BIODIVERSITY ENHANCEMENT STRATEGY

FOR PANGBOURNE PARISH COUNCIL

PANGBOURNE, OXFORDSHIRE

February 2025

FN23-148 VERSION 1

FUTURE NATURE WTC LTD | Meadow Farm, Thame Road, Blackthorn, Oxfordshire, OX25 1TW

Wildlife Trust Consultancies

Client	Project	
Pangbourne Parish Council c/o Becky Elkin, Parish Office, Pangbourne Village Hall, Station Road, Pangbourne, RG8 7AN	Project Name:	Pangbourne Meadow
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	Prepared by:	Sam Amy & Marcus Militello
	Reviewed by:	Louisa Medland
	Approved by:	Russell Hartwell
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CONTENTS

1. INTRODUCTION

1.1 BACKGROUND

Future Nature WTC, as part of the Wildlife Trust Consultancies (WTC), was commissioned to undertake a biodiversity enhancement strategy at Pangbourne Meadows by Pangbourne Parish Council. In 2024.

This report provides an introduction to the site (Section 1), sets out the methodologies used to assess the current and proposed biodiversity value of the site (Section 2) and provides the results of baseline surveys and desk-based assessments (Section 3). Recommendations are then provided on the biodiversity enhancements that could be undertaken (Section 4) and the units they could generate are shown in a Biodiversity Net Gain Assessment (Section 5). The conclusions reached are then set out (Section 6).

1.2 SITE LOCATION & DESCRIPTION

Pangbourne Meadow is located to the north-east of the village of Pangbourne, alongside the southern bank of the River Thames, less than 2km from the outskirts of the city of Reading. The site is owned in part by Pangbourne Parish Council, and in part by the National Trust and 'let' to the Parish Council, who are also responsible for management. The site has an approximate central grid reference of SU6309576834 as illustrated in Figure 1 below. The survey area is approximately 6.32 hectares and consists of grassland including a wet meadow, with scattered trees, areas of scrub and a wooded area along the southern boundary.

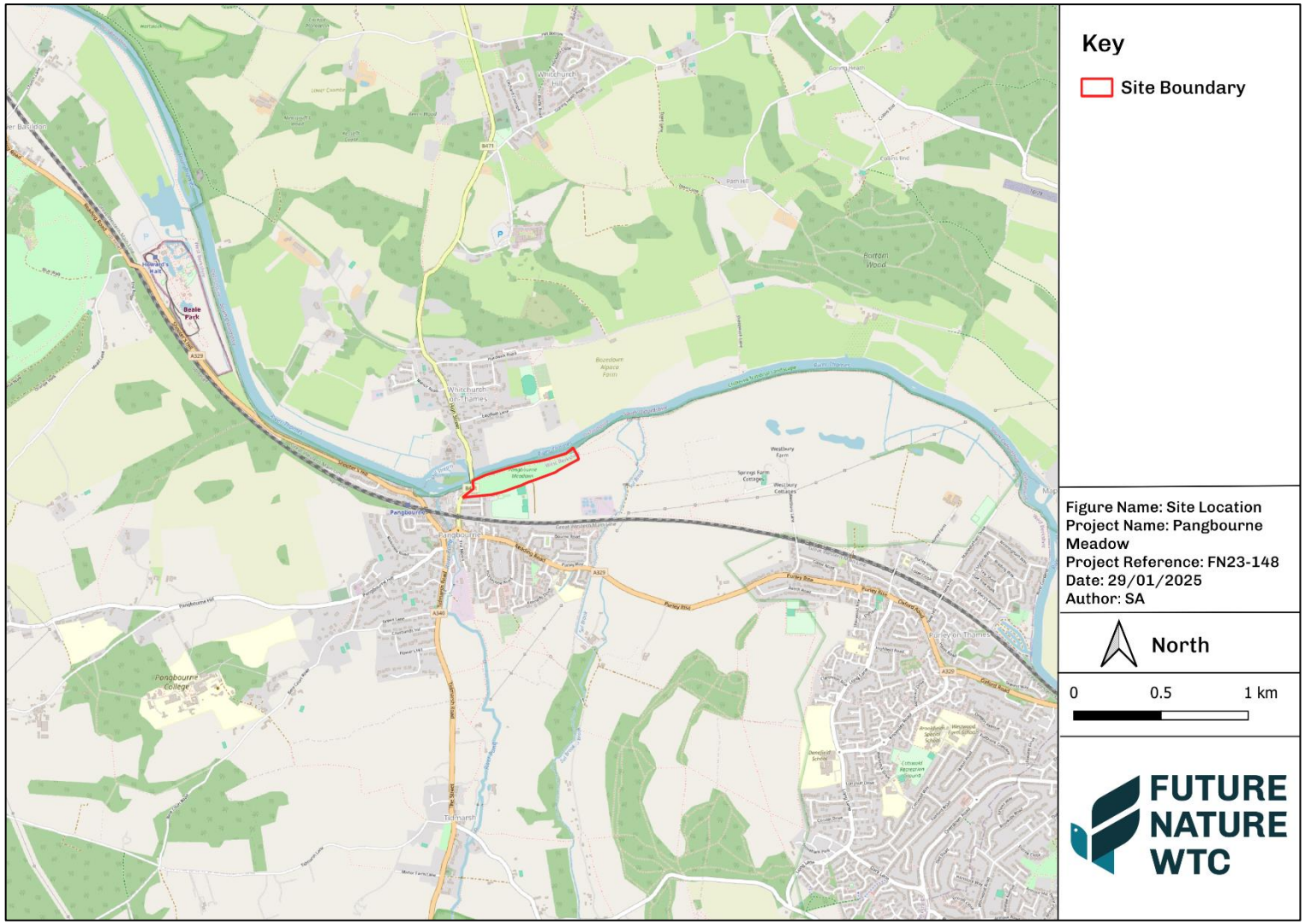
The Thames path runs along the edge of the river through the site, and it appears to receive a considerable amount of waterway traffic with boats mooring along the length of the meadow. Bordered to the south by a recreation ground and campsite, which themselves have a railway-line to the south, the other land use in the immediate vicinity of the Pangbourne Meadow is arable fields at the eastern end.

1.3 REPORT OBJECTIVES

The objectives of this report are to:

- Identify the existing habitats present on the site;
- Identify evidence or potential for protected and priority species;
- Measure existing habitat value using the biodiversity net gain statutory metric;
- Identify options that would enhance the biodiversity value of the site;
- Measure the change in habitat value using the biodiversity net gain statutory metric;

Figure 1: Site Location



2. METHODOLOGY

The methodologies used during the surveys are described in this section of the report.

2.1 DESK STUDY

A desk study was undertaken to assess the nature of the surrounding habitats and included:

- An assessment of aerial imagery and Ordnance Survey mapping.
- A data search submitted to the Thames Valley Environmental Records Centre (TVERC) for records of; protected and notable species; invasive non-native species (INNS); statutory sites; non-statutory sites; ancient woodland; and priority habitats within 2km of the site; and
- A search of the Multi Agency Geographic Information for the Countryside (MAGIC) website[1] for:
    - Statutory designated sites (such as Special Protection Areas (SPA), Special Areas of Conservation (SAC) and Sites of Special Scientific Interest (SSSI) within 2km of the site;
    - Statutory historical designated sites within 2km of the site;
    - Priority habitats (comprising those listed under Section 41 of the Natural Environment and Rural Communities Act (NERC) 2006) within 2km of the site; and
    - Details of granted European Protected Species (EPS) licenses within 1 km of the site.

2.2 FIELD SURVEY

2.2.1 UK Habitat Classification

The site was subject to a preliminary walkover, during which habitat types were identified and their boundaries mapped. Habitat types were defined as per the UK Habitat Classification survey methodology[2]. This separates habitat types into three groups; those measured by area (referred to as habitats); hedgerows and tree lines; and, rivers.

Habitat condition assessments were subsequently undertaken in line with the methods set out in The Statutory Biodiversity Metric[3]. All habitats are assigned a good, moderate, or poor condition. For some habitats, the condition has been pre-determined by the metric, such as vegetated garden, rhododendron scrub and various habitats associated with cropland.

The surveys were undertaken on 1st October 2024 by Marcus Militello BSc (Hons) MSc in suitable weather conditions. Marcus is a Field Identification Skills Certificate (FISC) level 4 botanist.

[1] Multi Agency Geographic Information for the Countryside. Available from; www.magic.gov.uk

[2] UKHab (2023) The UK Habitat classification Version 2.0

[3] DEFRA (2024) The Statutory Biodiversity Metric User Guide

A full watercourse assessment has not been carried out, however ditches on site have been surveyed and classified.

2.3 CALCULATION OF BASELINE BIODIVERSITY VALUE

2.3.1 Biodiversity Net Gain

The baseline biodiversity units for the site were calculated using the DEFRA Statutory metric[4]. This required information on a habitat's area, distinctiveness, condition and strategic significance. The habitat areas and habitat condition are based on the habitat survey data collected during the survey.

A habitat's distinctiveness refers to the relative scarcity of the habitat and its importance for nature conservation. The distinctiveness categories are predetermined by the metric.

Strategic significance was determined by checking whether the site falls within a relevant Local Nature Recovery Strategy (LNRS).

The data was input into the Biodiversity Net Gain (BNG) Metric. A summary of the completed metric is shown in Section 5 of the report.

2.4 LIMITATIONS

BNG uses habitats as a proxy for biodiversity and is a simplification of the real world. Ecological function must also be considered to manage this limitation and this is detailed throughout relevant sections of the report.

The survey was carried out on 1st October, so marginally outside the optimal survey season for habitat assessments (April to September), and for woodland areas the surveys would have missed the peak spring flowering period for any woodland plant species. Despite this, confidence remains high that the habitat categories and condition assigned are correct, since reference to historic maps, aerial photos and the ancient woodland inventory suggest the woodland has developed in recent decades, possibly from a hedgerow, and thus is unlikely to support a particularly characteristic woodland ground flora. Due to heavy rainfall, part of the grassland area surveyed was submerged at the time of survey (Table 2), and therefore not fully accessible, requiring reasonable assumptions made based on those areas that were.

2.5 LEGISLATIVE AND PLANNING POLICY FRAMEWORK

Certain designated sites, habitats and species are protected under UK legislation and planning policies. This assessment is not intended to inform the specific requirements of the project with this regard. However, it is important that any legislative or policy driven requirements are taken into account when considering the future management of the site. Details of these are presented in Appendix A.

[4] DEFRA (2024) The Statutory Biodiversity Metric

3. RESULTS

3.1 DESK STUDY

Designated Sites

Five statutory designated sites were found to be located within the 2 km search area, including two National Landscapes, two Sites of Species Scientific Interest (SSSI), and one Historic Scheduled Monument.

A total of 22 non-statutory designated sites located within the 2 km search area including 18 Local Wildlife Sites (13 in Berkshire and five in Oxfordshire).

Conservation Target Areas (CTA) in Oxfordshire, Biodiversity Opportunity Areas (BOA) in Berkshire identify some of the most important areas for wildlife, providing opportunities for coordinated delivery of work to make positive enhancements for biodiversity, such as through agri-environment schemes and the planning system. Four such sites were identified within 2km of Pangbourne Meadows.

Details of the designated site that were identified can be found Table 1 below.

Table 1: Designated Sites

Site Name	Reason for Designation	Distance from Survey Area (Closest Point)
Statutory designated sites		
North Wessex Downs National Landscape/AONB	The designation of Area of Outstanding Natural Beauty recognises the character, value and quality of the North Wessex Downs. Although almost entirely a chalk landscape, the North Wessex Downs' character differs markedly across the area, depending on local surface geology, soils, landform, land use, vegetation and settlement patterns.	The survey area falls entirely within, as does approximately half the area within a 2km buffer of the site.
Chilterns National Landscape/AONB	The designation of Area of Outstanding Natural Beauty recognises the character, value and quality of the Chilterns. A dramatic chalk escarpment, the landscape is interwoven with intimate valleys and rolling fields. Ancient hedgerows, trees, woodland, orchards and parkland weaving across farmland.	The River Thames lies between the northern boundary of the survey area and the designated site.
Hartslock SSSI	Mosaic of chalk grassland, chalk scrub and broadleaved woodland along with one of the few examples of ancient Yew *Taxus baccata* wood in the Chilterns. The site supports one of only three UK populations of Monkey Orchid *Orchis simia*, which is protected under Schedule 8 of the Wildlife and Countryside Act 1981 (as amended).	780m to the north
Sulham and Tidmarsh Woods and Meadows SSSI	The SSSI designation affords protection to the site on account of features of interest, which include a mosaic of damp copses and seasonally flooded meadow communities, maintained here by a long history of coppicing and sympathetic grassland husbandry.	2km to the north-west
Camp on Bozedown Scheduled Monument	Scheduled to protect the Iron Age hillfort of Bozedown, which now consists mainly of arable fields, some remnants of the earth rampart and ditch that surrounded the site.	1.3km to the north-east

Non-Statutory designated sites		
The Basin and Bozedown Park LWS (Oxfordshire)	The Basin has species-rich chalk grassland on east, west and south-facing slopes. Although not found in more recent surveys, the nationally scarce Chiltern Gentian has been recorded from this site in the past. To the north, there is another bank of species-rich chalk grassland. At least 11 different species of wax cap fungi are found on the grassland, along with a good diversity of typical chalk grassland flowering plants including the nationally scarce Chiltern Gentian *Gentianella germanica*. Butterflies recorded on the site include the rare Adonis Blue, as well as Chalkhill Blue and Small Blue	650m to the north
Whitchurch on Thames Wet Meadow LWS (Oxfordshire)	This narrow field adjacent to the River Thames is bounded by trees and has a well-vegetated ditch running along its length. At the eastern end, especially along the ditch and away from the river, there is grassland with lowland meadow habitat that is sometimes cut for hay and sometimes grazed. This grades into tall fen at the western end. The ditch and the tall fen areas are species rich and dominated by Meadowsweet; interesting species include tubular water dropwort *Oenanthe fistulosa*, Sneezewort *Achillea ptarmica*, and Devil's Bit Scabious *Succisa pratensis*.	650m to the west
Bozedown LWS (Oxfordhshire)	A good example of good example of unimproved species-rich chalk grassland, with several interesting species recorded here including Chalk Milkwort *Polygala calcarea*, Pale Toadflax *Linaria repens*, Hound's-tongue *Cynoglossum officinale* and Autumn Gentian *Gentianella amarella*.	814m to the north-east
Purley Meadows and Mapledurham Wier LWS (Berkshire)	An ornithological site with waterside meadows attracting many species including passage migrants passing through the Goring Gap.	1km to the east

Hardwick riverside pasture LWS (Oxfordhshire)	A hay meadow adjacent to the River Thames with lower-lying areas remaining wet in winter and resulting variety in the flora. Includes priority habitats such as lowland meadow and lowland fen.	1km to the east
Berry's copse LWS (Berkshire)	Predominantly semi-natural ancient woodland in a valley that cuts into the chalk south of the River Thames. It has areas dominated by either Ash *Fraxinus excelsior* or Beech *Fagus sylvatica* but with much variation in composition. Wych Elm *Ulmus glabra* is found in some of the ash areas and this is an uncommon woodland community.	1.2km to the west
Mosshall Wood, Part of Harryjaws Wood LWS (Berkshire)	The site consists of areas of Lowland Beech and Yew Woodland and Lowland Mixed Deciduous Woodland.	1.3km to the south-east
Sulham Wood LWS (Berkshire)	Ancient woodland although much replanted with conifers, with a varied ground flora.	1.4km to the south
Horsham Lane wood LWS (Berkshire)	A narrow band of beech woodland on a steep bank adjacent to the Reading – Didcot railway.	1.4km to the west
Child Beale Meadows LWS (Berkshire)	A mixture of habitats including tall-herb reed fen, secondary woodland, scrub, wet rushy grassland, and a riparian stretch along the River Thames.	1.5km to the north-west
Strawhill LWS (Berkshire)	South-facing pasture on the lower part of a steep chalk slop cut by the River Thames, protected by a large swathe of woodland to the north. The strip of calcareous grassland is astonishingly rich, including the rare Autumn Lady's Tresses orchid *Spiranthes spiralis* and the unusual Common Dodder *Cuscuta epithymum*. There are many species typical of long-established calcareous grassland which has never been treated with herbicide or re-seeded.	1.7km to the north-east
Pangbourne College Wood 3 LWS (Berkshire)	Ancient woodland with an open even-aged canopy of oak with some ash and birch.	1.7km to the south-west

Pangbourne Pound LWS (Berkshire)	A small area of semi-natural woodland.	1.8km to the west
Meandown Copse LWS (Berkshire)	An ancient oak, birch and ash woodland with Hazel *Corylus avellana* coppice below.	1.8km to the west
Part of Oxley's Copse LWS (Berkshire)	A small area of woodland, some of which ancient, including wet woodland.	1.8km to the south
Pangbourne College Woods LWS (Berkshire)	Largely ancient woodland with some more recent planting.	1.9km to the south-west
Bottom Wood LWS (Oxfordhshire)	An exceptionally rich ancient woodland on the South Chiltern's plateau, with a population of the nationally scarce Lady Orchid *Orchis purpurea* and records of the nationally scarce Mezereon *Daphne mezereum*.	1.3km to the north-east
Top Gate Fold LWS (Berkshire)	An area of calcareous grassland reverted from arable land, with planted native trees.	1km to the south
Chilterns Escarpment South CTA	This is the escarpment from Goring to Mapledurham and includes some dry valleys that cut into the Chiltern's plateau. Targets and opportunities include the management and restoration of lowland calcareous grassland and woodland, and the management of lowland meadows.	630m to the north
Yattendon and Basildon Woodlands BOA	An extensive area encompassing the many woodlands on the clay and Head topped chalk from Aldworth and Basildon in the north to the edge of the Pang Valley in the South. Targets and opportunities include management of the lowland mixed deciduous woodland, and chalk grassland re-creation.	1.2km to the west
Pang Valley and Sulham Stream BOA	Covering the Pang Valley from Hampstead Norreys to Pangbourne and forming a wider area in the east to include the Sulham Stream. Targets and opportunities include river	600m to the south

	management, restoration and protection, management and re-creation of lowland meadow and wet grassland, management of woodland including wet woodland.	
West Reading Woodlands and Local Nature Reserve BOA	Lowland mixed deciduous woodland and parkland, some of which within an urban setting within Reading. Targets and opportunities include woodland and parkland management, and restoration of grassland habitats.	1km to the south

Priority Habitats

Seven priority habitats, and one additional notable habitat, have been previously recorded within 2km of the site[5], though none within the site itself (within the priority habitats inventory). These are summarised below:

- **Coastal Floodplain and Grazing Marsh:** Coastal floodplain and grazing marsh (CFGM) is defined as periodically inundated pasture or meadow, typically with ditches or rills containing standing water. This is not a specific habitat but rather a landscape type, with many sites having low botanical grassland interest, but often supporting bird species of high conservation value, with ditches that can be rich in plants and invertebrates. The riverside parcels from the boundary of, and extending over 1km to the east of, Pangbourne Meadow, are identified as CFGM, although this is derived from data collected in 1976. A smaller area of CFGM to the north of the River Thames (250m to the north-west of the site) is identified based on Environment Agency Flood Zone data from 2009. Much of the lower-lying areas withing the Lower Pang Valley and Sulham Stream CTA are also identified as CFGM based on an English Nature inventory of Lowland Meadows in 2003.

