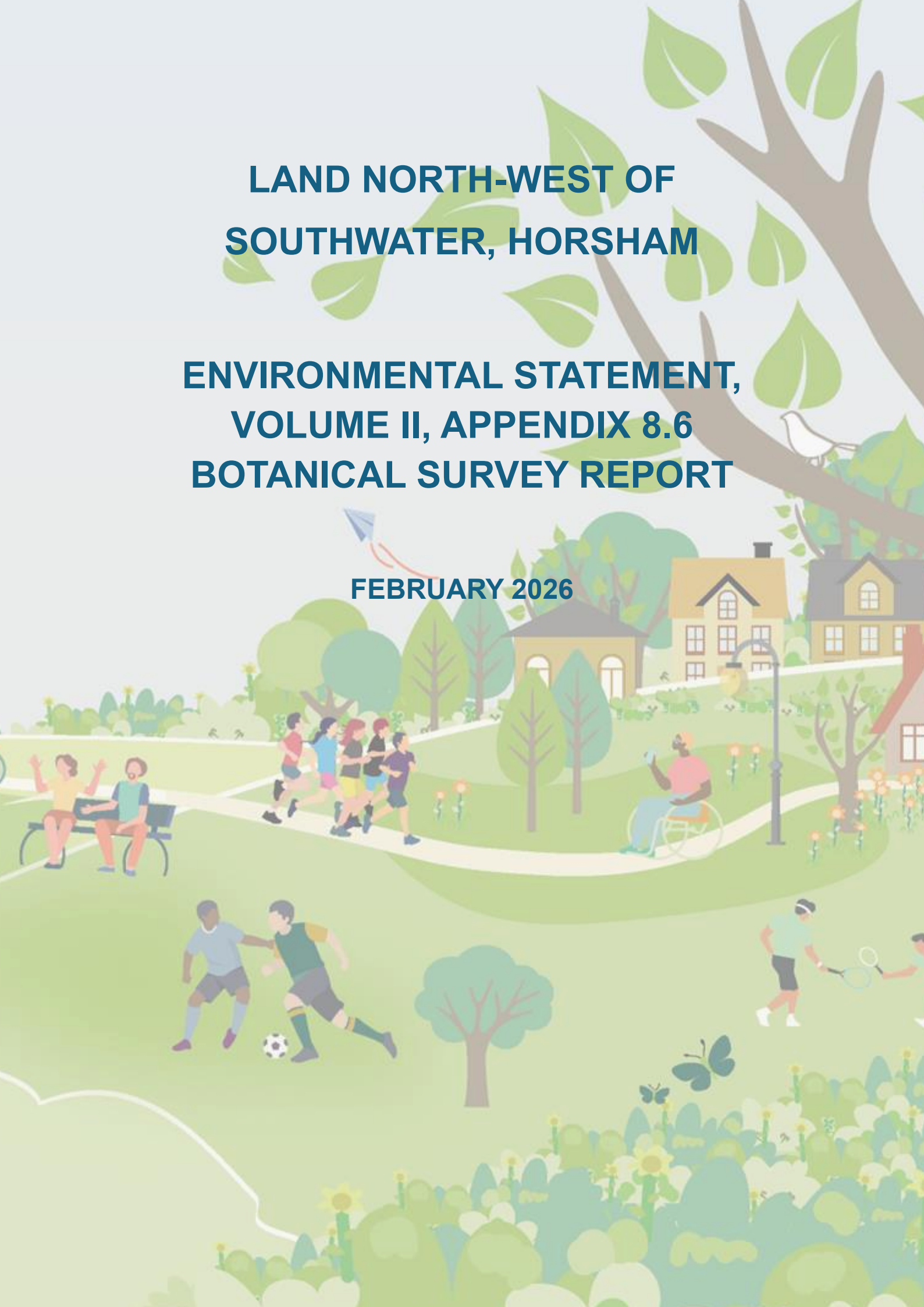
LAND NORTH-WEST OF SOUTHWATER, HORSHAM

ENVIRONMENTAL STATEMENT, VOLUME II, APPENDIX 8.6 BOTANICAL SURVEY REPORT

FEBRUARY 2026



Landscape Architecture
Masterplanning
Ecology

hda

LAND NORTH WEST OF SOUTHWATER

BOTANICAL SURVEY REPORT

Prepared for Berkeley Homes (Southern) Ltd

by

Hankinson Duckett Associates

HDA ref: 2090.78

July 2022

hankinson duckett associates
t 01491 838175 f 01491 838997 e consult@hda-enviro.co.uk w www.hda-enviro.co.uk
The Stables, Howbery Park, Benson Lane, Wallingford, Oxfordshire, OX10 8BA

Hankinson Duckett Associates Limited Registered in England & Wales 3462810 Registered Office: The Stables, Howbery Park, Benson Lane, Wallingford, OX10 8BA

CONTENTS **Page**

APPENDICES

1 INTRODUCTION

1.1 Site location and summary description

1.1.1 This report describes a Phase 2 botanical survey of woodland and grassland habitats of highest interest associated with approximately 128ha of land west of Southwater, West Sussex, hereinafter referred to as 'the site'. The site centre is located by National Grid Reference TQ154274. The study was commissioned by Berkeley Homes (Southern) Ltd in July 2020.

1.1.2 The site is split into a main site and a smaller area. The main site lies on the western edge of the village of Southwater and comprises a series of arable fields, semi-improved grassland fields, and improved grassland fields bordered by hedgerows, treelines, and fence lines. Other habitats present include areas of broadleaved woodland, mixed woodland, and tall ruderal vegetation. In addition, Marlpost Gill flows in a southerly direction through the west of this area and a second stream flows east to west through the north. The main site is bordered to the west by Two Mile Ash road and associated residential properties, beyond which are arable fields; to the north by the A24, industrial units, and agricultural land; to the south by Kirsty's Wood, residential properties and grassland fields; and to the east by Worthing Road, beyond which is the settlement of Southwater.

1.1.3 The smaller area of the site measures approximately 1.35ha in size and is located approximately 800m to the north-west of the main site near Christ's Hospital railway station. This area comprises part of a grassland field and is bordered to the north by woodland; to the east by grassland fields; to the west by a public right of way and access road with residential properties and Christ's Hospital station car park beyond; and to the south by residential properties.

1.1.4 The location and boundary of the main site are shown in *Appendix A*. A more detailed description of the habitats present and plans showing the distribution of habitats across both parts of the site are given in the *Ecological Appraisal* (HDA, 2019) and *Christs Hospital Ecological Appraisal* (HDA, 2022).

1.2 Development Proposals

1.2.1 Development proposals for the main site include an outline planning application with all matters reserved for a mixed use strategic development to include demolition of existing buildings and erection of up to 1,500 dwellings, up to 15,750 sqm (GIA) of flexible employment space (Use Classes E/B2/B8), up to 2,900 sqm (GIA) flexible community facilities (Use Classes E/F1/F2); education facilities; sports facilities; 5 gypsy and traveller pitches; public open space; landscaping and related infrastructure.

The smaller area to the west is proposed for provision of new parking facilities for users of the local rail network.

1.3 Scope and purpose of the report

1.3.1 An extended Phase 1 Habitat survey of the site carried out in May 2019 identified habitats of potential ecological interest affected by the proposed development which merited further botanical study in order to better determine their nature conservation value and further inform an assessment of the implications of the proposed development on the habitats present. These are the ancient woodland habitats associated with the Courtland Wood Local Wildlife Site (LWS), Smiths Copse and Two Mile Ash Gill all located within the main site, and three fields identified as potentially being 'species-rich meadow grassland' within in the northern part of the main site.

1.3.2 This report describes the outcome of the subsequent Phase 2 botanical survey of these habitats. More specifically the aims of this study are:

i) To assess the nature conservation interest of the meadow grassland and woodland habitats within the site on the basis of the plant assemblages present;
ii) To identify any meadow grassland and woodland species of nature conservation interest within the site and their distribution;
iii) To identify constraints to development due to the above; and
iv) To identify appropriate measures to avoid or minimise the ecological effects of development on grassland and woodland habitats of nature conservation interest, and where effects are unavoidable, provide outline proposals to mitigate or compensate for these effects.

2 BACKGROUND

2.1 Woodland

2.1.1 Three areas of woodland included on Natural England's Ancient Woodland Inventory are located within the site. These are:

- Smith's Copse, a 1.0ha block of ancient and semi-natural woodland located in the north-east of the site.
- Courtland Wood, a 6.1ha block of ancient and semi-natural woodland located in the centre west of the site. 5.8 ha of this area is also designated as Courtland Wood Local Wildlife Site (LWS) which is described in its citation as supporting a relatively small area of ancient semi-natural broadleaved woodland with conifer introductions, and having a ground flora with a good number of ancient woodland indicators.
- Two Mile Ash Gill, a 0.48ha strip of ancient and semi-natural woodland located on a north-south aligned gill adjoining the southern edge of Courtland Wood.

2.1.2 A further parcel of ancient and semi-natural woodland borders the northern boundary of the Christ's Hospital area of the site, this is also designated as Sparrows Copse LWS. This area was not included within the botanical survey as it is located outside the site boundary but is considered in the recommendations at *Section 6* below.

2.1.3 Woodlands are widely recognised as a valuable habitat for a wide range of wildlife, and 'lowland mixed deciduous woodland' is identified as UK Biodiversity Action Plan (UKBAP) Priority Habitats for the United Kingdom and as Habitats of Principal Importance for the conservation of biological diversity in England under Section 41 of the 2006 Natural Environment and Rural Communities (NERC) Act. Section 40 of the Act requires that decision-making authorities, such as local planning authorities, have due regard to habitats and species of principal importance in the exercise of their functions. A copy of the habitat description for the UK BAP habitat 'lowland mixed deciduous woodland' is given in *Appendix D*.

2.1.4 Older woodland is considered of particular interest due to the diversity of species it supports, many of which are poor dispersers and/ or specialist to the unique habitats they provide. Ancient woodlands are defined as areas that have been continuously wooded since at least 1600AD. These can include woodland areas that have been subject to usual forestry operations such as coppicing, clearance and replanting, in addition to areas of temporary or permanent open spaces within the woodland such as glades, rides, deer lawns, ponds etc. Ancient woodland is noted for its ability to support a high diversity of species, many of which depend on the longevity of the habitat in order to survive. It is also recognised for its soils, recreation, cultural and historical value, in addition to the contribution it makes towards the landscape character. Ancient woodland is a relatively scarce habitat in the England, covering only 3% of the land area.

2.1.5 In view of the time taken to establish ancient woodland, this is regarded as an irreplaceable habitat under the 2021 National Planning Policy Framework (NPPF) and within Natural England and Forestry Commission Standing Advice.

2.2 Grassland

2.2.1 Since the 1940's England's grassland resource has undergone a significant decline in biodiversity value due to a combination of changes in land use and agricultural practice resulting in overgrazing, nutrient enrichment, abandonment, fragmentation and direct loss of habitat (magnificentmeadows.org.uk, 2022).

2.2.2 This degradation has resulted in an estimated loss of 97% of unimproved lowland meadows in England and Wales over a period of 50 years up until 1984, equating to a 0.2 million hectare loss of this habitat noted for its rich botanical assemblages and

provision of habitat for rare and notable plant species. Losses of this habitat continue to this day and have been recorded at 2 -10% per annum during the 1980s and 1990s in some parts of England, with less than 15,000ha of species-rich neutral grassland estimated to survive in the UK today (BRIG, 2011).

2.2.3 'Lowland meadow grassland' has subsequently been included as a UK Biodiversity Action Plan (UKBAP) Priority Habitat for the United Kingdom under the broad habitat type of 'neutral grassland', and 'lowland meadows' are a Habitat of Principal Importance listed under Section 41 of the 2006 NERC Act. A copy of the habitat description for UK BAP lowland meadow grassland is given in *Appendix D*.

3 METHODOLOGY

3.1 Woodland survey

3.1.1 The field survey comprised a Phase 2 walkover survey of the ancient woodlands located within the site boundary. This was carried out to identify the character of the woodland habitats within the woodlands with broad reference to the woodland types described in the National Vegetation Classification (NVC) and to determine the presence/ absence of Ancient Woodland Indicator (AWI) species in accordance with the lists devised for Southern England by as collated by Kirby K., English Nature, 2004 (Rose & O'Reilly, 2006).

3.1.2 During the field survey, a walkover search of each of the woodland areas was made and lists of the vascular plant species noted were recorded within compartments of distinct character or where specific habitat and landscape features occurred. Additional observations in relation to aspect, soil type and drainage were also made. Botanical names follow Stace (2019) for higher plants.

3.1.3 The woodland field survey was carried out by Anna Senior MCIEEM of HDA on 17th May 2022. Weather conditions were warm, dry and calm with partial cloud.

3.1.4 The findings of the woodland field survey are summarised in *Section 4* below and full species lists are given in *Appendix B*.

3.2 Grassland survey

3.2.1 The grassland survey took the form of a walkover of three grassland fields in the north of the site (*Appendix A*) which had been identified as being potentially species-rich during the Phase 1 Habitat survey (HDA, 2019). The remainder of the grasslands within the site comprise fields clearly of improved or species-poor semi-improved grassland managed by either Cattle grazing or cutting and have therefore been excluded from the detailed assessment.

