



West Winch Housing Access Road

Environmental Statement Chapter 8 Annex 8.2 National Vegetation Classification Survey Report

Author: WSP

Document Reference: NCC/3.08.06

Version Number: 01

Date: November 2023



Contents

1	National Vegetation Classification Survey Report.....	3
1.1	Methodology.....	3
1.2	Overview.....	11
1.3	References.....	25



1 National Vegetation Classification Survey Report

1.1 Methodology

Overview

- 1.1.1 Areas of homogeneous vegetation, (homogeneous vegetation exhibits a uniform character across a specified area. It is generally comprised of a suite of species which occur regularly across the area, with very few patches possessing atypical vegetation structure or species), within the Scheme Boundary were subject to NVC surveys on 6th and 7th July 2021 by a WSP ecologist who is accomplished in botanical surveys, as per the Chartered Institute of Ecology and Environmental Management (CIEEM) Competency Framework (2019). The methodology employed for the NVC surveys followed the methods outlined in Rodwell, 2006.
- 1.1.2 Homogeneous stands of vegetation were first identified using visual inspection and surveyor experience, gained within similar habitats. Sample quadrats were then located in these homogeneous areas. This inevitably involved some surveyor bias but avoided problems of the arrangement of random samples and incorporating obvious vegetation boundaries (ecotones) or unrepresentative floristic features. The field data were analysed, and the vegetation present was assigned, where possible, to an NVC vegetation community published in British Plant Communities (Rodwell *et al.*, 1991, 1992, and 2000).
- 1.1.3 Where the vegetation was in narrow strips, heavily disturbed or modified, and could not be characterised as a homogeneous stand, quadrat sampling would not have been appropriate. Vegetation within these areas was assessed as a 'whole stand', and a qualitative assessment was made of the vegetation communities present.
- 1.1.4 Where mosaics, (mosaics comprise vegetation of more than one community type, which occur repeatedly across the sampling area at a very small scale, forming a patchwork of community types which are too small to individually



map) of vegetation occurred and mapping of different small-scale communities was not practical, quadrats were placed within each type of homogeneous vegetation present. The extent of different communities found to be present was then estimated as a percentage of the total sampling area which contained the mosaic.

Quadrat Size

1.1.5 Throughout the NVC surveys, the size of the sampling quadrats was selected appropriately to match the scale of the vegetation being sampled. The following quadrat dimensions were employed:

- 2 metre (m) x 2m for short, herbaceous vegetation/grassland communities; and
- 4m x 4m for taller herbaceous vegetation/grassland communities.

1.1.6 Due to their small size and disturbed nature, woodland stands within the Scheme Boundary were not sampled using nested quadrats (whereby the canopy, understorey and ground layers are sampled using different sized quadrats, with the smaller quadrats contained within the larger quadrats). Small areas of woodland were assessed as a 'whole stand', and a qualitative assessment was made of the vegetation communities present.

Measuring Abundance

1.1.7 Within each quadrat a quantitative measure of the abundance of each species of vascular plant and bryophyte recorded using the Domin scale. Cover was assessed by eye as a vertical projection on to the ground of all live, above-ground parts of the plants within the quadrat. The Domin scale categories are presented below:

- Cover of 91-100% is recorded as Domin 10;
- Cover of 76-90% is recorded as Domin 9;
- Cover of 51-75% is recorded as Domin 8;
- Cover of 34-50% is recorded as Domin 7;



- Cover of 26-33% is recorded as Domin 6;
- Cover of 11-25% is recorded as Domin 5;
- Cover of 4-10% is recorded as Domin 4;
- Cover of <4% with many individuals is recorded as Domin 3;
- Cover of <4% with several individuals is recorded as Domin 2; and
- Cover of <4% with few individuals is recorded as Domin 1.

1.1.8 Frequency was used in conjunction with abundance when determining the community type, either using dichotomous keys within “British Plant Communities” (Rodwell *et al.*, 1991, 1992, and 2000) or the MATCH (v.2.16) computer program (University of Lancaster, 2000). Roman numerals I-V are used to measure frequency with:

- I signifying a species present in 1-20% of samples (scarce);
- II signifying a species present in 21-40% of samples (occasional);
- III signifying a species present in 41-60% of samples (frequent);
- IV signifying a species present in 61-80% of samples (constant); and
- V signifying a species present in 81-100% of samples (constant).

1.1.9 Floristic tables were compiled from the quadrat data, showing the range of Domin scores of each species, and its frequency class within the community. Species occurring at frequencies of IV and V are described as constants within the community, while species occurring at other frequencies are described as companions.

Determining Vegetation Community Type

1.1.10 Shortlists of possible communities were identified using the MATCH (v.2.16) computer program. This program compares the survey data with floristic tables of NVC communities. The shortlists were subsequently refined using NVC keys and the appropriate community descriptions as given in “British



Plant Communities” volumes 1, 3 and 5 (Rodwell *et al.*, 1991, 1992, and 2000).

