natural Environment Rural Communities Act 2006 (NERC Act) - England.

Specifically, the existing legal framework makes it illegal to:

- Intentionally or deliberately capture, injure or kill a Natterjack Toad,
- Damage or destroy a breeding or resting place of a Natterjack Toad, or intentionally or recklessly damage or destroy any structure or place used for shelter or protection,
- Intentionally or recklessly disturb a Natterjack Toad in a place used for shelter or protection, or deliberately disturb Natterjack Toad in such a way as to be likely significant to affect (i) the ability of any significant group to survive, breed, rear or nurture their young, or (ii) the local distribution or abundance,
- Intentionally or recklessly obstruct access to a place used for shelter or protection,
- Possess a Natterjack Toad (alive or dead), or any part of a Natterjack Toad.

Legislation Relating to Great Crested Newts

Legislation Relating to Natura 2000 Sites and Habitats Directive Annex I/II Species

European Commission Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Fauna and Flora ('EU Habitats Directive'), and Council Directive 79/409/EEC on the Conservation of Wild Birds ('Birds Directive') form the cornerstones of nature conservation legislation across EU member states. Priority species requiring protection across Europe are listed in the Annexes of these Directives. Regulation 63(1) of the Conservation of Habitats and Species Regulations 2017 and Offshore Marine Conservation Regulations, 2007 (as amended) transpose these directives into UK law and set the basis for the designations of protected sites (known as Natura 2000 sites; Special Areas of Conservation under the Habitat Directive and Special Areas of Protection under the Birds Directive) that are of importance for habitats, species or assemblages listed on the directive Annexes. In the UK Ramsar sites are also offered the same level of protection as SPAs and SACs however the qualifying species for the designation may differ; Ramsar sites being designated specifically as important wetland habitats.

Under article 6(3) of the Habitats Directive, where projects stand to have likely significant effect (in accordance with the European Court of Justice ruling of C-127/02 Waddenzee cockle fishing) upon the integrity of conservation objectives (i.e. conservation status of the qualifying species or habitats) within the designated sites then the Competent Authority must undertake an Appropriate Assessment.

C.2 PLANNING POLICY

National

National Planning Policy Framework

The National Planning Policy Framework (NPPF) 2021[45] sets out the Government's planning policies for England, including how plans and decisions are expected to apply a presumption in favour of sustainable development. Chapter 15 of the NPPF focuses on conservation and enhancement of the

natural environment, stating plans should 'identify and pursue opportunities for securing measurable net gains for biodiversity'.

It goes on to state: 'if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused'. Alongside this, it acknowledges that planning should be refused where irreplaceable habitats such as ancient woodland are lost.

Regional

Copeland Local Plan 2017-2035 (Preffered Options Draft)[46]

Policy DS5PO: Development Principles

In order to achieve sustainable development in the Borough and meet Local Plan objectives, development must, where possible:

Mitigation of and adaption to climate change

- Minimise carbon emissions, maximise energy efficiency and help us to mitigate and adapt to the effects of climate change
- Be located on sites where there is no risk of flooding and where the development does not increase the risk of flooding elsewhere
- Protect, enhance and create new areas of green infrastructure, recognising the important role that the natural environment and healthy ecosystems have to play in the future social and economic, as well as environmental sustainability of Copeland
- Make the most efficient use of land by building at appropriate densities and reusing existing buildings and previously developed land
- Minimise waste, maximise opportunities for recycling and use sustainable construction methods, taking into account circular economy principles
- Be located on sites which minimise the need to travel, with good, safe pedestrian links to services and facilities.

Protection, enhancement and restoration of the Borough's valued natural and cultural assets

Protect and enhance areas, sites, species and features of biodiversity or geodiversity value, important landscapes and the undeveloped coast including valued landscapes which form a setting to the Lake District National Park and areas of Heritage Coast.

- Conserve and enhance the Borough's cultural and heritage assets and their settings
- Provide and enhance recreational opportunities for the Borough's residents and its visitors, protecting existing provision where possible and ensuring that future development meet appropriate standards in terms of quantity and quality
- Protect the Borough's best and most versatile agricultural land from development

- Support the reclamation and redevelopment or restoration of the Borough's vacant or derelict sites, whilst taking account of landscape, biodiversity and historic environment objectives
- Minimise air, ground and water pollution, ensuring that development does not have a negative impact upon water quality (including waterbodies and bathing waters)

Creation and retention of quality places

- Be of high quality in terms of design so that it retains and enhances locally distinctive places and raises aspirations
- Provide or safeguard good levels of residential amenity and security, reducing the fear of crime and minimising the opportunities for crime and anti-social behaviour
- Be supported by the relevant infrastructure, ensuring it can accommodate traffic and access arrangements in ways that make it safe and convenient for pedestrians and cyclists to move around
- Address land contamination with appropriate remediation measures

Healthy Communities

- Adopt dementia-friendly design principles
- Provide opportunities for food growing
- Contribute to the creation of mixed communities, helping to reduce social isolation and create community resilience
- Retain and enhance valuable community facilities (including healthcare, cultural and education facilities)
- Include community energy generation to provide low carbon heat and/or power and address energy poverty
- Enhance local pedestrian links to promote physical activity

Policy DS6PO: Planning Obligation

1. Where it is reasonable, necessary and directly related to the development Copeland Borough Council, through planning obligations (until such time an alternative method is introduced), will

secure:

a) The enhancement of existing or provision of new infrastructure, facilities and services

b) Where appropriate future maintenance of car parking provision and sustainable transport solutions will be required in perpetuity;

c) Future maintenance and/or monitoring of other facilities delivered as a result of development for a period of 15 years or as agreed/identified in a specific Development Plan policy;

d) Future management and monitoring of biodiversity net gain will be required for a period of 30 years

2. The Council will expect planning obligations to be provided on site unless specific circumstances make off-site contributions more appropriate and;

3. When determining the nature and scale of any planning obligations sought, account will be taken of specific site conditions, the Infrastructure Delivery Plan and other material considerations.