- **Deciduous Woodland:** The largest parcels of mixed deciduous woodland identified within 2km of the site are associated with the many statutory and non-statutory designated sites mentioned above, and combined amount to approximately 150ha, almost half of which identified as ancient woodland, or plantation on ancient woodland sites. In addition, there are over 120 small (<7ha) parcels of deciduous woodland, two thirds of which smaller than 500m^2. Within 300m of Pangbourne Meadow, there are a few separate parcels identified as mixed deciduous woodland to the north of the river, and one to the south of the meadow, adjacent to the railway line.

- **Good Quality Semi-improved Grassland:** Although technically not a Priority Habitat, it has the potential to be. Two small parcels are identified within Whitchurch on Thames Wet Meadow LWS, and two larger areas; one within the Chilterns Escarpment South CTA, north of Bozedown and Bottom Wood Local Wildlife Sites, and one adjacent to the River Thames to the east of Hardwick Riverside Pasture LWS.

- **Lowland Calcareous Grassland:** Three parcels of Lowland calcareous grassland are identified, covering much of The Basin and Bozedown Park, and all the Bozedown Local Wildlife Sites.

- **Lowland Fen:** Lowland fen is identified as being present within Whitchurch on Thames Wet Meadow LWS, 650m to the west of Pangbourne Meadow.

- **Lowland Meadows:** Three parcels of Lowland meadow are identified within the Lower Pang Valley and Sulham Stream CTA (totalling over 7ha), as well as the full extent of Hardwick riverside pasture (16ha).

[5] UK Biodiversity Action Plan; Priority Habitat Descriptions. BRIG (ed. Ant Maddock) 2008. (Updated Dec 2011)

- **Traditional Orchard:** There are 15 parcels of Traditional orchard identified within 2km of Pangbourne Meadow. Most are under 0.1ha, but two of the larger parcels are within 150-300m of the site, to the north of the River Thames.

- **Wood Pasture & Parkland:** Four contiguous areas of Wood pasture and parkland are identified within 2km of the site. By far the two most extensive are approximately 85ha lying between the Chiltern's escarpment and the River Thames, 650m to the west of Pangbourne Meadow, and approximately 45ha to the north of and between the ancient woodland areas of Sulham and Tidmarsh Woods and Meadows SSSI and Mosshall wood, Part of Harryjaws Wood LWS.

Protected and notable species

Legally protected and notable species records within 2km of the survey site and since 2010, were returned as part of the desk study. The results are presented in full in Appendix B. These included four amphibians, 76 birds, 7 fish, 38 higher plants, 80 invertebrates, 15 bats, 16 other mammals and 2 reptiles. Of these, records from Pangbourne Meadows itself included 26 birds, one Mayfly and three plants including the Nationally Scarce Spring Snowflake (*Leucojum aestivum subsp. aestivum*).

The site includes various opportunities for many of the protected and notable species with records within 2km of the site, for which further survey work would be required to understand their presence or likely absence at Pangbourne Meadows. An assessment of such species is outside the scope of this report, however a brief summary of the opportunities is given in Section 3.3, in order to indicate which species or species groups might require consideration under any forthcoming management regime.

Invasive and non-native species records within 2km of the search area

INNS records from within 2km of the survey site and since 2010, were returned as part of the desk study. The results are presented in full in Appendix C and comprise 15 INNS, including one fish, five higher plants, four crustaceans, one mollusc (Zebra mussel), and one mammal (American mink). Of these, three plants (Floating Pennywort, Himalayan balsam, and Nuttall's Waterweed), the Signal Crayfish and American Mink are listed on Schedule 9 of the Wildlife and Countryside Act (WCA).

3.2 FIELD SURVEY

3.2.1 UKHab Survey

Thirteen habitats were recorded during the UKHab survey. A summary of each habitat compartment along with photographs is provided in Table 2 below, and the location of these is presented in Figures 2 and 3. Details of the condition criteria that were passed or failed provided in Appendix D.

A total of 71 vascular plants were recorded during the survey, and a species list is provided in Appendix E.

Table 2: UK Habitat survey results

UK Habitat type and secondary codes	Survey ID	Area (ha) and condition	Description	Photos
g3c Other neutral grassland 15 Rushes dominant 16 Tall forbs 19 Coastal & floodplain grazing marsh 55 Floodplain and wetland mosaic	G1	1.62ha Moderate	This is the national trust-owned section comprising the eastern half of the site and was a floodplain wetland mosaic with g3c Other neutral grassland, with elements of f2f Other wetlands, and scattered trees. The grassland was also classified using secondary code 19: Coastal and floodplain grazing marsh priority habitat. It had not in the past been designated as such on the priority habitat inventory. The grassland was unmanaged at the time of survey, with no obvious signs of having been cut (i.e. for hay) or grazed, and a sward height of approximately 20cm, except for an approximately 10m wide mown strip nearest to the river. Much of the area was under water at the time of survey, and rushes were dominant. Himalayan Balsam *Impatiens glandulifera*, an invasive non-native plant listed on Schedule 9 of the Wildlife and Countryside Act 1981, was present.	 

g3c Other neutral grassland 19 Coastal & floodplain grazing marsh 32 Scattered trees	G2	1.21ha Moderate	Grassland similar to G1 but this area had been cut and collected, and was lacking in other wetland elements, although much of the area was flooded at the time of survey and can be classified as Coastal and floodplain grazing marsh priority habitat (again not designated on the priority habitats inventory). The sward was still quite high and would benefit from some shorter areas. There are scattered trees throughout.	
g4 Modified grassland 19 Coastal & floodplain grazing marsh 32 Scattered trees	G3	1.85ha Poor	Modified grassland dominated by Annual Meadow-grass, also classified as Coastal & floodplain grazing marsh (also not designated on the PHI), with scattered trees. This habitat is maintained by regular mowing, resulting in a very short sward. The cover of forbs is approximately 10%. Extensive fairy-rings were seen, indicating the presence of one or several species of fungi.	

w1d Wet woodland	W1	0.08ha Poor	Small stand of woodland with grass (see compartment G1) beneath. Black Poplar is dominant in the canopy, with other species including Hawthorn, Dog Rose, Blackthorn and Bramble forming a shrub layer beneath. All wet woodland on site is priority habitat though not included on the priority habitat inventory	
w1d Wet woodland	W2	0.37ha Moderate	Wet woodland which has grown up around a ditch. Some notable Sallow, approaching veteran status, have been pollarded in the past and these provide the majority of biodiversity interest, with scope to support nesting birds, saprobic fungi and xylophagous insects.	

w1g Other broadleaved woodland	W3, W4i, W4ii W4iii, W6	0.17ha Poor (W3, W4i, W4ii) 0.02Ha Moderate (W4iii, W6)	These patches of woodland were small and found at the western end of the site, often surrounding the Adventure Dolphin site, and acting to buffer the site from the road and the car park. Scrubby margins were present in several of the blocks and often were dominated by bramble. The main tree species in these areas tended to be sycamore and horse chestnuts but scattered native species were also present including field maple, elm, ash and guelder rose. Invasive buddleia was observed in W3.	 

w1d Wet woodland	W5	0.17ha Moderate	Wet woodland forming part of a floodplain wetland mosaic, which is a thin strip of woodland edge, part of a larger parcel of woodland to the south of the track. The canopy is mainly Sallow and Ash, the latter showing some signs of Ash-dieback. There is lots of scrub regeneration, and in general a dense scrub layer beneath.	
h3j Willow scrub	S1	0.17ha Moderate	Willow scrub dominated by Crack Willow, with Nettle and Hedge Bindweed in the ground flora.	

r1e Ditch	D1	363m Poor	Overshaded ditch running through W2, with a significant amount of Crack Willow but flora is minimal. Flooding preventing proper access.	
h2b Non-native and ornamental hedgerow	H1	27m Moderate	Non-native ornamental hedgerow comprised of Privet and Wilson's Honeysuckle, kept trimmed.	

h2a5 Species-rich native hedgerow (Priority habitat)	H2	31m Moderate	Species-rich hedgerow comprised of Hawthorn, Ash, Elder, Dog Rose, Bramble, Elm sp., and Ivy, with shrub layer thin in places, particularly to the east. The four large trees are all Horse Chestnut.	
u1b5 Buildings	U4	0.05ha	Buildings accommodating Adventure Dolphin.	

u1b6 Other developed land	U1	0.11ha	Tarmacked carpark.	
u1b6 Other developed land	U2	0.02ha	Paved area behind building.	
u1c Artificial unvegetated unsealed surface	U3	0.05ha	Unvegetated area to the south of the building, used for storing kayaks/canoes.	

Figure 2: Baseline Habitats East

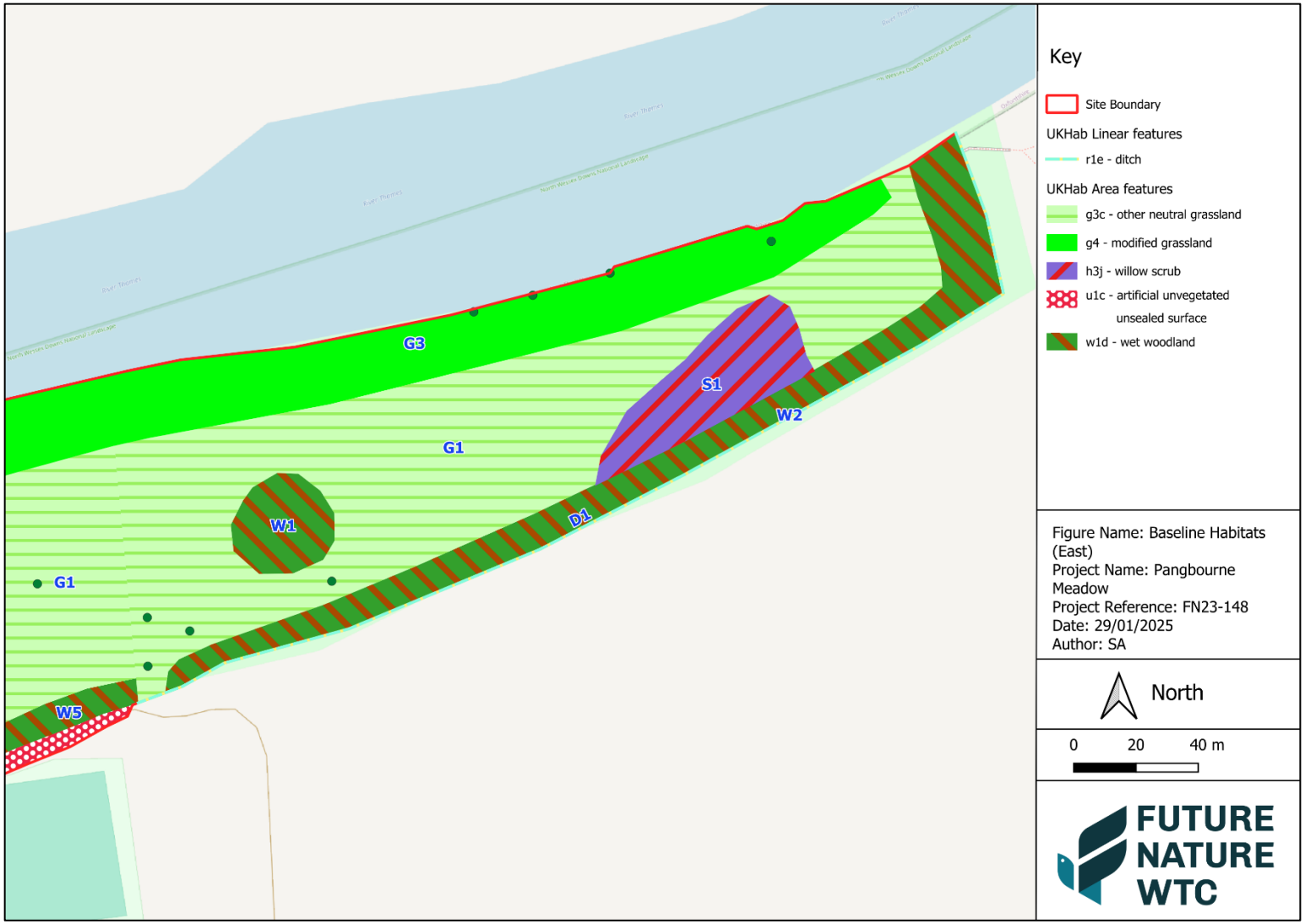
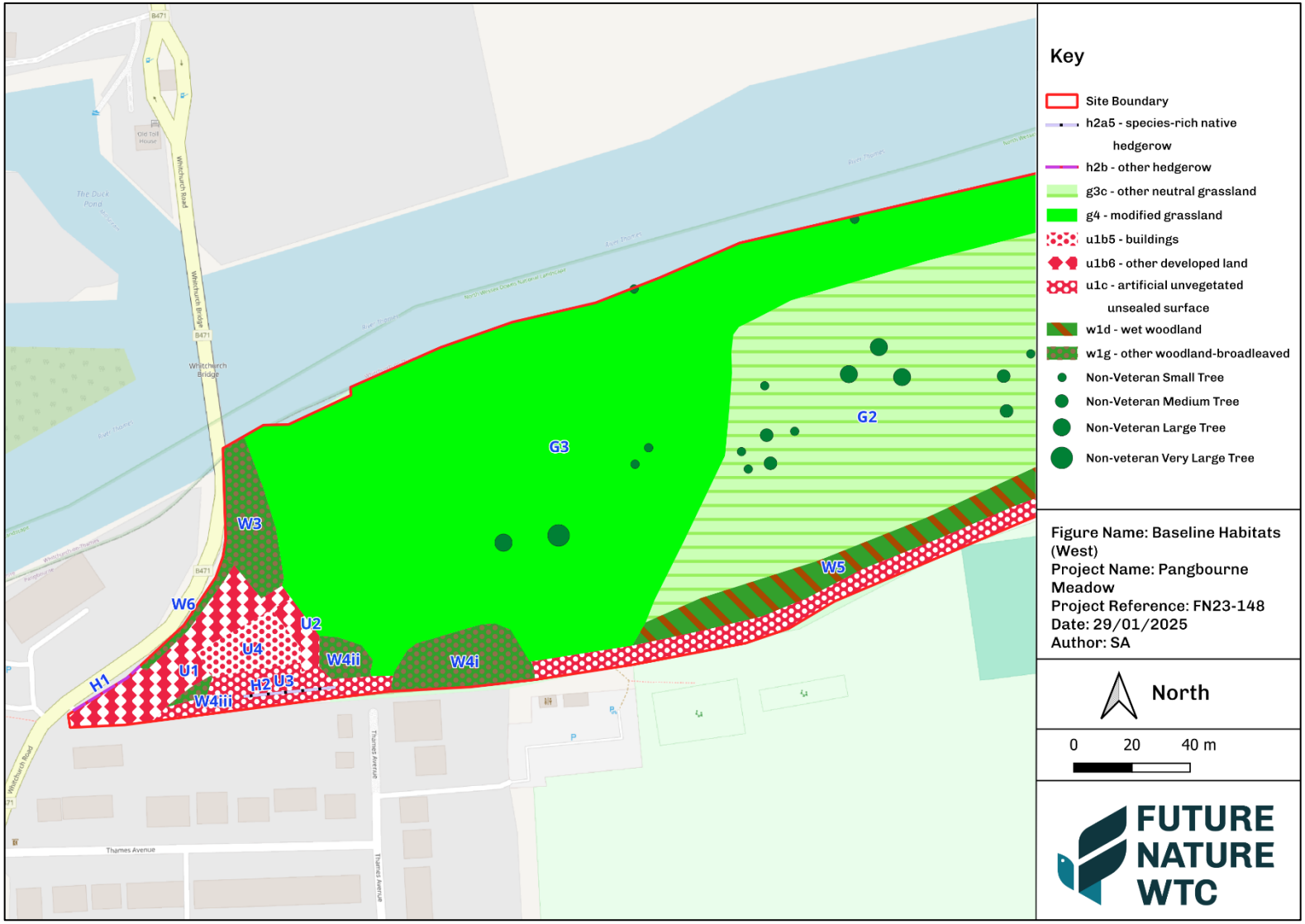


Figure 3: Baseline Habitat West



3.3 POTENTIAL FOR PROTECTED, PRIORITY AND INVASIVE SPECIES

No specific surveys for protected, priority or invasive species were undertaken but the suitability of the site for these species can be determined from the habitat types present.