- 1.1.11 The coefficient of similarity generated by MATCH (calculated as a percentage) was used to improve the confidence with which data collected could be assigned to a particular NVC community. In line with the published guidance, however, the MATCH assessments were not used in isolation: a combination of the keys and descriptions within the published NVC handbooks, MATCH assessment, and surveyor experience was used to determine community types.
- 1.1.12 Within this report, MATCH coefficients below 40% were considered to represent particularly poor fits, while those over 50% were considered particularly good fits. Coefficients between 40% and 49% inclusive were not considered to provide a definitive result with confidence, and in these cases, the published keys and descriptions, plus surveyor experience was used as a favoured method. In some cases, even particularly good fits for MATCH assessments were disregarded where the result was not considered to be a true reflection of the existing conditions by the surveyor. This judgement may have been made because of the absence of one or more species at the survey site, which are normally constant species within the community with the highest percentage similarity coefficient, using the MATCH program.

Habitats of Principal Importance

- 1.1.13 To assess whether grassland habitats qualify as HPI (formerly UK BAP habitats) it is necessary to compare species present with published lists of wildflower indicator species or to compare the NVC community present with those listed within the UK BAP Priority Habitat descriptions as constituting lowland meadows or Purple Moor-grass and rush pastures HPI (BRIG (ed. Ant Maddock (2008)).
- 1.1.14 Lists of indicator species for a range of grasslands and rush-dominated habitats are contained within the Higher Level Stewardship (HLS) Farm Environment Plan (FEP) Manual (Natural England, 2010). The species lists



within the FEP, along with tables of condition assessment criteria, are used to evaluate habitat condition as part of an HLS application, relating to the overall environmental interest of a farm site. The species lists can also be used for non-farm sites, to provide standardised lists of indicator species for different HPIs.

1.1.15 The definition of lowland meadows HPI is taken to include most forms of unimproved neutral grassland across the enclosed lowland landscapes of the UK. In terms of NVC communities, they primarily include:

- MG4 *Alopecurus pratensis* – *Sanguisorba officinalis* grassland;
- MG5 *Cynosurus cristatus* – *Centaurea nigra* grassland; and
- MG8 *Cynosurus cristatus* – *Caltha palustris* grassland.

1.1.16 Purple Moor-grass and rush pastures HPI consists of various species-rich types of mire, fen meadow and rush pasture, with the main NVC communities including:

- MG10 *Holcus lanatus* – *Juncus effusus* rush pasture;
- M22 *Juncus subnodulosus* – *Cirsium palustre* fen-meadow;
- M23 *Juncus effusus/acutiflorus* – *Galium palustre* rush-pasture;
- M24 *Molinia caerulea* – *Cirsium dissectum* fen-meadow;
- M25 *Molinia caerulea* – *Potentilla erecta* mire; and
- M26 *Molinia caerulea* – *Crepis paludosa* mire.

1.1.17 The definition of lowland mixed deciduous woodland HPI includes woodland growing on the full range of soil conditions, from very acidic to base-rich, and takes in most semi-natural woodland in lowland England (BRIG (ed. Ant Maddock (2008))). The majority of lowland mixed deciduous woodland HPI belongs to either the:



- W8 *Fraxinus excelsior* - *Acer campestre* - *Mercurialis perennis* woodland community, or the
- W10 *Quercus robur* - *Pteridium aquilinum* - *Rubus fruticosus* woodland community.

1.1.18 Wet woodland HPI occurs on poorly drained or seasonally wet soils, usually with Alder *Alnus* spp., Birch *Betula* spp. and Willow *Salix* spp. as the dominant tree species. It is found on floodplains, as successional habitat on fens, mires and bogs, along streams and hill-side flushes, and in peaty hollows. These woodlands occur on a range of soil types including nutrient-rich mineral and nutrient-poor organic soils. In terms of NVC plant communities, wet woodland includes:

- W1 *Salix cinerea* - *Galium palustre* woodland;
- W2 *Salix cinerea* - *Betula pubescens* - *Phragmites australis* woodland;
- W3 *Salix pentandra* - *Carex rostrata* woodland;
- W4c *Betula pubescens* - *Molinia caerulea* woodland - *Sphagnum* sub-community;
- W5 *Alnus glutinosa* - *Carex paniculata* woodland;
- W6 *Alnus glutinosa* - *Urtica dioica* woodland; and
- W7 *Alnus glutinosa* - *Fraxinus excelsior* - *Lysimachia nemorum* woodland.

1.1.19 Hedgerows are defined as any boundary line of trees or shrubs over 20m long and less than 5m wide, where any gaps between the trees or shrub species are less than 20m wide. All hedgerows consisting predominantly (i.e., 80% or more cover) of at least one woody UK native species are considered as hedgerows HPI.



Norfolk BAP Criteria

1.1.20 The lowland meadows and pastures Habitat Action Plan (HAP) (NWT, 2007) within the Norfolk BAP (NBP, 1996) adopts a wide-ranging approach 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, including grasslands which would comprise coastal and floodplain grazing marsh HPI/coastal and floodplain grazing marsh Norfolk HAP (NE, 2005) (MG11, MG12 and MG13). In terms of NVC plant communities, the HAP specifically includes:

- MG5 *Cynosurus cristatus* - *Centaurea nigra* grassland;
- MG8 *Cynosurus cristatus* - *Caltha palustris* grassland;
- MG11 *Festuca rubra* - *Agrostis stolonifera* - *Potentilla anserina* grassland;
- MG12 *Schedonorus arundinaceus* grassland; and
- MG13 *Agrostis stolonifera* - *Alopecurus geniculatus* grassland.

1.1.21 Representative species lists for each of these NVC communities are included within the HAP. The plan does not cover improved or semi-improved grassland, or re-created grassland that is species poor.

