

A417 Missing Link
TR010056

6.4 Environmental Statement
Appendix 8.4 Botanical Assessment

Planning Act 2008

APFP Regulation 5(2)(a)
Infrastructure Planning (Applications: Prescribed Forms and
Procedure) Regulations 2009

Volume 6

May 2021

Infrastructure Planning

Planning Act 2008

**The Infrastructure Planning
(Applications: Prescribed Forms
and Procedure) Regulations 2009**

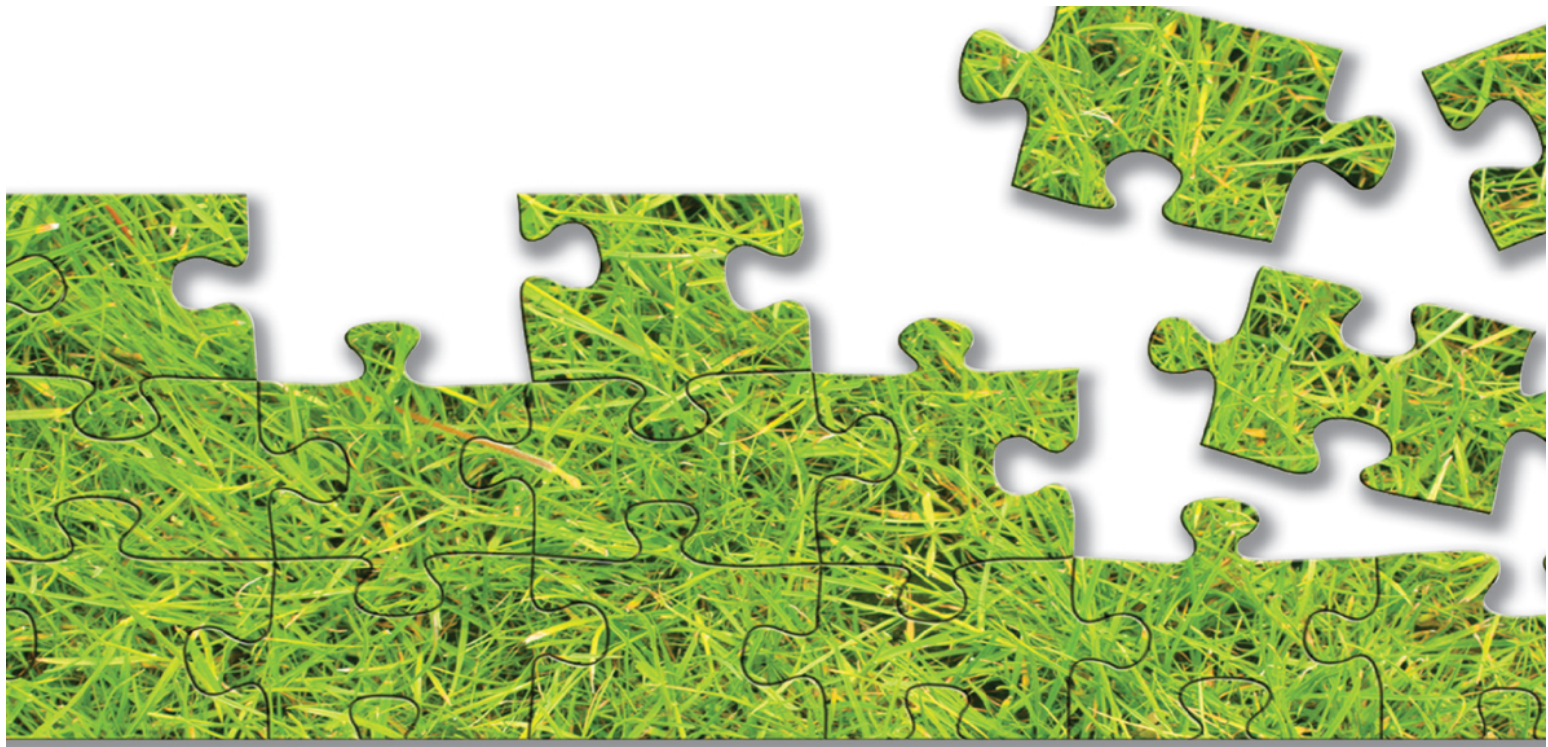
A417 Missing Link

Development Consent Order 202[x]

**6.4 Environmental Statement
Appendix 8.4 Botanical Assessment**

Regulation Number:	5(2)(a)
Planning Inspectorate Scheme Reference	TR010056
Application Document Reference	6.4
Author:	A417 Missing Link

Version	Date	Status of Version
C01	May 2021	Application Submission

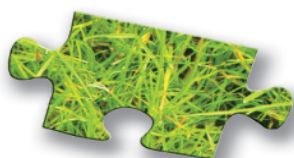


VEGETATION SURVEY & ASSESSMENT

A417 MISSING LINK

BOTANICAL ASSESSMENT

September 2019



CONTENTS

	<u>Page</u>
1.0 INTRODUCTION	1
1.1 Scope of Work and Objectives	1
1.2 Legislation and Conservation Context	1
2.0 METHODOLOGY	2
2.1 Survey Locations	2
2.2 National Vegetation Classification Survey	2
2.3 Limitations and Assumptions	3
3.0 RESULTS	4
3.1 Shab Hill	4
3.2 Field North of Shab Hill	5
3.3 Crickley Hill	6
3.4 Land West of Air Balloon Roundabout	7
3.5 Bushley Muzzard, Brimpsfield SSSI and Adjacent Land	9
4.0 ECOLOGICAL CONTEXT	12
5.0 EVALUATION	13
6.0 CONCLUSIONS	16
REFERENCES	17
APPENDICES	
I NVC Data	

Sharon Pilkington BSc (Hons) MSc CEnv MCIEEM
Botanist – Bryologist – Vegetation Ecologist

Vegetation Survey & Assessment Ltd
66 Newtown
Westbury
Wiltshire
BA13 3EF

Tel: 01373 827074

Mob: [REDACTED]

www.vegetationsurvey.co.uk

1. INTRODUCTION

1.1 Scope of Work and Objectives

This report brings together the results of a number of botanical surveys, all of which were undertaken in 2019 to provide a baseline of information about habitats and species within areas of land with potential to be directly or indirectly affected by the proposed alignment options for the A417 Missing Link road enhancement scheme.

1.2 Legislation and Conservation Context

The legislative provisions in Great Britain for the protection of wild plants are contained primarily in the Wildlife and Countryside Act, 1981, Section 13, with protected wild plants listed on Schedule 8. In practice, few British wild plants are directly protected by legislation relevant to the kind of impacts caused by major infrastructure projects.

Valuation of species conservation importance is generally determined against a set of national and regional criteria of rarity and threat (Table 1.1).

Table 1.1 Criteria used to define Plants of National/ Regional Conservation Importance

Conservation Category	Status	Definition	Reference
Extent	Nationally Rare (NR)	A taxon present in 1-15 10km Ordnance Survey grid squares in Britain post-1950	<i>New Atlas of the British and Irish Flora</i> (2002) by C.D. Preston, D.A. Pearman and T.D. Dines.
	Nationally Scarce (NS)	A taxon present in 16-100 10km Ordnance Survey grid squares in Britain post-1950	
Threat (IUCN Red List)	Critically Endangered (CR)	A taxon facing an extremely high risk of regional extinction in the wild in the near future.	<i>The Vascular Plant Red Data List for Great Britain</i> (2005) by JNCC (Eds. C.M. Cheffings and L. Farrell). Also: <i>A Vascular Plant Red List for England</i> (2014) by BSBI (Eds. P.A. Stroh et al)
	Endangered (EN)	A taxon that is not CR but facing a very high risk of regional extinction in the wild in the immediate future.	
	Vulnerable (VU)	A taxon that is not CR or EN, but facing a high risk of regional extinction in the medium-term future.	
Conservation	NERC Act Section 41	A taxon identified by the Secretary of State as being of principle importance for the purpose of conserving biodiversity in England.	Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006

Vegetation communities of the highest ecological importance are generally recognised and protected through the formal designation of sites including Sites of Special Scientific Interest (SSSIs). Where sites also support habitats listed on Annex I of the EU Habitats Directive many have also been notified as Special Areas of Conservation (SACs).

Outside statutory designated sites, many habitats of high ecological value have been recognised by selection of BAP Priority Habitats under the former UK Biodiversity Action Plan. In England, the UK BAP lists have subsequently been used to draw up statutory lists of habitats that are of principal importance for the conservation of biodiversity in under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006.

2. METHODOLOGY

2.1 Survey Locations

In several sites likely to be directly or indirectly impacted by the A417 realignment, a Phase I Habitat Survey in 2017 had indicated the potential presence of grassland of conservation importance and these areas were targeted for more detailed botanical investigation. These included:

- Shab Hill: a small valley centred at Ordnance Survey National Grid Reference SO 939152;
- Crickley Hill: within Crickley Hill and Barrow Wake Site of Special Scientific Interest (SSSI) and Crickley Hill Country Park between woodland known as The Scrubbs and the A417 road centred at SO 933161;
- Land west of Air Balloon Roundabout: two fields near the Air Balloon public house centred at SO 933160; no grassland of potential conservation interest was noted here by Phase I surveyors but the land abuts part of Crickley Hill and Barrow Wake SSSI; and
- Part of a field north of Shab Hill: this field, at SO 939156 was included latterly in the botanical survey when a large number of common orchids were seen there in summer 2019; this field had not been identified as having any grassland of potential conservation importance during the Phase I Habitat Survey.