All of the semi-natural habitats on site; grasslands, woodland, scrub, hedgerows and trees have the scope to support protected and priority species.

Invertebrates: The site comprises a variety of habitats which are likely to support a relatively diverse assemblage of common and widespread invertebrates, albeit constrained by the grassland being fairly limited floristically. The wildflowers that are present in the grassland, such as black Knapweed *Centaurea nigra*, Bird's-foot Trefoil *Lotus corniculatus* and Red Clover *Trifolium pratense*, will likely provide a nectar resource and foodplant for invertebrates, areas of long grass provide overwintering, resting and breeding sites for invertebrates such as beetles, moths and butterflies. Unmanaged scrub provides an important nectar resource for bumblebees and other invertebrates, with Sallow *Salix spp.*particularly important early in the year, followed by Blackthorn *Prunus spinosa* and then Hawthorn *Crataegus monogyna*.

Birds: Floodplain meadows provide a rich habitat for a range of birds throughout the year and can be important for breeding waders such as lapwing *Vanellus vanellus*, during spring and summer, as they provide soft feeding grounds and nesting habitat.

The data search returned records of 26 notable bird species from Pangbourne Meadow itself since 2010, including 9 Red Birds of Conservation Concern (BoCC; Cuckoo (*Cuculus canorus*), Fieldfare (*Turdus pilaris*), Greenfinch (*Chloris chloris*), Hawfinch (*Coccothraustes coccothraustes*), House Martin (*Delichon urbicum*), Lapwing (*Vanellus vanellus*), Linnet (*Linaria cannabina*), Skylark (*Alauda arvensis*) and Yellowhammer (*Emberiza citrinella*)) and 10 Amber BoCC (Black-headed Gull (*Chroicocephalus ridibundus*), Common Tern (*Sterna hirundo*), Grey Wagtail (*Motacilla cinerea*), Kestrel (*Falco tinnunculus*), Mallard (*Anas platyrhynchos*), Meadow Pipit (*Anthus pratensis*), Reed Bunting (*Emberiza schoeniclus*), Sedge Warbler (*Acrocephalus schoenobaenus*), Sparrowhawk (*Accipiter nisus*) and Whitethroat (*Sylvia communis*)). Six of these are also Species of Principal Importance (SPIs), and an additional SPI, Lesser Redpoll (*Acanthis cabaret*), has also been recorded on site as well as Barn Owl (*Tyto alba*) and Kingfisher (*Alcedo atthis*) (protected under Part 1A of the Wildlife and Countryside Act 1981 as amended; WCA) and Ruddy Shelduck (*Tadorna ferruginea*) (listed on Annex 1 of EC Directive 79/409/EEC on the Conservation of Wild Birds).In total there were 76 notable bird species recorded within 2km of the site since 2010. Twelve of these are protected under Schedule 1 Part 1 of the WCA, 26 are SPIs, 37 are Amber BoCC and 25 are Red BoCC (see Appendix for details), for many of which suitable habitat is or could be provided by Pangbourne Meadows.

Skylark (*Alauda arvensis*), Lapwing (*Vanellus vanellus*) and Curlew (*Numenius arquata*) are particularly likely to nest in floodplain meadows. Many other species will use the scrub, trees and hedgerows on the areas of drier ground, with dense scrub habitats of particular importance for passerine birds. Long grassy areas on site may provide a significant hunting resource for predatory birds present in the surrounding area, including Kestrel (*Falco tinnunculus*), Red Kite (*Milvus milvus*) and Buzzard (*Buteo buteo*). Cetti's warbler (*Cettia cetti*), recorded less than 2km away, benefits from long grass, marshy ground and Willow scrub.**Bats:** At least twelve bat species have been recorded since 2010 within 2km of the site: Brown Long-

Eared (*Plecotus auritus*), Common Pipistrelle (*Pipistrellus pipistrellus*), Daubenton's (*Myotis daubentonii*), Leisler's (*Nyctalus leisleri*), Myotis sp., Nathusius's Pipistrelle (*Pipistrellus nathusii*), Natterer's (*Myotis nattereri*), Noctule (*Nyctalus noctula*), Nyctalus, Serotine (*Eptesicus serotinus*), Soprano Pipistrelle (*Pipistrellus pygmaeus*), Western Barbastelle (*Barbastella barbastellus*). Of these eight are SPIs. Serotine (*Eptesicus serotinus*) and Western Barbastelle (*Barbastella barbastellus*) are recorded as Vulnerable on the GB Red List, and Leisler's (*Nyctalus leisleri*) and Nathusius's Pipistrelle (*Pipistrellus nathusii*) are recorded as Near Threatened. Core sustenance zones for most common bat species range from 2-3 km, and so bats are likely to be foraging onsite with possible roost sites in woodland and individual trees. They likely forage for invertebrates above the vegetation on site and utilise the linear hedgerow features for commuting.

Other mammals: Six mammals, all SPIs, have been recorded within 2km of Pangbourne Meadow: Brown Hare (*Lepus europaeus*), Badger (*Meles meles*), Otter (*Lutra lutra*), Hazel Dormouse (*Muscardinus avellanarius*), Polecat (*Mustela putorius*) and Hedgehog (*Erinaceus europaeus*). Hazel Dormouse (*Muscardinus avellanarius*) and Hedgehog (*Erinaceus europaeus*) are also listed as Vulnerable on the GB Red List.

Many of the 13 records of Otter (*Lutra lutra*) within 2km of Pangbourne Meadows, are close to the site boundary, and further downstream along the River Thames. Otters could benefit from the small patches of wet woodland, and thick scrub that occurs here close to the river, as well as the ditch which could potentially be used for foraging habitat, although any grazing that occurs is likely to be detrimental. They would likely benefit from the addition of further wetland features such as ponds.

Small mammals are also likely to find significant shelter within areas of unmanaged grassland on site. It is likely that wood mice and the smaller vole species, as well as Hedgehog (*Erinaceus europaeus*) could be present in the area and forage across the site, especially in drier areas, but lacks connectivity of woodland and hedgerow to areas where Hazel Dormouse (*Muscardinus avellanarius*) has been recorded.

Twenty-eight records of Badger (*Meles meles*) within 2km of the site and since 2010 were returned by the data search, though none less than 700m away. The site offers some shelter and foraging opportunities for Badger (*Meles meles*) and is connected to further rural areas, with connectivity via hedgerow networks. Badgers and their setts are protected under the Protection of Badgers Act 1992.

The Polecat (*Mustela putorius*) (with a single record returned 1.5km away), which has been undergoing a recovery recently, could benefit from the presence of wooded and marshy habitats in close proximity to the riverbank, that Pangbourne Meadow provides.

Reptiles and amphibians:

The data search returned records of four notable amphibians (Common Frog (*Rana temporaria*), Common Toad (*Bufo bufo*), Great Crested Newt (*Triturus cristatus*) and Smooth Newt (*Lissotriton vulgaris*)) and two reptiles (Grass Snake (*Natrix natrix*) and Slow-worm (*Anguis fragilis*)) within 2km of Pangbourne Meadow since 2010. Common Toad (*Bufo bufo*),

Great Crested Newt (*Triturus cristatus*), Grass Snake (*Natrix natrix*) and Slow-worm (*Anguis fragilis*) are SPIs.

Reptiles such as Grass Snake (*Natrix natrix*) and Slow-worm (*Anguis fragilis*) benefit from taller and diverse grassland and shrubs that are not frequently mown/managed and could likely make most use of the woodland edge habitat around the border of the site. The proximity to the fast-moving River Thames, and resulting propensity for the site to flood, means that even with the introduction of ponds, it is unlikely to provide ideal

Invasive species: Himalayan Balsam, a species on Schedule 9 of the WCA, was recorded during the survey. Another non-native species with the potential to become invasive which was found was

Wilson's honeysuckle (*Lonicera nitida*), planted as part of the ornamental hedge along the roadside. Thriving in damp marshes and by rivers, it dies back in winter leaving riverbanks bare of vegetation and prone to erosion and would be beneficial to control where it arises onsite.

Additional records exist for Himalayan Balsam outside but close to the site, less than 1km along the river Pang, which is a tributary that joins the Thames just upstream of Pangbourne Meadow. It has also been recorded on the southern bank of the Thames between the River Pang and Pangbourne Meadows, suggesting it is likely to continue to arise on site. Floating Pennywort (*Hydrocotyle ranunculoides*) is also present upstream of Pangbourne Meadows, although not yet recorded on site.

Signal Crayfish (*Pacifastacus leniusculus*), Zebra Mussel (*Dreissena polymorpha*) and American Mink (*Neovison vison*) are additional INNS priority species, also on Schedule 9 of the WCA, for which records exist within 500m of Pangbourne Meadows, although of less relevance to management of the site itself.

4. BIODIVERSITY ENHANCEMENT OPPORTUNITIES

4.1 INTRODUCTION OF ENHANCEMENT MEASURES

In this section, a recommended enhancement strategy is set out, with the individual habitat enhancement and/or creation measures individually considered. A detailed habitat management plan should be created for the enhancement strategy to be fully implemented. This is something that we would be happy to discuss further at Future Nature WTC.

Figure 4: Proposed habitats west

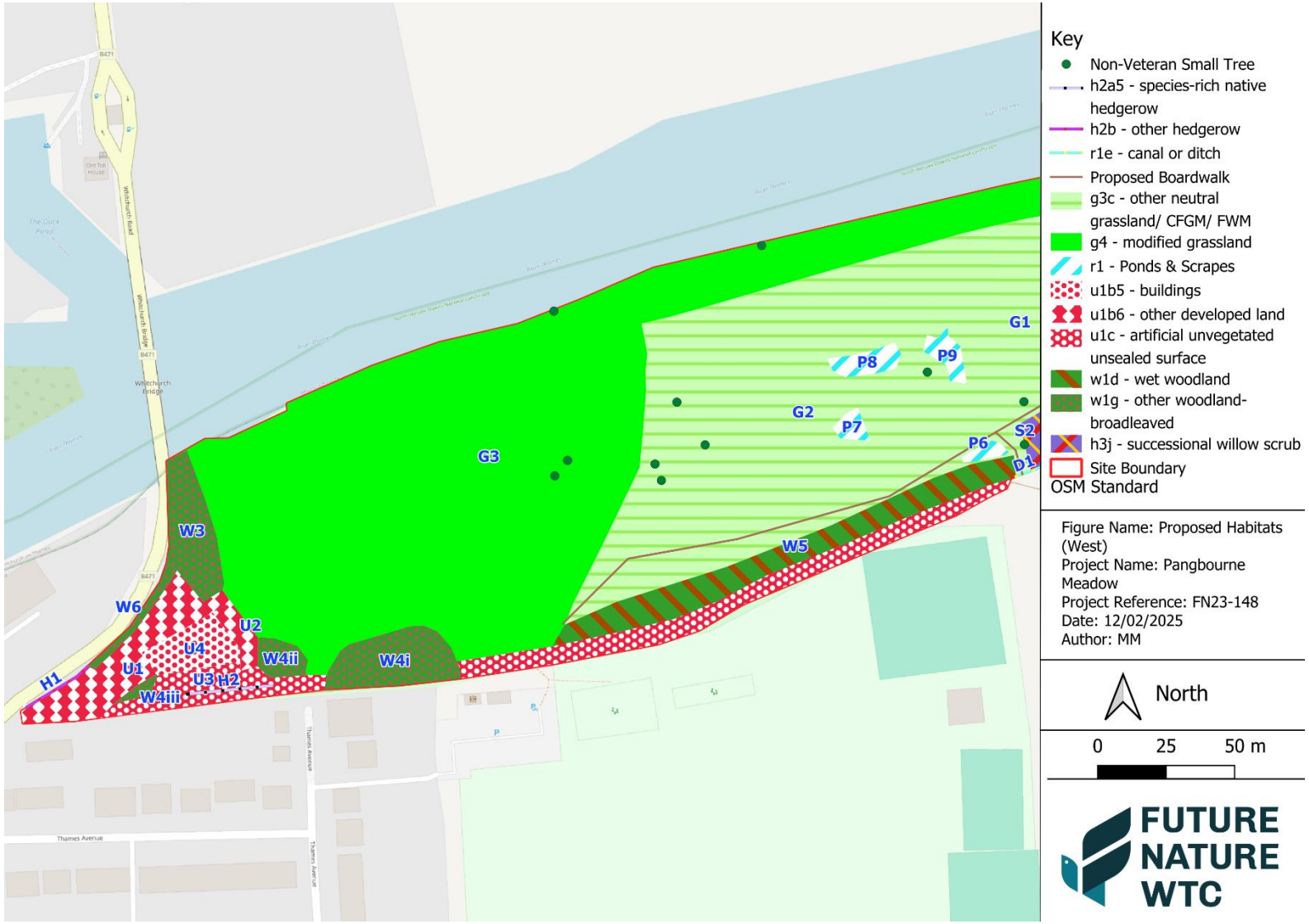
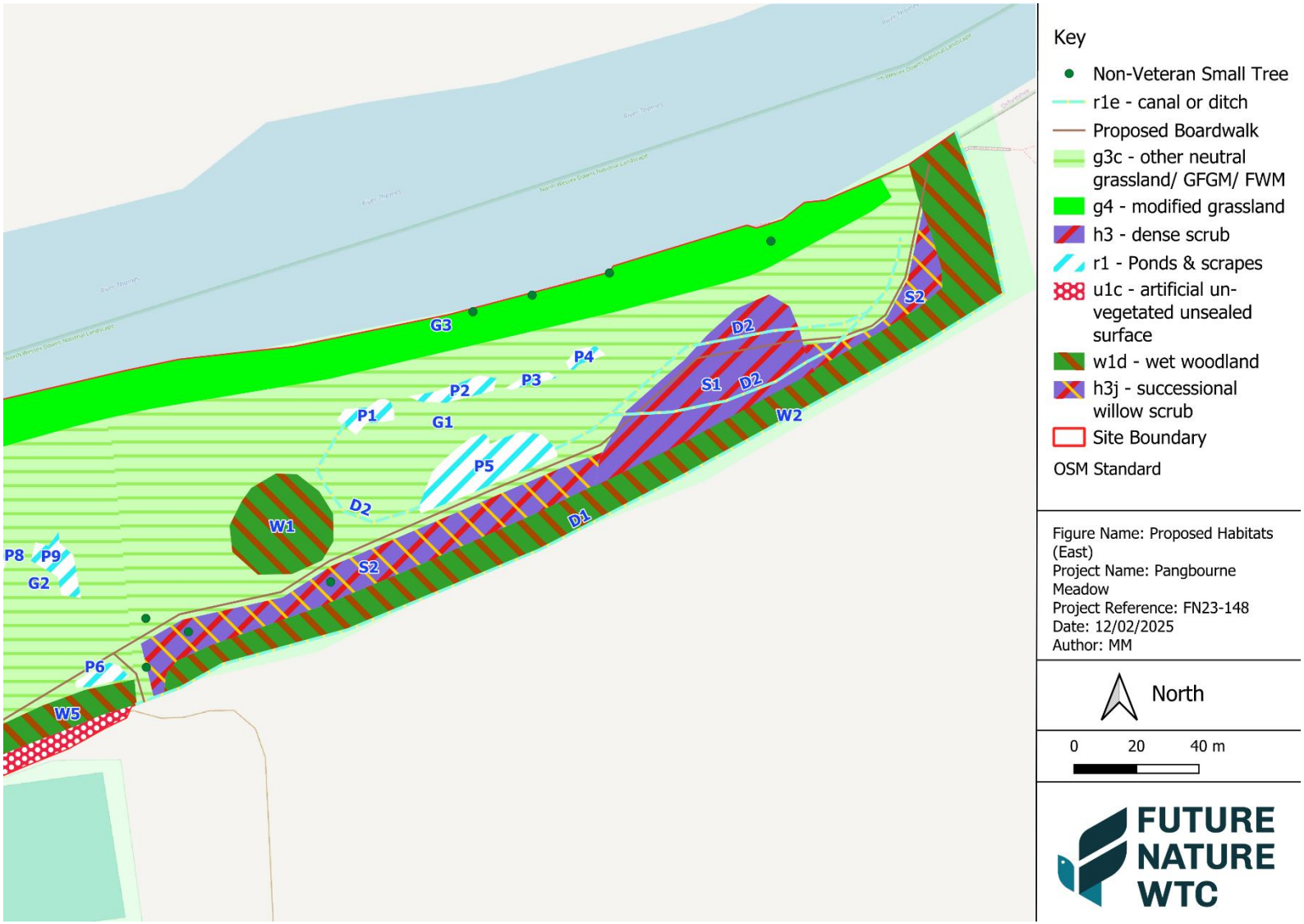


Figure 5: Proposed habitats east



4.2 Enhancement of Moderate Condition Other Neutral Grassland/ CFGM from Moderate to Good

Location: G1, G2

Blocks G1 and G2 are both currently held back by a lack of management. This has meant that overtime, the sward has become dominated mainly by a mixture of tall grasses and a small number of larger flowering herbs, which leaves little space for smaller and more delicate flowering species to thrive and therefore floral diversity is low.