1.1.22 Within the Norfolk BAP there is no HAP for Purple Moor-grass and rush pastures.

1.1.23 The lowland mixed deciduous woodland HAP (NCC, 2006) within the Norfolk BAP adopts a similar definition of lowland mixed deciduous woodland as the definition used for HPI, whereby all areas of trees, shrubs and associated ground flora are included, except for wood-pasture and wet woodlands (NCC, 2005), which have their own Norfolk HAPs.

1.1.24 The wet woodland HAP (NCC, 2005) within the Norfolk BAP adopts a similar definition of wet woodland as the definition used for HPI, stating that “wet woodlands occur on land that is waterlogged or on seasonally waterlogged



soils. They are frequently associated with river valleys, flood plains, flushes and plateau woodlands”.

1.1.25 Wet woodland NVC communities that are likely to occur in Norfolk include:

- W1 *Salix cinerea* - *Galium palustre* woodland;
- W2 *Salix cinerea* - *Betula pubescens* - *Phragmites australis* woodland;
- W4c *Betula pubescens* - *Molinia caerulea* woodland - *Sphagnum* sub-community;
- W5 *Alnus glutinosa* - *Carex paniculata* woodland;
- W6 *Alnus glutinosa* - *Urtica dioica* woodland;
- W7 *Alnus glutinosa* - *Fraxinus excelsior* - *Lysimachia nemorum* woodland (only 9 hectares (ha) of this community is known in Norfolk); and
- W8 *Fraxinus excelsior* - *Acer campestre* - *Mercurialis perennis* woodland on floodplain. (These stands are found on floodplains as successional habitats on fens and mires, along rivers and streams, by flushes and in peaty hollows. The wet woodlands on the Boulder Clay in Norfolk tend to be considered as part of the W8 community and are included in the lowland mixed deciduous woodland HAP).

1.1.26 The hedgerows HAP (NCC, 2009) within the Norfolk BAP uses the same criteria as that used to define hedgerows HPI i.e., any boundary line of trees or shrubs over 20m long and less than 5m wide, where any gaps between the trees or shrub species are less than 20m wide and 80% cover of at least one woody UK native species.

Taxonomy

1.1.27 Names of vascular plants follow Stace (2019) with bryophytes following Hill et al. (2008).



Notes and Limitations

- 1.1.28 There were no significant limitations to the survey. The quadrat sampling was undertaken during the optimal time of year for botanical surveys, when most species present within the survey areas would have been evident.
- 1.1.29 Full access was available for most of the land within the (previous) Scheme Boundary. The only exception to this was for Areas 1 and 2 where access was not granted for the NVC survey but this was overcome by viewing the areas through boundary fences and hedges.
- 1.1.30 As the survey was undertaken over a total of only two days in July 2021, it is possible that some species which are more evident at other times of year have been missed. However, the survey was adequate to meet the aims of classifying NVC habitat types and assessing the importance of the habitats.
- 1.1.31 Small scale mapping of vegetation extents was not practical to undertake where communities occurred in very close proximity as intricate mosaics (e.g., within Area 3). In these instances, the individual communities were described and assigned to an NVC type and were then given a percentage coverage score within prescribed areas. This methodology is widely used within NVC surveys and was adequate to meet the aims of classifying NVC habitat types and assessing the importance of the habitats.

1.2 Overview

- 1.2.1 Floristic tables for all sampling compartments are shown in Appendix A (Tables A: 1-7). The extent of the Proposed Scheme and the extent of the NVC community areas surveyed is shown in Appendix B (this has been updated with the latest Scheme Boundary (October 2023)) presented, with representative photographs of habitats within these areas shown in Appendix C. Indicator species for NVC communities included within the Norfolk lowland meadows and pastures HAP are shown in Appendix D, which also references tables of lowland meadows and Purple Moor-grass and rush pastures indicator species within FEP. The results of the NVC survey analysis for each area are given below. Where reference is made to NVC community types,



these are based on the published keys and community accounts within Rodwell *et al.* (1991, 1992 and 2000).

Area 1

Neutral grassland located within the north of the Scheme Boundary, east of the Dragonfly Hotel and south-west of Hardwick Roundabout – MG1a *Arrhenatherum elatius* grassland – *Festuca rubra* sub-community

- 1.2.2 This area was not subject to quadrat sampling as access to the land parcel was not granted during the time of the survey. The area was assessed through a post and wire fence, adjacent to a publicly accessible grass verge.
- 1.2.3 The grassland between the boundary fence and the hotel had not been recently mown or grazed, appeared homogeneous (Photograph 1) and was dominated by dense False Oat-grass *Arrhenatherum elatius*. Scattered tussocks of Cock's-foot *Dactylis glomerata* were present and there were localised patches of Common Bent *Agrostis capillaris* and Smaller Cat's-tail *Phleum bertolonii* with more extensive areas of Yorkshire Fog *Holcus lanatus* and Red Fescue *Festuca rubra*. Forbs (a forb is an herbaceous (non-woody) flowering plant that is not a graminoid (grass, sedge or rush)) were scarce within the sward with only Ground Ivy *Glechoma hederacea*, Yarrow *Achillea millefolium*, Lesser Stitchwort *Stellaria graminea*, Common Vetch *Vicia sativa*, Cleavers *Galium aparine* and Dove's-foot Crane's-bill *Geranium molle* visible from the fence.
- 1.2.4 This grassland is a good match for the MG1a *Arrhenatherum elatius* grassland – *Festuca rubra* sub-community. The MG1a sub-community is generally grass-dominated, including constant Red Fescue, and is typically very species-poor. It often develops on newly created grasslands and road verges, where Cock's-foot and False Oat-grass gradually increase within the sward, due to cessation or reduction of mowing. These two tussock-forming grasses start to overcome the previous dominance of Red Fescue, which is an important component in most neutral grassland seed mixes.