To help understand the potential indirect impacts of the new road alignment on sites of high ecological importance that are likely to be particularly sensitive to local hydrological change, Bushley Muzzard, Brimpsfield SSSI, and its immediate surroundings (centred at SO943133) was also assessed. According to the SSSI Citation, *'it is one of a small number of marshes found in the Cotswolds and is of particular importance for its species richness and the presence of several uncommon plants.'*

2.2 National Vegetation Classification Survey

All fieldwork was undertaken in July and August 2019; the two Shab Hill sites and Crickley Hill on 10th and 11th July, Bushley Muzzard, Brimpsfield SSSI on the 6th and 7th August and land west of Air Balloon Roundabout on the 13th August. All surveys and analysis were undertaken by Sharon Pilkington, a professional botanist, bryologist and vegetation ecologist with 18 years' experience of botanical assessment.

At all of the sites, standard National Vegetation Classification (NVC) sampling methodology (Rodwell 2006) was employed to classify all grassland, marsh and spring-line vegetation likely to fall within the scope of the NVC. Five 2m x 2m quadrats were sampled in most stands of vegetation with distinct floristics and physiognomy in order to construct a floristic table ready for data analysis. Very small stands were sampled with a single quadrat. Sampling protocol followed Rodwell (2006) and included all vascular plants, mosses and liverworts.

MATCH¹ software was subsequently employed to analyse the quadrat data and to highlight potential affinities with published NVC communities/sub-communities. Such analysis produces a numerical coefficient of similarity on a scale from 0 to 100 for each dataset. It indicates a 'goodness of fit' with documented NVC communities/sub-communities and as a general rule, the higher the number, the more confidence there is with the result.

Surveyor experience and detailed descriptions of vegetation communities provided by Rodwell (1991 and 1992) were subsequently used to confirm the classification of each stand in NVC terms as appropriate. Stands of other kinds of vegetation e.g. tall herbaceous were assigned to NVC communities where appropriate in the field but were not sampled with quadrats.

¹ Vegetation analysis software developed by scientists from the University of Lancaster for NVC classification.

2.3 Limitations and Assumptions

All surveys were undertaken at an optimal time of year and in reasonable weather conditions and there were few constraints.

However, west of the Air Balloon public house, the larger of the two fields had been heavily grazed by ponies, which were still present at the time of survey. Quadrat sampling was therefore restricted to the western fringe where the sward retained some height and vegetation within the rest of the field was deduced by visual comparison of species composition to the longer sward. Within the curtilage of the public house, a children's play area was fenced off and cut very short, so it could not be sampled with quadrats. However, it was evident that the short-mowed grassland within was of very low botanical interest.

The single large field containing Bushley Muzzard, Brimpsfield SSSI had been grazed by cattle relatively recently and whilst partial recovery of the sward meant that quadrat sampling was possible, it is likely that some species occurring at low frequency within the richest spring-line vegetation were overlooked or under-represented.

3. RESULTS

Botanical nomenclature used in this report follows Stace (2019) for vascular plants and Hill *et al* (2008 as amended) for bryophytes. Appendix I shows tabulated data collected from all sites where NVC sampling was undertaken.

3.1 Shab Hill

3.1.1 Vegetation Communities

Figure 3.1 shows the vegetation communities present in the valley. The vegetation was quite complex and included neutral grassland that could not be placed confidently in any NVC community.

Limestone grassland was restricted to one south-facing slope, where it occurred in small relict patches as well as in a mosaic with neutral grassland and tall herbaceous vegetation. It was classified as **CG4c** *Brachypodium rupestre*² grassland (*Holcus lanatus* sub-community) and analysis of samples gave a relatively low coefficient of similarity (46.3). This reflected the poor condition of the vegetation, and elsewhere on the bank the transitional nature of the grassland was clearer. However, in the relict CG4c, Tor-grass *Brachypodium rupestre* was quite abundant, alongside many other calcicoles.

Most of the sloping ground on the valley sides was characterised by a form of coarse neutral grassland considered to be the **MG1e** *Centaurea nigra* sub-community of *Arrhenatherum elatius* grassland (coefficient of similarity 63.6). Although dominated by such grasses as False Oat-grass *Arrhenatherum elatius* and Yorkshire-fog *Holcus lanatus*, it also included variable amounts of Lady's Bedstraw *Galium verum*, Crosswort *Cruciata laevipes* and Field Scabious *Knautia arvensis*. The presence of occasional Tor-grass was distinctive, suggesting localised transitions to calcareous grassland, perhaps where underlying limestone lay close to the surface.

Grassland in the valley bottom conformed to **MG9b** *Arrhenatherum elatius* sub-community of *Holcus lanatus* – *Deschampsia cespitosa* grassland (coefficient of similarity 55.1). It was structurally distinctive, with many large tussocks of Tufted Hair-grass *Deschampsia cespitosa* over other common grasses and a few forbs in a species-poor coarse sward.

At the eastern end of the valley an indeterminate kind of species-poor neutral grassland (**MG unclassified**) was present within scattered scrub. It included elements of MG1 and MG9 but was mostly defined by high cover of Yorkshire-fog and Wood Dock *Rumex sanguineus*.

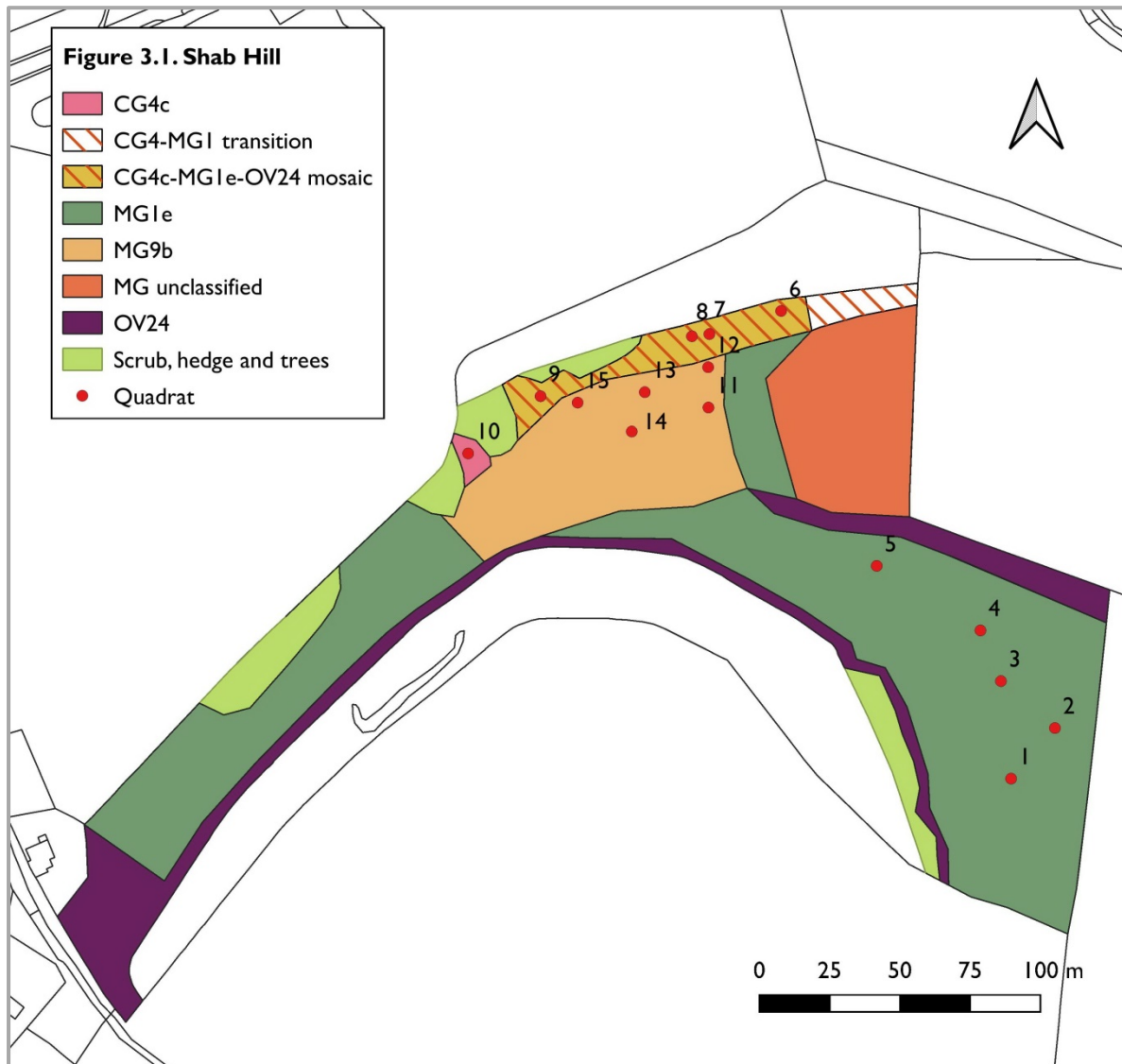
Other types of vegetation mapped but not sampled included **OV24** *Urtica dioica* – *Galium aparine* community, a species-poor kind of tall herbaceous vegetation where Common Nettle *Urtica dioica* and Cleavers *Galium aparine* were co-dominant, and small areas of dense Elder *Sambucus nigra* scrub. Both kinds of vegetation are common where there has been significant nutrient enrichment of soils.