The area floods yearly and as such is positioned well to be restored into floodplain meadow, which is likely the habitat that existed on site in the past. For the purposes of this plan we have not suggested that this area should be fully reverted to floodplain meadow, since this may be difficult to achieve, however, enhancement can be made to as closely as possible manage the area with the best chance to enhance towards floodplain meadow, even if this is not possible to fully achieve.

Management can take place via two different methods or ideally a combination of both:

- Extensive Conservation Grazing with Cattle – This would involve fencing areas off, introducing cattle corrals and water troughs. Grazing could take place between July and when the ground becomes too wet in autumn. Grazing would be beneficial in terms of improving structural diversity of the vegetation on site and for invertebrates in particular. Cattle would be the best option as they are better suited to a site which the public access regularly with dogs. If cattle are to be introduced, ensure that the public are consulted and consider the erection of interpretation and signage also.
- Yearly hay cut and remove – The carrying out of yearly hay cut between mid-July and late August would be beneficial and start to control the dominance of those larger plant species currently found on site. Cutting earlier is likely to have a greater impact for increasing flowering plant cover and diversity, whilst cutting later may be of greater benefit to invertebrates allowing them to complete their lifecycles. Leaving 10% uncut each year will always ensure insects complete their lifecycles Hay cutting may be carried out by a tractor and baler, by smaller specialist ride on mowers such as a Grillo or by volunteers.
- Combination of hay cut and aftermath grazing – This would be the best option and would provide greatest chance to restore the meadows to their former glory. Approximately 1 month after the hay cut, the grazing animals could be introduced onto the site to graze off the regrowth. This would create more open space within the sward for smaller more delicate species; which have been lost in the past but may still exist within the seedbed, to regenerate.

4.3 Enhancement of Poor Condition Modified Grassland From Poor to Moderate

Location: G3

G3 is currently modified grassland and would not be appropriate for the full enhancement to other neutral grassland but may be tweaked to slightly enhance its biodiversity.

Three main changes can be made in this area:

1. Introduction of additional short growing herbs through light harrowing and overseeding. Species can be included as part of a tailored mix from a wildflower supplier and can include red clover *Trifolium pratense,* dandelion *Taraxacum officinale,* common daisy *Bellis perennis,* germander speedwell *Veronica chamaedrys* yarrow *Achillea millefolium*, selfheal *Prunella vulgaris*, birds-foot trefoil *Lotus corniculatus*, cowslips *Primula veris* and lady's bedstraw *Galium verum*;
2. Raising cutting height on mowers to approximately 5cm, this will allow more plants to successfully flower and set seed; and
3. Cutting these areas every 4- 6 weeks during the growing season has been shown to produce the highest amount of flowers and nectar. Rotating mown patches around G3 will ensure that there is always a pollen and nectar source.

4.4 Enhancement of Poor Condition Wet Woodland to Moderate Condition & General Woodland Management Notes

Location: W1

This area, being comprised mainly of 1 species (black poplar) and of an even age, falls short in several areas: a lack of veteran trees, amount of deadwood, too much woodland disturbance via nutrient enrichment, a lack of recognisable woodland ground flora, a lack of regeneration and only 1 age class of tree being present.

Some of the above will take a long time to remedy and will largely require that a significant amount of time passes rather than management interventions needing to take place. However, a couple of quick easy fixes can help to solve the lack of regeneration and lack of deadwood.

A lack of regeneration tends to signify browsing pressure, usually from deer. This area could be fenced off with deer fence, which would allow regeneration to take place.

Fencing off should also help to ensure that deadwood; which may leave site via a variety of vectors, such as floating off downstream during flooding events, being 'tidied up' by site managers and being removed by members of the public looking to fuel their fires at home, is retained on site. Additional deadwood can also be created via the process of 'veteranisation'. Select younger trees can be chosen to be veteranised. This involves a mixture of carrying out ringbarking, partial ringbarking, pulling and snapping of branches and drilling of holes. All of which will turn into interesting deadwood features as trees develop. Younger trees are recommended since they tend to be more resilient to damage than mature trees and are of less significance if veteranisation does accidentally kill the tree in question.

General woodland Management notes

Willow pollarding was noted within the wet woodlands on site, it is recommended that this process continues with these willows being managed on 10-20 year rotation, this will slowly allow for development of veteran willow trees on site, a nationally important irreplaceable habitat.

Where any tree planting is considered within woodland blocks, look to use only native species in the future, or even better, protect those saplings and seedlings which grow of their own accord, since these will be best adapted to site conditions.

Remove non-native, invasive species where and when they appear. The non-native buddleia was observed in woodland W3, look to remove this before it becomes overly competitive with native plants.

Resist the temptation to tidy up after tree works and retain as much deadwood on site as possible, both fallen and standing.

Look to ensure that woodlands have wavy edges and slowly phase into neighbouring grasslands via an ecotonal zone of scrub and long grass/ flowering herbs, which provides shelter at the edge of the woodland, protection for the woodland from high winds and a

phasing zone which will support a high number of species dpendent upon various different habitat attributes

4.5 Creation of Good Condition Other Neutral Grassland

Location: G1, G2 (on areas formerly part of G3)

When surveys were carried out it was noted that the mown strip between compartments G1/G2 and the river is unnecessarily wide at up to 25m in some places. This regular mowing has resulted in the sward losing its botanical diversity and becoming akin to grassland G3 at the western end of the site. Simply decreasing the width of the mown area, allowing the southern part to regenerate and be managed in the same way as G1 and G2 (detailed in Section 4.2), should in time allow this patch of grassland to be enhanced significantly.

If species diversity is slow to develop in these areas, then the ground in these areas could be lightly harrowed and seed rich green hay could be cut from more diverse areas of the site and strewn in these areas to drop its seed.

4.6 Creation of Moderate Condition Ponds

Location: P1-P9 (on areas formerly part of G1 and G2)

Given that the site is positioned directly next to the Thames, there is a surprising lack of wetland and standing water present throughout the year. The creation of a number of small ponds and scrapes will help to rectify this, offering scope for a greater range of wetland plants and invertebrates to colonise the site plus also some potential benefits for wildfowl.

Following discussions with Landscape architects at Hankinson Duckett Associates, appropriate locations for a number of ponds and scrapes were drawn up.

Ponds would be best located within blocks G1 and G2 and should be a mixture of depths from 0.5-1.5m with varied margins and shallowly sloping edges wherever possible. A detailed description of how to create ponds is beyond the scope of this report, so it is advised that the land managers consult the Freshwater Habitat's Trusts Pond Creation Toolkit for a detailed account of how best to create the ponds[6] or further advise from Future Nature can be sought.

Ponds should be created in tandem with the new ditch, D2, which will act to link ponds P1 and P5. Ponds and the ditch may be created by use of a rotary ditcher, which is eligible for an Environment Agency Flood Risk Permit Exemption. The contracting wing of the RPSB currently have this technology available for hire[7].

[6] Freshwater Habitats Trust (2025) Pond creation Toolkit, accessed online [Pond Creation Toolkit - Freshwater Habitats Trust]

[7] RC Baker (2025) Wetland Restoration with the RSPB, accessed online [Wetland Restoration with the RSPB]

In terms of introducing pond vegetation, it has been decided that it would be best if some ponds are allowed to succeed naturally with seeds arriving on site via vectors such as wind, and within animal fur. Whilst some ponds can be deliberately planted up.

Ponds within G1 (P1-P5) can colonise naturally, whilst ponds in G2 (P6-P9) can be planted up with a mixture of wetland plant species already present on site, including reed canary grass and wild angelica, along with a suitable mixture of native pond plants found in other ponds nearby. These could include but are not limited to those shown in Table 3.

Table 3. suitable pond species which could be planted. B=bare mud, SA=submerged aquatic, M=pond margins, ME=Medium sized emergent, LE=Low growing emergent, TE=tall emergent, & FA=floating aquatic

Species	**Habitat**
Water Plantain *Alisma plantago-aquatica*	B, SE
Water Starwort *Callitriche stagnalis agg.*	B, SA
Marsh Marigold *Caltha palustris*	M
Greater Pond Sedge *Carex riparia*	ME
Rigid Hornwort *Ceratophyllum demersum*	SA
Common Spike Rush *Eleocharis palustris*	ME
Hairy Willowherb *Epilobium hirsutum*	M
Hemp Agrimony *Eupatorium cannabinum*	M
Meadowsweet *Filipendula ulmaria*	M
Yellow Iris *Iris pseudacorus*	M or ME
Soft Rush *Juncus effusus*	M
Hard Rush *Juncus inflexus*	M
Flote grass *Glyceria fluitans*	B or LE
Reed sweet grass *Glyceria maxima*	TE

Water Mint *Mentha aquatica*	B or LE
Water Forget-me-not *Myosotis scorpioides*	B or LE
Purple Loosestrife *Lythrum salicaria*	M
Mares Tail *Hippuris vulgaris*	LE
Yellow Water Lily *Nuphar lutea*	FA
White Water Lily *Nymphaea alba*	FA
Hemlock Water Dropwort *Oenanthe crocata*	M
Amphibious Bistort (*Polygonum amphibium*	LE
Broadleaved Pondweed *Potamogeton natans*	FA
Water Crowfoot *Ranunculus aquatilis*	B, SA or FA
Lesser Spearwort *Ranunclus flammula*	B or SW
Celery Leaved Buttercup *Ranunculus sceleratus*	B
Water Figwort *Scrophularia auriculata*	M
Woody Nightshade *Solanum dulcamera*	M
Branched Bur Reed *Sparganium erectum*	ME
Brooklime *Veronica beccabunga*	B or LE

It may be beneficial to fence off some ponds to prevent access via dogs and livestock (if they are to be introduced)

4.7 Creation of Moderate Condition Successional Willow Scrub

Location: S2, S2i (on areas formerly part of G1)

The proposed route of a new boardwalk (as shown in figures 4 and 5) will lead to a small part of the grassland in G1 being cut off from the main compartment. This will cause an issue in terms of managing this patch of grassland and as such it is recommended that this small area is allowed to develop into scrub of its own accord.

Doing so will allow for habitats to grade more smoothly between the open grassland of G1 and the closed canopy woodland of W2. It is expected that the habitat which will develop will in time become willow scrub, with scattered areas of tall herbaceous plants and grasses which are currently found across much of G1 but may be reduced in number when a regular management strategy is deployed.

It is recommended that some areas are deliberately kept open within these new scrub blocks, to ensure that these tall herbaceous plants continue to thrive in this areas alongside scrub, though this management is unlikely to be necessary in the first 5-10 years as scrub slowly develops.

The extension of scrub on site is likely to be highly beneficial for nesting and roosting passerine birds

4.8 Creation of Ditches in Good Condition

Location: D2 (on areas of G1 and S1)

The creation new ditches in G2 can be achieved through following a largely similar process to that laid out in the creation of ponds (detailed in section 4.6). However, depths should be somewhat different to those of ponds.

This ditch can be of varying depth from 0.1-0.5m and varying width from 1-5m. The idea of the ditch is to provide a mixture of ephemeral and permanent wet areas on the floodplain with extensive bare mud areas for invertebrates and predatory bird species.

Ditches should not be planted up and instead should be able to colonise of their own accord.

4.9 A Note on Enhancement of the River Thames Bankside Vegetation

Location: n/a

Some small, scattered patches of aquatic vegetation including species such as wild angelica, common nettle and Michaelmas daisy were observed alongside the River Thames. These patches were so small and trimmed back that they have not been mapped within this report.

It is clear that these areas are regularly cut back to allow access for canal boats, however it is the authors opinion that cutting of these bankside areas could be reduced in order to allow for as much development of this bankside vegetation as possible. Only the metre or so nearest

the bankside need be left uncut and it will have considerable benefit even if the areas left uncut are patchy and not connected to one another.

5. MEASURING BIODIVERSITY CHANGE

This section of the report reviews the baseline value of the habitats present based on the Defra Statutory metric. We use the Metric as a rough means of measuring biodiversity and the uplifts provided by our suggestions.

5.1 BIODIVERSITY NET GAIN ASSESSMENT

A summary of the assessment is provided below and the full metric spreadsheet is available separately.

Biodiversity units

A summary of how the units have been calculated is provided in Table 4.

Table 4: Baseline Biodiversity Units for Habitats, Hedgerows & Watercourses

Habitat	**Area (Ha)**	**Condition**	**Biodiversity Units**
g4 Modified Grassland	2.378	Poor	4.76
g3c Other Neutral Grassland	2.301	Moderate	18.41
w1g Other woodland; broadleaved	0.713	Poor	0.796
	0.016	Moderate	0.147
w1d Wet Woodland	0.084	Poor	0.58
	0.536	Moderate	7.367
h3j Willow Scrub	0.169	Moderate	1.553
Total habitat units			**32.27**
Hedgerow	**Length (km)**	**Condition**	**Biodiversity Units**
h2a5 Species-rich Native hedgerow	0.031	Moderate	0.285
h2b Native hedgerow	0.027	Moderate	0.124

Total hedgerow units			**0.409**
Watercourse	**Length (km)**	**Condition**	**Biodiversity Units**
Ditch	0.363	Poor	1.45
Total watercourse units			**1.45**

The recommended opportunities, discussed in Section 4, have been assessed to determine how much uplift would be generated in terms of a biodiversity net gain. The biodiversity units generated by enhancing existing units are shown in Table 5.

Table 5: Enhanced Biodiversity Units for Habitats, Hedgerows and Watercourses

Habitat change	**Area (Ha)**	**Condition change**	**Biodiversity Units**
g4 Modified grassland	2.099	Poor to Moderate	7.14
g3c other neutral grassland	1.964	Moderate to Good	21.21
w1d wet woodland	0.084	Poor to Moderate	25.26
w1g Other woodland; broadleaved to w1g Other woodland; broadleaved	0.741	Poor to Moderate	0.74
Total habitat units from habitat enhancement			**29.09**
Hedgerow change	**Length (km)**	**Condition**	**Biodiversity Units**
N/A	N/A	N/A	N/A
Total hedgerow units from enhancement			**0**

Watercourse change	Condition	Biodiversity Units	
N/A	N/A	N/A	
Total watercourse units from enhancement		**0**	

The biodiversity units generated from new habitat creation are shown in Table 6.

Table 6: Created Biodiversity Units for Habitats, Hedgerows and Watercourses

Habitat	Area (Ha)	Condition	Biodiversity Units
g3c Other Neutral Grassland	0.28	Good	2.35
42 Ponds (Non-priority)	0.141	Moderate	1.01
h3j Willow scrub	0.197	Moderate	0.74
Total habitat units created			**4.11**
Hedgerows	**Length (km)**	**Condition**	**Biodiversity Units**
Total hedgerow units created	0	n/a	**0**
Watercourses	**Length (km)**	**Condition**	**Biodiversity Units**
50 Ditches	0.389	Good	1.63
Total Watercourse units created			**1.63**

A summary of the change in Biodiversity Net Gain is provided in Figure 6. Overall, there is a gain of 9.53 habitats units (or a 29.53% gain) and a gain of 1.63 watercourse units (or a 112.06% gain). No additional hedgerow units have been gained.

Figure 6: Biodiversity Net Gain Assessment Results

Off-site baseline	*Habitat units*	32.27	
	Hedgerow units	0.68	
	Watercourse units	1.45	
Off-site post-intervention (Including habitat retention, creation & enhancement)	*Habitat units*	41.80	
	Hedgerow units	0.68	
	Watercourse units	3.08	
Off-site net change (units & percentage)	*Habitat units*	9.53	29.53%
	Hedgerow units	0.00	0.00%
	Watercourse units	1.63	112.06%

6. CONCLUSION

In conclusion the surveys and report find that Pangbourne Meadows currently consists of a mixture of other neutral grassland, other broadleaved woodland, wet woodland, willow scrub, and hedgerows.

Baseline biodiversity units are calculated at 32.27 for area habitats, 0.68 for hedgerows and 1.56 for watercourses.

This report lays out a vision to enhance and create habitats on site leading to improvements to some of those habitats already detailed and the development of higher distinctiveness habitats including new ponds, scrub and ditches. The species likely to benefit from habitat creation and enhancement are briefly touched upon.

Biodiversity units are calculated which show an overall gain of 293.22 habitats units (or a 154.10% gain) and a gain of 12.98 hedgerow units (or an 88.44% gain). Overall, there is a gain of 9.53 habitats units (or a 29.53% gain) and a gain of 1.63 watercourse units (or a 112.06% gain). No additional hedgerow units will be gained.