Area 2

Field to the south of Hardwick Roundabout – MG1b *Arrhenatherum elatius* grassland – *Urtica dioica* sub-community and OV24b *Urtica dioica* – *Galium aparine* community – *Arrhenatherum elatius* – *Rubus fruticosus* agg. sub-community

- 1.2.5 This area was not subject to quadrat sampling as access to the land parcel was not granted during the time of the survey. The area was assessed over a fence/line of scrub, adjacent to a publicly accessible grass verge.
- 1.2.6 The grassland within Area 2 was dominated by False Oat-grass, with patches of Bramble *Rubus fruticosus* agg. scrub, Willow *Salix* sp. scrub and Creeping Thistle *Cirsium arvense*, located towards the south of the field (Photograph 2). The northern half of the field (within Scheme Boundary), however, had less scrub coverage and was predominantly grassland. The sward contained frequent Common Nettle *Urtica dioica* and occasional Cleavers. The frequency of these species indicates that the grassland is most like the MG1b *Arrhenatherum elatius* grassland – *Urtica dioica* sub-community.
- 1.2.7 To the north of the grassland, along the western, northern, and eastern field boundaries there was a narrow band of tall herbaceous and scrub vegetation growing along the field boundary, overtopped in places by several small trees including Cherry *Prunus* sp. and Sycamore *Acer pseudoplatanus*. The herbaceous component was dominated by Common Nettle, with Cleavers growing through the Nettles (Photograph 3), and occasional Hemlock *Conium maculatum*. The scrub component comprised patches of Bramble (Photograph 4). The closest NVC match with the field boundary vegetation is OV24b *Urtica dioica* – *Galium aparine* community – *Arrhenatherum elatius* – *Rubus fruticosus* agg. sub-community which comprises less dense, continuous Nettle coverage than in the typical sub-community and includes Bramble patches and may occasionally include Hemlock. There is also some overlap between the grassland community and the boundary vegetation which have several species in common, including False Oat-grass, Common Nettle and Cleavers.



Area 3

Mosaic of woodland, scrub, grassland, swamp and tall herbaceous vegetation to the south of the A47 and Constitution Hill Roundabout – Unclassified woodland, W1 *Salix cinerea* – *Galium palustre* woodland, MG10 *Holcus lanatus* – *Juncus effusus* rush-pasture, S6 *Carex riparia* swamp, S12 *Typha latifolia* swamp, MG1b *Arrhenatherum elatius* grassland – *Urtica dioica* sub-community, OV24a *Urtica dioica* – *Galium aparine* community – typical sub-community, OV24b *Urtica dioica* – *Galium aparine* community – *Arrhenatherum elatius* – *Rubus fruticosus* agg. sub-community and OV25 *Urtica dioica* – *Cirsium arvense* community

- 1.2.8 The vegetation within Area 3 consisted of a narrow band of plantation woodland running along the northern and eastern edges of the boundary with the A47 and Constitution Hill Roundabout. The band of woodland had been recently planted, with plastic tree guards still present in places, although it was comprised predominantly of native tree and shrub species including Pedunculate Oak *Quercus robur*, Silver Birch *Betula pendula*, Hawthorn *Crataegus monogyna*, Ash *Fraxinus excelsior*, Scots Pine *Pinus sylvestris*, Grey Willow *Salix cinerea*, Blackthorn *Prunus spinosa* and Wild Cherry *Prunus avium*. The trees were mostly small and immature but larger trees were present to the north of Area 3, south of the boundary plantation woodland, including several large White Willows *Salix alba*, adjacent to wetter parts of Area 3 (Photograph 5). The plantation woodland was very dense, with consequently little or no ground flora beneath the shade of the canopy. Due to the recent plantation origin, no attempt was made to assign an NVC community to the woodland strip.
- 1.2.9 The rest of Area 3 consisted of patches of dense scrub, grading into scattered scrub, interspersed with an intricate mosaic of several different vegetation types. These different communities occurred at a small scale across Area 3 and accurate mapping of individual areas of each community was not possible within the timescale of the survey. Instead, Appendix B shows the extent of the boundary plantation woodland, areas of dense scrub and the locations of relatively wetter and drier areas of vegetation. The descriptions below assign NVC communities to each type of vegetation present and an approximate



percentage coverage score (within the wet or dry areas) for each type is given.

1.2.10 The scrub within Area 3 was dominated by Grey Willow, with scarce, scattered Hawthorn. Although most of the Willow scrub was still immature, with an atypical grass-dominated ground flora, the scrub shows an affinity to early successional stage W1 *Salix cinerea* – *Galium palustre* woodland. It is postulated that this community type is gradually developing over the wetter parts of Area 3 (Photograph 6) and if left un-managed, would eventually replace areas of swamp and wet grassland.