3.1.2 Condition of Vegetation

The grassland communities had the appearance of not having been regularly grazed for a significant period of time. Evidence for this could be seen in the coarseness of the sward, the creeping advance of scrub and ruderal vegetation from the site perimeter and in the accumulation of thatch within the sward.

² NVC community name updated from CG4 *Brachypodium pinnatum* grassland

Remnant calcareous grassland was confined to one slope, where it was in poor condition, as shown by the dominance of rank Tor-grass, a lack of small calcicoles, the abundance of particular mesophiles e.g. False Oat-grass and invasion of Bramble *Rubus fruticosus* agg. and Cleavers.



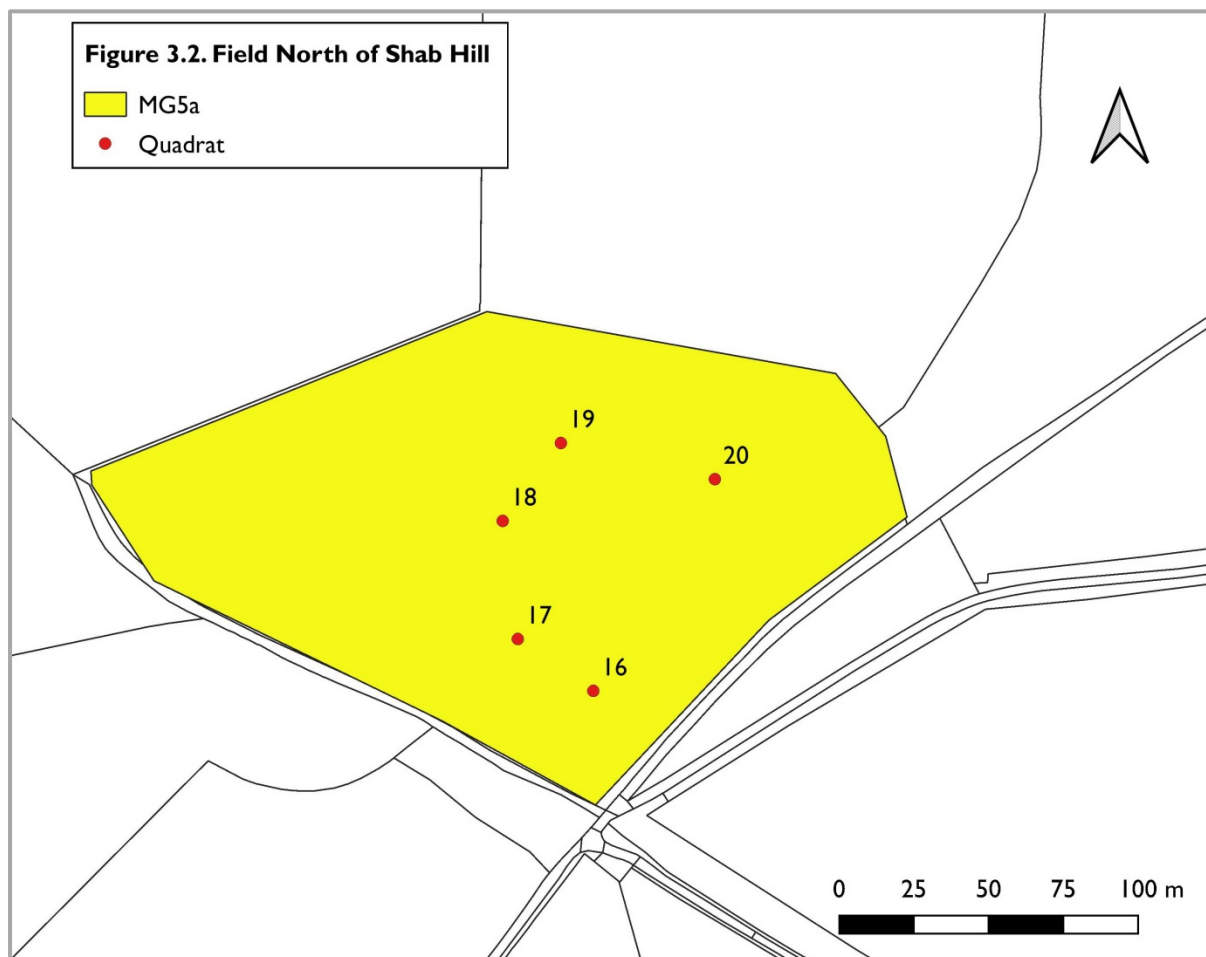
This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the controller of Her Majesty's Stationery Office. ©Crown Copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. CLIENT NAME: Highways England LICENCE NUMBER: 100030649 [2019]

3.2 Field North of Shab Hill

The survey area (which was part of a larger field) comprised a single vegetation community (Figure 3.2). Analysis of quadrat data gave a relatively good co-efficient of similarity to MG5a *Centaurea nigra* – *Cynosurus cristatus* grassland, *Lathyrus pratensis* sub-community (54.2). The most distinctive feature of this grassland was its diversity, with high cover of forbs. Prominent among these were Oxeye Daisy *Leucanthemum vulgare*, Red Clover *Trifolium pratense*, Cat's-ear *Hypochaeris radicata*, Meadow Buttercup *Ranunculus acris* and Sweet Vernal-grass *Anthoxanthum odoratum*. Yellow-rattle *Rhinanthus minor* was also very common in the sward, which appeared relatively uniform across the stand.

3.2.1 Condition of Vegetation

Whilst a large number of species was recorded in this stand, no species indicative of 'old hay meadow' were seen. Rodwell (1992) acknowledges that as long as grassland has a history of management that has traditionally involved grazing, cutting a hay crop and light application of natural organic manures, it can develop the floristic characteristics of MG5. Furthermore, the absence of rare species is not a reliable indicator of agricultural improvement and it was clear that regular and sympathetic agricultural management had maintained this grassland in good floristic condition.



This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the controller of Her Majesty's Stationery Office. ©Crown Copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. CLIENT NAME: Highways England LICENCE NUMBER: 100030649 [2019]

3.3 Crickley Hill

The survey area (northern part of Figure 3.3) primarily included two different kinds of neutral grassland community. Much of the open ground supported a colourful coarse grassland considered to be **MG1aii** (*Geranium pratense* variant of the *Festuca rubra* sub-community of *Arrhenatherum elatius* grassland). As well as False Oat-grass, other prominent species in this sward (co-efficient of similarity to MG1a 60.6) included Yorkshire-fog, Red Fescue *Festuca rubra*, Crosswort and Meadow Crane's-bill *Geranium pratense*.

A second, smaller area of grassland had a much shorter and more diverse sward and was classified as **MG5a** (coefficient of similarity 59.6). This stand was variable and degraded at the edges by trampling along grass paths. However, it was rich in forbs, including a number of species of short turf e.g. Self-

heal *Prunella vulgaris* and Rough Hawkbit *Leontodon hispidus* and it supported a number of meadow ant-hills, which are indicative of older grasslands which have been sheep-grazed.

Well-used grass paths through long grassland had the broad floristic composition of the **OV23** *Lolium perenne* – *Dactylis glomerata* community which is very typical of trampled grassy ground over neutral soils. Hairy Lady's-mantle *Alchemilla filicaulis* subsp. *vestita* was occasional in these paths. Other vegetation types present within the survey area included **OV24** and mixed scrub.

3.3.1 Condition of Vegetation

Within the MGIaii there was a significant accumulation of plant litter between plants indicating that this part of the country park may not have been grazed much recently. Bramble invading the edges of the grassland from neighbouring scrub, woodland and hedgerow also indicated a relaxed management regime in this area. Rabbit grazing of the MG5a grassland was evident but the frequency of False Oat-grass was an indication that the sward may be coarsening in response to a relaxation of traditional management.

3.4 Land West of Air Balloon Roundabout

Vegetation communities in this locality are shown on Figure 3.3 (southern part). Calcareous grassland occupied the two fields that make up most of the site. In the western field, heavily grazed **CG3c** (*Knautilia arvensis* – *Bellis perennis* sub-community of *Bromopsis erecta*³ grassland) was present (co-efficient of similarity 47.6) except for one small area of species-poor and unclassifiable neutral grassland. This sward was quite herb-rich and as is typical of CG3c, supported many different calcicoles and mesophiles together.

The eastern field did not appear to have been managed recently and supported **CG3d** (*Festuca rubra* – *Schedonorus arundinaceus* sub-community of *Bromopsis erecta* grassland). This had a coefficient of similarity of 46.5 and the stand was not a particularly good example. The sward was very variable and in places transitional to MGI *Arrhenatherum elatius* grassland. Large tussocks of Upright Brome *Bromopsis erecta* typically achieved high cover in a rank sward, alongside Common Knapweed *Centaurea nigra*, Greater Knapweed *C. scabiosa*, Yarrow *Achillea millefolium*, Lady's Bedstraw and False Oat-grass. Large meadow ant-hills were frequent within the sward and there was a thick layer of thatch below the plants.

Other minor areas of vegetation included **MGIe**, **OV24**, scrub and outgrown hedgerows, short-mown amenity grassland within a children's play area near the Air Balloon public house and low-lying ground characterised by OV24 grading into patches of near-pure Common Reed *Phragmites australis*. This latter area was considered to be transitional OV24-S4 *Phragmites australis* swamp and reed-beds vegetation.