APPENDICES

APPENDIX A - POLICY AND LEGISLATION

National Planning Policy Framework (NPPF)[8]

The National Planning Policy Framework sets out the government's planning policies for England and how these are expected to be applied. It provides a framework within which locally-prepared plans for housing and other development can be produced. Planning law requires that applications for planning permission be determined in accordance with the development plan. The framework includes key paragraphs relating to the natural environment and how it should be considered in the planning context including details on achieving a biodiversity net gain and protecting designated sites and protected and notable habitats and species.

Government Circular ODPM 06/2005 Biodiversity and Geological Conservation [9] (England only)

This Circular provides administrative guidance on the application of the law relating to planning and nature conservation as it applies in England.

Part IV - Conservation of Species protected by Law details that the presence of a protected species is a material consideration when considering a development proposal that may result in harm to the species or its habitat and that planning authorities must have regard to species protected under the Habitat Regulations.

It goes on to say that: *it is essential that the presence or otherwise of protected species, and the extent that they may be affected by the proposed development, is established before the planning permission is granted, otherwise all relevant material considerations may not have been addressed in making the decision. The need to ensure ecological surveys are carried out should therefore only be left to coverage under planning conditions in exceptional circumstances, with the result that the surveys are carried out after planning permission has been granted.*

Natural Environment and Rural Communities (NERC) Act 2006[10] [11]

Section 40 – To conserve biodiversity

Section 40 puts a duty on public authorities to conserve biodiversity when undertaking its duties and functions.

Section 41 – Biodiversity list and Action

Section 41 – Requires the Secretary of State "*to publish a list of the living organisms and types of habitat which in the Secretary of State's opinion are of principal importance for the purpose*

[8] NPPF February 2021 (https://www.gov.uk/government/publications/national-planning-policy-framework--2)

[9] ODPM Circular 06/2005 Office of the Deputy Prime Minister Eland House, Bressenden Place, London SWIE 5DU Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their Impact within the Planning System

[10] https://www.legislation.gov.uk/ukpga/2006/16/section/40

[11] https://www.legislation.gov.uk/ukpga/2006/16/section/41

of conserving biodiversity." They must also "*take such steps as appear to the Secretary of State to be reasonably practicable to further the conservation of the living organisms and types of habitat included in any list published under this section or promote the taking by others of such steps*."

Protected Species Legislation

European Protected Species

European Protected Species (EPS) are those listed on Annexes II and IV of the European Habitats Directive and receive full protection under The Conservation of Species and Habitats Regulations 2017. This make it an offence to:

- deliberately capture, injure or kill any European Protected Species (EPS)
- to deliberately disturb any European Protected Species (EPS);
- to damage or destroy a breeding site or place of rest or shelter used by any European Protected Species (EPS).

European protected species in England include all resident bat species, great crested newt, dormouse and otter

Wildlife and Countryside Act 1981 (as amended)

Schedule 1

Under Schedule 1 of the Wildlife and Countryside Act (1981) all wild birds are protected against the following actions:

- intentionally killing, injuring or taking any wild bird
- intentionally taking, damaging or destroying the nest of any wild bird whilst that nest is in use of being built;
- intentionally taking, damaging or destroying eggs of any wild bird;

Some wild birds that are specifically listed on Schedule 1 receive further protection from:

- intentional or reckless disturbance whilst it is building a nest or is in, on or near a nest containing eggs or young;
- disturbance of dependent young

Schedule 5

The following actions would result in an offence to the species listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) (WCA):

- intentionally killing, injuring, or taking
- intentionally or recklessly damaging, destroying or obstructing access to any structure or place used for shelter or protection

- disturbing a species whilst they are using any structure or place used for shelter or protection

All EPS are also listed on Schedule 5 of the WCA. Other species fully protected by Schedule 5 include water vole and red squirrel.

The common UK reptiles (adder, common lizard, slow worm and grass snake) are partially protected by Section 9 of Schedule 5 making it an offense to kill or injure them.

White-clawed crayfish are protected from being taken only.

Schedule 9

The purpose of section 14 of the Wildlife and Countryside Act 1981 ('the Act') is to prevent the release into the wild of certain plants and animals which may cause ecological, environmental, or socio-economic harm. To achieve this section 14 prohibits the introduction into the wild of any animal of a kind which is not ordinarily resident in and is not a regular visitor to Great Britain in a wild state, or any species of animal or plant listed in Schedule 9 of the Act.

Schedule 9 lists non-native species that are already established in the wild, which continue to pose a conservation threat to native biodiversity and habitats, so that further releases should be regulated.

APPENDIX B – PROTECTED AND NOTABLE SPECIES WITHIN 2KM OF THE SURVEY SITE

Common Name	Scientific Name	European Directives	UK Legislation	NERC S41	Other Designations	No. of records	Latest record
Amphibians							
Common Frog	Rana temporaria	HabDir-A5	WACA-Sch5-s9.5a			7	15/10/2015
Common Toad	Bufo bufo		WACA-Sch5-s9.5a	NERC-S41		8	23/11/2015
Great Crested Newt	Triturus cristatus	HabDir-A2np, HabDir-A4	HabReg-Sch2, WACA-Sch5-s9.4b/s9.4c/s9.5a	NERC-S41		13	21/05/2020
Smooth Newt	Lissotriton vulgaris		WACA-Sch5-s9.5a			13	14/06/2020
Birds							
Barn Owl	Tyto alba		WACA-Sch1-p1			10	14/03/2016
Black-headed Gull	Chroicocephalus ridibundus				Bird-Amber	53	07/02/2022
Brambling	Fringilla montifringilla		WACA-Sch1-p1			20	13/03/2022

Bullfinch	Pyrrhula pyrrhula			NERC-S41	Bird-Amber	38	28/01/2022
Cetti's Warbler	Cettia cetti		WACA-Sch1-p1			2	07/07/2014
Common Gull	Larus canus				Bird-Amber	21	11/12/2022
Common Sandpiper	Actitis hypoleucos				Bird-Amber	4	17/06/2024
Common Tern	Sterna hirundo	BirdsDir-A1			Bird-Amber	24	25/07/2022
Crossbill	Loxia curvirostra		WACA-Sch1-p1			3	02/02/2013
Cuckoo	Cuculus canorus			NERC-S41	Bird-Red	5	25/04/2022
Curlew	Numenius arquata			NERC-S41	Bird-Red, RL-Global-post2001-NT	1	16/10/2022
Dartford Warbler	Curruca undata	BirdsDir-A1	WACA-Sch1-p1		Bird-Amber, RL-Global-post2001-NT	2	26/12/2022
Dunnock	Prunella modularis			NERC-S41	Bird-Amber	307	15/06/2023
Fieldfare	Turdus pilaris		WACA-Sch1-p1		Bird-Red	34	11/02/2022

Firecrest	Regulus ignicapilla		WACA-Sch1-p1			4	02/05/2016
Gadwall	Mareca strepera				Bird-Amber	6	26/12/2018
Great Northern Diver	Gavia immer	BirdsDir-A1	WACA-Sch1-p1		Bird-Amber	4	02/01/2019
Great White Egret	Ardea alba				Bird-Amber	12	22/08/2021
Greenfinch	Chloris chloris				Bird-Red	228	23/06/2022
Grey Partridge	Perdix perdix			NERC-S41	Bird-Red	9	19/01/2016
Grey Wagtail	Motacilla cinerea				Bird-Amber	87	13/10/2022
Greylag Goose	Anser anser				Bird-Amber	72	16/12/2022
Hawfinch	Coccothraustes coccothraustes			NERC-S41	Bird-Red	2	23/02/2018
Herring Gull	Larus argentatus			NERC-S41	Bird-Red	8	17/04/2022
House Martin	Delichon urbicum				Bird-Red	41	24/07/2022

House Sparrow	Passer domesticus			NERC-S41	Bird-Red	131	23/12/2022
Kestrel	Falco tinnunculus				Bird-Amber	59	28/06/2024
Kingfisher	Alcedo atthis	BirdsDir-A1	WACA-Sch1-p1			103	17/12/2022
Lapwing	Vanellus vanellus			NERC-S41	Bird-Red	112	11/12/2022
Lesser Black-backed Gull	Larus fuscus				Bird-Amber	15	07/02/2022
Lesser Redpoll	Acanthis cabaret			NERC-S41		11	17/12/2022
Lesser Spotted Woodpecker	Dryobates minor			NERC-S41	Bird-Red	3	06/02/2010
Linnet	Linaria cannabina			NERC-S41	Bird-Red	29	18/06/2022
Little Egret	Egretta garzetta	BirdsDir-A1				32	14/12/2022
Mallard	Anas platyrhynchos				Bird-Amber	105	16/12/2022
Marsh Tit	Poecile palustris			NERC-S41	Bird-Red	85	07/08/2022

Meadow Pipit	Anthus pratensis				Bird-Amber	26	29/12/2022
Mistle Thrush	Turdus viscivorus				Bird-Red	22	04/08/2022
Moorhen	Gallinula chloropus				Bird-Amber	148	16/12/2022
Nightingale	Luscinia megarhynchos				Bird-Red	2	28/07/2015
Peregrine	Falco peregrinus	BirdsDir-A1	WACA-Sch1-p1			3	27/03/2020
Red Kite	Milvus milvus	BirdsDir-A1	WACA-Sch1-p1		RL-Global-post2001-NT	138	15/06/2023
Red-breasted Merganser	Mergus serrator				Bird-Amber	1	18/01/2016
Redshank	Tringa totanus				Bird-Amber	1	25/06/2019
Redwing	Turdus iliacus		WACA-Sch1-p1		Bird-Amber	67	19/11/2022
Reed Bunting	Emberiza schoeniclus			NERC-S41	Bird-Amber	223	16/12/2022
Ring Ouzel	Turdus torquatus			NERC-S41	Bird-Red	1	15/04/2013
Rook	Corvus frugilegus				Bird-Amber	60	24/02/2022

Ruddy Shelduck	Tadorna ferruginea	BirdsDir-A1				19	16/12/2022
Sedge Warbler	Acrocephalus schoenobaenus				Bird-Amber	133	11/07/2022
Shelduck	Tadorna tadorna				Bird-Amber	7	11/02/2015
Shoveler	Spatula clypeata				Bird-Amber	3	16/12/2022
Skylark	Alauda arvensis			NERC-S41	Bird-Red	85	15/06/2023
Snipe	Gallinago gallinago				Bird-Amber	11	16/12/2022
Song Thrush	Turdus philomelos			NERC-S41	Bird-Amber	97	27/12/2022
Sparrowhawk	Accipiter nisus				Bird-Amber	36	23/07/2022
Spotted Flycatcher	Muscicapa striata			NERC-S41	Bird-Red	11	27/08/2016
Starling	Sturnus vulgaris			NERC-S41	Bird-Red	50	07/01/2022
Stock Dove	Columba oenas				Bird-Amber	29	18/06/2022

Swift	Apus apus				Bird-Red	87	11/07/2022
Tawny Owl	Strix aluco				Bird-Amber	17	21/01/2022
Teal	Anas crecca				Bird-Amber	6	17/12/2022
Wheatear	Oenanthe oenanthe				Bird-Amber	4	17/04/2022
Whinchat	Saxicola rubetra				Bird-Red	2	24/09/2017
White Stork	Ciconia ciconia	BirdsDir-A1				1	22/04/2021
Whitethroat	Curruca communis				Bird-Amber	64	26/07/2022
Wigeon	Mareca penelope				Bird-Amber	5	27/12/2018
Willow Tit	Poecile montanus			NERC-S41	Bird-Red	2	22/12/2013
Willow Warbler	Phylloscopus trochilus				Bird-Amber	38	08/04/2022
Woodcock	Scolopax rusticola				Bird-Red	4	18/03/2019
Woodpigeon	Columba palumbus				Bird-Amber	96	15/06/2023
Wren	Troglodytes troglodytes				Bird-Amber	243	26/07/2022

Yellow Wagtail	Motacilla flava			NERC-S41	Bird-Red	4	26/07/2022
Yellow Wagtail	Motacilla flava flavissima			NERC-S41	Bird-Red	3	17/10/2020
Yellow-legged Gull	Larus michahellis				Bird-Amber	2	05/02/2018
Yellowhammer	Emberiza citrinella			NERC-S41	Bird-Red	95	24/12/2022
Fish - Bony							
Barbel	Barbus barbus	HabDir-A5	HabReg-Sch4			11	10/07/2013
Brown Trout	Salmo trutta subsp. fario			NERC-S41		12	03/09/2015
Brown/Sea Trout	Salmo trutta			NERC-S41		10	25/10/2023
Bullhead	Cottus gobio	HabDir-A2np				31	25/07/2024
European Eel	Anguilla anguilla			NERC-S41	RL-Global-post2001-CR	36	09/07/2016
Grayling	Thymallus thymallus	HabDir-A5	HabReg-Sch4			18	25/10/2023

Fish - Jawless							
Brook Lamprey	Lampetra planeri	HabDir-A2np				3	26/09/2023
Higher Plants - Flowering Plants							
Autumn Gentian	Gentianella amarella				RL-Eng-post2001-NT	5	03/09/2014
Basil Thyme	Clinopodium acinos			NERC-S41	RL-Eng-post2001-VU, RL-GB-post2001-VU	9	02/06/2019
Bluebell	Hyacinthoides non-scripta		WACA-Sch8			11	20/06/2022
Butcher's-broom	Ruscus aculeatus	HabDir-A5				14	22/06/2022
Carline Thistle	Carlina vulgaris				RL-Eng-post2001-NT	15	15/06/2023
Cat-mint	Nepeta cataria				RL-Eng-post2001-VU, RL-GB-post2001-VU	2	28/06/2015
Common Rock-rose	Helianthemum nummularium				RL-Eng-post2001-NT	11	10/07/2015
Common Valerian	Valeriana officinalis				RL-Eng-post2001-NT	8	01/07/2022

Corn Marigold	Glebionis segetum				RL-Eng-post2001-VU, RL-GB-post2001-VU	1	10/07/2016
Corn Mint	Mentha arvensis				RL-Eng-post2001-NT	3	11/06/2015
Dodder	Cuscuta epithymum				Oxon-Scarce, RL-Eng-post2001-VU, RL-GB-post2001-VU	2	24/05/2010
Field Scabious	Knautia arvensis				RL-Eng-post2001-NT	22	15/06/2023
Fine-leaved Sheep's-fescue	Festuca filiformis				Oxon-Scarce	1	29/05/2015
Fly Orchid	Ophrys insectifera			NERC-S41	Oxon-Rare, RL-Eng-post2001-VU, RL-GB-post2001-VU	1	24/05/2010
Grape-hyacinth	Muscari neglectum			NERC-S41	Oxon-Scarce, Status-NR	1	07/05/2020
Green Hound's-tongue	Cynoglossum germanicum		WACA-Sch8	NERC-S41	Oxon-Rare, Status-NR, RL-Eng-post2001-NT, RL-GB-post2001-NT	6	02/06/2019
Harebell	Campanula rotundifolia				RL-Eng-post2001-NT	6	11/07/2015

Heath Milkwort	Polygala serpyllifolia				Oxon-Scarce, RL-Eng-post2001-NT	1	02/06/2019
Heath Speedwell	Veronica officinalis				RL-Eng-post2001-NT	7	15/06/2023
Hoary Plantain	Plantago media				RL-Eng-post2001-NT	12	15/06/2023
Hound's-tongue	Cynoglossum officinale				RL-Eng-post2001-NT, RL-GB-post2001-NT	21	15/06/2023
Lady Orchid	Orchis purpurea				Oxon-Rare, Status-NS, RL-Eng-post2001-VU, RL-GB-post2001-VU	10	23/05/2010
Lesser Calamint	Clinopodium calamintha				Status-NS	1	01/08/2013
Marsh Ragwort	Jacobaea aquatica				RL-Eng-post2001-NT	9	30/07/2020
Marsh Speedwell	Veronica scutellata				RL-Eng-post2001-NT	2	10/05/2016
Marsh Valerian	Valeriana dioica				RL-Eng-post2001-NT	2	22/05/2016
Pale St John's-wort	Hypericum montanum				Oxon-Rare, RL-GB-post2001-NT	1	24/05/2010
Quaking-grass	Briza media				RL-Eng-post2001-NT	18	15/06/2023

Ragged-Robin	Silene flos-cuculi				RL-Eng-post2001-NT	8	01/07/2022
Sainfoin	Onobrychis viciifolia				RL-Eng-post2001-VU, RL-GB-post2001-VU	3	26/07/2022
Sanicle	Sanicula europaea				RL-Eng-post2001-NT	2	12/06/2007
Treacle-mustard	Erysimum cheiranthoides				RL-Eng-post2001-NT	2	10/07/2016
Tubular Water-dropwort	Oenanthe fistulosa			NERC-S41	RL-Eng-post2001-VU, RL-GB-post2001-VU	6	01/07/2022
Velvet Bent	Agrostis canina				Oxon-Scarce	3	30/07/2020
White Helleborine	Cephalanthera damasonium			NERC-S41	RL-Eng-post2001-VU, RL-GB-post2001-VU	7	21/05/2019
Wild Cabbage	Brassica oleracea				Status-NS	1	26/07/2022
Wild Strawberry	Fragaria vesca				RL-Eng-post2001-NT	12	26/07/2022
Wood-sorrel	Oxalis acetosella				RL-Eng-post2001-NT	2	24/05/2010
Invertebrates - Alderflies							
Invertebrates - Ants, Bees, Sawflies & Wasps							