1.2.11 The wetter parts of Area 3 included:

- Wet grassland with prominent tussocks of Soft Rush *Juncus effusus* and smaller amounts of Hard Rush *Juncus inflexus* amongst a shorter grassy sward including Yorkshire Fog, Creeping Bent *Agrostis stolonifera* and Creeping Buttercup *Ranunculus repens* (Photograph 7). This wet grassland also included frequent small patches of almost monospecific Meadow Foxtail *Alopecurus pratensis*, and a larger stand of Reed Canary-grass *Phalaris arundinacea* located near the north-west corner of Area 3 (Photograph 8). Quadrat sampling was not undertaken within the wet grassland due to its variability but overall, the community was a good match with the MG10 *Holcus lanatus* – *Juncus effusus* rush-pasture community. This community is characterised by the constant presence of Soft Rush, Creeping Bent, Creeping Buttercup and Yorkshire Fog. Reed Canary-grass and Meadow Foxtail can also occur infrequently within MG10. The typical sub-community (MG10a) which is dominated by Soft Rush and the *Juncus inflexus* sub-community (MG10b), within which hard rush can partially or totally replace Soft Rush, were both present within Area 3, with a combined percentage coverage of approximately 40% of the wet area shown in Appendix B being MG10 rush-pasture.



- Towards the west of Area 3 there were some extensive patches of swamp vegetation dominated by Greater Pond Sedge *Carex riparia* (Photograph 9), accompanied by small amounts of False Fox Sedge *Carex otrubae* (Photograph 10), Hedge Bindweed *Calystegia sepium*, Soft Rush, Reed Canary-grass and Bittersweet *Solanum dulcamara*. These species-poor stands of Greater Pond Sedge are preferable to the S6 *Carex riparia* swamp community. The S6 vegetation covered approximately 40% of the wet area shown in Appendix B.
- Towards the north of Area 3 there were depressions in the ground where several small ponds had been, but they were dry during the time of the NVC survey. Despite being dry most of the ponds were still filled with Bulrush *Typha latifolia* (Photograph 11), with species growing beneath including Redshank *Persicaria maculosa*, Curled Dock *Rumex crispus*, Celery-leaved Buttercup *Ranunculus sceleratus*, Creeping Buttercup, Hard Rush, Creeping Bent and Bittersweet. These Bulrush-dominated stands belong to the S12 *Typha latifolia* swamp community and comprised approximately 20% of the wet area shown in Appendix B.

1.2.12 The drier parts of Area 3 included:

- A small homogeneous stand of grassland located towards the west of Area 3 (Photograph 12). This area was subject to quadrat sampling with results shown in Appendix A; Table A-1. The sward was dominated by False Oat-grass, with other constants including Yorkshire Fog, Common Nettle, Creeping Thistle, Ground Ivy, Hemlock, Creeping Buttercup, Ground-elder *Aegopodium podagraria*, Field Bindweed *Convolvulus arvensis*, Wild Teasel *Dipsacus fullonum* and Smooth Tare *Ervum tetraspermum*. The results of the MATCH analysis gave the highest similarity co-efficient (42.6%) for the MG1b *Arrhenatherum elatius* grassland – *Urtica dioica* sub-community. This seems a good match for the community as the MG1b sub-community is characterised by frequent Nettles and large umbellifers, with this Area 3 grassland



also containing frequent Ground-elder (an umbellifer), accompanied by small amounts of Hemlock (another umbellifer). This homogeneous area of MG1b grassland, together with small patches of MG1b within the mosaic of drier vegetation, comprised approximately 20% of the dry area shown on in Appendix B.

- Patches of vegetation dominated by Common Nettle, with very few companion species (Photograph 13). These nettle-dominated areas show a strong affinity with the OV24a *Urtica dioica* – *Galium aparine* community – typical sub-community, within which common Nettle dominates, with companion species often excluded from the densest areas. The OV24a sub-community comprised approximately 30% of the dry area shown in Appendix B.
- Patches of Nettles were also present, forming a mosaic with patches of Bramble. These areas are closest to the OV24b *Urtica dioica* – *Galium aparine* community – *Arrhenatherum elatius* – *Rubus fruticosus* agg. sub-community, where Nettle coverage is greatly reduced compared to the OV24a sub-community. The reduction in Nettle density has also allowed some large patches of Hemlock to overtop the OV24b vegetation (Photograph 14). The OV24b sub-community comprised approximately 30% of the dry area shown in Appendix B.
- Within some small patches the prominence of Common Nettle was greatly reduced, with the most obvious forb being Creeping Thistle (Photograph 15). Where Spear Thistle *Cirsium vulgare* are constant, accompanied by Common Nettle, the NVC community shifts from OV24 to the OV25 *Urtica dioica* – *Cirsium arvense* community. Hemlock, which was present as scattered plants over these areas, is also a commonly occurring species within some sub-communities of OV25. The OV25 community comprised approximately 20% of the dry area shown in Appendix B.