3.4.1 Condition of Vegetation

Neither field of calcareous grassland was in optimal condition; in the western field it was over-grazed by ponies, in the other probable cessation of management had promoted a coarse, less diverse form of CG3 and probable loss of many of the smaller species typical of grazed calcareous grassland in this area. Without a resumption of management in the eastern field, it is likely that the grassland will continue to lose condition. In contrast, reduction (but not cessation) of the grazing intensity in the western field would quickly return its CG3 to good condition.

³ NVC community name updated from CG3 *Bromus erectus* grassland



This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the controller of Her Majesty's Stationery Office. ©Crown Copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. CLIENT NAME: Highways England LICENCE NUMBER: 100030649 [2019]

3.5 Bushley Muzzard, Brimpsfield SSSI and Adjacent Land

Bushley Muzzard, Brimpsfield SSSI occupies about a third of the large pasture which contains it (Figure 3.4). Within the SSSI, significant vegetation types include fen-meadow over a spring-line and limestone grassland.

The fen-meadow vegetation was very rich and included a large number of fen and wetland plants including several uncommon species such as Marsh Arrowgrass *Triglochin palustris*, Flat-sedge *Blysmus compressus* (cited as Vulnerable in the Red List for England), Long-stalked Yellow-sedge *Carex lepidocarpa* and Marsh Valerian *Valeriana dioica*. Analysis of quadrats sampled there helped to confirm it as the **M22b** *Briza media* – *Trifolium* spp. sub-community of *Juncus subnodulosus* – *Cirsium palustre* fen-meadow (coefficient of similarity 60.7). This stand appears to be an example of one lacking Blunt-flowered Rush *Juncus subnodulosus*, usually preferential to M22.

These springs and others fed small headwater streams which flowed downhill out of the SSSI. Vegetation in these was not as rich as the primary area of M22 fen-meadow but it could still be considered to be M22b (coefficient of similarity 48.1). The banks of the streams, which were poached by cattle, supported a population of Heath False-brome *Brachypodium pinnatum*, a relatively scarce grass of heavy neutral to calcareous soils.

A spring-fed rivulet elsewhere in the SSSI was of particular interest as it supported a population of the tufa-forming moss *Palustriella commutata* together with Marsh Arrowgrass and large tussocks of Long-stalked Yellow-sedge. Whilst it was still close to M22b, its vegetation appeared to be transitional to **M37** *Palustriella commutata*⁴-*Festuca rubra* spring vegetation.

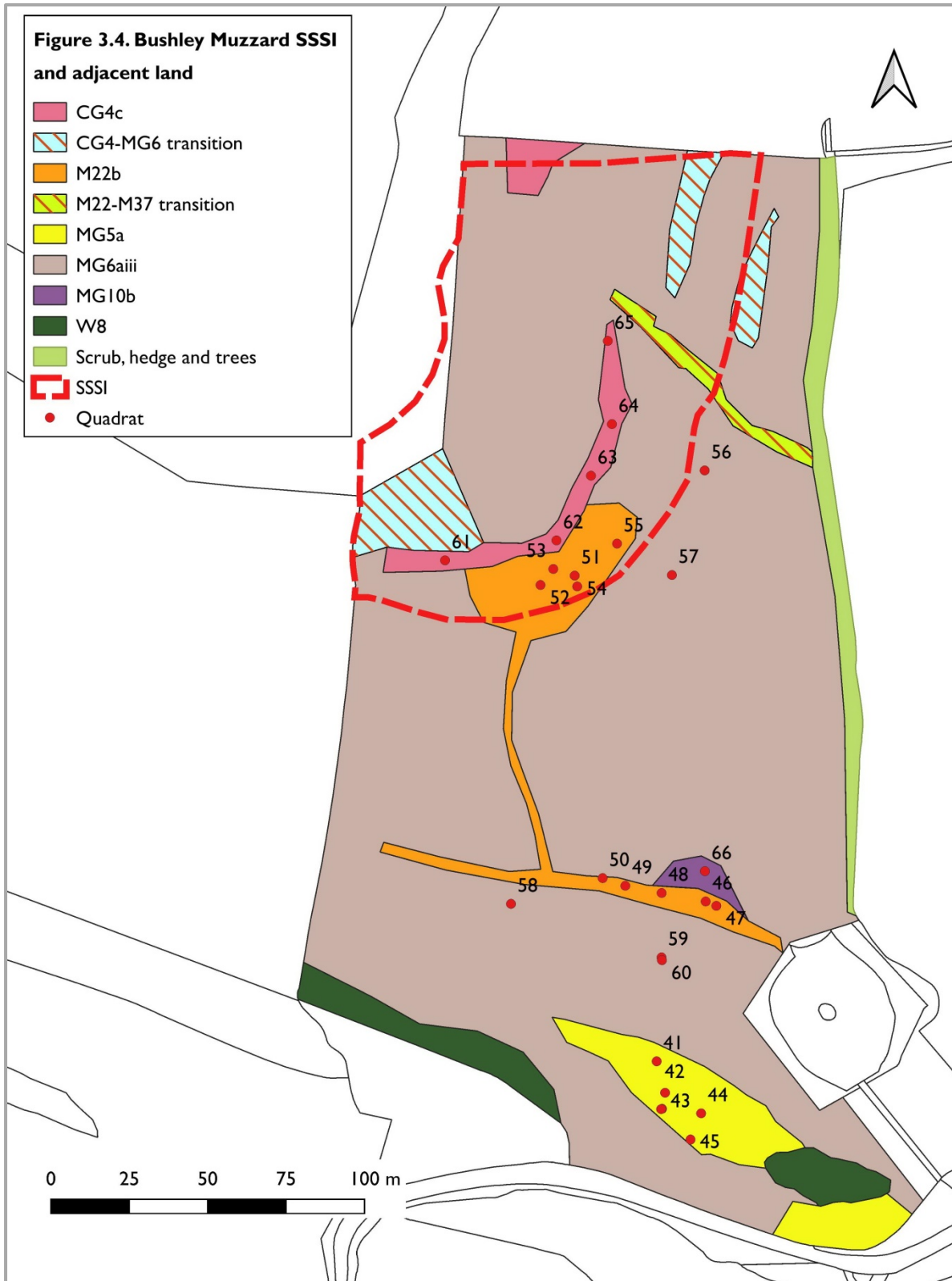
A bank of **CG4c** calcareous grassland occurred just above the main SSSI seepage line (coefficient of similarity 49.1). This differed from CG4c assessed in other sites in the area in being grazed and included more mesophiles, including species abundant in adjacent improved pasture such as Perennial Rye-grass *Lolium perenne* and White Clover *Trifolium repens*. Elsewhere in the survey area, small stands of CG4c transitional to MG6 *Lolium perenne*-*Cynosurus cristatus* grassland were also present.

Outside the SSSI, the only other stand of notable vegetation was a rich and varied bank of **MG5a** neutral grassland (co-efficient of similarity 73.2). It had a close-grazed, herb-rich turf supporting common MG5 species but also several more restricted forbs, including Tormentil *Potentilla erecta*, Hairy Lady's-mantle and Devil's-bit Scabious *Succisa pratensis*.

Other grassland included an extensive tract of **MG6aiii**, the *Deschampsia cespitosa* variant of the Typical sub-community of *Lolium perenne*-*Cynosurus cristatus* grassland (co-efficient of similarity 65.5). This grazed pasture was species-poor and dominated by Perennial Rye-grass, Common Bent *Agrostis capillaris* and Yorkshire-fog, with few herbaceous associates other than Creeping Buttercup *Ranunculus repens* and Meadow Buttercup *R. acris*. Tufted Hair-grass was frequent but patchily distributed.

One small area of rushy vegetation dominated by Hard Rush *Juncus inflexus* was assigned to **MG10b** (*Juncus inflexus* sub-community of *Holcus lanatus*-*Juncus effusus* rush-pasture). Apart from the rushes, the community was very grassy, with much Creeping Bent *Agrostis stolonifera*. Other indicators of wet ground included Creeping Buttercup *Ranunculus repens* and Common Spike-rush *Eleocharis palustris*. The rich-fen species of nearby M22 were absent from this community.

⁴ NVC community name updated from M37 *Cratoneuron commutatum*- *Festuca rubra* spring



This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the controller of Her Majesty's Stationery Office. ©Crown Copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. CLIENT NAME: Highways England LICENCE NUMBER: 100030649 [2019]

3.5.1 Condition of vegetation

The grazing and poaching of livestock have clearly been very important in maintaining the rich and varied flora within fen-meadow and species-rich grassland. Hydrological influences in this area are likely to be complex but will include the groundwater seepage characteristics and its chemical composition and these will also be playing a critical role in sustaining the high diversity and uncommon species of the M22 vegetation and its transitions to M37. All vegetation is regarded as being in good condition.

4. ECOLOGICAL CONTEXT

CG3 *Bromopsis erecta* grassland is characteristic of thin soils over limestone (including chalk) in the lowlands of southern Britain. The *Knautia arvensis* – *Bellis perennis* sub-community (CG3c) is frequent in the Cotswolds where the underlying oolite limestone weathers to produce deep, mesotrophic rendzinas. The more impoverished swards in the *Festuca rubra*- *Schedonorus arundinaceus* sub-community (CG3d) may develop when grazing ceases or becomes intermittent. CG3 is a qualifying NVC community of the Section 41 habitat *Lowland Calcareous Grassland*.