3.2.2 The walkover survey followed the approach given in Natural England's Technical Information Note TIN110 for assessment of whether grassland is a BAP Priority Habitat (or Habitat of Principal Importance under the 2006 NERC Act). The species present were recorded together with their abundance and general distribution within each field/area. Regular stop samples were made to ensure that smaller species were not being overlooked and to record cover of rye-grasses and White Clover; cover of wildflowers and sedges (excluding White Clover, Creeping Buttercup and injurious weeds); and total number of species within $1m^2$ samples. Locations at which $1m^2$ samples were taken are illustrated at *Appendix A*. Additional observations in relation to aspect, soil type and drainage were also made.

3.2.3 The grassland field survey was carried out by Anna Senior MCIEEM of HDA on the 5th July 2021. Weather conditions were warm, dry and calm with partial cloud.

3.2.4 The information relating to the grassland gathered through the field survey was assessed in two ways. Firstly, the conservation status of individual species was assessed by reference to the following criteria:

- Species specially protected under Annex I and IV of the EC Habitats Directive (as transposed into UK law by the 2019 Conservation of Habitats and Species (Amendment) (EU Exit) Regulations;
- Species specially protected under Schedule 8 of the 1981 Wildlife and Countryside Act (as amended);
- Species included on 'A Vascular Plant Red List for England' (Stroh *et al.*, 2014); and
- Species listed under Section 41 of the 2006 NERC Act and included on the UK BAP.

3.2.5 The species assemblage of each grassland sample area was then compared to Natural England guidance on the assessment of whether grassland qualifies as UKBAP Priority Habitat provided in Technical Information Note 110 (TIN110) (Natural England, 2012). Appendix 2 of the guidance provides a sequential approach to the assessment of the quality of grassland habitat based on the balance of plant species/ groups and the presence or absence of species indicative of habitat quality.

3.2.6 The findings of the grassland field survey are summarised in *Section 4* below and full species lists are given in *Appendix C*.

3.3 Limitations

3.3.1 No significant limitations were encountered during the field surveys; all relevant areas were accessible and the surveys were carried out at an optimal time of year to allow

assessment of the plant assemblages of the woodland and grassland habitats subject to survey.

4 RESULTS

4.1 Woodland survey

4.1.1 Each of the woodland areas subject to survey is described below. A plan identifying each of the woodlands, and the Woodland Compartments identified within Courtland Wood, is provided in *Appendix A*.

Courtland Wood

4.1.2 In general terms, Courtland Wood comprises a relatively flat and level area of deciduous woodland totalling approximately 6.1ha set within a predominantly farmed landscape. The woodland is bordered by intensively cultivated arable fields to the north, and by fields of species-poor semi-improved grassland to the east, south and south-west. The north-western edge of the woodland directly abuts Two Mile Ash road and Two Mile Ash Gill, a woodland shaw running along a steep-sided stream named Marlpost Gill, leads southwards from the woodland's south-western corner.

4.1.3 The woodland predominantly comprises mature standard Ash, Oak and Small-leaved Lime trees with underlying coppice and scrub and a frequently sparse ground flora. Areas of immature to early-mature trees are also present in places, where mature trees are less frequent, these areas are generally less highly shaded and support a more diverse ground flora. A total of twenty-four Ancient Woodland Indicator (AWI) species were recorded across the woodland during the survey.

4.1.4 The edges of the Courtland Wood are generally marked by tall, outgrown, species-rich hedgerows on low wood banks with adjacent dry ditches. The woodland edges generally stop abruptly where they meet adjacent farmland, with grassland management occurring directly up to the woodland edge to the south, east and south-west, and an approximately 4m rough grassland/ ruderal field margin being maintained between the woodland and adjacent arable cultivation to the north. A series of species-rich hedgerows connect to the woodland where intersecting field boundaries meet the woodland on the north, south and east edges.

4.1.5 The only notable species recorded within the woodland is native Bluebell which is protected under Schedule 8 of the Wildlife and Countryside Act 1981 (as amended) against commercial exploitation. No other protected plant species were recorded and all other species recorded within Courtland Wood are identified as being of 'Least Concern' in *A Vascular Plant Red List for England* (Strohe *et. al.*, 2014). No BAP or Species of Principal Importance were recorded.

4.1.6 The woodland as a whole best correlates with NVC community W8 *Fraxinus excelsior – Acer campestre – Mercurialis perennis* woodland.

4.1.7 The woodland broadly falls into five 'Woodland Compartments' of distinct character and each area is described below together with the species present and other identified features of interest.

Woodland Compartment A

4.1.8 Woodland Compartment A forms a small section of the north-western corner of the woodland. It is bordered by Woodland Compartments C and B to the south, west and east and by arable land to the north.

4.1.9 Woodland Compartment A comprises an area of mature woodland with a dense canopy comprising numerous mature Pedunculate Oak and Small-leaved Lime trees. Frequent early-mature and immature trees are also present and these are generally tall and leggy. The understorey is relatively sparse and restricted to occasional stands of Holly and Small-leaved Lime with some old coppice stools noted. Young saplings are very rare and deer browsing is likely to be restricting establishment of new trees. The ground flora is relatively sparse but includes some dense areas of Bluebell and Wood Anemone cover.

4.1.10 An informal footpath passes through this woodland compartment but no other anthropogenic disturbance was noted. Fallen deadwood is frequent throughout the area.

Woodland Compartment B

4.1.11 Woodland Compartment B forms the western edge of the woodland. It is bordered by Woodland Compartments A and C to the west, by Two Mile Ash Gill to the south, by arable land to the north and by grassland to the west.

4.1.12 Compartment B encompasses the northern stretch of the Marlpost Gill within the site. This is a small shallow stream flowing slowly southwards through the woodland at the base of a steep-sided earth valley. The banks of the gill are heavily vegetated with dense Bluebell and Wood Anemone and occasional scrub and trees are present, including Pedunculate Oak, Ash, Small-leaved Lime, Hazel and notably a dense area of Holly which grows over the stream at the southern end. The stream is blocked in places by assemblages of fallen deadwood and small stands of Hemlock Water-dropwort are also present.

4.1.13 Signs of anthropogenic disturbance within this part of the woodland include a swing on one of the trees over the stream valley which has resulted in a patch of worn bare ground

below. Informal footpaths are also present but overall human interference is relatively limited.

Woodland Compartment C

4.1.14 Woodland Compartment C forms a section of woodland bordered by Woodland Compartment D to the east and Compartments A and B to the west. Arable farmland borders the compartment to the north and a grassland field is present to the south.

4.1.15 This compartment contains relatively fewer mature trees and has a more open canopy than the surrounding compartments. Trees within this area are generally immature, tall and leggy, and include a number of planted trees approximately 20 years old with tree guards present including Pedunculate Oak, Ash, Silver Birch and Wild Cherry. Old Small-leaved Lime coppice stools are also present. The ground flora in this compartment includes some dense areas of Bramble and Dog's Mercury.

4.1.16 Two informal footpaths pass through this woodland compartment but no other anthropogenic disturbance was noted. Standing and fallen deadwood is frequent throughout the area.

Woodland Compartment D

4.1.17 Woodland Compartment D is located between Compartment C to the east and Compartment E to the west. Arable farmland is present to the north and grassland is present to the south.

4.1.18 Compartment D includes an area of abundant coppiced Hazel stools and immature trees with tree guards still present. The coppice stools have not been recently managed and the tree canopy is relatively dense. Occasional mature standard Ash and Pedunculate Oak trees are present, becoming more frequent towards the western edge of the compartment. The Ash trees frequently show evidence of Ash dieback and standing and fallen deadwood is frequent throughout the compartment. The ground flora of Compartment D is well established and diverse.

4.1.19 An informal footpath passes through this woodland compartment and the only other sign of anthropogenic disturbance at the time of survey was a tent towards the northern end.

Woodland Compartment E

4.1.20 Woodland Compartment E forms the eastern end of Cortland Wood, bordered by Compartment D to the east, by arable farmland to the north and by grassland fields to the east and south.

4.1.21 The compartment comprises a more mixed structure than the adjoining woodland, including some mature standard Pedunculate Oak and Ash trees and frequent early-mature trees. Abundant scrub is present, including dense areas of Holly and Bramble and limited areas of old coppice Hazel are present. These areas tend to be heavily shaded and contain limited ground flora, however some patches of more mixed ground flora occur.

4.1.22 Two informal footpaths pass through this woodland compartment but no other anthropogenic disturbance was noted. Standing and fallen deadwood is frequent throughout the area.

Two Mile Ash Gill

4.1.23 In general terms, Two Mile Ash Gill comprises an approximately 0.48ha woodland shaw lining the banks of Marlpost Gill, a small and shallow stream which flows southwards from the south-west corner of Courtland Wood. The woodland is set within a gill valley comprising generally steeply sloping earth banks with some less steep areas along the eastern edge. The woodland is bordered by Courtland Wood to the north, by the embankment of the Downs Link former railway line to the south and by Cattle-grazed grassland fields to the east and west. A steep-sided waterbody, formerly a hammer pond, is present at the top of the western bank.

4.1.24 The woodland within Two Mile Ash Gill is generally dominated by Ash, Pedunculate Oak and Small-leaved Lime trees and has a sub-canopy of predominantly Hazel, Hawthorn, Field Maple, Crab Apple, Holly and Blackthorn. Many of the mature trees support a dense growth of Ivy. The eastern woodland edge comprises a gappy outgrown hedgerow along a stock-proof fence and the adjacent grassland field is managed up to the base of this. The western edge is unfenced and comprises scattered trees and scrub through which livestock have access when present.

4.1.25 Heavy shading from the woodland has resulted in minimal/absent aquatic and marginal vegetation within the stream, with flora along the stream banks dominated by Ramsons, Wood Anemone and Bluebell. The ground flora further up the banks and away from the stream are generally less highly shaded and support a more diverse ground flora. A total of twelve Ancient Woodland Indicator (AWI) species were recorded across the woodland during the survey.

4.1.26 There are no footpaths within this woodland and anthropogenic disturbance is very limited. The western stream banks are however highly poached by Cattle. Abundant standing and fallen deadwood is present throughout the woodland.

4.1.27 With the exception of native Bluebell (see *Section 4.1.5* above) which is protected under the 1981 Wildlife and Countryside Act (as amended) against commercial exploitation only, no other protected plant species were recorded and all other species recorded within Two Mile Ash Gill are identified as being of 'Least Concern' in *A Vascular Plant Red List for England* (Strohe *et. al.*, 2014). No BAP or Species of Principal Importance were recorded.

4.1.28 The woodland as a whole best correlates with NVC community W8 *Fraxinus excelsior – Acer campestre – Mercurialis perennis* woodland.

Smith's Copse

4.1.29 In general terms, Smith's Copse comprises an approximately 1.0ha area of woodland in the north-east of the site. The woodland is flat and bordered by species-poor semi improved grassland to the north, west and south. The eastern side is bordered by the gardens of residential properties fronting Worthing Road.

4.1.30 The edges of Smith's Copse comprise dense species-rich hedgerows on low wood banks associated with dry ditches. To the eastern side the woodland edge is generally bound by garden fences although these are not continuous and 'garden creep' is occurring in places. A seasonal pond is present within the centre of the woodland.

4.1.31 The woodland within Smith's Copse is dense with many mature Pedunculate Oak and Ash trees and some tall and leggy early-mature trees also present. The woodland has a well-developed and diverse shrub layer comprising Crab Apple, Hawthorn, Midland Hawthorn, Hazel, Holly, Blackthorn, Bramble and Field Maple, and a diverse ground flora is present throughout most of the woodland, dominated by Bluebell and Common Nettle in places but generally more mixed. A total of thirteen Ancient Woodland Indicator (AWI) species were recorded across the woodland during the survey.

4.1.32 The southern part of the woodland supports a dense area of Cherry Laurel which shades the ground below and results in very limited ground flora. The woodland is subject to dumping of garden waste along its western boundary, along which tree cutting has taken place and resulted in piles of fallen deadwood are present. The woodland is more open along this boundary and supports a higher incidence of ruderal species such as Common Nettle and Cow Parsley. Garden creep is also occurring In places along the western boundary, with sections of ground flora being mown and used as garden by adjacent residential properties. The woodland is otherwise inaccessible to the public and human disturbance is limited elsewhere.

4.1.33 The only protected plant species recorded from Smith's Copse during the survey were native Bluebell (see *Section 4.1.5* above) which is protected under the 1981 Wildlife and Countryside Act (as amended) against commercial exploitation only and Butchers Broom, which is protected under Annex V of the EC Habitats Directive against commercial exploitation. No other protected plant species were recorded and all other species recorded within Smith's Copse are identified as being of 'Least Concern' in *A Vascular Plant Red List for England* (Strohe *et. al.*, 2014). No BAP or Species of Principal Importance were recorded.

4.1.34 The woodland as a whole best correlates with NVC community W8 *Fraxinus excelsior – Acer campestre – Mercurialis perennis* woodland.