Area 4

Tall *Calamagrostis* grassland at the north of land parcel located to the south of lay-by on Constitution Hill (A47) – *Calamagrostis epigejos* grassland (non-NVC type community)

- 1.2.13 The area at the north of the land to the south of the lay-by was dominated by Wood Small-reed *Calamagrostis epigejos*, with very few companion species visible amongst the tall grass sward (Photograph 16). This area was subject to quadrat sampling with results shown in Appendix A; Table A-2.
- 1.2.14 The highest percentage matches were for sub-communities of the S26 *Phragmites australis-Urtica dioica* tall-herb fen. This swamp community is clearly not a good description for the vegetation present within Area 4 as Common Reed *Phragmites australis* was completely absent and the ground beneath the Small-reed was relatively dry, whereas swamp communities (prefixed with 'S' in NVC) normally have some degree of standing water below.
- 1.2.15 Associated species within the quadrats included Field Horsetail *Equisetum arvense*, Cleavers, Oxford Ragwort *Senecio squalidus*, Colt's-foot *Tussilago farfara*, White Dead-nettle *Lamium album* and Common Ragwort *Jacobaea vulgaris*. These species are usually indicative of ground disturbance, which may account for the isolated occurrence of this vegetation community, when compared to the more extensive grassland and woodland habitat to the south.
- 1.2.16 This community does not resemble any of the currently described NVC communities, but similar habitats are known from Grangemouth, near Falkirk, Scotland, growing on recently disturbed ex-industrial land (Averis, 2021). Therefore Area 4 is described as *Calamagrostis epigejos* grassland (a non-NVC type community).

Area 5

Scrub adjacent to northbound carriageway of Constitution Hill (A47) – W21 *Crataegus monogyna* – *Hedera helix* scrub and W22 *Prunus spinosa* – *Rubus fruticosus* scrub

- 1.2.17 Area 5 consisted of a line of scrub to the south of the northbound carriageway of Constitution Hill (A47). The northern section of Area 5 was dominated by



Blackthorn (Photograph 17) with dominant Hawthorn further south (Photograph 18). There were several small Grey Willows and Pedunculate Oaks scattered throughout the scrub and Bramble under-scrub was present beneath both types of vegetation.

- 1.2.18 The combination of Hawthorn with Bramble below places the southern section of Area 5 within the W21 *Crataegus monogyna* – *Hedera helix* scrub community, where Hawthorn and Bramble are the commonest members of the community. The W21 community includes most thorn scrub and many of the hedges in this country. Further north the scrub is more typical of the W22 *Prunus spinosa* – *Rubus fruticosus* scrub community, where dominant Hawthorn is replaced by Blackthorn.

Area 6

Grassland to the south of Areas 4 and 5 – Grassland with an affinity to MG1b *Arrhenatherum elatius* grassland – *Urtica dioica* sub-community

- 1.2.19 The grassland at Area 6 was immediately to the south of the *Calamagrostis epigejos* grassland (Area 4), with a clearly defined boundary between the two very different swards. The Area 6 grassland adjacent to Area 4 was mostly without scrub encroachment but further south, the grass sward became increasingly enclosed by a surrounding area of woodland, with scattered scrub, including Hawthorn and Pedunculate Oak, becoming more frequent towards the south.
- 1.2.20 As the grassland at Area 6 was very different to Area 4 it was subject to quadrat sampling with results shown in Appendix A; Table A-3. The grassland was dominated by False Oat-grass, with Cock's-foot and Yorkshire Fog also constant and frequent (Photograph 19). The most frequent forb was hogweed, with other constant forbs including Tufted Vetch *Vicia cracca*, Hairy Tare *Ervilla hirsuta*, Cleavers and Oxford Ragwort.
- 1.2.21 The highest similarity co-efficient (40%) for the Area 6 quadrat samples was for the MG1b *Arrhenatherum elatius* grassland – *Urtica dioica* sub-community. This is not an ideal community match, as Common Nettle was absent from the five quadrats, but should normally be constant within the MG1b sub-



community. Red Fescue, which would be present within the MG1a sub-community, was also absent from the sampling quadrats. The quadrats also contained a single Pyramidal Orchid *Anacamptis pyramidalis* plant, which would indicate localised basic conditions, for this species which is more typical of calcareous grassland. Other features of MG1b are present, however, such as frequent large umbellifers (constant Hogweed and frequent upright Hedge-Parsley *Torilis japonica*), together with dense cleavers throughout the sward. Therefore, this area is described as only having an affinity to MG1b *Arrhenatherum elatius* grassland – *Urtica dioica* sub-community.

Area 7

Woodland to the south, east and west of Area 6 – Woodland with affinities to W10a *Quercus robur* – *Pteridium aquilinum* – *Rubus fruticosus* woodland – typical sub-community and W10d *Quercus robur* – *Pteridium aquilinum* – *Rubus fruticosus* woodland – *Holcus lanatus* sub-community

- 1.2.22 The woodland canopy at Area 7 consisted mostly of immature trees which were widely spaced towards the north, where scrub was invading the grassland habitat within Area 6 but became denser towards the south. The dominant tree species was Pedunculate Oak, accompanied by Silver Birch, Goat Willow *Salix caprea* and Hawthorn. The more mature woodland at the south of Area 6 contained some semi-mature Silver Birch, Hawthorn and scarce Hazel *Corylus avellana*, with small amounts of Bramble, Bracken *Pteridium aquilinum* and Honeysuckle *Lonicera periclymenum* in the ground layer.
- 1.2.23 Towards the north, the canopy was more open, with a grassy sward beneath the trees, similar to that present within Area 6 (Photograph 20), including frequent False Oat-grass and Yorkshire Fog. Where the understorey layer was denser, there were patches of bare ground. The southern section of the woodland shows a weak affinity to W10a *Quercus robur* – *Pteridium aquilinum* – *Rubus fruticosus* woodland – typical sub-community, comprising a Pedunculate Oak and Silver Birch canopy with Bracken, Bramble and Honeysuckle below. The northern section of woodland is still very immature



and grades into the grassland comprising Area 6. This vegetation has an affinity with W10d *Quercus robur* – *Pteridium aquilinum* – *Rubus fruticosus* woodland – *Holcus lanatus* sub-community which often comprises young woodlands, where Oak and Birch are invading together but have not yet formed a dense canopy. Approximately 40% of Area 7 was closest to W10a and approximately 60% was closest to W10d.