CG4 *Brachypodium rupestre* grassland is very characteristic of the Cotswold oolite. It is a community of situations where grazing has been relaxed or abandoned, allowing the strongly rhizomatous Tor-grass to become dominant. The *Holcus lanatus* sub-community (CG4c) includes a number of species more commonly associated with neutral swards and its development may be associated with cattle grazing. CG4 is a qualifying NVC community of the Section 41 habitat *Lowland Calcareous Grassland*.

M22 *Juncus subnodulosus*-*Cirsium palustre* fen-meadow is a scarce and declining vegetation type restricted to southern lowland Britain. It is found on a range of moist, base-rich and mesotrophic soils in and around springs, flushes and mires. It is most diverse if grazed and poached by livestock. The *Briza media* – *Trifolium* spp. sub-community (M22b) is especially characteristic of grazed spring-fens. M22 is a qualifying NVC community of the Section 41 habitat *Purple Moor-grass and Rush-pastures*.

M37 *Palustriella commutata*⁵-*Festuca rubra* spring vegetation is an uncommon community of northern and western Britain. Although it undoubtedly occurs in limestone districts of southern England, such examples have been poorly documented. M37 develops in springs, seepages and drip-lines where there is constant irrigation of base-rich, calcareous and nutrient-poor water. It is potentially a qualifying vegetation type in the SAC Annex I habitat 7220 Petrifying springs with tufa formation (*Cratoneurion*).

MG1 *Arrhenatherum elatius* grassland is ubiquitous on fertile, circumneutral and freely draining soil in the lowlands; it often represents formerly grazed land that has been abandoned. The *Geranium pratense* variant of the *Festuca rubra* sub-community (MG1aii) is characteristic of brown calcareous earths over limestone or other calcareous bedrock whilst the *Centaurea nigra* sub-community (MG1e) is normally found on mesotrophic soils.

MG5 *Centaurea nigra* – *Cynosurus cristatus* grassland is a scarce community of grazed hay-meadows over freely draining neutral soils in the lowlands and it is a qualifying NVC community of the Section 41 habitat *Lowland Meadows*. The *Lathyrus pratensis* sub-community (MG5a) favours circumneutral brown earths of heavy texture or other superficial deposits of low calcium content.

MG6 *Lolium perenne*-*Cynosurus cristatus* grassland is a ubiquitous permanent pasture of the type usually regarded as agriculturally improved grassland. The *Deschampsia cespitosa* variant of MG6a (Typical sub-community) is characteristic of undulating, poorly-drained pasture.

MG9 *Holcus lanatus*-*Deschampsia cespitosa* grassland is highly characteristic of permanently moist, gleyed clay soils. The *Arrhenatherum elatius* sub-community (MG9b) is usually found on slightly drier soils where there has been little or no recent grazing.

MG10 *Holcus lanatus*-*Juncus effusus* rush-pasture is found on consistently moist soils of varying pH, often where there is grazing. The *Juncus inflexus* sub-community (MG10b) is common in southern England on more calcareous soils.

⁵ NVC community name updated from M37 *Cratoneuron commutatum*- *Festuca rubra* spring

5. EVALUATION

Following analysis and interpretation of the NVC data for each site, each vegetation community has been accorded a relative intrinsic botanical value taking into account one or more of the following criteria:

- Its perceived nature conservation importance e.g. uncommon or rare NVC communities, NERC Act Section 41 habitats;
- Its goodness of fit with published NVC communities;
- The presence of plants of recognised conservation importance or other plant species of restricted ecological amplitude;
- Its botanical diversity;
- Its extent; and
- Its condition.

The evaluation is presented in Tables 5.1 to 5.5.

Table 5.1 Shab Hill

Vegetation Community	Botanical Value	Rationale
CG4c grassland	Moderate	<ul style="list-style-type: none"> • Section 41 habitat (Lowland calcareous grassland) • Poor condition likely to be irreversible • Small area
CG4-MG1 grassland transition	Low	<ul style="list-style-type: none"> • Not referable to any NVC community • Deterioration of calcareous grassland likely to be irreversible
CG4c-MG1e-OV24 mosaic	Low	<ul style="list-style-type: none"> • Not referable to any NVC type • Changes to former calcareous grassland likely to be irreversible
MG1e grassland	Low	<ul style="list-style-type: none"> • Common kind of grassland
MG9b grassland	Low	<ul style="list-style-type: none"> • Common kind of grassland
MG unclassified grassland	Negligible	<ul style="list-style-type: none"> • Not referable to any NVC community • Low diversity
OV24 community	Negligible	<ul style="list-style-type: none"> • Ubiquitous kind of ruderal vegetation

Table 5.2 Shab Hill (north)

Vegetation Community	Botanical Value	Rationale
MG5a grassland	High	<ul style="list-style-type: none"> • Section 41 habitat (Lowland meadows) • Extensive area • Good condition • Atypical example of MG5

Table 5.3 Crickley Hill

Vegetation Community	Botanical Value	Rationale
MG1aii grassland	Low	<ul style="list-style-type: none"> • Common kind of grassland • <i>Geranium pratense</i> variant characteristic of the Cotswold Hills
MG5a grassland	Moderate	<ul style="list-style-type: none"> • Section 4I habitat (Lowland meadows) • Small area • In reasonable condition but probably deteriorating from trampling at edges • Atypical example of MG5
OV23 community	Low	<ul style="list-style-type: none"> • Ubiquitous kind of vegetation • Supports population of Hairy Lady's-mantle
OV24 community	Negligible	<ul style="list-style-type: none"> • Ubiquitous kind of ruderal vegetation

Table 5.4 Land west of Air Balloon Roundabout

Vegetation Community	Botanical Value	Rationale
CG3c grassland	High	<ul style="list-style-type: none"> • Section 4I habitat (Lowland calcareous grassland) • Substantial area • Condition negatively affected by heavy grazing but could be improved.
CG3d grassland	Moderate	<ul style="list-style-type: none"> • Section 4I habitat (Lowland calcareous grassland) • Substantial area • In poor condition
MG1e grassland	Low	<ul style="list-style-type: none"> • Common kind of grassland • Moderately diverse
MG unclassified grassland	Negligible	<ul style="list-style-type: none"> • Not referable to any NVC community • Low diversity
OV24 community	Negligible	<ul style="list-style-type: none"> • Ubiquitous kind of ruderal vegetation
OV24 grassland-S4 swamp transition	Negligible	<ul style="list-style-type: none"> • Not referable to any NVC community • Very low diversity
Amenity grassland	Negligible	<ul style="list-style-type: none"> • Intensively managed grassland • Very low diversity

Table 5.5 Bushley Muzzard SSSI and adjacent land

Vegetation Community	Botanical Value	Rationale
CG4c grassland	High	<ul style="list-style-type: none"> • Section 41 habitat (Lowland calcareous grassland) • In good condition • Small area
CG4-MG6 grassland transition	Moderate	<ul style="list-style-type: none"> • Not referable to any single NVC community • Could revert to CG in time given suitable low-input treatment and continued livestock grazing
M22b spring fen	High	<ul style="list-style-type: none"> • Section 41 habitat (Purple Moor-grass and Rush-pastures) • Scarce vegetation type • High diversity • Supports several uncommon and/or declining species • In good condition
M22-M37 transition	Moderate	<ul style="list-style-type: none"> • Not referable to any single NVC community but with affinities to two scarce kinds of vegetation • High diversity • Supports uncommon and/or declining species • Small area
MG5a grassland	High	<ul style="list-style-type: none"> • Section 41 habitat (Lowland meadows) • High diversity • Good condition • Atypical example of MG5
MG6aiii grassland	Low	<ul style="list-style-type: none"> • Common kind of grassland
MG10b grassland	Low	<ul style="list-style-type: none"> • Common kind of grassland

6. CONCLUSIONS

In areas likely to be directly affected by the proposed road alignments, vegetation of moderate or high conservation importance is highly localised. In the Shab Hill valley, little remains of any calcareous grassland and what there is has almost been lost to neglect.

The most extensive tract of calcareous grassland is present in two small fields west of the Air Balloon Roundabout and though not currently managed well (for its botanical interest at least) it is still of high or moderate conservation importance and has potential for restoration.

Species-rich neutral grassland of high conservation importance is extensive in a field north of the Shab Hill valley, where it is well managed and in good condition. A very small tract of similar MG5 is the only vegetation of significant conservation importance in the surveyed part of Crickley Hill Country Park, although it appears to be declining in extent and condition there.

Though away from any direct impacts of the new road alignment, groundwater-fed vegetation in Bushley Muzzard, Brimpsfield SSSI is also considered to be of high conservation importance and is currently maintained well by grazing. The fen-meadow (M22) vegetation is highly dependent on the sustained irrigation of a series of base-rich springs rising within the SSSI and may therefore be sensitive to changes in local groundwater conditions caused by the new road.

REFERENCES

Hill M.O., Blackstock T.H., Long D.G. and Rothero G.P. 2008. **A Checklist and Census Catalogue of British and Irish Bryophytes**. British Bryological Society.

Rodwell J.S. (Ed.) 1991. **British Plant Communities Volume 2: Mires and Heaths**. Cambridge University Press.

Rodwell J.S. (Ed.) 1992. **British Plant Communities Volume 3: Grasslands and montane communities**. Cambridge University Press.

Rodwell J.S. 2006. **National Vegetation Classification Users' handbook**. Joint Nature Conservation Committee, Peterborough.