4.2 Grassland survey

4.2.1 Each of the grassland areas subject to survey are described below. A plan identifying these grassland areas and survey quadrat locations is provided in *Appendix A*.

Area A

4.2.2 Area A comprises a small field in the north of the site. The field slopes gently down to the south and lies at approximately 46m AOD. A mature tree line borders the western margin of this area and a small plantation woodland copse is located to the north. The field is bordered by Two Mile Ash road to the west and a field of improved grassland is present to the south.

4.2.3 The field appears to be managed through periodic hay cutting or Cattle grazing and is otherwise largely undisturbed throughout the growing season.

4.2.4 The field is well-drained and fairly homogenous in composition, with abundant grasses including Yorkshire Fog and Creeping Bent and occasional Cock's-foot, Common Couch, Cut-leaved Crane's-bill, Meadow Foxtail, Perennial Ryegrass, Rough Meadow-grass and Smaller Cat's-tail. A number of other herb species were recorded as rare within the sward and a full list of these is provided in *Appendix C*.

4.2.5 On the whole, herbs form a low proportion of ground cover, with generally less than 10% total cover excluding Creeping Buttercup, White Clover and injurious weeds. The species density for most quadrats was low, being between 6 and 8 species per m^2, although higher species densities of between 9 and 15 species were recorded in four quadrats.

4.2.6 All species recorded within Area A are identified as being of 'Least Concern' in *A Vascular Plant Red List for England* (Strohe *et. al.*, 2014). No BAP or Species of Principal Importance were recorded. No protected plant species were recorded.

Area B

4.2.7 Area B comprises a small field in the north-west of the site. The field is largely flat and lies at approximately 46m AOD. A species-rich hedgerow is present along the southern boundary and the field is bordered by a farm and access track to the east. Two Mile Ash Road and a residential property border the field to the west.

4.2.8 The field appears to be managed through periodic hay cutting and is otherwise largely undisturbed throughout the growing season.

4.2.9 The most abundant grasses within Area A are Creeping Bent and Perennial Rye-grass although Yorkshire Fog is also frequent. Occasional species include Black-grass, Meadow Buttercup and White Clover. Several herb species were recorded as rare within the sward and a full list of these is provided in *Appendix C*.

4.2.10 Cover of White Clover and Rye-grasses is generally >30% although two quadrats were lower than this, and coverage of wildflowers excluding Creeping Buttercup, White Clover and injurious weeds is <10%. The species density for most quadrats is between 6 and 8 species per m^2 although lower species densities of less than 6 species were recorded in three quadrats.

4.2.11 All species recorded within Area A are identified as being of 'Least Concern' in *A Vascular Plant Red List for England* (Strohe *et. al.*, 2014). No BAP or Species of Principal Importance were recorded. No protected plant species were recorded.

Area C

4.2.13 Area C comprises a small field in the north-west of the site to the immediate south of Area B. The field lies at approximately 46m AOD with a gentle slope down to the west. The field is bordered by a species-rich hedgerow to the north, by a farm to the east, by an arable grassland field to the south, and by Two Mile Ash Road and residential properties to the west.

4.2.14 The field appears to be managed through periodic hay cutting or Cattle grazing and is otherwise largely undisturbed throughout the growing season.

4.2.15 The most frequent grasses within Area C include Creeping Bent, Perennial Rye-grass, Meadow Foxtail and Yorkshire Fog. Occasional species include Meadow Buttercup, Smaller Cat's-tail. Generally less frequent are Red Fescue, Rough Meadow-grass and White Clover. Several herb species were recorded as rare within the sward and a full list of these is provided in *Appendix C*.

4.2.16 Cover of White Clover and Rye-grasses is generally >30% although two quadrats were lower than this, and coverage of wildflowers excluding Creeping Buttercup, White Clover and injurious weeds is <10% throughout. The species density for most quadrats is between 6 and 8 species per m^2 although higher species densities of between 9 and 15 species per m^2 were recorded in three quadrats and less than 5 species per m^2 were recorded in one quadrat.

4.2.17 All species recorded within Area C are identified as being of 'Least Concern' in *A Vascular Plant Red List for England* (Strohe *et. al.*, 2014). No BAP or Species of Principal Importance were recorded. No protected plant species were recorded.

5 EVALUATION

5.1 Woodland

Individual species

5.1.1 The only protected plant species recorded within the woodlands during the survey were native Bluebell, which is protected under Schedule 8 of the Wildlife and Countryside Act 1981 (as amended) against commercial exploitation, and Butchers Broom, which is protected under Annex V of the EC Habitats Directive against exploitation only. No other protected plant species were recorded and all other species recorded within the woodland areas are identified as being of 'Least Concern' in *A Vascular Plant Red List for England* (Strohe *et. al.*, 2014). No BAP or Species of Principal Importance were recorded.

Woodland: General assessment and conclusion

5.1.2 The on-site woodlands subject to survey support relatively high numbers of Ancient Woodland Indicator Species in relation to their generally small size, with between 12 and 24 species recorded in each of the woodland areas. Courtland Wood and Smith's Copse both support features typical of old woodlands including ditches and earth banks on the woodland edges and all three woodland areas support at least fragments of a historic coppice with standards structure.

5.1.3 The woodlands within the site best correlate with the NVC community W8 *Fraxinus excelsior – Acer campestre – Mercurialis perennis* woodland.

5.1.4 Courtland Wood is designated as a LWS and lowland mixed deciduous woodland habitat, which dominates all three woodland areas, is listed as a Habitat of Principal Importance under Section 41 of the 2006 NERC Act. The woodland habitats are complemented by the connecting network of generally dense, intact and species-rich hedgerows, and together with the Marlpost Gill watercourse which flows through the south-west of the site, these

provide complementary habitats and connectivity between the woodland areas within the site and those in the wider area.

5.1.5 Anthropogenic effects on the woodlands are generally low and limited to occasional informal footpaths and other minor disturbances. The integrity of Smith's Copse woodland is however more threatened by garden creep and dumping of garden waste/ introduction of non-native species from existing properties along its eastern boundary, together with colonisation by a large stand of Cherry Laurel. The value of the woodlands within the site are further limited by the surrounding farmland which results in generally abrupt woodland edges where the woodlands border intensively cultivated arable land and managed fields of species-poor semi-improved grassland.

5.1.6 Overall, the survey results indicate that the woodlands are of some antiquity and exhibit good species and structural diversity. As such the woodlands are considered to be of district importance in their own right.

5.2 Grassland

Individual species

5.2.1 No plants specially protected under Annexes I and IV of the EC Habitats Directive (as transposed into UK law under the 2019 Conservation of Habitats and Species (Amendment) (EU Exit) Regulations) or Schedule 8 of the 1981 Wildlife and Countryside Act (as amended) were recorded from the grassland habitats subject of this study. Furthermore no BAP or Species of Principal Importance were recorded and all grassland species recorded are identified as being of 'Least Concern' in the BSBI's 2014 'A Vascular Plant Red List for England'.

Assessment against BAP criteria (Appendices D & E)

5.2.2 This section assesses the habitats within the grassland areas against the BAP priority habitat descriptions provided in *Appendix D* and identification criteria set out in Natural England's Technical Information Note (TIN110) provided in *Appendix E*.

Area A

5.2.3 With regard to Key 2a provided in Appendix B of TIN110 (*Appendix E*), within Area A the cover of White Clover and Rye-grasses within all quadrats was <10% and the total coverage of wildflowers (excluding Creeping Buttercup, White Clover and injurious weeds) was <10%.

5.2.4 The botanical interest of the grassland within Area A is limited and the grassland is generally heavily dominated by common grasses (Yorkshire Fog and Creeping Bent). No bryophytes or lichens were recorded. More than half of the quadrats meet 'I'

(Species-poor Improved) level and diversity is generally low at 6 to 8 species per m^2, although higher species densities of between 9 and 15 species were recorded in four quadrats. No areas sampled meet 'Species-rich' criteria, and no more than one semi-improved wildflower indicator was present within any single quadrat.

5.2.5 When the species lists across the grassland field are assessed cumulatively against the list of indicator species provided for lowland meadow BAP priority habitat (Table E G06 of TIN 110) only one of the qualifying species is present within the sward (Meadow Vetchling) and Area A is therefore classified as 'Species-poor Improved grassland' under Key 2a of TIN110 and does not qualify for consideration as Biodiversity Action Plan (BAP) quality grassland or for consideration as a 'Habitat of Principal Importance' under Section 41 of the 2006 Natural Environment and Rural Communities (NERC) Act.

Area B

5.2.6 With regard to Key 2a provided in Appendix B of TIN110 (*Appendix E*), the combined cover of White Clover and Rye-grasses within Area B was >30% and the total coverage of wildflowers (excluding Creeping Buttercup, White Clover and injurious weeds) was generally <10%.

5.2.7 The grassland within Area B is dominated by a mix of common grasses (notably Creeping Bent, Perennial Rye-grass and Yorkshire Fog). Bryophytes and lichens are absent. All the quadrats meet 'I' (Species-poor Improved) level and diversity is low at no more than 8 species per m^2 in all instances. No areas sampled meet 'Species-rich' criteria and no more than one semi-improved wildflower indicator was present within a single quadrat.

5.2.8 No qualifying species for lowland meadow BAP priority habitat (Table E G06 of TIN 110) are present within Area B. Area B is classified as 'Species-poor Improved grassland' under Key 2a of TIN110 and does not qualify for consideration as BAP quality grassland or for consideration as a 'Habitat of Principal Importance' under Section 41 of the 2006 Natural Environment and Rural Communities (NERC) Act.

Area C

5.2.9 With regard to Key 2a provided in Appendix B of TIN110 (*Appendix E*), the combined cover of White Clover and Rye-grasses within Area C is generally >30% and the total coverage of wildflowers (excluding Creeping Buttercup, White Clover and injurious weeds) is <10% throughout.

5.2.10 The grassland within Area B is dominated by a mix of common grasses (notably Perennial Rye-grass, Creeping Bent, Meadow Foxtail, and Yorkshire Fog). Bryophytes

and lichens are absent. All the quadrats meet 'I' (Species-poor Improved) level and diversity is generally low with 5 species per m^2 recorded in one quadrat, between 6 and 8 species per m^2 in most quadrats, and higher species densities of between 9 and 15 species per m^2 recorded in three quadrats. No areas sampled meet 'Species-rich' criteria, and no more than one semi-improved wildflower indicator is present within any single quadrat.

5.2.11 When the species lists across the grassland are assessed cumulatively against the list of indicator species provided for lowland meadow BAP priority habitat (Table E G06 of TIN 110) only one of the qualifying species is present within the sward (Greater Bird's-foot-trefoil). Area C is therefore classified as 'Species-poor Improved grassland' under Key 2a of TIN110 and does not qualify for consideration as Biodiversity Action Plan (BAP) quality grassland or for consideration as a 'Habitat of Principal Importance' under Section 41 of the 2006 Natural Environment and Rural Communities (NERC) Act.

Grassland: General assessment and conclusion

5.2.12 No plants specially protected under Annexes I and IV of the EC Habitats Directive (as transposed into UK law under the 2019 Conservation of Habitats and Species (Amendment) (EU Exit) Regulations) or Schedule 8 of the 1981 Wildlife and Countryside Act (as amended) were recorded from the woodland, other than Bluebell and Butchers Broom which are protected against commercial exploitation only. Furthermore, no BAP or Species of Principal Importance were recorded and all species recorded are identified as being of 'Least Concern' in the BSBI's 2014 'A Vascular Plant Red List for England'.

5.2.13 None of the grasslands meet criteria for consideration as lowland meadow BAP priority habitats or for consideration as a 'Habitats of Principal Importance' under Section 41 of the 2006 Natural Environment and Rural Communities (NERC) Act.

5.2.14 All the grasslands subject to survey qualify on the whole as Species-poor Improved grassland and are considered to be of no more than **low local** nature conservation interest in their own right.

6 SUMMARY & RECOMMENDATIONS

6.1 Individual species

6.1.1 The only protected plant species recorded during the course of the botanical surveys were native Bluebell (from Courtland Wood, Two Mile Ash Gill and Smith's Copse) which is protected under Schedule 8 of the Wildlife and Countryside Act 1981 (as amended) against commercial exploitation, and Butchers Broom (from Smith's Copse), which is protected under Annex V of the EC Habitats Directive against exploitation. Both of these plants are however relatively common and widespread plant species in the UK. No other

protected plant species were recorded and all other species recorded within Smith's Copse are identified as being of 'Least Concern' in *A Vascular Plant Red List for England* (Strohe *et. al.*, 2014). No BAP or Species of Principal Importance were recorded.

6.2 Woodland

6.2.1 The areas of ancient woodland subject to survey are all structurally diverse and comprise lowland mixed deciduous woodland which is a UK BAP Priority Habitat and listed as a Habitat of Principal Importance under Section 41 of the 2006 NERC Act. The woodlands all support features of antiquity including coppice with standards structure and linear woodbanks and ditches on the woodland edges, and up to 24 ancient woodland indicator species were recorded within any one woodland. In addition the Marlpost Gill flows through the Courtland Wood and Two Mile Copse. The three woodland areas subject to survey are considered to be of **district** value.