Large Yellow-face Bee	Hylaeus signatus				Notable-B	3	28/06/2011
Red-girdled Mining Bee	Andrena labiata				Notable-A	1	29/06/2011
Red-tailed Mason Bee	Osmia bicolor				Notable-B	1	28/03/2012
Invertebrates - Beetles							
A Beetle	Riolus subviolaceus				Status-NS	22	06/09/2013
A Beetle	Riolus cupreus				Status-NS	7	24/11/2010
A Beetle	Deronectes latus				Status-NS	1	24/05/2006
Adonis' Ladybird	Hippodamia variegata				Notable-B	1	19/09/2017
Cramp-Ball Fungus Weevil	Platyrhinus resinosus				Notable-B	1	03/04/2018
Stag Beetle	Lucanus cervus	HabDir-A2np	WACA-Sch5-s9.5a	NERC-S41		157	03/07/2023
Invertebrates - Butterflies							

Adonis Blue	Polyommatus bellargus		WACA-Sch5-s9.5a		RL-GB-post2001-NT	11	19/05/2018
Chalk Hill Blue	Polyommatus coridon		WACA-Sch5-s9.5a		RL-GB-post2001-NT	40	30/08/2015
Dingy Skipper	Erynnis tages			NERC-S41	RL-GB-post2001-VU	10	28/04/2019
Grizzled Skipper	Pyrgus malvae			NERC-S41	RL-GB-post2001-VU	8	03/05/2015
Small Heath	Coenonympha pamphilus			NERC-S41	RL-GB-post2001-NT	31	30/07/2020
Small Heath	Coenonympha pamphilus pamphilus			NERC-S41	RL-GB-post2001-NT	2	06/07/2021
White-letter Hairstreak	Satyrium w-album		WACA-Sch5-s9.5a	NERC-S41	RL-GB-post2001-EN	3	18/06/2018
Invertebrates - Dragonflies & Damselflies							
Common Club-tail	Gomphus vulgatissimus				RL-GB-post2001-NT	16	26/04/2020
Common Darter	Sympetrum striolatum				RL-GB-post2001-DD	10	11/09/2016
Invertebrates - Mayflies							

A Mayfly	Ephemera lineata				RL-GB-post2001-VU	12	25/06/2022
Invertebrates - Molluscs							
Depressed River Mussel	Pseudanodonta complanata			NERC-S41	RL-Global-post2001-VU	4	01/03/2012
Fine-lined Pea Mussel	Odhneripisidium tenuilineatum			NERC-S41		9	24/11/2010
Marsh Pond Snail	Stagnicola palustris/fuscus/corvus				RL-GB-post2001-DD	1	24/05/2006
Thames Ramshorn	Gyraulus (Gyraulus) acronicus			NERC-S41	RL-GB-post2001-VU	11	07/05/2013
Invertebrates - Moths							
A Moth	Mecyna flavalis subsp. flaviculalis				RL-GB-pre94-VU	1	04/08/2015
August Thorn	Ennomos quercinaria			NERC-S41		33	19/07/2021
Balsam Carpet	Xanthorhoe biriviata				RL-GB-pre94-R	266	26/07/2021
Beaded Chestnut	Agrochola lychnidis			NERC-S41		28	15/11/2021

Blood-vein	Timandra comae			NERC-S41		190	17/06/2023
Brindled Beauty	Lycia hirtaria			NERC-S41		39	10/05/2021
Brown-spot Pinion	Anchoscelis litura			NERC-S41		6	21/10/2019
Buff Ermine	Spilosoma lutea			NERC-S41		334	17/06/2023
Bulrush Veneer	Calamotropha paludella				Notable-B	6	27/07/2021
Centre-barred Sallow	Atethmia centrago			NERC-S41		26	17/09/2020
Chalk Carpet	Scotopteryx bipunctaria			NERC-S41		2	15/08/2015
Cinnabar	Tyria jacobaeae			NERC-S41		71	17/06/2023
Crescent	Helotropha leucostigma leucostigma			NERC-S41		8	01/09/2013

Dark-barred Twin-spot Carpet	Xanthorhoe ferrugata			NERC-S41		52	22/07/2020
Deep-brown Dart	Aporophyla lutulenta			NERC-S41		9	07/10/2021
Dot Moth	Melanchra persicariae			NERC-S41		3	06/07/2019
Dotted Ermel	Ethmia dodecea				Notable-B	17	05/07/2021
Dusky Brocade	Apamea remissa			NERC-S41		1	06/07/2019
Dusky Thorn	Ennomos fuscantaria			NERC-S41		38	23/08/2021
Dusky-lemon Sallow	Cirrhia gilvago			NERC-S41		1	23/10/2014
Ear Moth	Amphipoea oculea			NERC-S41		2	26/07/2020
Feathered Gothic	Tholera decimalis			NERC-S41		46	13/09/2021
Flounced Chestnut	Anchoscelis helvola			NERC-S41		1	05/10/2014

Ghost Moth	Hepialus humuli			NERC-S41		42	17/06/2023
Giant Water-veneer	Schoenobius gigantella				Notable-B	1	10/07/2021
Green-brindled Crescent	Allophyes oxyacanthae			NERC-S41		30	29/10/2021
Haworth's Minor	Celaena haworthii			NERC-S41		1	30/08/2014
Hedge Rustic	Tholera cespitis			NERC-S41		1	10/09/2013
Knot Grass	Acronicta rumicis			NERC-S41		8	10/05/2021
Large Nutmeg	Apamea anceps			NERC-S41		4	17/06/2023
Large Wainscot	Rhizedra lutosa			NERC-S41		74	15/11/2021
Latticed Heath	Chiasmia clathrata			NERC-S41		1	29/05/2015

Minor Shoulder-knot	Brachylomia viminalis			NERC-S41		8	06/07/2019
Mottled Rustic	Caradrina morpheus			NERC-S41		96	17/06/2023
Mouse Moth	Amphipyra tragopoginis			NERC-S41		1	14/09/2019
Oak Hook-tip	Watsonalla binaria			NERC-S41		3	01/08/2014
Oblique Carpet	Orthonama vittata			NERC-S41		1	31/08/2014
Powdered Quaker	Orthosia gracilis			NERC-S41		17	19/04/2021
Pretty Chalk Carpet	Melanthia procellata			NERC-S41		59	24/08/2020
Rosy Minor	Litoligia literosa			NERC-S41		1	30/07/2010
Rosy Rustic	Hydraecia micacea			NERC-S41		24	12/10/2020

Rosy-striped Knot-horn	Oncocera semirubella				Notable-B	15	14/09/2021
Rustic	Hoplodrina blanda			NERC-S41		37	06/07/2019
Sallow	Cirrhia icteritia			NERC-S41		42	09/11/2020
September Thorn	Ennomos erosaria			NERC-S41		35	09/08/2021
Shaded Broad-bar	Scotopteryx chenopodiata			NERC-S41		15	31/07/2020
Shoulder-striped Wainscot	Leucania comma			NERC-S41		20	17/06/2023
Silky Wave	Idaea dilutaria			NERC-S41	RL-GB-pre94-R	2	13/07/2021
Small Emerald	Hemistola chrysoprasaria			NERC-S41		20	31/07/2020
Small Phoenix	Ecliptopera silaceata			NERC-S41		118	06/09/2021

Small Square-spot	Diarsia rubi			NERC-S41		51	17/06/2023
Sprawler	Asteroscopus sphinx			NERC-S41		76	15/11/2021
Striped Lychnis	Cucullia lychnitis			NERC-S41		1	17/06/2023
White Ermine	Spilosoma lubricipeda			NERC-S41		285	17/06/2023
Invertebrates - True Bugs							
A True Bug	Lygus pratensis				RL-GB-pre94-R	1	21/08/2018
Invertebrates - True Flies							
A True Fly	Gymnosoma rotundatum				RL-GB-pre94-R	1	06/08/2019
A True Fly	Ctenophora pectinicornis				Notable	1	19/05/2020
Mammals - Terrestrial (bats)							

Bat	Chiroptera	HabDir-A2np, HabDir-A4	HabReg-Sch2, WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41	RL-GB-post2001-CR, RL-GB-post2001-EN, RL-GB-post2001-VU, RL-GB-post2001-NT, RL-GB-post2001-DD	18	11/09/2016
Brown Long-eared Bat	Plecotus auritus	HabDir-A4	HabReg-Sch2, WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41		29	29/05/2020
Common Pipistrelle	Pipistrellus pipistrellus	HabDir-A4	HabReg-Sch2, WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b			54	29/05/2023
Daubenton's Bat	Myotis daubentonii	HabDir-A4	HabReg-Sch2, WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b			7	28/08/2014
Leisler's Bat	Nyctalus leisleri	HabDir-A4	HabReg-Sch2, WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b		RL-GB-post2001-NT	4	12/07/2016
Long-eared Bat species	Plecotus	HabDir-A4	HabReg-Sch2, WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41	RL-GB-post2001-EN	3	08/09/2015
Myotis Bat species	Myotis	HabDir-A2np, HabDir-A4	HabReg-Sch2, WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41	RL-GB-post2001-CR, RL-GB-post2001-DD	9	11/09/2016

Nathusius's Pipistrelle	Pipistrellus nathusii	HabDir-A4	HabReg-Sch2, WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b		RL-GB-post2001-NT	2	29/05/2020
Natterer's Bat	Myotis nattereri	HabDir-A4	HabReg-Sch2, WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b			3	09/07/2013
Noctule Bat	Nyctalus noctula	HabDir-A4	HabReg-Sch2, WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41		23	09/06/2020
Nyctalus Bat species	Nyctalus	HabDir-A4	HabReg-Sch2, WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41	RL-GB-post2001-NT	1	29/05/2012
Pipistrelle Bat species	Pipistrellus	HabDir-A4	HabReg-Sch2, WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41	RL-GB-post2001-NT	17	19/08/2016
Serotine	Eptesicus serotinus	HabDir-A4	HabReg-Sch2, WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b		RL-GB-post2001-VU	11	26/01/2021
Soprano Pipistrelle	Pipistrellus pygmaeus	HabDir-A4	HabReg-Sch2, WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41		48	14/05/2021

Western Barbastelle	Barbastella barbastellus	HabDir-A2np, HabDir-A4	HabReg-Sch2, WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41	RL-GB-post2001-VU	1	29/05/2020
Mammals - Terrestrial (excl. bats)							
Brown Hare	Lepus europaeus			NERC-S41		5	24/03/2021
Eurasian Badger	Meles meles		Badgers-1992			53	12/12/2023
Eurasian Otter	Lutra lutra	HabDir-A2np, HabDir-A4	HabReg-Sch2, WACA-Sch5-s9.4b/s9.4c/s9.5a	NERC-S41		14	10/06/2023
Hazel Dormouse	Muscardinus avellanarius	HabDir-A4	HabReg-Sch2, WACA-Sch5-s9.4b/s9.4c/s9.5a	NERC-S41	RL-GB-post2001-VU	8	26/10/2020
Polecat	Mustela putorius	HabDir-A5	HabReg-Sch4	NERC-S41		1	25/02/2012
West European Hedgehog	Erinaceus europaeus			NERC-S41	RL-GB-post2001-VU	17	24/09/2023
Reptiles							
Grass Snake	Natrix helvetica		WACA-Sch5-s9.1k/s9.5a	NERC-S41		21	24/10/2023

Slow-worm	Anguis fragilis		WACA-Sch5-s9.1k/s9.5a	NERC-S41		37	24/10/2023

APPENDIX C – INVASIVE NON-NATIVE SPECIES WITHIN 2KM OF THE SURVEY SITE

Common Name	Scientific Name	Status	No. of records	Latest record
Fish - Bony				
Rainbow Trout	Oncorhynchus mykiss	INNS-Other-2015	9	26/08/2020
Higher Plants - Flowering Plants				
Butterfly-bush	Buddleja davidii	INNS-Other-2015	5	25/02/2021
Floating Pennywort	Hydrocotyle ranunculoides	INNS-Priority-2015	1	07/08/2020
Himalayan Balsam	Impatiens glandulifera	INNS-Priority-2015	2	07/10/2022
Nuttall's Waterweed	Elodea nuttallii	INNS-Priority-2015	2	27/04/2018
Orange Balsam	Impatiens capensis	INNS-Other-2015	5	30/07/2020
Invertebrates - Crustaceans				
A Crustacean	Chelicorophium curvispinum	INNS-Rapid-2015	4	14/05/2021
A Crustacean	Crangonyx pseudogracilis/floridanus	INNS-Other-2015	6	14/05/2021

Demon Shrimp	Dikerogammarus haemobaphes	INNS-Rapid-2015	4	14/05/2021
Signal Crayfish	Pacifastacus leniusculus	INNS-Priority-2015	9	30/08/2024
Invertebrates - Molluscs				
Zebra Mussel	Dreissena polymorpha	INNS-Priority-2015	2	11/12/2015
Mammals - Terrestrial (excl. bats)				
American Mink	Neovison vison	INNS-Priority-2015	4	09/09/2022

APPENDIX D – BIODIVERSITY NET GAIN CONDITION ASSESSMENTS

Condition Sheet: GRASSLAND Habitat Type (low distinctiveness)													
UK Habitat Classification (UKHab) Habitat Type													
Grassland - Modified grassland													
Habitat Description													
ukhab – UK Habitat Classification													
On-site or off-site, site name and location		**Survey date and Surveyor name**											
		Survey reference (if relating to a wider survey)											
Limitations (if applicable)		**Habitat parcel reference**											
		g3											
		Grid reference											
Condition Assessment Criteria		**Criterion passed (Yes or No)**											**Notes (such as justification)**
A	There are 6-8 vascular plant species per m^2 present, including at least 2 forbs (these may include those listed in Footnote 1). **Note - this criterion is essential for achieving Moderate or Good condition.** Where the vascular plant species present are characteristic of medium, high or very high distinctiveness grassland, or there are 9 or more of these characteristic species per m^2 (excluding those listed in Footnote 1), please review the full UKHab description to assess whether the grassland should instead be classified as a higher distinctiveness grassland. Where a grassland is classed as medium, high, or very high distinctiveness, please use the relevant condition sheet.	n										
B	Sward height is varied (at least 20% of the sward is less than 7 cm and at least 20% is more than 7 cm) creating microclimates which provide opportunities for vertebrates and invertebrates to live and breed.	n										
C	Any scrub present accounts for less than 20% of the total grassland area. (Some scattered scrub such as bramble *Rubus fruticosus* agg. may be present). Note - patches of scrub with continuous (more than 90%) cover should be classified as the relevant scrub habitat type.	y										
D	Physical damage is evident in less than 5% of total grassland area. Examples of physical damage include excessive poaching, damage from machinery use or storage, erosion caused by high levels of access, or any other damaging management activities.	y										
E	Cover of bare ground is between 1% and 10%, including localised areas (for example, a concentration of rabbit warrens)[2].	y										
F	Cover of bracken *Pteridium aquilinum* is less than 20%.	y										
G	There is an absence of invasive non-native plant species[3] (as listed on Schedule 9 of WCA[4]).	y										
	Essential criterion achieved (Yes or No)	n										
	Number of criteria passed	5										

Condition Assessment Result (out of 7 criteria)	**Condition Assessment Score**	**Score Achieved ×/✓**									
Passes 6 or 7 criteria including passing essential criterion A	Good (3)										
Passes 4 or 5 criteria including passing essential criterion A	Moderate (2)										
Passes 3 or fewer criteria; OR Passes 4 - 6 criteria (excluding criterion A)	Poor (1)	1									

Suggested enhancement interventions to improve condition score

Footnotes

Footnote 1 – Creeping thistle *Cirsium arvense* , spear thistle *Cirsium vulgare* , curled dock *Rumex crispus* , broad-leaved dock *Rumex obtusifolius* , common nettle *Urtica dioica* , creeping buttercup *Ranunculus repens* , greater plantain *Plantago major* , white clover *Trifolium repens* and cow parsley *Anthriscus sylvestris* .

Footnote 2 – For example, this could include small, scattered areas of bare ground allowing establishment of new species, or localised patches where not exceeding 10% cover.

Footnote 3 – Assess this for each distinct habitat parcel. If the distribution of invasive non-native species varies across the habitat, split into parcels accordingly, applying a buffer zone around the invasive non-native species with a size relative to its risk of spread into adjacent habitat, using professional judgement.

Footnote 4 – Wildlife and Countryside Act 1981 (as amended).