Area 8

Copse and hedge to south of Area 7 woodland – W21 *Crataegus monogyna* – *Hedera helix* scrub and unclassified woodland

- 1.2.24 Immediately to the south of the woodland there was a hedgerow, running south from the eastern edge of Area 7 and connecting with a small copse. The hedge was approximately 4m high and 1.5m wide, with arable fields either side (Photograph 21). The hedge was predominantly Hawthorn, with small amounts of Blackthorn and Ivy *Hedera helix*. The ground layer beneath the hedge included Common Nettle, Mugwort *Artemisia vulgaris*, Garlic Mustard *Alliaria petiolata*, Creeping Thistle, Cleavers, Italian Rye-grass *Lolium multiflorum*, False Brome *Brachypodium sylvaticum*, False Oat-grass, Barren Brome *Anisantha sterilis* and Rat's-tail Fescue *Vulpia myuros*. The hedge within Area 8 has a strong affinity to the W21 *Crataegus monogyna* – *Hedera helix* scrub community.
- 1.2.25 The copse at the southern end of the hedge consisted of a single large mature Ivy-covered Oak at the northern end, with a pond immediately to the south (Photograph 22). The pond surface was completely covered in Common Duckweed *Lemna minor*. Beneath the Oak there was a shrub understorey consisting of Field Maple *Acer campestre*, Hawthorn, Elder *Sambucus nigra* and Elm *Ulmus* sp. The ground layer surrounding the pond and beneath the understorey appeared to have been recently disturbed and was dominated by Common Nettle. Due to the very small size and disturbed nature of this woodland area and pond it was not classified as an NVC community.



Area 9

Neutral grassland located along a drainage ditch to the north of Rectory Lane – MG1b *Arrhenatherum elatius* grassland – *Urtica dioica* sub-community

- 1.2.26 Area 9 consisted of a drainage ditch separating two arable fields approximately 150m north of Rectory Lane. There was a single pedunculate oak on the southern bank and narrow strips of grassland along the northern and southern banks of the ditch, which were subject to quadrat sampling (Photograph 23). The grassland along the banks encroached across the open water within the ditch but Fool's Water-cress *Helosciadium nodiflorum* was recorded growing along most of the length of the drainage channel.
- 1.2.27 The results of the quadrat sampling are shown in Appendix A; Table A-4. The sward was dominated by False Oat-grass, with other constants including Yorkshire Fog, Common Nettle, Black-grass *Alopecurus myosuroides*, Cock's-foot, Hogweed, Broad-leaved Dock, Cleavers and Scentless Mayweed *Tripleurospermum inodorum*. The results of the MATCH analysis gave the highest similarity co-efficient (46.9%) for the MG1b *Arrhenatherum elatius* grassland – *Urtica dioica* sub-community. This is a good match for the grassland at Area 9, with dominant False Oat-grass, constant Cock's-foot and frequent Common Nettle and Hogweed, both of which are preferentially abundant within the MG1b sub-community. Black-grass is unusual within MG1 grassland, and more normally occurs within arable cereal crops, which were present to the north and south of the drainage ditch.

Area 10

Grassland within field to the south of Rectory Lane – MG1b *Arrhenatherum elatius* grassland – *Urtica dioica* sub-community

- 1.2.28 Grassland within Area 10 formed a homogeneous sward across the field (Photograph 24) and was subject to quadrat sampling with results shown in Appendix A; Table A-5. The sward was dominated by False Oat-grass, with constant Yorkshire Fog, Common Nettle, Hogweed, Horse-Radish *Armoracia rusticana* and Red Fescue. The results of the MATCH analysis gave the highest similarity co-efficient (58.0%) for the MG1b *Arrhenatherum elatius*



grassland – *Urtica dioica* sub-community. Although Red Fescue was more frequent within the sampling quadrats than is normal for MG1b, the grassland at Area 10 does appear to closely resemble MG1b, due to dominant False Oat-grass, accompanied by constant Hogweed and Common Nettle. Horse-radish is not typical of MG1 grassland but can be locally abundant within grassland as a relic of cultivation.