6.2.2 Courtland Wood and Two Mile Copse, and the off-site Sparrows Copse, are designated as LWSs which afford protection under planning policy. In addition, all four woodlands are listed on Natural England's Ancient Woodland Inventory. Ancient woodland habitats are regarded as irreplaceable under the 2021 National Planning Policy Framework (NPPF) and Natural England and the Forestry Commission have provided Standing Advice for ancient woodland to guide Planning Authorities' considerations in relation to developments in proximity to this habitat (Natural England, 2018). The Standing Advice is a material consideration which should be taken into account when determining planning applications. The advice states:

"You should refuse planning permission if development will result in the loss or deterioration of ancient woodland, ancient trees and veteran trees unless both of the following applies:

- *there are wholly exceptional reasons*
- *there's a suitable compensation strategy in place (this must not be a part of considerations of wholly exceptional reasons) - see paragraphs 33 and 34 of the planning practice guidance on compensation guidance*

You should make decisions in line with paragraph 180 (c) of the NPPF.

"Ancient woodland, ancient trees and veteran trees are irreplaceable."

6.2.3 The standing advice goes on to identify potential effects of development on ancient woodland including indirect loss, damage to rooting zones of woodland trees, pollution, effects on hydrology, fragmentation, loss of supportive habitat, disturbance and introduction of invasive species. The advice goes on to identify possible mitigation measures:

"Mitigation measures will depend on the type of development but could include:

- *putting up screening barriers to protect woodland or veteran trees from dust and pollution;*
- *measures to reduce noise or light;*
- *designing open space to protect ancient or veteran trees;*
- *rerouting footpaths and managing vegetation to deflect trampling pressure away from sensitive locations;*
- *creating buffer zones."*

6.2.4 Current development proposals indicate that the ancient woodlands within the site fall outside the development areas and as such no loss of ancient woodland habitat would be expected to arise as a result of development of the site. As stated above, Natural England Standing Advice advises that, depending on the size, nature and location of development, a minimum buffer of 15m is required between new development and ancient woodland edges. Although hardstanding within the buffer zone should be avoided, it is usually acceptable to provide opportunities for informal recreation in the buffer such as unsurfaced or loose-bound paths. Similarly, it may be acceptable to provide wetland features within the buffer in association with the site surface water drainage scheme where these do not compromise the rooting areas of the outermost woodland trees and they provide complementary habitat to the woodland through sympathetic wildlife-friendly design. The buffer zone should predominantly comprise semi-natural habitats such as scrub, rough grassland and trees and be located outside the residential curtilage of any new dwellings.

6.2.5 Where possible, the layout of new development should avoid having housing backing on to the LWS buffer to avoid 'garden creep' into the buffer and the risk of introduction of invasive species into the woodland through tipping of garden waste. Any lighting proposals should also be designed to avoid light spill onto the woodland margins. This could be achieved through use of hooded, directional and low level lighting as appropriate together with use of narrow spectrum and low-UV bulbs. It is also recommended that in order to protect wildlife associated with the LWS woodland residents should be provided with 'living with wildlife' leaflets to inform them of the presence of the woodland and how it can be enjoyed and protected. This would include information on the responsible disposal of green waste and keeping cats indoors at dawn/ dusk.

6.2.6 Any access to the ancient woodland areas should be managed through provision of a sensitively designed footpath network and use of fencing, signage and scrub planting to discourage access to more sensitive areas. Recreational use of particularly sensitive woodland areas should be discouraged through appropriate boundary treatments (e.g. fencing, thorny scrub planting) and provision of alternative informal green space.

6.2.7 Consideration should be given to the effects of development on the quality and quantity of water supporting the ancient woodland habitats during the construction and operational phases of the proposed development. The following measures are also recommended in order to minimise any potential indirect effects on the retained ancient woodland habitats during construction works:

- Where possible, construction activities should seek to provide a 15m stand-off from the ancient woodlands. This includes storage of materials and movement of vehicles. The exclusion area should be fenced throughout the construction phase.
- Where construction works within 15m are unavoidable (e.g. for sympathetically designed attenuation ponds or path provision), these works should be subject of a specific method statement and supervised by a suitably qualified ecologist.
- Where works are required within the 15m buffer zone, unless otherwise covered under an agreed Arboricultural Method Statement and supervised by a suitably qualified arboriculturalist, works should be carried out in accordance with BS5837 'Trees in relation to Construction' and avoid the rooting areas of retained woodland trees.
- Compound areas should be located away from the woodland buffer area in order to avoid indirect effects of noise and lighting (see below).
- Although it would not be expected that specific lighting would be required during the construction phase, in the event that temporary lighting is required this should be the minimum level required for safety and use directional, hooded and low-level lighting as appropriate to avoid lighting up of the woodland edges.
- Similarly, it is not expected that significant levels of noise would be generated during the construction phase that might otherwise have an impact on the woodlands. Notwithstanding this, where possible quiet methods of working should be employed (as would be required with respect to nearby residential development in any event) and noisy activities should seek to avoid the bird breeding season.

6.2.8 Development of the site may provide opportunity to increase the value of the retained ancient woodland areas for wildlife through enhancement and management of the habitats present together with the creation of adjacent areas of new habitat of high nature conservation value. These measures could include:

- Planting of new complementary areas of habitat within undeveloped areas of the site, ideally contiguous with retained woodland areas. Suitable habitats include woodland, species-rich scrub, wetland and rough and meadow grassland habitats;
- Plant new habitat links, e.g. hedgerows and tree lines, to improve connectivity of retained woodland area with habitats in the wider area;
- Establish a buffer area around retained woodland to protect the woodland edge and discourage access from sensitive areas;
- Establish 'ecotone' habitats within the woodland buffers and along the margins of new woodland planting. These are recognised for their ability to support a high diversity of species, and comprise a gradation from woodland to scrub to rough and meadow grassland habitats;
- Provide alternatives for informal recreation to use of existing woodland areas; and

- Introduce a scheme of improved management of the retained woodlands to include:
  - removal of debris and abandoned items;
  - phased removal of non-native species such as Cherry Laurel;
  - re-establishment of coppice regime on selected native broad-leaved woodland trees;
  - thinning of woodland canopy to encourage more diverse ground flora and woodland structure;
  - provision of new opportunities for wildlife within woodlands and adjacent habitat such as bird and bat boxes, habitat piles etc; and
  - maintenance and enhancement existing deadwood interest.

6.2.9 Subject to the above measures to protect and enhance the ancient woodland habitats within the site, no significant reduction in the long-term ecological interest of woodland habitats is likely to arise as a result of the site's development. Depending on the extent of woodland planting the proposed development could in fact provide opportunity to enhance the woodland resource of the site and its surrounds.

6.3 Grassland

6.3.1 None of the grasslands within the site meet criteria for consideration as BAP priority habitats or for consideration as a 'Habitats of Principal Importance' under Section 41 of the 2006 Natural Environment and Rural Communities (NERC) Act. The grasslands subject to survey all qualify as Species-poor Improved grassland and are considered to be of no more than **low local** nature conservation interest in their own right.

6.3.2 The majority of the grassland within the site appears to be subject to agricultural improvement. Although no protection or mitigation measures are proposed for the development in relation to the grasslands present, the proposed development provides an opportunity to enhance the grassland resource of the site and its surrounds. Where appropriate, all retained or newly created grassland habitats should therefore seek to include the following restoration/ management measures to maximise their value for wildlife in the long-term:

- The grassland should be subject to a sympathetic cutting regime, with no more than two cuts carried out annually, timed to allow flowering and seed set of target species;
- Selected areas of grassland should be left uncut during each mowing period in order to provide additional refuge habitat for reptiles, small mammals and invertebrates and encourage a more diverse flora;
- No fertilizers, lime or farmyard manure should be deployed;
- If required, injurious weed species (e.g. Creeping Thistle, Common Ragwort) should be controlled through either topping or pulling before flowering or using spot treatment with herbicide;
- Where new grassland is to be created:

- If necessary, the weed burden should first be reduced using herbicide. A fine, firm and level seedbed should then be created prior to sowing with a grassland seed mix using native species appropriate to the local area and soil type.
- Where possible the seed should be sourced from local stock and supplemented with green hay from grassland of higher nature conservation interest in the surrounding area.
- During the first year after sowing, new areas of meadow grassland should be regularly cut (every 6-8 weeks to a height of 10cm) to encourage strong root growth. All cuttings should be removed.
- The newly established meadow grasslands should then be mown to no less than 10cm in height up to twice a year, at the end of May and the end of September and the cuttings removed. This will allow flowering and seed set of most species over the summer, and result in two main periods of flowering. Over time this should reduce the fertility of the soil favouring increased dominance of flowering herbs.

6.3.3 Subject to the implementation of the above measures for enhancement of retained grasslands and creation of new areas of species-rich grassland at the site, it is considered that no significant reduction in the long-term ecological interest of grassland habitats is likely to arise as a result of the site's development. Depending on the extent of grassland enhancement and creation works, the proposed development could in fact provide opportunity to enhance the grassland resource of the site and its surrounds.

7 REFERENCES

BRIG (2011) *UK Biodiversity Action Plan*. UK Biodiversity Partnership. Available from: http://jncc.defra.gov.uk/page-5155

Cheffings, CM, Farrell L, Dines T.D., Jones R.A., Leach S.J., McKean D.R., Pearman D.A., Preston C.D., Rumsey F.J., Taylor I. (2005) The Vascular Plant Red Data List for Great Britain. Joint Nature Conservation Council.

CIEEM (2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine.* Chartered Institute of Ecology and Environmental Management, Winchester.

Department for Communities & Local Government, (2021) *National Planning Policy Framework: Legislation and policy, Good practice and guidance.* Sited on https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf

HDA (2019) *Southwater 2019 Ecology: Ecological Appraisal.* Hankinson Duckett Associates, Wallingford.

HDA (2022) *Land North West of Southwater: Christs Hospital Ecological Appraisal.* Hankinson Duckett Associates, Wallingford.

Natural England (2012) *Natural England Technical Information Note TIN110. Assessing whether created or restored grassland is a BAP Priority Habitat*. First edition 22 June 2012. Available from: https://webarchive.nationalarchives.gov.uk/20150902172513/http://publications.naturalengland.org.uk/publication/1649037 [accessed May 2022].

Natural England (2018) *Ancient woodland and veteran trees: protecting them from development*. Available from: https://www.gov.uk/guidance/ancient-woodland-and-veteran-trees-protection-surveys-licences#ancient-woodland [accessed May 2022].

Magnificent Meadows (2022) Importance of Meadows. Available from: http://magnificentmeadows.org.uk/conserve-restore/importance-of-meadows [accessed May 2022].

ODPM (2005) *Government Circular: Biodiversity and Geological Conservation – Statutory obligations and their impact within the planning system.* Office of the Deputy Prime Minister, August 2005.

PRP (2022) BA9817 *North West Southwater: Illustrative Masterplan Dwg. BA9817 3012*. PRP, London.

Preston C.D., Pearman D.A. and Diny T.D. (2002) *New Atlas of British and Irish Flora*. Oxford University Press, Oxford.

Rackham, Oliver (2006) *Woodlands* (New Naturalist Series). Collins, London.

Rodwell JS (1992). *British Plant Communities: Grassland and Montane Communities* Cambridge University Press.

Rose, F. (1999) *Indicators of ancient woodland - the use of vascular plants in evaluating ancient woods for nature conservation*. British Wildlife 10: 241-251.

Rose, F & O'Reilly, C (2006) *The Wild Flower Key*. Penguin Group, London.

Stace, C. (2019) *New Flora of the British Isles (Fourth edition).* Cambridge University Press, Cambridge.

Stroh, P.A., Leach, S.J., August, T.A., Walker, K.J., Pearman, D.A., Rumsey, F.J., Harrower, C.A., Fay, M.F., Martin, J.P., Pankhurst, T., Preston, C.D. & Taylor, I. (2014) *A Vascular Plant Red List for England*. Botanical Society of Britain and Ireland (BSBI), Bristol.