Condition Sheet: GRASSLAND Habitat Type (medium, high and very high distinctiveness)													
UK Habitat Classification (UKHab) Habitat Types													
Grassland - Lowland calcareous grassland **Grassland - Lowland dry acid grassland** **Grassland - Lowland meadows** **Grassland - Other lowland acid grassland** **Grassland - Other neutral grassland** **Grassland - Tall herb communities (H6430)** [Not to be confused with the Tall forbs secondary code – see UKHab guidance for details.] **Grassland - Upland acid grassland** **Grassland - Upland calcareous grassland** **Grassland - Upland hay meadows** **Sparsely vegetated land - Calaminarian grassland**													
Habitat Description													
ukhab – UK Habitat Classification													
On-site or off-site, site name and location		**Survey date and Surveyor name**											
		Survey reference (if relating to a wider survey)											
Limitations (if applicable)		**Habitat parcel reference**											
		g1	g2										
Condition Assessment Criteria		**Grid reference**											
		Criterion passed (Yes or No)											**Notes (such as justification)**
A	The parcel represents a good example of its habitat type, with a consistently high proportion of characteristic indicator species present relevant to the specific habitat type (and relative to Footnote 3 suboptimal species which may be listed in the UKHab description).[1] **Note - this criterion is essential for achieving Moderate or Good condition for non-acid grassland types only.**	y	y										
B	Sward height is varied (at least 20% of the sward is less than 7 cm and at least 20% is more than 7 cm) creating microclimates which provide opportunities for insects, birds and small mammals to live and breed.	y	n										
C	Cover of bare ground is between 1% and 5%, including localised areas, for example, rabbit warrens[2].	y	y										
D	Cover of bracken *Pteridium aquilinum* is less than 20% and cover of scrub (including bramble *Rubus fruticosus* agg.) is less than 5%.	y	y										
E	Combined cover of species indicative of suboptimal condition[3] and physical damage (such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging management activities) accounts for less than 5% of total area. If any invasive non-native plant species[4] (as listed on Schedule 9 of WCA[5]) are present, this criterion is automatically failed.	y	y										
Additional Criterion - must be assessed for all non-acid grassland types													
F	There are 10 or more vascular plant species per m^2 present, including forbs that are characteristic of the habitat type (species referenced in Footnote 3 and 5 cannot contribute towards this count). **Note - this criterion is essential for achieving Good condition for non-acid grassland types only.**	n	n										
Essential criterion for Good condition achieved (for non-acid grassland) (Yes or No)		n	n										
Number of criteria passed		5	4										
Condition Assessment Result	**Condition Assessment Score**	**Score Achieved ×/✓**											
Acid grassland types (Result out of 5 criteria)													
Passes 5 criteria	Good (3)												
Passes 3 or 4 criteria	Moderate (2)												
Passes 2 or fewer criteria	Poor (1)												
Non-acid grassland types (Result out of 6 criteria)													
Passes 5 or 6 criteria, including essential criterion A and additional criterion F.	Good (3)												
Passes 3 - 5 criteria, including essential criterion A.	Moderate (2)	2	2										
Passes 2 or fewer criteria; OR Passes 3 or 4 criteria excluding criterion A and F.	Poor (1)												

Non-acid grassland types (Result out of 6 criteria)												
Passes 5 or 6 criteria, including essential criterion A and additional criterion F.	Good (3)											
Passes 3 - 5 criteria, including essential criterion A.	Moderate (2)	2	2									
Passes 2 or fewer criteria; OR Passes 3 or 4 criteria excluding criterion A and F.	Poor (1)											

Suggested enhancement interventions to improve condition score

Notes

Footnote 1 - Professional judgement should be used alongside the UKHab description.

Footnote 2 – For example, this could include small, scattered areas of bare ground allowing for plant colonisation, or localised patches not exceeding 5% cover.

Footnote 3 - Species indicative of suboptimal condition for this habitat type include: creeping thistle *Cirsium arvense* , spear thistle *Cirsium vulgare* , curled dock *Rumex crispus* , broad-leaved dock *Rumex obtusifolius* , common nettle *Urtica dioica* , creeping buttercup *Ranunculus repens* , greater plantain *Plantago major* , white clover *Trifolium repens* and cow parsley *Anthriscus sylvestris* . There may be additional relevant species local to the region and or site.

Footnote 4 – Assess this for each distinct habitat parcel. If the distribution of invasive non-native species varies across the habitat, split into parcels accordingly, applying a buffer zone around the invasive non-native species with a size relative to its risk of spread into adjacent habitat, by applying professional judgement.

Footnote 5 – Wildlife and Countryside Act 1981 (as amended).

Condition Sheet: SCRUB Habitat Type

Habitat Types

Heathland and shrub - Blackthorn scrub
Heathland and shrub - Gorse scrub
Heathland and shrub - Hawthorn scrub
Heathland and shrub - Hazel scrub
Heathland and shrub - Mixed scrub
Heathland and shrub - Dunes with sea buckthorn (H2160)
Heathland and shrub - Willow scrub

Habitat Description

For Dunes with sea buckthorn see:	Dunes with sea-buckthorn (Dunes with Hippophae rhamnoides) - Special Areas of Conservation (jncc.gov.uk)
For other scrub types see:	ukhab – UK Habitat Classification

On-site or off-site, site name and location		**Survey date and Surveyor name**	
		Survey reference (if relating to a wider survey)	
Limitations (if applicable)		**Habitat parcel reference**	s1
		Grid reference	

	Condition Assessment Criteria	**Criterion passed (Yes or No)**	**Notes (such as justification)**
A	The parcel represents a good example of its habitat type - the appearance and composition of the vegetation closely matches its UKHab description (where in its natural range).[1] - At least 80% of scrub is native, - There are at least three native woody species[2], - No single species comprises more than 75% of the cover (except hazel *Corylus avellana* , common juniper *Juniperus communis* , sea buckthorn *Hippophae rhamnoides* (only in its restricted native range), or box *Buxus sempervirens* , which can be up to 100% cover).	n	
B	Seedlings, saplings, young shrubs and mature (or ancient or veteran[3]) shrubs are all present.	n	
C	There is an absence of invasive non-native plant species[4] (as listed on Schedule 9 of WCA[5]) and species indicative of suboptimal condition[6] make up less than 5% of ground cover.	y	
D	The scrub has a well-developed edge with scattered scrub and tall grassland and or forbs present between the scrub and adjacent habitat.	y	
E	There are clearings, glades or rides present within the scrub, providing sheltered edges.	y	
	Number of criteria passed	4	

Condition Assessment Result (out of 5 criteria)	**Condition Assessment Score**	**Score Achieved ×/✓**
Passes 5 criteria	Good (3)	
Passes 3 or 4 criteria	Moderate (2)	2
Passes 2 or fewer criteria	Poor (1)	

Suggested enhancement interventions to improve condition score

Footnotes

Footnote 1 – Professional judgement should be used alongside the UKHab description.

Footnote 2 – Native woody species as defined and listed in the Hedgerow Survey Handbook: DEFRA (2007) *Hedgerow Survey Handbook: A standard procedure for local surveys in the UK*. 2nd ed. [online]. Defra, London. PB1195. Available from: Hedgerow Survey Handbook (publishing.service.gov.uk).

Footnote 3 – See gov.uk standing advice on ancient and veteran species. Available from:

Keepers of time: ancient and native woodland and trees policy in England (publishing.service.gov.uk) and
Ancient woodland, ancient trees and veteran trees: advice for making planning decisions - GOV.UK (www.gov.uk)

Footnote 4 – Assess this for each distinct habitat parcel. If the distribution of invasive non-native species varies across the habitat, split into parcels accordingly, applying a buffer zone around the invasive non-native species with a size relative to its risk of spread into adjacent habitat, using professional judgement.

Footnote 5 – Wildlife and Countryside Act 1981 (as amended).

Footnote 6 – Species indicative of suboptimal condition for this habitat type may include: non-native conifers, tree-of-heaven *Alianthus altissima* , holm oak *Quercus ilex* , European turkey oak *Quercus cerris* , cherry laurel *Prunus laurocerasus* , snowberry *Symphoricarpos* spp., shallon *Gaultheria shallon* , American skunk cabbage *Lysichiton americanus* , buddleia *Buddleja* spp., cotoneaster *Cotoneaster* spp., Spanish bluebell *Hyacinthoides hispanica* and hybrid bluebells *Hyacinthoides x massartiana* . There may be additional relevant species local to the region and or site.

Condition Sheet: WETLAND Habitat Type

Habitat Types

Grassland - Floodplain wetland mosaic and CFGM - See the Statutory Biodiversity Metric User Guide.
Wetland - Blanket bog
Wetland - Depression on peat substrates (H7150)
Wetland - Fens (upland and lowland)
Wetland - Lowland raised bog
Wetland - Oceanic valley mire [1] (D2.1)
Wetland - Purple moor grass and rush pastures
Wetland - Reedbeds
Wetland - Transition mires and quaking bogs (H7140)

Habitat Description

For Oceanic valley mires - see EUNIS

See the Statutory Biodiversity Metric User Guide for Floodplain wetland mosaic (FWM) and coastal and floodplain grazing marsh (CFGM). For CFGM also see the below:
Coastal and floodplain grazing marsh UK BAP Priority Habitat description
Priority Habitat Inventory (England) - data.gov.uk
All other wetland habitats - see UK Habitat Classification (UKHab):
UKHab

On-site or off-site, site name and location		**Survey date and Surveyor name**	
		Survey reference (if relating to a wider survey)	
Limitations (if applicable)		**Habitat parcel reference**	g1
		Grid reference	

	Condition Assessment Criteria	**Criterion passed (Yes or No)**	**Notes (such as justification)**
Core Criteria - must be assessed for **all wetland habitat types**:			
A	The water table is at, or near the surface throughout the year - this could be open water or saturation of soil at the surface. There is no artificial drainage, unless specifically to maintain water levels as specified above. **Note - this criterion is essential for achieving Good condition.**	y	
B	The parcel represents a good example of its specific habitat type - the appearance and composition of the vegetation closely matches its UKHab description, with vascular and non-vascular characteristic indicator species consistently present.[1]	y	
C	The water supplies (groundwater, surface water and or rainwater) to the wetland are of good water quality, with clear water (low turbidity) indicating no obvious signs of pollution.	n	
D	Cover of scrub and scattered trees are less than 10%.	y	
E	Cover of bare ground is less than 5%.	y	
F	There is an absence of invasive non-native plant species[2] (as listed on Schedule 9 of WCA[3]) and species indicative of suboptimal condition[4] make up less than 5% of ground cover.	n	
Additional Criterion - must be assessed for **Fen and Purple moor grass and rush pasture** habitats only:			
G	No more than 25% of the habitat area has a continuous cover of litter (such as dead vegetation) preventing regeneration.		
Additional Criterion - must be assessed for **Bog** habitats only:			
H	Sphagnum moss *Sphagnum* spp. and cottongrasses *Eriophorum* spp. are at least Frequent[5]. Cover of ericaceous dwarf shrubs[6] is less than 75%.		
Additional Criterion - must be assessed for **Reedbed** habitats only:			
I	The reedbed has a diverse structure with between 60% and 80% reeds *Phragmites australis* . Other areas may include open water (at least 10%), species-rich fen and or wet woodland.		
Additional Criterion - must be assessed for **Floodplain wetland mosaic and CFGM** only:			
J	All ditches recorded within the habitat achieve Good condition as assessed using the Ditch condition sheet.	n	
	Essential criterion achieved (required for Good condition) Yes or No:	n	
	Number of criteria passed	4	

Condition Assessment Result	Condition Assessment Score	Score Achieved ×/✓										
Results for habitats requiring assessment of 6 criteria (Depression on peat substrates (H7150) and Oceanic valley mire [1] (D2.1)):												
•Passes 5 or 6 core criteria, including criterion A.	Good (3)											
•Passes 3 or 4 core criteria; OR •Passes 5 core criteria but fails criterion A.	Moderate (2)											
•Passes 2 or fewer core criteria.	Poor (1)											
Results for habitats requiring assessment of 7 criteria - core criteria and additional criterion specified for habitat type - all habitat types except Depression on peat substrates (H7150) and Oceanic valley mire [1] (D2.1):												
•Passes 5 or 6 core criteria including criterion A; AND •Passes additional criterion G, H, I or J (choose the one specified for the habitat type).	Good (3)											
•Passes 4 or 5 of 7 criteria; OR •Passes 6 of 7 criteria but fails criterion A or additional criterion G, H, I or J (choose the one specified for the habitat type).	Moderate (2)	2										
•Passes 3 or fewer criteria.	Poor (1)											

Suggested enhancement interventions to improve condition score

Footnotes

Footnote 1 – Professional judgement should be used alongside the UKHab description.

Footnote 2 – Assess this for each distinct habitat parcel. If the distribution of invasive non-native species varies across the habitat, split into parcels accordingly, applying a buffer zone around the invasive non-native species with a size relative to its risk of spread into adjacent habitat, using professional judgement.

Footnote 3 – Wildlife and Countryside Act 1981 (as amended).

Footnote 4 – Species indicative of suboptimal condition for this habitat type include: creeping thistle *Cirsium arvense* , spear thistle *Cirsium vulgare* , common nettle *Urtica dioica* , docks *Rumex* spp., and common ragwort *Jacobaea vulgaris* . There may be additional relevant species local to the region and or site.

Footnote 5 – According to the relative abundance DAFOR scale – Dominant, Abundant, Frequent, Occasional or Rare.

Footnote 6 – Ericaceous dwarf shrubs include: crowberry *Empetrum nigrum* , cowberry *Vaccinium vitis-idaea* , bilberry *Vaccinium myrtillus* , cranberry *Vaccinium oxycoccos* , heather *Calluna vulgaris* , cross-leaved heath *Erica tetralix* , and bell heather *Erica cinerea* . There may be additional relevant species local to the region and or site.

Footnote 7 – For fens, specify what fen type is present using base-status and trophic status - alkaline, neutral, or acidic; eutrophic, mesotrophic or oligotrophic.

Condition Sheet: WOODLAND Habitat Type

UK Habitat Classification (UKHab) Habitat Types

Woodland and forest - Lowland beech and yew woodland
Woodland and forest - Lowland mixed deciduous woodland
Woodland and forest - Native pine woodlands
Woodland and forest - Other coniferous woodland
Woodland and forest - Other Scot's pine woodland
Woodland and forest - Other woodland; broadleaved
Woodland and forest - Other woodland; mixed
Woodland and forest - Upland birchwoods
Woodland and forest - Upland mixed ashwoods
Woodland and forest - Upland oakwood
Woodland and forest - Wet woodland

Habitat Description

ukhab – UK Habitat Classification

This condition sheet is based on the England Woodland Biodiversity Group (EWBG) Woodland Condition Survey Method, available here:
Woodland Wildlife Toolkit (sylva.org.uk)

IMPORTANT: This biodiversity metric woodland condition assessment must be used to assess woodland being input into the biodiversity metric. The outputs of this condition assessment are not equivalent to, nor are they comparable with the scores from the EWBG condition assessment, because the EWBG assessment has been adapted for the biodiversity metric, including the removal of EWBG Indicator 7 (Proportion of favourable land cover around woodland) and Indicator 14 (Size of woodland), and minor changes to other indicators.

On-site or off-site, site name and location		**Survey date and Surveyor name**		**Habitat parcel reference**											
				w1	w2	w3	w4	w5							
Limitations (if applicable)		**Survey reference (if relating to a wider survey)**		**Grid reference**											

Condition Assessment Criteria

	Indicator	**Good (3 points)**	**Moderate (2 points)**	**Poor (1 point)**	**Score per indicator**										**Notes (such as justification)**
A	**Age distribution of trees**	Three age-classes[1] present.	Two age-classes[1] present.	One age-class[1] present.	1	3	2	2	2						
B	**Wild, domestic and feral herbivore damage**	No significant browsing damage evident in woodland[2].	Evidence of significant browsing pressure is present in less than 40% of whole woodland[2].	Evidence of significant browsing pressure is present in 40% or more of whole woodland[2].	3	2	3	3	2						
C	**Invasive plant species**	No invasive species[3] present in woodland.	Rhododendron *Rhododendron ponticum* or cherry laurel *Prunus laurocerasus* not present, and other invasive species[3] <10% cover.	Rhododendron or cherry laurel present, or other invasive species[3] ≥10% cover.	3	2	2	2	3						
D	**Number of native tree species**	Five or more native tree or shrub species[4] found across woodland parcel.	Three to four native tree or shrub species[4] found across woodland parcel.	Two or less native tree or shrub species[4] across woodland parcel.	2	3	3	3	3						
E	**Cover of native tree and shrub species**	>80% of canopy trees and >80% of understory shrubs are native[5].	50 - 80% of canopy trees and 50 - 80% of understory shrubs are native[5].	<50% of canopy trees and <50% of understory shrubs are native[5].	3	3	2	2	3						
F	**Open space within woodland**	10 - 20% of woodland has areas of temporary open space[6]. Unless woodland is <10ha, in which case 0 - 20% temporary open space is permitted[7].	21 - 40% of woodland has areas of temporary open space[6].	<10% or >40% of woodland has areas of temporary open space[6]. But if woodland <10ha has <10% temporary open space, please see Good category[7].	3	3	3	3	3						
G	**Woodland regeneration**	All three classes present in woodland[8]; trees 4 - 7 cm Diameter at Breast Height (DBH), saplings and seedlings or advanced coppice regrowth.	One or two classes only present in woodland[8].	No classes or coppice regrowth present in woodland[8].	1	3	2	2	3						
H	**Tree health**	Tree mortality 10% or less, no pests or diseases and no crown dieback[9].	11% to 25% tree mortality and or crown dieback or low-risk pest or disease present[9].	Greater than 25% tree mortality and or any high-risk pest or disease present[9].	3	3	3	3	2						
I	**Vegetation and ground flora**	Recognisable NVC plant community[10] at ground layer present, strongly characterised by ancient woodland flora specialists.	Recognisable woodland NVC plant community[10] at ground layer present.	No recognisable woodland NVC plant community[10] at ground layer present.	1	2	1	1	2						
J	**Woodland vertical structure**	Three or more storeys across all survey plots, or a complex woodland[11].	Two storeys across all survey plots[11].	One or less storey across all survey plots[11].	2	3	2	2	2						
K	**Veteran trees**	Two or more veteran trees[12] per hectare.	One veteran tree[12] per hectare.	No veteran trees[12] present in woodland.	1	1	1	1	1						

L	**Amount of deadwood**	50% of all survey plots within the woodland parcel have deadwood, such as standing and fallen deadwood, large dead branches and or stems, branch stubs and stumps, or an abundance of small cavities[13].	Between 25% and 50% of all survey plots within the woodland parcel have deadwood, such as standing and fallen deadwood, large dead branches and or stems, stubs and stumps, or an abundance of small cavities[13].	Less than 25% of all survey plots within the woodland parcel have deadwood, such as standing and fallen deadwood, large dead branches and or stems, stubs and stumps, or an abundance of small cavities[13].	1	3	1	1	2							
M	**Woodland disturbance**	No nutrient enrichment or damaged ground evident[14].	Less than 1 hectare in total of nutrient enrichment across woodland area, and or less than 20% of woodland area has damaged ground[14].	1 hectare or more of nutrient enrichment, and or 20% or more of woodland area has damaged ground[14].	1	1	1	2	1							
				Total Score (out of a possible 39)	25	32	26	27	29							

Condition Assessment Result	**Condition Assessment Score**	**Result Achieved**										
Total score >32 (33 to 39)	Good (3)											
Total score 26 to 32	Moderate (2)		2			2						
Total score <26 (13 to 25)	Poor (1)	1		1	1							

Suggested enhancement interventions to improve condition score

Footnotes

Footnotes below refer to the EWBG woodland condition assessment details: EWBG (No date). *Assessing your Woodland's Condition* [online]. Available from: Woodland Wildlife Toolkit (sylva.org.uk)

The woodland condition assessment survey methodology is outlined in the EWBG toolkit. However the criteria on this sheet are those specific to the Statutory Biodiversity Metric and must be used when assessing woodland condition.