Where an applicant considers that the provision of appropriate infrastructure would make the development unviable a viability assessment must be submitted to, and agreed by the Council, as early as possible within the planning application process.

Policy N1PO Conserving and Enhancing Biodiversity and Geodiversity

Potential harmful impacts of any development upon biodiversity and geodiversity should be identified and considered at the earliest stage

Proposals must demonstrate, to the satisfaction of the Council, that the following sequential steps have been undertaken

Avoidance – Biodiversity and geodiversity must be considered when drafting up proposals and any potential harmful effects on biodiversity and geodiversity must be identified along with appropriate measures that will be taken to avoid these effects

Mitigation – Where harmful effects cannot be avoided, they must be appropriately mitigated in order to overcome or reduce negative impacts.

Compensation – Where mitigation is not possible or viable or in cases where residual harm would remain following mitigation, harmful effects should be compensated for. Where this is in the form of compensatory habitat of an area of equivalent or greater biodiversity value should be provided.

Compensation is a last resort and will only be accepted in exceptional circumstances. Where harm remains to a Natura 2000 site, development will only be approved where it can be demonstrated that there are imperative reasons of overriding public interest. In such cases, compensatory measures must ensure the overall coherence of the network of European sites as a whole is protected.

Planning permission will be refused for any development if significant harm cannot be avoided, mitigated or compensated for.

Sustainable construction methods should be used where possible.

Development proposals where the principal objective is to conserve or enhance biodiversity and geodiversity interests will be supported in principle.

Policy N2PO: Biodiversity Net Gain

All development, with the exception of that listed in paragraph 49.8.10 above, must provide a minimum of 10% biodiversity net gain over and above existing site levels. This is in addition to any compensatory habitat provided under Policy N1PO. Net gain should be delivered on site where possible. Where on-site provision is not appropriate, provision must be made elsewhere in order of the following preference:

1. Off site in an area identified as a Local Nature Recovery Network;

2. Off site on an alternative suitable site within the Borough

3. Through the purchase of an appropriate amount of national biodiversity units/credits.

Details must be submitted to, and agreed in writing by the Council, before the development can commence.

Sites where net gain is provided (on or off site) must be managed and monitored by the applicant or an appropriate body funded by the applicant for a minimum period of 30 years. Annual monitoring reports detailing the sites condition post-enhancement must be submitted to the Council each year over this period.

Where there is evidence of deliberate neglect or damage to any of the Boroughs protected habitats and species in order to reduce its biodiversity value their deteriorated condition will not be taken into consideration and previous ecological records of the site and/or the ecological potential of the site will be used to decide the acceptability of any development proposals.

Policy N3PO: Local Nature Recovery Networks

The Council will support the identification and implementation of Local Nature Recovery Networks that extend beyond the Boroughs boundaries and provide important linkages for wildlife within Copeland and beyond.

Development which protects or enhances nature recovery networks will be supported in principle.

Policy N6PO: The Undeveloped Coast

The Council will ensure that the landscape character of the undeveloped coast is maintained by conserving the intrinsic qualities, natural beauty and open character of the undeveloped coast from inappropriate development. Inappropriate development includes that which affects views within or towards/from the St Bees Head Heritage Coast.

The following types of development will however be supported:

- Development which supports the management of the undeveloped coast for biodiversity;
- Development which provides or improves safe access to and interpretation of the undeveloped coast for residents and visitors such as appropriate fencing, signage and interpretation boards;
- Energy generating developments that that require a coastal location along the undeveloped coast, provided that the potential impacts on biodiversity, landscape and heritage assets are carefully assessed against the benefits. Where negative impacts are likely these must be mitigated against and compensated for.

Policy N7PO: Green Wedges

The Local Plan Proposals Map identifies Green Wedges within the Borough. Development will only be permitted within a Green Wedge in the following circumstances unless the economic, environmental or social benefits of the proposal significantly and demonstrably outweigh any harm:

- where the open character of the Green Wedge and separation between settlements is maintained; and
- where the special characteristics and quality of the landscape are conserved and enhanced.

Policy N8PO: Protected Green Spaces

The Local Plan Proposals Map identifies Protected Green spaces which are of a high quality and/or value.

Development proposals that enhance Protected Green Spaces will be supported in principle.

The loss of such Protected Green Spaces will be resisted unless equivalent replacement provision of the same or better quality is provided within the same settlement.

Proposals to develop other green spaces, including play areas and allotments not identified on the

Proposals Map, should also comply with this policy where there is evidence that they are of value to the community.

Policy N9PO: Local Green Spaces

The Local Plan Proposals Map identifies important Local Green Spaces. Development will only be permitted within a Local Green Space in the following circumstances, where the open character of the Space and its community value is not compromised:

- Proposals which improve access to/from and within the LGS, or
- Proposals which provide opportunities for outdoor sport and recreation, or
- Proposals which allow a wider range of uses to take place within the LGS, or
- Proposals which enhance landscapes and visual amenity, or
- Proposals which provide/enhance habitats.

Development on sites adjacent to Local Green Spaces should provide an attractive frontage, natural surveillance and strong pedestrian connections to the LGS.

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