HDA Document Control and Quality Assurance Record

Project Title: Land West of Southwater Ecology
Project Reference: 2090.78
Document Title: Botanical Survey
Commissioning Party: Berkeley Homes (Southern) Ltd

Issue	Description	Date of Issue	Signed
1	Botanical Survey	July 2022	

	Personnel	Position
Author	Anna Senior MCIEEM	Principal Ecologist
Approved for issue	Adrian Meurer MCIEEM	Director

APPENDIX A

Botanical survey location plan

AREA A

AREA B

AREA C

A

B

C

D

E

COURTLAND WOOD

TWO MILE ASH GILL

SMITH'S COPSE

north

KEY

- Site boundary
- Woodland survey area
- Grassland survey area
- A — Woodland compartment
- ■ Grassland quadrat location (indicative)

CLIENT:
Berkeley Homes (Southern) Ltd

PROJECT:
Land North West of Southwater

TITLE:
Botanical Survey Location Plan

SCALE AT A3:
NTS

DATE:
July 2022

2090.78/11

The Stables, Howbery Park, Benson Lane, Wallingford, OX10 8BA
t 01491 838175 e consult@hda-enviro.co.uk w www.hda-enviro.co.uk

Landscape Architecture
Masterplanning
Ecology

hda

APPENDIX B

Woodland species lists

Common Name	Latin Name	Ancient Woodland Indicator	Present in Courtland Wood	Present in Two Mile Ash Gill	Present in Smiths Copse
TREE LAYER					
Silver Birch	*Betula pendula*	N	Y		
Ash	*Fraxinus excelsior*	N	Y	Y	Y
Wild Cherry	*Prunus avium*	Y	Y		
Pedunculate Oak	*Quercus robur*	N	Y	Y	Y
Small-leaved Lime	*Tilia cordata*	Y	Y	Y	
SHRUB LAYER					
Black Currant	*Ribes nigrum*	Y			Y
Bramble	*Rubus fruticosus*	N			Y
Field Maple	*Acer campestre*	Y	Y	Y	
Hazel	*Corylus avellana*	N	Y	Y	Y
Midland Hawthorn	*Crataegus laevigata*	Y	Y		Y
Hawthorn	*Crataegus monogyna*	N	Y	Y	Y
Holly	*Ilex aquifolium*	Y	Y	Y	Y
Crab Apple	*Malus sylvestris*	Y	Y	Y	Y
Blackthorn	*Prunus spinosa*	N		Y	Y
Elder	*Sambucus nigra*	N	Y		
Small-leaved Lime	*Tilia cordata*	Y	Y		
Cherry Laurel	*Prunus laurocerasus*	N			Y
GROUND FLORA					
Black Bryony	*Tamus communis*	Y	Y		Y
Bluebell	*Hyacinthoides non-scripta*	Y	Y	Y	Y
Bramble	*Rubus fruticosus*	N	Y		
Broad Buckler-fern	*Dryopteris dilatata*	N	Y		Y
Broad-leaved Willowherb	*Epilobium montanum*	N	Y		
Bush Vetch	*Vicia sepium*	Y	Y		
Butchers Broom	*Ruscus aculeatus*	Y			Y
Cleavers	*Galium aparine*	N			Y
Common Figwort	*Scrophularia nodosa*	N		Y	
Common Male Fern	*Dryopteris filix-mas*	N	Y		
Common Nettle	*Urtica dioica*	N		Y	Y
Cow Parsley	*Anthriscus sylvestris*	N		Y	Y
Creeping Bent	*Agrostis stolonifera*	N	Y	Y	
Creeping Buttercup	*Ranunculus repens*	N	Y		
Dog's Mercury	*Mercurialis perennis*	N	Y	Y	
Early Dog-violet	*Viola reichenbachiana*	Y	Y		
Enchanter's Nightshade	*Circaea lutetiana*	N	Y		Y
Field Rose	*Rosa arvensis*	Y	Y		Y
Foxglove	*Digitalis purpurea*	N	Y		
Garlic Mustard	*Alliaria petiolata*	N	Y	Y	
Germander Speedwell	*Veronica chamaedrys*	N	Y		
Goldilocks Buttercup	*Ranunculus auricomus*	Y	Y		
Greater Stitchwort	*Stellaria holostea*	N	Y		Y
Ground Ivy	*Glechoma hederacea*	N	Y		
Hairy Woodrush	*Luzula pilosa*	Y		Y	
Hedge Woundwort	*Stachys sylvatica*	N			Y
Hemlock Water-dropwort	*Oenanthe crocata*	N	Y		
Herb Robert	*Geranium robertianum*	N	Y		Y
Honeysuckle	*Lonicera periclymenum*	N	Y		Y
Ivy	*Hedera helix*	N	Y		Y
Ivy-leaved Speedwell	*Veronica hederifolia*	N		Y	
Lesser Celandine	*Ficaria verna*	N	Y	Y	Y
Lords-and-Ladies	*Arum maculatum*	N	Y	Y	Y
Pendulous Sedge	*Carex pendula*	Y	Y		Y
Pignut	*Conopodium majus*	Y		Y	
Ramsons	*Allium ursinum*	Y	Y	Y	
Remote Sedge	*Carex remota*	Y			Y
Soft Rush	*Juncus effusus*	N		Y	
Sticky Mouse-ear	*Cerastium glomeratum*	N		Y	
Stinking Iris	*Iris foetidissima*	Y	Y		
Three-nerved Sandwort	*Moehringia trinervia*	Y	Y	Y	
Tufted Hair-grass	*Deschampsia cespitosa*	N	Y		Y
Yellow Archangel	*Lamiastrum galeobdolon*	Y	Y		
Wood Anemone	*Anemone nemorosa*	Y	Y	Y	Y
Wood Avens	*Geum urbanum*	N	Y		Y
Wood Dock	*Rumex sanguineus*	N	Y		
Wood False-brome	*Brachypodium sylvaticum*	N		Y	Y
Wood Meadowgrass	*Poa nemoralis*	Y	Y		
Wood Melick	*Melica uniflora*	Y	Y	Y	Y
Wood Millet	*Millium effusium*	Y	Y		
Wood Sedge	*Carex sylvatica*	Y	Y		Y
Wood Sorrel	*Oxalis acetosella*	Y	Y		
Wood Speedwell	*Veronica montana*	Y	Y	Y	

APPENDIX C

Grassland species lists

					Area A											Area B											Area C										
Common name	**Scientific name**	**Indicator species*:**				**Quadrat references**											**Quadrat references**											**Quadrat references**										
		Semi-improved Grassland	**Lowland Calcareous**	**Lowland Meadow**	**General abundance**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**General abundance**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**General abundance**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Agrimony	*Agrimonia eupatoria*			Y																							R										
Black-grass	*Alopecurus myosuroides*															O	R					R	F	R	O		R						R				
Blackthorn saplings	*Prunus spinosa*																										R										
Broad-leaved Dock	*Rumex obtusifolius*				R																																
Cocksfoot	*Dactylis glomerata*				O			O	F	R	R	O															R										
Couch-grass	*Elymus repens*				O				O		R	R	R																								
Common Bird's-foot-trefoil	*Lotus corniculatus*		Y	Y																																	
Common Nettle	*Urtica dioica*				R					O		R															R										
Common Mouse-ear	*Cerastium fontanum*				R	R	O			R																	R							R			
Common Sorrel	*Rumex acetosa*	Y			R				R																		R										
Common Vetch	*Vicia sativa*				R							R																									
Creeping Bent	*Agrostis stolonifera*				A	A	D	A	F	F	D	A	F	A	O	A	A	F	A	A	A	A	A	D	A	D	F	F	A	F	F	F	F	F	F	F	F
Creeping Buttercup	*Ranunculus repens*				R								R	O		R	R						R				R							R			
Creeping Cinquefoil	*Potentilla reptans*				R							R																									
Creeping Thistle	*Cirsium arvense*				R																						R	O	O						R	O
Curled Dock	*Rumex crispus*				R																																
Cut-leaved Crane's-bill	*Geranium dissectum*				O					O	R	R	R		O	R					R																
Dandelion	*Taraxacum officinale* agg.																										R										
False Oat-grass	*Arrhenatherum elatius*				R						R																										
Field Bindweed	*Convolvulus arvensis*								F	O																											
Greater Bird's-foot-trefoil	*Lotus pedunculatus*			Y																							R										
Hairy Sedge	*Carex hirta*				R									R																							
Hogweed	*Heracleum sphondylium*				R																						R										
Lesser Stitchwort	*Stellaria graminea*																										R			R							
Meadow Buttercup	*Ranunculus acris*	Y			R	R		R					R			O		R	O	R	O		O	R	O	O	O	O	O	O	O		O	R	R	
Meadow Foxtail	*Alopecurus pratensis*				O	R	F		R	R	R			R	O	R	R	R	O								F	F	F	O	F	O	O	R	O	R	
Meadow Vetchling	*Lathyrus pratensis*			Y	R																																
Pedunculate Oak saplings	*Quercus robur*																										R										
Perennial Ryegrass	*Lolium perenne*				O	O	R				R			R	O	A	A	D	F	A	A	A	F	F	F	F	A	F	F	A	F	F	A	F	D	A	F
Red Clover	*Trifolium pratense*	Y																																			
Red Fescue	*Festuca rubra*																										R			O							
Rough Meadow-grass	*Poa trivialis*				O	O	O	R	O		O	R		R		R						R					R				R		F		R		
Smaller Cat's-tail	*Phleum bertolonii*				O			O	R	F		R	F	R	O	R	R	R		R						R	O	R	R	R	O				R	R	
Smooth Meadow-grass	*Poa pratensis*				R							R	O														R							R		R	
Soft Rush	*Juncus effusus*																										R										
Spear Thistle	*Cirsium vulgare*															R																						
Sweet Vernal-grass	*Anthoxanthum odoratum*																										R							F			
Timothy	*Phleum pratense*															R						R															
White Clover	*Trifolium repens*															O	R		O		O		O	R			O	R	O	F	O	O		O		R	O
Wood Dock	*Rumex sanguineus*				R																						R										
Yarrow	*Achillea millefolium*	Y																									R										
Yorkshire Fog	*Holcus lanatus*				A	A	A	A	F	A	O	A	D	A	A	F	A	O	F	F	A	F	F	O	F	O	F	O	F	R		F		F	F	F	F
STATUS**						I	I	I	SPSN	SPSN	SPSN	SPSN	I	I	I		I	I	I	I	I	I	I	I	I	I		I	I	I	I	I	I	I	I	I	I

* Indicators reflect those used for identification of BAP priority grasslands (Natural England Technical Information Note TIN110, June 2012).

** Status determined in accordance with Key 2a Natural England Technical Information Note TIN110, June 2012. SPSN = Species-poor Semi-natural Grassland and I = Species-poor improved grassland

APPENDIX D

UK BAP Priority Habitat Descriptions

UK Biodiversity Action Plan
Priority Habitat Descriptions

Lowland Meadows

From:
UK Biodiversity Action Plan; Priority Habitat Descriptions. BRIG (ed. Ant Maddock) 2008.

This document is available from:
http://jncc.defra.gov.uk/page-5706

For more information about the UK Biodiversity Action Plan (UK BAP) visit
http://www.jncc.defra.gov.uk/page-5155

Please note: this document was uploaded in November 2016, and replaces an earlier version, in order to correct a broken web-link. No other changes have been made. The earlier version can be viewed and downloaded from The National Archives:
http://webarchive.nationalarchives.gov.uk/20150302161254/http://jncc.defra.gov.uk/page-5706

Lowland Meadows

The definition of this habitat remains unchanged from the pre-existing Habitat Action Plan (https://webarchive.nationalarchives.gov.uk/20110303150139/http://www.ukbap.org.uk/UKPlans.aspx?ID=10), a summary of which appears below. Following the 2007 review, occurrences of this habitat on roadside verges are also covered by the definition.

A wide-ranging approach is adopted in this plan to lowland grasslands treated as lowland meadows. They are taken to include most forms of unimproved neutral grassland across the enclosed lowland landscapes of the UK. In terms of National Vegetation Classification plant communities, they primarily embrace each type of *Cynosurus cristatus-Centaurea nigra* grassland, *Alopecurus pratensis-Sanguisorba officinalis* floodplain meadow and *Cynosurus cristatus-Caltha palustris* flood-pasture. The plan is not restricted to grasslands cut for hay, but also takes into account unimproved neutral pastures where livestock grazing is the main land use. On many farms in different parts of the UK, use of particular fields for grazing pasture and hay cropping changes over time, but the characteristic plant community may persist with subtle changes in floristic composition.

In non-agricultural settings, such grasslands are less frequent but additional examples may be found in recreational sites, church-yards, roadside verges and a variety of other localities. Excluded from this plan are maritime grassland communities confined to coastal habitats (which will be covered in maritime cliff and machair action plans), *Anthoxanthum odoratum-Geranium sylvaticum* grasslands (which are treated in a companion action plan for upland hay meadows) and *Molinia-Juncus* pastures (which are covered in the purple moor grass and rush pasture (*Molinia-Juncus*) plan).

As indicated in the Habitat Statement included in *Biodiversity: the UK Steering Group Report, Vol 2* (1995), unimproved neutral grassland habitat has undergone a remarkable decline in the 20th century, almost entirely due to changing agricultural practice. It is estimated that by 1984 in lowland England and Wales, semi-natural grassland had declined by 97% over the previous 50 years to approximately 0.2 million hectares. Losses have continued during the 1980s and 1990s, and have been recorded at 2–10% per annum in some parts of England. Extensive agricultural modification of unimproved grasslands has also been recorded in Scotland between the 1940s and 1970s. Recent conservation survey findings in Britain and Northern Ireland reveal that the impact has been pervasive, and an estimated extent of less than 15,000ha of species-rich neutral grassland surviving today in the UK is given in the Habitat Statement.

The plan concentrates on meadows and pastures associated with low-input nutrient regimes, and covers the major forms of neutral grassland which have a specialist group of scarce and declining plant species. Among flowering plants, these include fritillary *Fritillaria meleagris*, Dyer's greenweed *Genista tinctoria*, green-winged orchid *Orchis morio*, greater butterfly orchid *Platanthera chlorantha*, pepper saxifrage *Silaum silaus* and wood bitter vetch *Vicia orobus*. Lowland meadows and pastures are important habitats for skylark and a number of other farmland birds, notably corncrake which has experienced a major range contraction across the UK.