Stace C.A. 2019. **New Flora of the British Isles** (4th edition). C & M Floristics.

APPENDIX I. NVC DATA

SHAB HILL: QUADRATS I-10

Site name		Shab Hill	Shab Hill	Shab Hill	Shab Hill	Shab Hill	Shab Hill	Shab Hill	Shab Hill	Shab Hill	Shab Hill
Grid reference		SO 94100	SO 94116	SO 94097	SO 94090	SO 94053	SO 94019	SO 93993	SO 93987	SO 93933	SO 93907
Quadrat number		15159	15178	15194	15212	15235	15326	15318	15317	15296	15275
Veg unit		MG1e	MG1e	MG1e	MG1e	MG1e	CG4c	CG4c	CG4c	CG4c	CG4c
	<i>Plant litter</i>	4	5	5	5	6	5	5	5	5	4
<i>Agrimonia eupatoria</i>	Agrimony									1	1
<i>Agrostis capillaris</i>	Common Bent		3	3	3	3					2
<i>Alopecurus pratensis</i>	Meadow Foxtail					1					
<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass	3	3	3	3	3					1
<i>Arrhenatherum elatius</i>	False Oat-Grass	7	7	6	6	7	4	4	4	4	4
<i>Avenula pubescens</i>	Downy Oat-grass					1					
<i>Brachypodium rupestre</i>	Tor-grass	4		5		5	8	8	8	8	7
<i>Bromopsis erecta</i>	Upright Brome								2		2
<i>Carex flacca</i>	Glaucous Sedge						1	1			
<i>Centaurea nigra</i>	Common Knapweed										2
<i>Cerastium fontanum</i>	Common Mouse-ear			1		1	1		1		2
<i>Cirsium acaule</i>	Dwarf Thistle						4	1			
<i>Cirsium arvense</i>	Creeping Thistle				1	2		1	4	5	
<i>Cirsium eriophorum</i>	Woolly Thistle						1				5
<i>Clinopodium vulgare</i>	Wild Basil						4				4
<i>Convolvulus arvensis</i>	Field Bindweed	1	3	2		1	2	1	4	4	
<i>Cruciata laevipes</i>	Crosswort	4	5		5		2	3		4	5
<i>Dactylis glomerata</i>	Cock's-foot	4	5	5	5	4	3	2	2		1
<i>Deschampsia cespitosa</i>	Tufted Hair-grass			4		4					
<i>Festuca rubra</i>	Red Fescue	4	4	4	4	4					2
<i>Galium aparine</i>	Cleavers		1					2	3	3	
<i>Galium verum</i>	Lady's Bedstraw	4			1	4	5	4	5	4	5
<i>Glechoma hederacea</i>	Ground-ivy							4	3	3	
<i>Heracleum sphondylium</i>	Hogweed	1	1	4	3	4		1		4	1
<i>Holcus lanatus</i>	Yorkshire-fog	6	5	5	6	6	2	3	3		4
<i>Hypericum maculatum</i>	Imperforate St John's-wort			5							
<i>Knautia arvensis</i>	Field Scabious		4	4	4		4	4	2	4	2
<i>Lathyrus pratensis</i>	Meadow Vetchling		1		2	4	4	1	3	1	3
<i>Lotus corniculatus</i>	Common Bird's-foot-trefoil				2			2	4	1	3
<i>Medicago lupulina</i>	Black Medick								1		
<i>Ononis repens</i>	Common Restharrow						2	4	4		4
<i>Plantago lanceolata</i>	Ribwort Plantain										1
<i>Poa pratensis</i>	Smooth Meadow-grass						2		3		1
<i>Poa trivialis</i>	Rough Meadow-grass	2	3	3	3	3					
<i>Potentilla reptans</i>	Creeping Cinquefoil			2	4					1	
<i>Poterium sanguisorba</i> subsp.	Salad Burnet						2	4	4		2
<i>Ranunculus acris</i>	Meadow Buttercup		1		1						
<i>Ranunculus repens</i>	Creeping Buttercup	1									
<i>Rubus fruticosus</i> agg.	Bramble	1				4	2	4	5	4	4
<i>Rumex acetosa</i>	Common Sorrel	3	3	2							
<i>Schedonorus pratensis</i>	Meadow Fescue								2		
<i>Stellaria graminea</i>	Lesser Stitchwort	4									
<i>Taraxacum</i> agg.	Dandelion									1	
<i>Trisetum flavescens</i>	Yellow Oat-grass	2			3	2	3		1		
<i>Urtica dioica</i>	Common Nettle		2								
<i>Veronica chamaedrys</i>	Germander Speedwell		2	4	2	1	4	2			
<i>Vicia cracca</i>	Tufted Vetch	1	1							2	
<i>Vicia sativa</i>	Common Vetch	1	2								
<i>Vicia sepium</i>	Bush Vetch			1						1	
<i>Viola hirta</i>	Hairy Violet						1		4		2

Abundance within quadrats is recorded using the Domin scale, where:

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

SHAB HILL: QUADRATS 11-15

Site name		Shab Hill	Shab Hill	Shab Hill	Shab Hill	Shab Hill
Grid reference		SO 93993 15291	SO 93993 15306	SO 93970 15297	SO 93965 15283	SO 93946 15293
Quadrat number		11	12	13	14	15
Veg unit		MG9b	MG9b	MG9b	MG9b	MG9b
	<i>Plant litter</i>	4	5	5	5	6
Agrostis capillaris	Common Bent	5	4	3	3	3
Alopecurus pratensis	Meadow Foxtail			3	4	2
Arrhenatherum elatius	False Oat-Grass	5	8	4	7	4
Cirsium arvense	Creeping Thistle	4	1	4	1	1
Convolvulus arvensis	Field Bindweed					5
Dactylis glomerata	Cock's-foot	4	2		3	4
Deschampsia cespitosa	Tufted Hair-grass	5		6	4	7
Festuca rubra	Red Fescue		4	3	3	4
Galium aparine	Cleavers	4	1	1	1	3
Galium verum	Lady's Bedstraw	1				
Holcus lanatus	Yorkshire-fog	5	2	2	2	
Lathyrus pratensis	Meadow Vetchling	2	4	2		
Poa trivialis	Rough Meadow-grass	3	2	3		3
Taraxacum agg.	Dandelion			1		
Urtica dioica	Common Nettle	1	4	4		4
Veronica chamaedrys	Germander Speedwell	1				

FIELD NORTH OF SHAB HILL: QUADRATS 16-20

Site name		Shab Hill N	Shab Hill N	Shab Hill N	Shab Hill N	Shab Hill N
Grid reference		SO 93975 15625	SO 93950 15642	SO 93945 15681	SO 93964 15707	SO 94016 15695
Quadrat number		16	17	18	19	20
Veg unit		MG5a	MG5a	MG5a	MG5a	MG5a
	<i>Plant litter</i>					4
Agrostis capillaris	Common Bent		2	3	3	3
Anacamptis pyramidalis	Pyramidal Orchid		2	1		1
Anthoxanthum odoratum	Sweet Vernal-grass	4	4	2	4	4
Arrhenatherum elatius	False Oat-Grass	5	4	4	4	5
Bellis perennis	Daisy	1				
Brachythecium rutabulum	Rough-stalked Feather-moss				4	4
Bromus hordeaceus	Soft-brome	3	2	3	3	3
Calliergonella cuspidata	Pointed Spear-moss			3	2	
Crepis capillaris	Smooth Hawk's-beard	1	2			1
Crepis vesicaria	Beaked Hawk's-beard	1		1		1
Cynosurus cristatus	Crested Dog's-tail	2	4	2	2	
Dactylis glomerata	Cock's-foot	4	2			4
Euphrasia agg.	Eyebright		2			
Festuca rubra	Red Fescue	4	2	3	4	5
Geranium dissectum	Cut-leaved Crane's-bill	2				1
Holcus lanatus	Yorkshire-fog	4	4	3	3	4
Hypericum perforatum	Perforate St John's-wort					5
Hypochaeris radicata	Cat's-ear	4	5	4	4	4
Jacobaea erucifolia	Hoary Ragwort				1	
Jacobaea vulgaris	Common Ragwort	2	2			1
Leucanthemum vulgare	Oxeye Daisy	5	6	5	4	5
Medicago lupulina	Black Medick	2	4	5	5	5
Plantago lanceolata	Ribwort Plantain	1	2	1	1	
Poa humilis	Spreading Meadow-grass				1	
Poa pratensis	Smooth Meadow-grass				2	3
Pseudoscleropodium purum	Neat Feather-moss					4
Ranunculus acris	Meadow Buttercup	3	5	3	3	3
Rhinanthus minor	Yellow-rattle	4	4	4	4	4
Rhytidiadelphus squarrosus	Springy Turf-moss	6	6	5	4	
Rumex acetosa	Common Sorrel		1			
Scorzoneroides autumnalis	Autumn Hawkbit		1			
Taraxacum agg.	Dandelion	5	4	5	5	4
Tragopogon pratensis	Goat's-beard	1		4	4	3
Trifolium dubium	Lesser Trefoil	1		2	2	2
Trifolium pratense	Red Clover	5	4	4	5	
Trifolium repens	White Clover		2			
Trisetum flavescens	Yellow Oat-grass	3	4			
Veronica chamaedrys	Germander Speedwell	1				
Vicia sativa	Common Vetch		1		1	1