Area 11

Verges to north and south of Chequers Lane – MG1a *Arrhenatherum elatius* grassland – *Festuca rubra* sub-community and unclassified scrub

- 1.2.29 The southern verge along Chequers Lane consisted of a line of small trees and scrub growing over a ground flora of grasses and tall forbs whilst the northern verge possessed a similar ground flora but without any trees (Photograph 25). Tree and shrub species present along the southern verge included Wild Cherry *Prunus avium*, Horse Chestnut *Aesculus hippocastanum*, Pedunculate Oak, Field Maple, Lime *Tilia x europaea*, Wych Elm *Ulmus glabra*, Ash *Fraxinus excelsior* and Blackthorn. No attempt was made to classify the line of small trees/scrub due to the wide mix of species seemingly planted along the boundary of the field to the south of Chequers Lane.
- 1.2.30 The results of quadrat sampling undertaken along the northern verge is shown in Appendix A; Table A-6. Quadrats within this area were dominated by False Oat-grass, with frequent Perennial Rye-grass *Lolium perenne*, Cock's-foot, Hogweed, Yarrow *Achillea millefolium* and Broad-leaved Dock *Rumex obtusifolius*. The results of the MATCH analysis gave the highest similarity coefficient (48.9%) for MG1a *Arrhenatherum elatius* grassland – *Festuca rubra* sub-community. This is considered a suitable description of the vegetation as, Red Fescue was present in two of the three sampling quadrats, whilst Common Nettle was not present within any of the samples. This places the sub-community closer to MG1a than MG1b although Hogweed was present at relatively high Domin scores, which would usually be more typical of the MG1b sub-community.



Area 12

Neutral grassland located along a drainage ditch in a field to the south of Chequers Lane – MG1a *Arrhenatherum elatius* grassland – *Festuca rubra* sub-community

- 1.2.31 Area 12 consisted of a drainage ditch, separating two arable fields, with narrow strips of grassland either side of the northern and southern banks. The dense grass sward was adjacent to a cereal crop, south of the ditch and a fallow field to the north of the ditch (Photograph 26). The drainage channel was filled with Common Reed and Bulrush, with localised patches of Grey Willow and Meadowsweet *Filipendula ulmaria* growing on the sloping sides of the ditch. A small Bramble patch was present on the northern edge at the western end of the ditch.
- 1.2.32 The results of quadrat sampling undertaken within the grassland is shown in Appendix A; Table A-7. Quadrats within this area were dominated by False Oat-grass, with constant Cock's-foot, Hogweed, Yorkshire Fog and Common Couch *Elymus repens*. The quadrats also contained a single Bee Orchid *Ophrys apifera* plant, which would indicate localised basic conditions, for this species which is more typical of calcareous grassland. The results of the MATCH analysis gave the highest similarity co-efficient (56.2%) for MG1b *Arrhenatherum elatius* grassland – *Urtica dioica* sub-community but this is not a good match due to the absence of Common Nettle within the quadrats. A more suitable match would be with the MG1a *Arrhenatherum elatius* grassland – *Festuca rubra* sub-community. This sub-community is more typical of recently established MG1 grassland or where there has been some degree of recent disturbance, which appears to be the case within Area 12 where several species typical of disturbed ground occurred, including Creeping Thistle, Goat's-beard *Tragopogon pratensis*, Field Bindweed, Field Horsetail, Common Poppy *Papaver rhoeas*, Barren Brome, Bee Orchid and Scentless Mayweed.



1.3 References

- Averis, B. (2021). E-mail communication with Ben Averis on 12/10/2021.
- BRIG (ed. Ant Maddock), (2008). UK Biodiversity Action Plan Priority Habitat Descriptions [online]. Available at: [UK Biodiversity Action Plan - Priority Habitat Descriptions \(2008, Revised 2011\)](#) [Accessed 28/05/2021]
- CIEEM, (2019). Competency Framework. Available: <https://cieem.net/wp-content/uploads/2019/02/Competency-Framework-web-FINAL.pdf>
- Hill, M.O., Blackstock, T.H., Long, D.G., Rothero, G.P. (2008). A Checklist and Census Catalogue of British and Irish Bryophytes (Updated 2008). British Bryological Society, Middlewich.
- Natural England, (2010). Higher Level Stewardship: Farm Environment Plan (FEP) Manual (Third Edition). Available at: [Natural England – Higher Level Stewardship Farm Environment Plan Manual – PDF Version \(NE 264\)](#) [Accessed 28/05/2021]
- NCC, (2005). Wet Woodlands Habitat Action Plan 2. Norfolk County Council (Gerry Barnes).
- NCC, (2006). Lowland Mixed Deciduous Woodland Habitat Action Plan 3. Norfolk County Council (Gerry Barnes).
- NCC, (2009). Hedgerows Habitat Action Plan 5. Norfolk County Council (Gerry Barnes).
- NBP, (1996). Norfolk BAP [online]. Available at: norfolkbiodiversity.org/habitats-and-species/ [Accessed 28/05/2021] Norfolk Biodiversity Partnership.
- NWT, (2007). Lowland Meadows & Pastures Habitat Action Plan 9. Norfolk Wildlife Trust.



- Rodwell, J.S. ed. (1991a). British Plant Communities volume 1: Woodlands and Scrub. Cambridge University Press. Cambridge
- Rodwell, J.S. ed. (1992). British Plant Communities volume 3: Grasslands and Montane Communities. Cambridge University Press. Cambridge.
- Rodwell, J.S. ed. (2000). British Plant Communities volume 5: Maritime Communities and Vegetation of Open Habitats. Cambridge University Press. Cambridge.
- Rodwell, J.S. (2006). NVC User's Handbook. JNCC, Peterborough.
- Stace, C.A. (2019). New Flora of the British Isles (Fourth Edition). C & M Floristics. Suffolk.
- University of Lancaster-Unit of Vegetation Science (2000). MATCH 2.16 for Windows 95/NT.