The overall outcome of habitat change in the lowland agricultural zone is that *Cynosurus - Centaurea* grassland, the mainstream community of unimproved hay meadows and pastures over much of Britain, is now highly localised, fragmented and in small stands. Recent estimates for cover in England and Wales indicate that there is between 5,000–10,000ha of this community in total. There is an especially important concentration in Worcestershire and other particularly important areas include south-west England (Somerset, Dorset and Wiltshire), the East Midlands & East Anglia (Leicestershire, Northamptonshire,

Cambridgeshire and Suffolk), in various parts of Wales and in West Fermanagh and Erne Lakeland in Northern Ireland. In certain areas, such as in the old district of Brecknock in Powys, remnant examples are locally aggregated. Scotland is estimated to have between 2,000–3,000ha of this community, with particular concentrations in the crofting areas of Lochaber, Skye and the Western Isles. Local data for Northern Ireland are less complete, but the West Fermanagh and Erne Lakeland ESA in Northern Ireland contains an important concentration of the resource.

Unimproved seasonally-flooded grasslands are less widely distributed. They have lower overall cover, but there are still a few quite large stands. *Alopecurus-Sanguisorba* flood-meadow has a total cover of <1,500ha and is found in scattered sites from the Thames valley through the Midlands and Welsh borders to the Ouse catchment in Yorkshire. These include well-known but now very rare Lammas meadows, such as North Meadow, Cricklade, and Pixey and Yarnton Meads near Oxford, which are shut up for hay in early spring, cropped in July, with aftermath grazing from early August; nutrients are supplied by flooding episodes in winter. *Cynosurus-Caltha* flood-pasture is also now scarce and localised, with probably <1,000ha cover in England and Wales. Scotland is estimated to have 600–800ha of this community.

It will be important to ensure that such periodically flooded grasslands are taken into account during implementation of the action plan for coastal and floodplain grazing marshes; actions in the two plans need to be closely integrated.

Agricultural intensification has led to the extensive development of nutrient-demanding, productive *Lolium perenne* grasslands. These are managed for grazing and also silage production which has widely replaced traditional hay-making. Where fertiliser input is relaxed or in swards which have only been partially improved, *Lolium-Cynosurus* grassland is common; in many respects this is intermediate between improved and unimproved lowland neutral grasslands but has few uncommon species and is generally of low botanical value.

UK Biodiversity Action Plan
Priority Habitat Descriptions

Lowland Mixed Deciduous Woodland

From:
UK Biodiversity Action Plan; Priority Habitat Descriptions. BRIG (ed. Ant Maddock) 2008.

This document is available from:
http://jncc.defra.gov.uk/page-5706

For more information about the UK Biodiversity Action Plan (UK BAP) visit
http://www.jncc.defra.gov.uk/page-5155

Lowland Mixed Deciduous Woodland

Lowland mixed deciduous woodland includes woodland growing on the full range of soil conditions, from very acidic to base-rich, and takes in most semi-natural woodland in southern and eastern England, and in parts of lowland Wales and Scotland. It thus complements the ranges of upland oak and upland ash types. It occurs largely within enclosed landscapes, usually on sites with well-defined boundaries, at relatively low altitudes, although altitude is not a defining feature. Many are ancient woods and they include the classic examples of ancient woodland studied by Rackham (1980) and Peterken (1981) in East Anglia and the East Midlands. The woods tend to be small, less than 20ha. Often there is evidence of past coppicing, particularly on moderately acid to base-rich soils; on very acid sands the type may be represented by former wood-pastures of oak and birch.

There is great variety in the species composition of the canopy layer and the ground flora, and this is reflected in the range of associated NVC and Stand Types. *Quercus robur* is generally the commoner oak (although *Quercus petraea* may be abundant locally) and may occur with virtually all combinations of other locally native tree species.

In terms of the National Vegetation Classification the bulk of this type falls into W8 (mainly sub-communities a - c in ancient or recent woods; in the lowlands W8d mostly occurs in secondary woodland) and W10 (sub-communities a to d) with lesser amounts of W16 (mainly W16a). Locally, it may form a mosaic with other types, including patches of beech woodland, small wet areas, and types more commonly found in western Britain. Rides and edges may grade into grassland and scrub types.

The canopy variations as represented by the Stand Type system include most of the field maple (2), lime (4, 5), suckering elm (10) and hornbeam (9) Stand Groups, and substantial proportions of the wych elm (1), ash (3) and oak (6) Stand Groups. More rarely, birch (12) and some alder stands (7C) may also occur. These may require separate management treatments.

There are no precise data on the total extent of lowland mixed deciduous woodland in the UK, but in the late 1980s the Nature Conservancy Council estimated the total extent of this type to be about 250,000ha. There is however no doubt that the area of this priority type on ancient woodland sites has declined in area by clearance, overgrazing and replanting with non-native species, by about 30–40% over the last 50 years.

References

Peterken, G.F. (1981) *Woodland conservation and management*. London: Chapman & Hall.

Rackham, O. (1980) *Ancient woodland*. London: Arnold.

APPENDIX E

Natural England Technical Information Note (TIN110)

Natural England Technical Information Note TIN110

Assessing whether created or restored grassland is a BAP Priority Habitat

This guidance note sets out a system to assess whether created or restored grass swards have reached a point where they can be considered species-rich and a Biodiversity Action Plan (BAP) priority habitat. It has been written to allow Natural England advisers and others to systematically judge whether grassland under Environmental Stewardship is achieving, or progressing towards, scheme objectives. These assessments will also enable relevant sites to be added to the lowland grassland habitat inventories and will help quantify Environmental Stewardship's contribution to BAP grassland targets.

Background

The Higher Level Stewardship (HLS) scheme is a major tool in the delivery of Biodiversity Action Plan (BAP) Priority Habitat restoration and expansion targets.

Lowland grassland priority habitat is largely defined by conformity to certain National Vegetation Classification (NVC) types. Whilst high quality examples of unimproved semi-natural grassland will fall clearly within one of the NVC types that define BAP habitat, many grasslands in agri-environment schemes do not.

Grasslands in the process of being restored are likely to be in transition from a non- priority habitat starting point.

In the case of grassland creation on ex-arable or ley grassland sites a sward will have been established from seed, and is unlikely to contain as wide a compliment of species as expected in a long-established semi-natural sward.

Created grassland in Lincolnshire

Priority Habitat definitions

The NVC classes encompassed within each lowland grassland priority habitat definition are shown below in *Appendix 1*, along with relevant Farm Environment Plan (FEP) codes.

First edition 22 June 2012

www.naturalengland.org.uk

Although not priority habitat, NVC communities considered as semi-improved grassland are also listed as these swards are often the starting point for grassland restoration, and assessing progress requires a judgement on where a sward lies on the transition from semi-improved grassland to semi-natural, priority habitat.

Skills required

This assessment system needs to be reasonably rigorous and consistent, while also being accessible to users with moderate botanical identification skills.

As a guide, the identification skills required to complete an assessment equates to a level 3 on the Botanical Society of the British Isles Skills Pyramid.

Assessment tools

The FEP guidance incorporates two keys to assess grassland quality and type. These were developed to identify grassland features to set HLS scheme objectives and to identify appropriate management options. These keys can be seen at *Appendix 2* below and on pages 61 and 70-78 of the FEP handbook. They form the basis for evaluating a grassland feature against BAP priority habitat definitions.

The keys use groups of wildflower indicator species, and the number and frequency of occurrence of these, to identify grassland feature and condition. The indicator species are based on the lists in Common Standards Monitoring guidance for assessing condition of grassland SSSI features (Robertson & Jefferson, 2000), these have been adapted for non-statutory sites (Hewins et al, 2005).

Assessment process

The process of assessing whether a sward in restoration or creation management can be considered to meet priority habitat definitions is similar to that set out in the FEP for identifying grassland features.

The main difference is that for the purposes of an HLS application both good quality and moderate quality (ie with less frequent indicator species) are identified, where as when assessing whether grassland areas should count towards BAP habitat targets only the areas that meet the 'good quality' thresholds of indicator species frequency should be considered.

This recognises that, whilst 'moderate quality' swards may represent progress towards a desired objective, they lack some floristic characteristics of a BAP habitat.

Assessing whether a sward can be considered priority habitat is a 3-step process that can be seen as a key in *Figure 1* on page 8.

Step1

Using FEP key 2a, decide whether the sward meets the species-rich grassland definition or is semi-improved or improved grassland. If the grassland meets the definition of species-rich move to step 2.

Step 2

For grassland identified from key 2a as species-rich, identify the priority habitat to which the sward conforms by using:

- key 2b;
- the associated table of indicator species; and
- knowledge of the site.

If the number and frequency of indicator species meets the habitat-specific threshold set out in the table, the sward can be considered to be good quality priority habitat and move on to step 3.

Where indicator species are below the threshold number and frequency, the sward is of moderate quality. This equates to condition C in the FEP. Further improvement would be needed before such swards can be counted towards BAP habitat restoration or expansion targets, and added to inventories.

Step3

For grasslands that meet the thresholds at step 2, assess the condition against criteria for the feature in the FEP handbook (pages 62-69).

Sites in condition A (all condition criteria met) and B (failing one condition criterion, but meeting the indicator species frequency criterion) are of sufficient quality and floristic diversity to be considered BAP priority habitat, and could be added to the relevant grassland inventory.

Sites in condition C (failing two or more condition criteria) will require further improvement.

Sequence of steps

It is **very important** that the keys are applied in sequence. A sward may meet the threshold for number and frequency of indicator species for a particular priority habitat, but other habitat elements typical of long-established and non-intensively managed grasslands may be absent.

A sward under restoration or creation may, for example, be flower rich but relatively species poor overall, particularly where it has been created using wildflower mixes that have a high proportion of indicator species. Grasslands under restoration may have remnant populations of indicator species, but low cover of wildflowers, or a high cover of agricultural grasses and/or white clover.

Field assessment

The field survey should take place in the summer months (May-August) when most species are in flower and, in the case of meadows, before they are cut for hay (usually July 1st onwards).

The field survey method for assessing Priority Habitats should follow those set out in the FEP manual, pages 56-59. In summary this involves a representative walk through the sward, making observations at a minimum of 10 stops. At each stop estimates are made within a sample 1m^2 area for:

- cover of rye grass and white clover;
- cover of wildflowers and sedges (excluding white clover, creeping buttercup and injurious weeds); and
- total number of species.

Wildflower indicator species from the possible target grassland features, and from semi-improved grassland, are recorded, allowing a frequency to be calculated for each species. For lists of indicator species see *Appendix 2*, Tables B - I; FEP handbook pp 71-78).

Condition criteria, such as the cover of bare ground and of injurious weeds, should also be recorded.

Recording and reporting

Swards under restoration or creation management may be assessed for quality and condition, and progress towards objectives, through a number of mechanisms.

Each holding in HLS should receive an Integrated Site Assessment (ISA) visit, which may target grassland restoration as an assessment priority, during the lifetime of the agreement.

The more strategic Monitoring and Evaluation programme may include sample surveys of priority habitat or sites in certain HLS options, including grassland restoration and creation. The process outlined here can form part of any of these surveys, to assess whether swards meet Priority Habitat definitions and ultimately feed into BAP reporting.

To make the assessment as part of an ISA on a grassland creation or restoration site, it will be necessary to include the three key 2a attributes in the assessment. It is advisable to assess these attributes in a 1 m^2 portion (ie a quarter) of the ISA 2 m^2 quadrat, to ensure consistency with the FEP method. The assessment of indicator species frequency should also be made on this basis, since frequency is scale-dependant. Record species in the 2 m^2 quadrat as per the ISA guidance, but indicate which ones occur in the 1 m^2 portion.

Natural England advisers can report potential habitat inventory additions, via WEBMAP – using the "B" button on the taskbar above the main map screen. This allows details of potential BAP habitat to be emailed in a standard format to the Science, Evidence and Advice Team, who will consult habitat specialists, to consider whether to add the site to the relevant habitat inventory.

Selected references

HEWINS, E.J, PINCHES, C., ARNOLD, J., LUSH, M., ROBERTSON, H & ESCOTT, S. 2005. *The condition of lowland grassland BAP priority grasslands: results from a sample survey of non-statutory sites in England*. English Nature Research Report 636. English Nature, Peterborough.

HEWINS, E.J & WILSON, P. *Results from surveys of agri-environment species-rich grassland and heathland creation and restoration sites*. Natural England Research Report, in preparation.

ROBERTSON, H.J. & JEFFERSON, R.G. 2000. *Monitoring the condition of lowland grassland SSSIs: 1. English Nature's rapid assessment*. English Nature Research Report 315. English Nature, Peterborough.

Further information

Natural England publications are available to download from the Natural England website: **www.naturalengland.org.uk**. In particular see:

- NE264: *Higher Level Stewardship: Farm Environment Plan (FEP) Manual*

For any other information contact the Natural England Enquiry Service on 0300 060 0863 or e-mail **enquiries@naturalengland.org.uk**.