Footnote 1 - See EWBG method INDICATOR 1 for more information. If tree species is not a birch *Betula* sp., cherry *Prunus* sp. or *Sorbus* sp.: 0 - 20 years (Young); 21 - 150 years (Intermediate); and >150 years (Old). For birch, cherry or *Sorbus* species; 0 - 20 years = Young; 21 - 60 years =Intermediate; >60 years = Old. A recognisable age-class should be a consistent recognisable layer across the woodland or stand being assessed. Presence of a few saplings would not indicate that the woodland has an 'age-class' of young trees.

Footnote 2 - See EWBG method INDICATOR 2 for more information. Browsing pressure is considered to be significant where >20% of vegetation visible within each survey plot shows damage from any type of browsing pressure listed.

Footnote 3 - See EWBG method INDICATOR 3 for more information. Assess this for each distinct habitat parcel. If the distribution of invasive non-native species varies across the habitat, split into parcels accordingly.

Check for the presence of all plant species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended), particularly the following invasive non-native species: American skunk cabbage *Lysichiton americanus* ; Himalayan balsam *Impatiens glandulifera* ; Japanese knotweed *Reynoutria japonica* ; cherry laurel *Prunus laurocerasus* ; shallon *Gaultheria shallon* ; snowberry *Symphoricarpos albus* ; variegated yellow archangel *Lamiastrum galeobdolon subsp. argentatum* ; rhododendron *Rhododendron ponticum* ; and tree-of-heaven *Alianthus altissima* .

Footnote 4 - See EWBG method INDICATOR 4 and Table 2 for more information. The number of different native tree or shrub species including young trees and shrubs. A list of commonly found native tree and shrub species is provided in Table 2. Not all species listed are native to all parts of the UK. Note a list of commonly found non-native tree species are also included and should be recorded if present.

Footnote 5 - See EWBG method INDICATOR 5 and for more information. The abundance of native tree species in upper (>5 m) and understorey (up to 5 m) layers including young trees and shrubs.

Footnote 6 - See EWBG method INDICATOR 6 for more information. Open space within woodland in this context is temporary open space in which trees can be expected to regenerate (for example, glades, rides, footpaths, areas of clear-fell). This differs from permanent open space where tree regeneration is not possible or desirable (for example, tarmac, buildings, rivers). Area is at least 10 m wide with less than 20% covered by shrubs or trees.

Footnote 7 – Given the increased ratio of edge habitat to woodland where the woodland is <10ha.

Footnote 8 - See EWBG method INDICATOR 8 for more information. This indicator measures regeneration potential of the woodland by considering three classes: seedlings; saplings; and young trees of 4-7 cm DBH. All three classes would fall in the 'young' category of the 'age distribution of trees' indicator, but the regeneration indicator gathers additional information by considering regeneration potential - if seedlings, saplings and young trees are all present that means natural regeneration processes are happening.

Footnote 9 - See EWBG method INDICATOR 9 for more information and Table 3 for a list of diseases and pests and their risk level.

Footnote 10 - See EWBG method INDICATOR 10 directing to NVC key for more information. The 'UKHab to NVC translation table' in the UK Habitat Classification resources may also be useful to assess this.

Footnote 11 – This criterion looks at structural diversity and is useful to understand in conjunction with the age of trees in a woodland. Vertical structure is defined as the number of canopy storeys present. Possible storey values are: 1) Upper; 2) Complex: recorded when the stand is composed of multiple tree heights that cannot easily be stratified into broad height bands (such as upper, middle or lower); 3) Middle; 4) Lower; and 5) Shrub layer. There might be no storeys where the woodland has been felled. See EWBG INDICATOR 11 for more information.

Footnote 12 - See gov.uk standing advice on ancient and veteran trees. Available from:

Keepers of time: ancient and native woodland and trees policy in England (publishing.service.gov.uk)
and:
Ancient woodland, ancient trees and veteran trees: advice for making planning decisions - GOV.UK (www.gov.uk)
EWBG INDICATOR 12 is the relevant indicator.

Footnote 13 – See EWBG method INDICATOR 13 for more information. This includes logs, large dead branches on the forest floor and stumps (<1 m tall) >20 cm diameter at narrowest point and >50 cm long. Also includes standing dead trees (>1 m tall) and also deadwood on standing live trees. Diameter is measured at the narrowest point on the stem. Minimum diameter of 20 cm.

Footnote 14 - See EWBG method INDICATOR 15 for more information. Examples of disturbance are: significant nutrient enrichment; soil compaction from trampling, machinery, animal poaching or litter.

Condition Sheet: DITCH Habitat Type													
Habitat Type													
Watercourses - Ditches													
Habitat Description													
See the Statutory Biodiversity Metric User Guide.													
On-site or off-site, site name and location			**Survey date and Surveyor name**										
Limitations (if applicable)			**Survey reference (if relating to a wider survey)**										
			Habitat parcel reference										
			d1										
			Grid reference										
Condition Assessment Criteria			**Criterion passed (Yes or No)**										**Notes (such as justification)**
A	The ditch is of good water quality, with clear water (low turbidity) indicating no obvious signs of pollution.		y										
B	A range of emergent, submerged and floating-leaved plants are present. As a guide >10 species of emergent, floating or submerged plants present in a 20 m ditch length.		n										
C	There is less than 10% cover of filamentous algae and or duckweed *Lemna* spp. (these are signs of eutrophication).		y										
D	A fringe of aquatic marginal vegetation is present along more than 75% of the ditch.		n										
E	Physical damage is evident along less than 5% of the ditch, with examples of damage including: excessive poaching, damage from machinery use or storage, or any other damaging management activities.		y										
F	Sufficient water levels are maintained - as a guide a minimum summer depth of approximately 50 cm in minor ditches and 1 m in main drains.		y										
G	Less than 10% of the ditch is heavily shaded.		n										
H	There is an absence of non-native plant and animal species[1].		y										
		Number of criteria passed	5										
Condition Assessment Result (out of 8 criteria)		**Condition Assessment Score**	**Score Achieved ×/✓**										
Passes 8 criteria		Good (3)											
Passes 6 or 7 criteria		Moderate (2)											
Passes 5 or fewer criteria		Poor (1)	1										

Condition sheet: HEDGEROW Habitat Types

Habitat Type

Native hedgerow
Native hedgerow - associated with bank or ditch
Native hedgerow with trees
Native hedgerow with trees - associated with bank or ditch
Species-rich native hedgerow
Species-rich native hedgerow - associated with bank or ditch
Species-rich native hedgerow with trees
Species-rich native hedgerow with trees - associated with bank or ditch

Habitat Description

ukhab – UK Habitat Classification

On-site or off-site, site name and location		**Survey date and Surveyor name**	
Limitations (if applicable)		**Survey reference (if relating to a wider survey)**	

Condition Assessment Details

A series of ten attributes, representing key physical characteristics are used for this assessment. Each attribute is assigned to one of five functional groups (A – E) and the condition of a hedgerow is assessed according to the number of attributes from these functional groups which pass or fail the 'favourable condition' criteria.

This assessment is based on the Hedgerow Survey Handbook[1] and Favourable Conservation Status document[2]. For further clarification please refer to the Hedgerow Survey Handbook.

Best practice would be to record the species, age, spacing and other key information about all trees present along a hedgerow within the 'Habitat Description' box, as well as other key features of the hedgerow.

Hedgerow favourable condition attributes

Attributes and functional groupings (A, B, C, D and E)		**Criteria - the minimum requirements for 'favourable condition'**	**Criteria description**	**Habitat parcel reference**									
				h1	h2								
				Grid reference									
Core groups - applicable to all hedgerow types				**Criterion passed (Yes or No)**									**Notes (such as justification)**
A1.	Height	>1.5 m average along length	The average height of woody growth estimated from base of stem to the top of the shoots, excluding any bank beneath the hedgerow, any gaps or isolated trees. Newly laid or coppiced hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practice). A newly planted hedgerow does not pass this criterion (unless it is >1.5 m height).	y	y								
A2.	Width	>1.5 m average along length	The average width of woody growth estimated at the widest point of the canopy, excluding gaps and isolated trees. Outgrowths (such as blackthorn *Prunus spinosa* suckers) are only included in the width estimate when they are >0.5 m in height. Laid, coppiced, cut and newly planted hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practice).	y	n								
B1.	Gap - hedge base	Gap between ground and base of canopy <0.5 m for >90% of length	This is the vertical 'gappiness' of the woody component of the hedgerow, and its distance from the ground to the lowest leafy growth. Certain exceptions to this criterion are acceptable (see page 65 of the Hedgerow Survey Handbook).	y	y								
B2.	Gap - hedge canopy continuity	Gaps make up <10% of total length; and No canopy gaps >5 m	This is the horizontal 'gappiness' of the woody component of the hedgerow. Gaps are complete breaks in the woody canopy (no matter how small). Access points and gates contribute to the overall 'gappiness' but are not subject to the >5 m criterion (as this is the typical size of a gate).	y	y								

C1.	Undisturbed ground and perennial vegetation	>1 m width of undisturbed ground with perennial herbaceous vegetation for >90% of length: · Measured from outer edge of hedgerow; and · Is present on one side of the hedgerow (at least).	This is the level of disturbance (excluding wildlife disturbance) at the base of the hedgerow. Undisturbed ground is present for at least 90% of the hedgerow length, greater than 1 m in width and must be present along at least one side of the hedgerow. This criterion recognises the value of the hedgerow base as a boundary habitat with the capacity to support a wide range of species. Cultivation, heavily trodden footpaths, poached ground etc. can limit available habitat niches.	n	n									
C2.	Nutrient-enriched perennial vegetation	Plant species indicative of nutrient enrichment of soils dominate <20% cover of the area of undisturbed ground.	The indicator species used are nettles *Urtica* spp., cleavers *Galium aparine* and docks *Rumex* spp. Their presence, either singly or together, does not exceed the 20% cover threshold.	y	y									
D1.	Invasive and neophyte species	>90% of the hedgerow and undisturbed ground is free of invasive non-native plant species (including those listed on Schedule 9 of WCA[3]) and recently introduced species.	Recently introduced species refer to plants that have naturalised in the UK since AD 1500 (neophytes). Archaeophytes count as natives. For information on archaeophytes and neophytes see the JNCC website[4], as well as the BSBI website[5] where the 'Online Atlas of the British and Irish Flora'[6] contains an up-to-date list of the status of species. For information on invasive non-native species see the GB Non-Native Secretariat website[7].	n	y									
D2.	Current damage	>90% of the hedgerow or undisturbed ground is free of damage caused by human activities.	This criterion addresses damaging activities that may have led to or lead to deterioration in other attributes. This could include evidence of pollution, piles of manure or rubble, or inappropriate management practices (for example, excessive hedgerow cutting).	n	n									
Additional group - applicable to hedgerows with trees only														
E1.	Tree class	There is more than one age-class (or morphology) of tree present (for example: young, mature, veteran and or ancient[8]), and there is on average at least one mature, ancient or veteran tree present per 20 - 50m of hedgerow.	This criterion addresses if there are a range of age-classes or morphologies which allow for replacement of trees and provide opportunities for different species.		n									
E2.	Tree health	At least 95% of hedgerow trees are in a healthy condition (excluding veteran features valuable for wildlife). There is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.	This criterion identifies if the trees are subject to damage which compromises the survival and health of the individual specimens.		y									

The hedgerow condition assessment generates a weighting (score) ranging from 1 - 3, which is used within the Statutory Biodiversity Metric. The scores for each are set out in the tables below.

Condition categories for hedgerows without trees		
Category	**Category Requirements**	**Metric Score**
Good	No more than 2 failures in total; **AND** No more than 1 failure in any functional group.	3
Moderate	No more than 4 failures in total; **AND** Does not fail both attributes in more than one functional group (for example, fails attributes A1, A2, B1 and C2 = Moderate condition).	2
Poor	Fails a total of more than 4 attributes; **OR** Fails both attributes in more than one functional group (for example, fails attributes A1, A2, B1 and B2 = Poor condition).	1
	Score achieved:	h1:2

Condition categories for hedgerows with trees		
Category	**Category Requirements**	**Metric score**
Good	No more than 2 failures in total; **AND** No more than 1 failure in any functional group.	3
Moderate	No more than 5 failures in total; **AND** Does not fail both attributes in more than one functional group (for example, fails attributes A1, A2, B1, C2 and E1 = Moderate condition).	2
Poor	Fails a total of more than 5 attributes; **OR** Fails both attributes in more than one functional group (for example, fails attributes A1, A2, B1 and B2 = Poor condition).	1
	Score achieved:	h2:2

APPENDIX E – HIGHER PLANT SPECIES LIST

Common name	Scientific name
Alder	Alnus glutinosa
Angelica	Angelica sylvestris
Annual Meadow-grass	Poa annua
Ash	Fraxinus excelsior
Bird's-foot Trefoil	Lotus corniculatus
Bitter Nightshade	Solanum dulcamara
Black Knapweed	Centaurea nigra
Black Poplar	Populus nigra
Blackthorn	Prunus spinosa
Bramble	Rubus fruticosus agg.
Broad-leaved Dock	Rumex obtusifolius
Broad-leaved Plantain	Plantago major
Buddleja	Buddleja davidii
Bush vetch	Vicia sepium
Carex sp. (likely riparia)	Carex sp.
Cat's Ear	Hypochaeris radicata
Cherry Plum	Prunus cerasifera
Cock's-foot	Dactylis glomerata
Comfrey	Symphytum sp.
Crack Willow	Salix fragilis

Creeping Buttercup	Ranunculus repens
Creeping Thistle	Cirsium arvensis
Daisy	Bellis perennis
Dandelion	Taraxacum officinalis agg.
Dog rose	Rosa canina agg.
Elder	Sambucus nigra
Elm sp.	Ulmus sp.
European Gorse	Ulex europaeus
Field Maple	Acer campestre
Great Willowherb	Epilobium hirsutum
Greater Burdock	Arctium lappa
Greater Plantain	Plantago major
Guelder Rose	Viburnum opulus
Hard Rush	Juncus inflexus
Hawthorn	Crataegus monogyna
Hazel	Corylus avellana
Hedge Bindweed	Calystegia sepium
Himalayan Balsam	Impatiens glandulifera
Hogweed	Heracleum sphondylium
Horse Chestnut	Aesculus hippocastanum
Hybrid Lime	Tilia x europaeus
Italian Alder	Alnus cordata

Ivy	Hedera helix
Meadow Buttercup	Ranunculus acris
Meadow Cranesbill	Geranium pratense
Meadow Vetchling	Lathyrus pratensis
Meadowsweet	Filipendula ulmaria
Michaelmas Daisy	Symphyotrichum sp.
Mistletoe	Viscum album
Nettle	Urtica dioica
Old-man's Beard	Clematis vitalba
Perennial Rye-grass	Lolium perenne
Privet	Ligustrum sp.
Red Clover	Trifolium pratense
Reed Canary Grass	Phalaris arundinacea
Ribwort Plantain	Plantago lanceolata
Sallow	Salix cinerea
Silverweed	Potentilla reptans
Small-leaved Elm	Ulmus minor
Small-leaved Lime	Tilia cordata
Sneezewort	Achillea ptarmica
Sycamore	Acer pseudoplatanus
Tall Fescue	Schedonorus arundinaceus
Teasel	Dipsacus fullonum

Tufted Hair-grass	Deschampsia cespitosa
Upright Brome	Bromopsis erecta
Water Figwort	Scrophularia auriculata
White Clover	Trifolium repens
White Willow	Salix alba
Wilson's honeysuckle	Lonincera nitida
Yarrow	Achillia millefolium