CRICKLEY HILL: QUADRATS 21-30

Site name		Crickley Hill	Crickley Hill	Crickley Hill	Crickley Hill	Crickley Hill	Crickley Hill	Crickley Hill	Crickley Hill	Crickley Hill	Crickley Hill
Grid reference		SO 93389	SO 93432	SO 93441	SO 93424	SO 93377	SO 93355	SO 93352	SO 93350	SO 93347	SO 93352
Quadrat number		16162	16184	16156	16153	16118	16121	16118	16120	16119	16128
Veg unit		MG1aii	MG1aii	MG1aii	MG1aii	MG1aii	MG5a	MG5a	MG5a	MG5a	MG5a
	<i>Plant litter</i>	4		2	3	4					
Achillea millefolium	Yarrow						1		1		1
Agrostis capillaris	Common Bent							2		3	3
Agrostis stolonifera	Creeping Bent									4	1
Anacamptis pyramidalis	Pyramidal Orchid				1						
Anthoxanthum odoratum	Sweet Vernal-grass					3	4	4	4	5	4
Anthriscus sylvestris	Cow Parsley				4	1					
Arrhenatherum elatius	False Oat-Grass	6	8	6	7	6	4	5	4	4	2
Avenula pubescens	Downy Oat-grass						1				
Carex flacca	Glaucous Sedge						3				
Carex hirta	Hairy Sedge				4						
Centaurea nigra	Common Knapweed									1	
Cerastium fontanum	Common Mouse-ear	3				2	2	3	2	2	3
Cirsium arvense	Creeping Thistle	1	1	1							
Cirsium eriophorum	Woolly Thistle					4					
Crepis capillaris	Smooth Hawk's-beard					1	1	1	4	4	4
Cruciata laevipes	Crosswort	7	5		1	2	6				
Dactylis glomerata	Cock's-foot	2	1	4		5	4	4	5	4	4
Dactylorhiza fuchsii	Common Spotted-orchid					1					
Festuca rubra	Red Fescue	4	4	4	4		5	5	5	5	5
Galium verum	Lady's Bedstraw							4	4	5	
Geranium dissectum	Cut-leaved Crane's-bill	1									
Geranium pratense	Meadow Crane's-bill			7	4						
Heracleum sphondylium	Hogweed		4		1	2					
Holcus lanatus	Yorkshire-fog	4	5	4	4	4	3	4	4	4	3
Jacobaea vulgaris	Common Ragwort								1		
Knautia arvensis	Field Scabious					1					
Lathyrus pratensis	Meadow Vetchling						4				
Leontodon hispidus	Rough Hawkbit					1	4	4	4	2	6
Lotus corniculatus	Common Bird's-foot-trefoil						2				
Luzula campestris	Field Wood-rush							2			
Medicago lupulina	Black Medick										4
Persicaria maculosa	Redshank									1	
Plantago lanceolata	Ribwort Plantain			1		4	4	4	4	4	4
Poa sp.	a meadow-grass	2						2	2		
Potentilla anserina	Silverweed	4								2	
Poterium sanguisorba	Salad Burnet										
subsp. sanguisorba								4			
Primula veris	Cowslip							4	1		
Prunella vulgaris	Selfheal							1	3	1	4
Ranunculus acris	Meadow Buttercup	1		2	1	4	2	2			4
Ranunculus repens	Creeping Buttercup	4				4	2	4	5	7	2
Rubus fruticosus agg.	Bramble	6				5					
Rumex acetosa	Common Sorrel				4	4	3	1	2		
Rumex crispus	Curled Dock									1	
Rumex obtusifolius	Broad-leaved Dock		1	1							
Schedonorus arundinaceus	Tall Fescue			1							
Schedonorus pratensis	Meadow Fescue						1	1			
Taraxacum agg.	Dandelion			1		1					
Trifolium pratense	Red Clover	2		2			4		4	2	4
Trifolium repens	White Clover						2				2
Trisetum flavescens	Yellow Oat-grass							2			
Urtica dioica	Common Nettle	1	2								
Veronica chamaedrys	Germander Speedwell					2	3	4	3	3	4
Vicia cracca	Tufted Vetch						2				

LAND WEST OF AIR BALLOON ROUNDABOUT: QUADRATS 31-40

Site name		W of Air Balloon	W of Air Balloon	W of Air Balloon	W of Air Balloon	W of Air Balloon	W of Air Balloon	W of Air Balloon	W of Air Balloon	W of Air Balloon	W of Air Balloon
Grid reference											
Quadrat number		31	32	33	34	35	36	37	38	39	40
Veg unit		CG3c	CG3c	CG3c	CG3c	CG3c	CG3d	CG3d	CG3d	CG3d	CG3d
	<i>Plant litter</i>						3	4	3	4	4
Achillea millefolium	Yarrow		4	4	5		5	4	3		
Agrostis stolonifera	Creeping Bent	2	1		3	3					
Anthoxanthum odoratum	Sweet Vernal-grass						1		3		2
Arenaria serpyllifolia	Thyme-leaved Sandwort		1	2	3						
Arrhenatherum elatius	False Oat-Grass	1	2	3	3	2	5	5	4	7	5
Avenula pubescens	Downy Oat-grass		4	3	3	4	2	3			2
Blackstonia perfoliata	Yellow-wort		2		4						
Brachypodium rupestre	Tor-grass	4									
Brachythecium rutabulum	Rough-stalked Feather-moss			2		2					
Bromopsis erecta	Upright Brome	4	2	3	2	6	5	5	7	6	8
Calliergonella cuspidata	Pointed Spear-moss		2	3	2		2	3	3	2	
Campanula rotundifolia	Harebell		2	2							
Carex flacca	Glaucous Sedge						1	4	3		4
Centaurea nigra	Common Knapweed						6	6	5	4	
Centaurea scabiosa	Greater Knapweed							4	4		
Cerastium fontanum	Common Mouse-ear	4	3	3	3	3	1				
Cirsium arvense	Creeping Thistle									4	4
Cirsium vulgare	Spear Thistle	1									
Clinopodium vulgare	Wild Basil								4		
Convolvulus arvensis	Field Bindweed	1	4	4						4	4
Crataegus monogyna	Hawthorn							1			
Crepis capillaris	Smooth Hawk's-beard	2	2	2	2	2					
Dactylis glomerata	Cock's-foot	4	5	4	4	4	2	2	1	1	2
Festuca rubra	Red Fescue	4	5	4	4	5	4		2	2	2
Galium verum	Lady's Bedstraw			6	6	4	2	4	4	4	4
Glechoma hederacea	Ground-ivy						4	4	4		5
Heracleum sphondylium	Hogweed									1	
Holcus lanatus	Yorkshire-fog	2	3	4		2	2	2	2	3	2
Hypericum hirsutum	Hairy St John's-wort							4			
Hypericum perforatum	Perforate St John's-wort								1		
Hypochaeris radicata	Cat's-ear		1			4					
Jacobaea vulgaris	Common Ragwort	4	2		4						1
Knautia arvensis	Field Scabious						4		1	1	
Lathyrus pratensis	Meadow Vetchling	1	2	1		4	4	1	3		2
Leucanthemum vulgare	Oxeye Daisy	5	5	4	4	4					
Lolium perenne	Perennial Rye-grass	3									
Lotus corniculatus	Common Bird's-foot-trefoil			4	4		2	3	3		
Medicago lupulina	Black Medick	1	1	2	2	6					
Pimpinella saxifraga	Burnet-saxifrage	3	4	4	2		2		2	1	1
Plantago lanceolata	Ribwort Plantain	5	5	4	5	5	2		2		
Poa humilis	Spreading Meadow-grass			2	1						
Poa pratensis	Smooth Meadow-grass		2	3			1				
Poterium sanguisorba	Salad Burnet										
subsp. sanguisorba				4				4			
Primula veris	Cowslip	1				1		2	1	1	4
Prunella vulgaris	Selfheal					1					
Pseudoscleropodium purum	Neat Feather-moss				2	2	4	4	5	2	3
Ranunculus acris	Meadow Buttercup			1		2					
Rhytidiadelphus squarrosus	Springy Turf-moss			2	2	2	4	3	3	3	4
Rubus fruticosus agg.	Bramble						4		4		
Rumex acetosa	Common Sorrel	4	4	4	1						
Sonchus asper	Prickly Sow-thistle	1									
Taraxacum agg.	Dandelion	1	2	1	1	1					
Trifolium dubium	Lesser Trefoil					2					
Trifolium pratense	Red Clover	5	5	5		6					
Trifolium repens	White Clover	2	2		4	2					
Trisetum flavescens	Yellow Oat-grass		3	2	2	2					
Veronica chamaedrys	Germander Speedwell	5	3	1					3		
Vicia cracca	Tufted Vetch	4	4	4	4			1			
Vicia sepium	Bush Vetch						1				