Background information

UK Biodiversity Action Plan
jncc.defra.gov.uk/page-1817

National Vegetation Classification
jncc.defra.gov.uk/page-4259

Botanical Society of the British Isles (BSBI)
www.bsbi.org.uk/

Acknowledgments

This information note builds on the findings and experience from two studies which evaluated the success of grassland restoration and creation, led by Eleanor Hewins and Phil Wilson, and an initial discussion document by Clare Pinches on the consistent identification of priority habitat using the FEP keys. It has been compiled by David Martin, with contributions from Richard Jefferson, Steve Peel and Andy Nisbet. Editor Susie Smith, photograph Barry Wilkinson.

Copyright

Appendix 1: Relationship between FEP grassland feature codes, UK BAP grassland priority habitat types and definitive NVC types

Table A

HLS code	UKBAP name	Principal NVC stand types
G02	Semi-improved grassland	MG1 false-oat grassland MG6 perennial rye-grass – crested dog's-tail grassland MG9 Yorkshire fog-tufted hair-grass grassland MG10 Yorkshire fog-soft rush grassland
G04	Lowland calcareous grassland	CG1 sheep's fescue – carline thistle grassland CG2 sheep's fescue – meadow oat-grass grassland CG3 upright brome grassland CG4 tor grass grassland CG5 upright brome – tor grass grassland CG6 hairy oat-grass grassland CG7 sheep's fescue – mouse-ear hawkweed – thyme grassland CG8 blue moor-grass – small scabious grassland CG9 blue moor-grass – limestone bedstraw grassland
G05	Lowland dry acid grassland	U1 common bent – sheep's sorrel grassland U2 wavy hair-grass grassland U3 bristle bent grassland U4 sheep's fescue – common bent – heath bedstraw grassland
G06	Lowland meadows	MG4 meadow foxtail – great burnet grassland MG5 crested dog's-tail – black knapweed grassland MG8 crested dog's-tail – marsh marigold grassland
G07	Purple moor-grass and rush pastures	M22 blunt-flowered rush – marsh thistle fen meadow M23 soft rush/sharp-flowered rush – marsh bedstraw rush-pasture M24 purple moor-grass – meadow thistle fen meadow M25 purple moor-grass – tormentil mire M26 purple moor-grass – marsh hawksbeard mire
G09	Upland hay meadows	MG3 sweet vernal-grass – wood cranesbill grassland Upland forms* of MG8 crested dog's-tail – marsh marigold grassland

* Upland forms of MG8 can be defined by 1) co-occurrence with MG3 2) Altitude and geographical location – the average altitude for MG8 is 400m and most occur above 360m 3) Occurrence of certain northern/boreal plant species such as *Trollus europaeus, Crepis paludosa.*

Appendix 2: The Farm Environment Plan keys

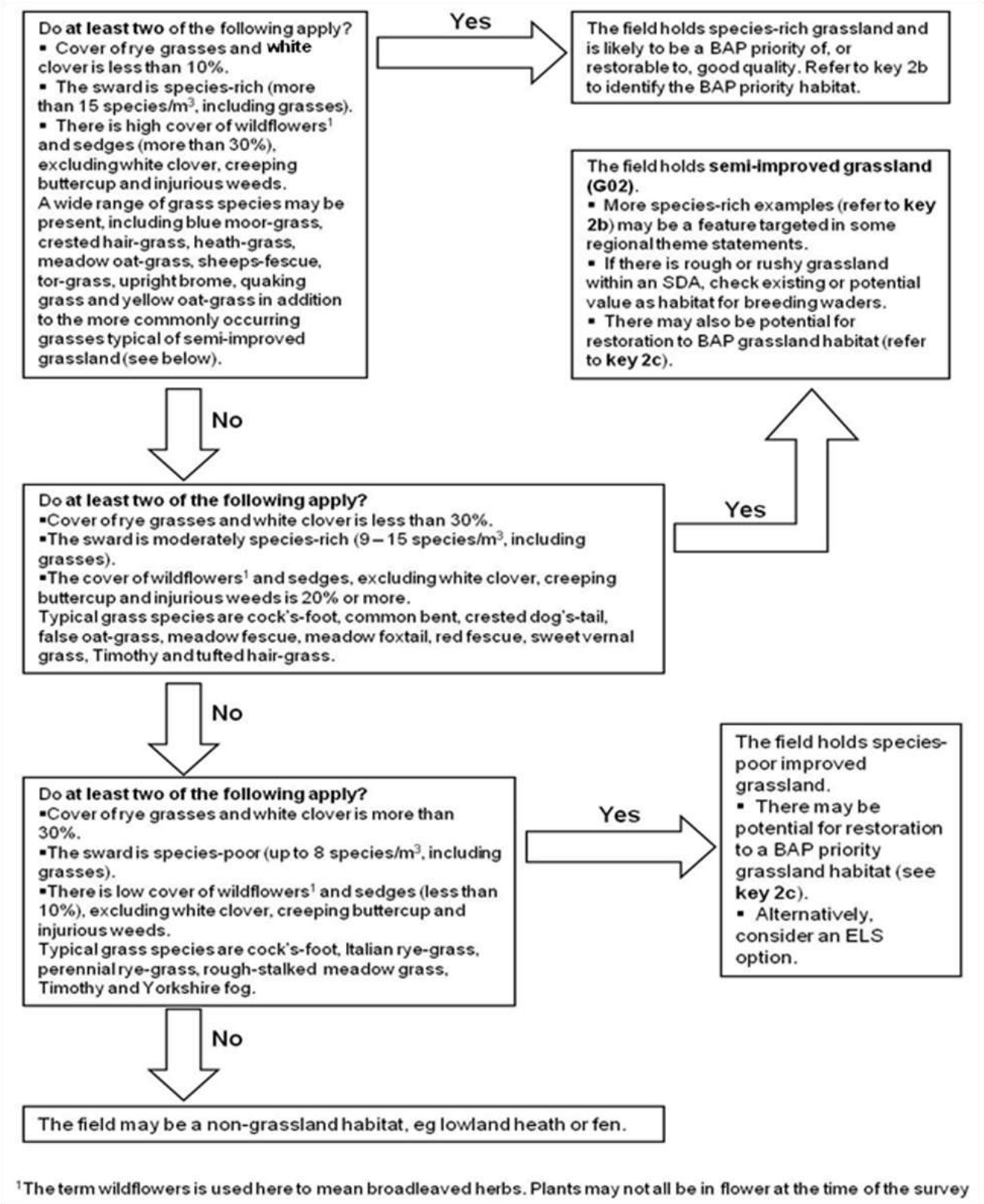
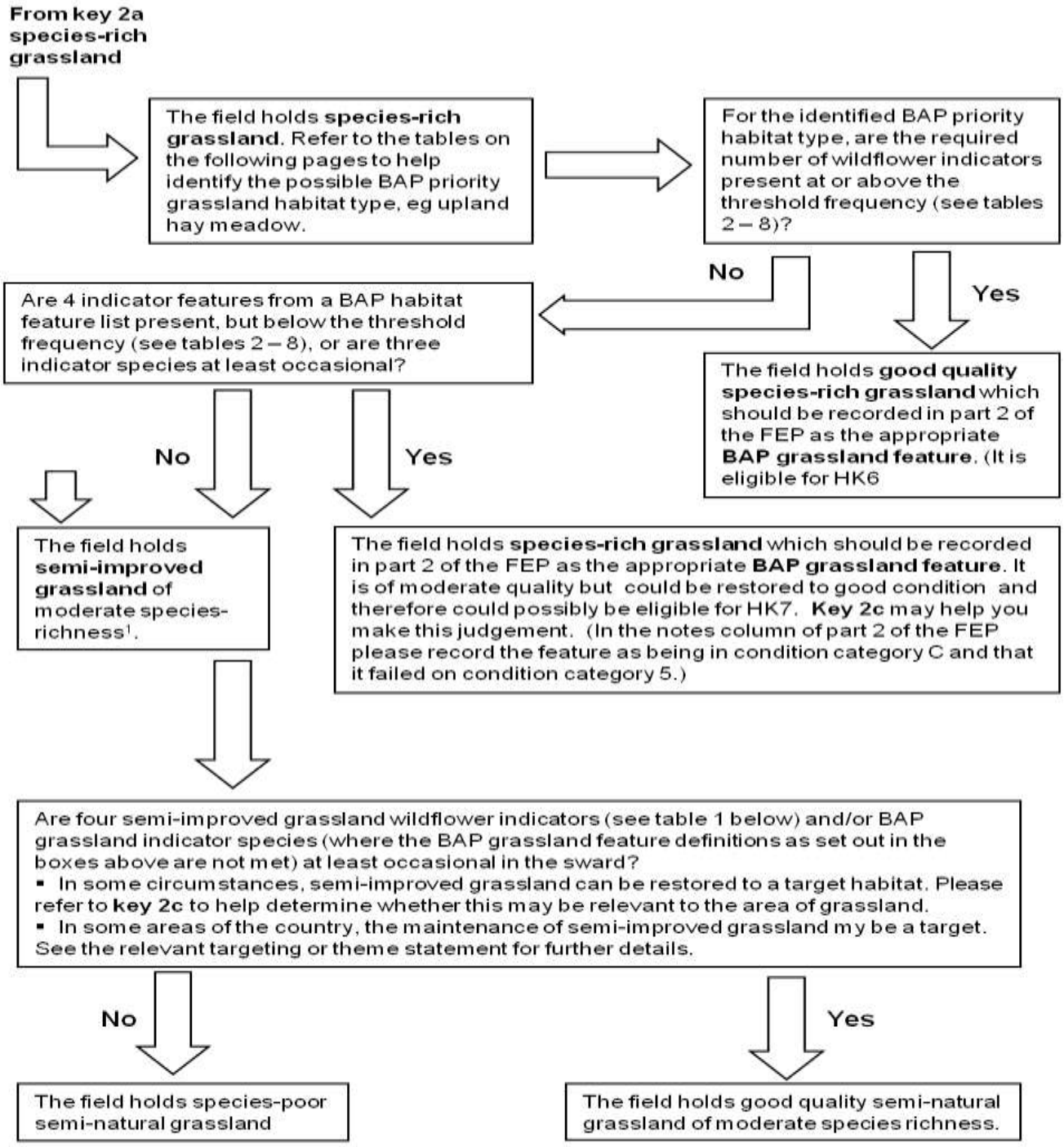


Figure A Key 2a – Key to identify semi-improved (G02) and species-rich grasslands



[1] In wet grassland with a bulky sward which includes a number of wildflowers and occasional to frequent rushes and sedges, and where cover of rye grasses and white clover is less than 10%, check for the number and frequency of indicator species of purple moor-grass and rush pasture, and lowland meadow and pasture and record as such if the criterion is met. In such swards, there may be fewer than 25 species per square metre and less than 30% cover of wildflowers and sedges, so the grassland may be identified as semi-improved in Key 2a.

Figure B Key 2b – Key to identify BAP grassland features

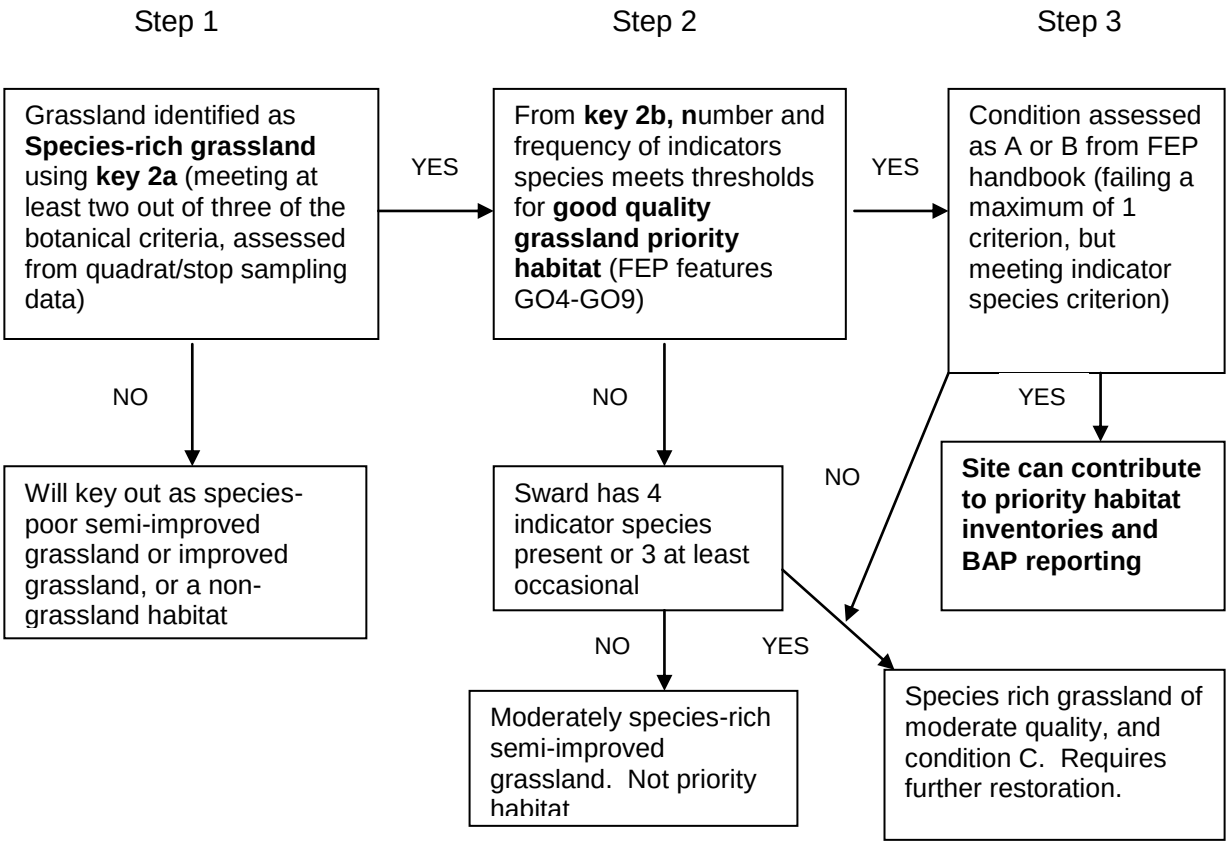


Figure C Flow diagram of process for grassland priority habitat determination

Table B G02 – Semi-improved grassland

Soils and topography	Wildflower indicator species	Species abundance threshold	Typical grasses (do not count as indicator species)
Found on a wide range of soil types and conditions, often derived from species-rich grassland following agricultural improvement. Moderately species-rich, with typically 8-15 species/m2. Total cover of wildflowers and sedges usually less than 30%, excluding white clover, creeping buttercup and injurious weeds. Rye-grass cover generally less than 25%.	Autumn hawkbit Black medick Cuckoo flower Bulbous buttercup Common cat's-ear Common sorrel Field wood-rush Germander speedwell Lesser trefoil Ribwort plantain Meadow buttercup Red clover Selfheal Yarrow	At least four occasional in the sward. A limited number of indicator species from BAP grassland habitats may be present, and may be only rare or localised in the sward. Can substitute for semi-improved indicator if at least occasional.	Cock's-foot Common bent Crested dog's-tail Creeping bent False oat-grass Meadow fescue Meadow foxtail Red fescue Sweet vernal grass Timothy Tufted hair-grass Yorkshire fog

Table C G04 – BAP habitat Lowland calcareous grassland

Soils and topography	Wildflower indicator species	Species abundance threshold	Typical grasses (do not count as indicator species)
Calcareous soils over chalk and limestone in the lowlands and enclosed upland fringe, generally below 300 m. See note to G08 Upland calcareous grassland.	Betony Bird's-foot-trefoil Bloody crane's-bill Carline thistle Clustered bellflower Common rock-rose Cowslip Dropworts Devil's-bit scabious Eyebright Fairy flax Field scabious Gentians Greater knapweed Hairy violet Harebell Hoary plantain Hoary rock-rose Horseshoe vetch Kidney vetch Lady's bedstraw Marjoram Milkworts Mouse-ear hawkweed Orchids Ox-eye daisy Purple milk-vetch Restharrow Rough/lesser hawkbit Salad burnet Saw-wort Small scabiuos Squinancywort Stemless thistle Thyme-leaved sandwort Wild basil Wild thyme Yellow-wort	At least two frequent and three occasional in the sward. If either three indicator species are occasional or four are present (but not limited to field corners or edges) then record this as G04 in condition C. Record as failing condition 5 in the notes column.	Blue moor-grass Cock's-foot Common bent Crested hair-grass Hairy oat-grass Quaking-grass Sheep's fescue Tor-grass Upright brome Yellow oat-grass

Table D G05 – Lowland dry acid grassland: BAP habitat

Soils and topography	Wildflower indicator species	Species abundance threshold	Typical grasses (do not count as indicator species)
Acid soils in the lowlands and enclosed upland fringe. Some sites may be species-poor (dominated for example by bristle bent or wavy hair-grass). However, lowland acid grassland is a scarce resource and any site outside the SDA is likely to be considered of high value. Lichens and mosses may be prominent.	Bell heather Betony Bilberry Brid's-foot-trefoil Biting stonecrop Bitter-vetch Blue fleabane Buck's-horn plantain Common centaury Common rock-rose Common stork's-bill Devil's-bit scabious Harebell Heath bedstraw Heath speedwell Heather Lady's bedstraw Lichens Lousewort Maiden pink Milkworts Mouse-ear hawkweed Parsley pierts Pignut Purple milk-vetch Rough/lesser hawkbit Saw-wort Sheep's-bit Sheep's sorrel Shepherd's-cress Thymes Tormentil Violets Wild strawberry Wood anemone Wood sage	At least one frequent and three occasional in sward. If either three indicator species are occasional or four are present (but not limited to field corners or edges) then record this as G05 in condition C. Record as failing condition 5 in the notes column.	Bristle bent Common bent Early hair-grass Heath-grass Sheep's fescue Sweet vernal grass Wavy hair-grass

Note: Acid grassland is widespread above the Moorland Line where it exists largely as extensive species-poor communities on the open fell or enclosed rough grazing. In such situations it should be recorded as M01 – Grass moorland and rough grazing. Where it is species-rich and enclosed it should be treated as lowland. Such sites would generally be dominated by sheep's fescue and common bent, with a high proportion of herbs such as betony, bitter-vetch, devil's-bit scabious, harebell, heath bedstraw, lady's bedstraw and mountain pansy.

Some acid grassland sites may form part of a heathland mosaic, or have the potential for heathland restoration or creation. Where the cover of dwarf shrub is greater than 25%, the vegetation is considered to be heathland.

Table E G06 – Lowland meadows: BAP habitat

Soils and topography	Wildflower indicator species	Species abundance threshold	Typical grasses (do not count as indicator species)
Free-draining neutral soils in the lowlands and upland fringes, including species-rich flood plain grasslands. (If there is high rush cover, go to Table F.)	Agrimony **Autumn hawkbit** Betony Bird's-foot-trefoil Bitter vetch Black knapweed Bugle Burnet saxifrage C**ommon bistort** **Common meadow-rue** Cowslip **Devil's-bit scabious** Dropwort Dyer's greenweed Eyebright Field scabious Goat's-beard **Great burnet** Greater bird's-foot-trefoil Lady's bedstraw Lady's mantles Marsh/fen bedstraw Marsh marigold Marsh valerian Meadow vetchling M**eadowsweet** Milkworts **Narrow-leaved water-dropwort** Orchids Ox-eye daisy **Pepper saxifrage** Pignut Ragged robin Rough hawkbit Salad burnet Saw-wort Sneezewort Tormentil Water avens Water mint Wood anemone Yellow rattle Small blue-green sedges (glaucous, common, carnation)	At least two frequent and two occasional in the sward, or, for flood plain meadows, one frequent **bold** species and three occasional. If three indicator species are occasional or four are present at lower frequencies (but not limited to field corners or edges), then record as G06 in condition C. Record as failing condition 5 in the notes column.	Cock's foot Common bent Crested dog's-tail Meadow fescue Red fescue Sweet vernal grass Yellow oat-grass Yorkshire fog

Table F G07 – Purple moor-grass and rush pastures: BAP habitat

Soils and topography	Wildflower indicator species	Species abundance threshold	Typical grasses (do not count as indicator species)
Pastures dominated by purple moor-grass of jointed rushes on poorly draining, neutral or mildly acidic soils of the lowlands and upland fringe. Associated with springs, seepage lines and slopes surrounding waterlogged depressions and hollows. Usually grazed but some sites may be cut for hay.	Bog asphodel Bog mosses Bog pimpernel Bugle Common valerian Cross-leaved heath Devil's-bit scabious Globeflower Greater burnet Greater bird's-foot-trefoil Hemp agrimony Jointed rushes Lesser spearwort Lesser water-parsnip Lousewort Marsh/fen bedstraw Marsh cinquefoil Marsh hawk's-beard Marsh marigold Marsh pennywort Marsh valerian Marsh violet Meadow rue Meadow thistle Meadowsweet Orchids Ragged robin Rough hawkbit Saw-wort Sneezewort Tormentil Water avens Water mint Whorled caraway Wild angelica Small blue-green sedges (glaucous, common, carnation)	At least two frequent and two occasional in the sward, or where purple moor-grass is frequent, at least one frequent and three occasional. If either three indicator species are occasional or four are present (but not limited to field corners or edges), then record this as G07 in condition C. Record as failing condition 5 in the notes column.	Creeping bent Crested dog's-tail Floating sweet-grass Marsh foxtail Purple moor-grass Red fescue Sweet vernal grass Yorkshire fog

Note: It can be difficult to separate this habitat from other fen habitats. In G07 – purple moor-grass and rush pastures – BAP habitat, grasses generally make a greater contribution to the sward than in the other fen habitats and there is usually a history of management as grazed pasture. Swards dominated by tall herbs such as meadowsweet and yellow iris and/or tall tussocky sedges should be considered as fen. More open valley mire habitats with low cover of grasses and characterised by bog-mosses, dwarf shrubs, cotton grasses, small sedges and sundews should similarly be considered as fens, or, if on unenclosed moorland, as the FEP feature M08 – Upland flushes, fens and swamps – BAP habitat. G07 can occur on the upland fringes and above the

Moorland Line, but should not be confused with species-poor, rush-dominated flushes or rush pastures, which lack most of the wildflower indicator species.

Table G G08 – Upland calcareous grassland: BAP habitat

Soils and topography	Wildflower indicator species	Species abundance threshold	Typical grasses (do not count as indicator species)
Calcareous soils over Carboniferous limestone in enclosed upland areas, generally above 300m. Large-scale enclosures in the Pennines of North Yorkshire, Durham and Cumbria.	Bird's-eye primrose Bird's-foot-trefoil Carline thistle Common butterwort Common rock-rose Dropworts Devil's-bit scabious Eyebrights Fairy flax Gentians Grass of Parnassus Harebell Hoary rock-rose Hoary whitlowgrass Horseshoe vetch Lesser club-moss Mossy saxifrage Mountain everlasting Mouse-ear hawkweed Rough hawkbit Salad burnet Small scabious Squinancywort Wild thyme Yellow saxifrage Small sedges (spring, flea, glaucous, carnation)	At least one frequent and three occasional in the sward. If either three indicator species are occasional or four are present (but not limited to field corners or edges), then record this as G08 in condition C. Record as failing condition 5 in the notes column.	Blue moor-grass Common bent Crested hair-grass Meadow oat-grass Red fescue Sheep's fescue Sweet vernal grass Quaking-grass

Note: In the upland fringe, some enclosed swards on south-facing valley sides, particularly on deeper soils, may have many of the indicators of G06 – Lowland meadows – BAP habitat and G04 – Lowland calcareous grassland – BAP habitat, and may be considered as examples of the latter.

Table H G09 – Upland hay meadows: BAP habitat

Soils and topography	Wildflower indicator species	Species abundance threshold	Typical grasses (do not count as indicator species)
Free-draining or moist neutral soils in the North Pennine and Cumbrian uplands, largely cut for hay.	Bird's-foot-trefoil Black knapweed Bugle Burnet saxifrage Common bistort Devil's-bit scabious Globeflower **Eyebrights** **Great burnet** Hawkbits **Lady's mantles** Marsh marigold Marsh valerian Meadow vetchling Meadowsweet Melancholy thistle Orchids **Pignut** Ragged robin Sawwort Sneezewort Tormentil Water avens Wood anemone Wood crane's-bill Yellow rattle Small blue-green sedges (glaucous, common, carnation)	At least two frequent and two occasional in the sward, or, for wet meadows, at least one frequent and three occasional. If three indicator species are at least occasional or four are present (but not limited to field edges or corners), then record as G09 in condition C. Record as failing condition 5 in the notes column.	Cock's-foot Common bent Crested dog's-tail Red fescue Rough-stalked meadow-grass Soft brome Sweet vernal grass Yorkshire-fog

Note: Many indicators are common to both upland and lowland neutral grassland, and the two types can occur in the same geographical area. In the absence of strict upland hay meadow indicators, a high frequency of those species in **bold** would indicate G09 – Upland hay meadows – BAP habitat.

Table I G10 – Calaminarian grassland

Soils and topography	Wildflower indicator species	Species abundance threshold	Typical grasses (do not count as indicator species)
Gravels and spoil from mineral extraction and ultrabasic exposures.	Alpine penny-cress Mountain pansy Pyrenean scurvygrass Sea campion Spring sandwort Thrift	Any indicators, singly or together, at least occasional in the sward. If none of these species is found then record as G10 in condition C. Record as failing condition 5 in the notes column.	Common bent Red fescue Sheep's fescue Sweet vernal grass

Note: G10 is generally associated with lead mine spoil and outcropping mineral veins in the upland fringes of northern and western England, and with river gravels arising from mining activity. Mineral veins are largely found within the Carboniferous limestones of the North Pennines and Yorkshire Dales, Derbyshire, Cornwall, and the Mendips. Serpentine soils rich in metals such as nickel and chromium will support similar vegetation.