BUSHLEY MUZZARD SSSI AND ADJACENT LAND: QUADRATS 41-45

Site name		Bushley Muzzard	Bushley Muzzard	Bushley Muzzard	Bushley Muzzard	Bushley Muzzard
Grid reference		SO 94328 13194	SO 94330 13184	SO 94329 13179	SO 94342 13178	SO 94338 13169
Quadrat number		41	42	43	44	45
Veg unit		MG5a	MG5a	MG5a	MG5a	MG5a
	<i>Plant litter</i>					
<i>Achillea millefolium</i>	Yarrow	1	1	4	2	4
<i>Agrostis capillaris</i>	Common Bent	5	5	5	6	5
<i>Agrostis stolonifera</i>	Creeping Bent					1
<i>Ajuga reptans</i>	Bugle					1
<i>Alchemilla filicaulis</i> subsp. <i>vestita</i>	Common Lady's mantle		1			
<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass	2	2		2	
<i>Arrhenatherum elatius</i>	False Oat-Grass					1
<i>Avenula pubescens</i>	Downy Oat-grass		2		3	
<i>Bellis perennis</i>	Daisy			1	1	
<i>Betonica officinalis</i>	Betony	4			5	4
<i>Brachypodium rupestre</i>	Tor-grass		4	2	4	5
<i>Brachythecium rutabulum</i>	Rough-stalked Feather-moss			2		1
<i>Briza media</i>	Quaking-grass			1	1	
<i>Bromopsis erecta</i>	Upright Brome					4
<i>Calliergonella cuspidata</i>	Pointed Spear-moss			1		
<i>Carex flacca</i>	Glaucous Sedge			4	2	1
<i>Centaurea nigra</i>	Common Knapweed	4	4	4	4	2
<i>Cerastium fontanum</i>	Common Mouse-ear	1	2		1	1
<i>Cirsium arvense</i>	Creeping Thistle	1	1	1		
<i>Cirsium palustre</i>	Marsh Thistle	5	5	4	4	4
<i>Cynosurus cristatus</i>	Crested Dog's-tail	4	4	4	5	4
<i>Dactylis glomerata</i>	Cock's-foot	5	5	5	5	5
<i>Festuca rubra</i>	Red Fescue	4	4	4	3	4
<i>Galium verum</i>	Lady's Bedstraw			6	4	1
<i>Heracleum sphondylium</i>	Hogweed		1			1
<i>Holcus lanatus</i>	Yorkshire-fog	4	4		4	3
<i>Hypericum tetrapterum</i>	Square-stalked St John's-wort					
<i>Hypochaeris radicata</i>	Cat's-ear		4	2	4	4
<i>Jacobaea vulgaris</i>	Common Ragwort					1
<i>Juncus inflexus</i>	Hard Rush	1				
<i>Knautia arvensis</i>	Field Scabious				1	5
<i>Lathyrus pratensis</i>	Meadow Vetchling	4	4	4	4	4
<i>Leucanthemum vulgare</i>	Oxeye Daisy	1	4	2	4	
<i>Lolium perenne</i>	Perennial Rye-grass	4	4	4	4	4
<i>Lotus corniculatus</i>	Common Bird's-foot-trefoil	4	4	6	6	7
<i>Phleum bertolonii</i>	Smaller Cat's-tail		1			
<i>Pimpinella saxifraga</i>	Burnet-saxifrage			1		1
<i>Plantago lanceolata</i>	Ribwort Plantain	6	5	6	6	5
<i>Poa</i> sp.	a meadow-grass	1			1	
<i>Potentilla erecta</i>	Tormentil	2	4			
<i>Potentilla sterilis</i>	Barren Strawberry				2	
<i>Poterium sanguisorba</i> subsp.	Salad Burnet		2	4	5	
<i>Primula veris</i>	Cowslip			4		1
<i>Prunella vulgaris</i>	Selfheal	4	4	4	3	5
<i>Pseudoscleropodium purum</i>	Neat Feather-moss	4	4	4	2	4
<i>Pulicaria dysenterica</i>	Common Fleabane					
<i>Ranunculus acris</i>	Meadow Buttercup	5	6	5	5	5
<i>Ranunculus flammula</i>	Lesser Spearwort					
<i>Ranunculus repens</i>	Creeping Buttercup	4	4	4		
<i>Rhytidiadelphus squarrosus</i>	Springy Turf-moss	2	1	4	4	4
<i>Rumex acetosa</i>	Common Sorrel	2	2	3		
<i>Scorzoneroideis autumnalis</i>	Autumn Hawkbit		1			
<i>Succisa pratensis</i>	Devil's-bit Scabious				5	
<i>Taraxacum</i> agg.	Dandelion	4	4	2	2	1
<i>Trifolium pratense</i>	Red Clover	1	4	4	4	4
<i>Trifolium repens</i>	White Clover	5	6	5	5	
<i>Veronica chamaedrys</i>	Germander Speedwell	4		2	2	
<i>Vicia sepium</i>	Bush Vetch				1	

BUSHLEY MUZZARD, BRIMPSFIELD SSSI & ADJACENT LAND: QUADRATS 56-66

Site name		Bushley Muzzard	Bushley Muzzard	Bushley Muzzard	Bushley Muzzard	Bushley Muzzard	Bushley Muzzard	Bushley Muzzard	Bushley Muzzard	Bushley Muzzard	Bushley Muzzard	Bushley Muzzard
Grid reference		SO 94343	SO 94332	SO 94281	SO 94329	SO 94329	SO 94260	SO 94296	SO 94307	SO 94313	SO 94312	SO 94343
Quadrat number		56	57	58	59	60	61	62	63	64	65	66
Veg unit		MG6a	MG6a	MG6a	MG6a	MG6a	CG4c	CG4c	CG4c	CG4c	CG4c	MG10b
	<i>Plant litter</i>											
Achillea millefolium	Yarrow						4	4			3	
Agrostis capillaris	Common Bent	6	4	1	5	3	3	4	4	5	5	
Agrostis stolonifera	Creeping Bent		3	3		1						4
Alchemilla filicaulis subsp. vestita	Common Lady's mantle									4		
Anthoxanthum odoratum	Sweet Vernal-grass						2				2	
Arrhenatherum elatius	False Oat-Grass			1			1					
Avenula pratensis	Meadow Oat-grass									1		
Avenula pubescens	Downy Oat-grass									2		
Betonica officinalis	Betony									4		
Brachypodium rupestre	Tor-grass						4	7	7	6	5	
Briza media	Quaking-grass						3			3		
Bromopsis erecta	Upright Brome						6		4	2		
Bryum sp.	a moss											2
Calliergonella cuspidata	Pointed Spear-moss									1	2	3
Carex flacca	Glaucous Sedge						4	4	2	3		
Carex hirta	Hairy Sedge		4	4	4				2		4	2
Centaurea nigra	Common Knapweed						4	2				
Cerastium fontanum	Common Mouse-ear				3		1	1	1			1
Cirsium acaule	Dwarf Thistle						4			4		
Cirsium arvense	Creeping Thistle	1	1		4		2	2	2	1	4	
Cirsium palustre	Marsh Thistle							4				
Cirsium vulgare	Spear Thistle								1			
Crepis capillaris	Smooth Hawk's-beard						1		1	2	4	
Cynosurus cristatus	Crested Dog's-tail		2		2		4	3	4	4	3	
Dactylis glomerata	Cock's-foot		4	5			3	4	4	4	5	
Deschampsia cespitosa	Tufted Hair-grass	4			2			4			4	
Eleocharis palustris	Common Spike-rush											4
Festuca rubra	Red Fescue	4	8	7	3		3	2	4	4	4	4
Galium verum	Lady's Bedstraw						4	2	4	4	5	
Geranium dissectum	Cut-leaved Crane's-bill								1			
Holcus lanatus	Yorkshire-fog	6	4	4	5	4		3	4		4	4
Juncus articulatus	Jointed Rush											2
Juncus inflexus	Hard Rush											7
Lathyrus pratensis	Meadow Vetchling						4		4	3	3	
Leontodon hispidus	Rough Hawkbit						6					
Lolium perenne	Perennial Rye-grass	5	5	6	8	7	3	3	4	3	3	
Lotus corniculatus	Common Bird's-foot-trefoil						4			4	3	
Medicago lupulina	Black Medick						4		2			
Phleum bertolonii	Smaller Cat's-tail									2		
Phleum pratense	Timothy	3	1		4	4						3
Pilosella officinarum	Mouse-ear-hawkweed							2		1		
Plantago lanceolata	Ribwort Plantain						1	4				
Plantago major	Greater Plantain					1						
Poa sp.	a meadow-grass			2								
Poa trivialis	Rough Meadow-grass											3
Potentilla anserina	Silverweed								1			
Potentilla reptans	Creeping Cinquefoil						1	5	2	4		
Potentilla sterilis	Barren Strawberry								1	3		
Poterium sanguisorba subsp.	Salad Burnet						4			4		
Prunella vulgaris	Selfheal							4		4		2
Pseudoscleropodium purum	Neat Feather-moss									4	3	
Ranunculus acris	Meadow Buttercup	2	4	2	4	5	2	4		4	4	
Ranunculus repens	Creeping Buttercup	4	1	2	4	4		2		2	2	4
Rhizidiadelphus squarrosus	Springy Turf-moss										4	
Rumex acetosa	Common Sorrel					2		2				
Rumex conglomeratus	Clustered Dock											4
Schedonorus arundinaceus	Tall Fescue	4						1	4	4		
Schedonorus pratensis	Meadow Fescue				2		2					4
Sonchus asper	Prickly Sow-thistle										1	
Stellaria graminea	Lesser Stitchwort											1
Taraxacum agg.	Dandelion		1		2	4	2	1	4	2	3	
Trifolium pratense	Red Clover				4	2	5			4	2	
Trifolium repens	White Clover	3		2	3	4	4	4	5	5	1	2
Urtica dioica	Common Nettle	1		1								
Veronica beccabunga	Brooklime											3
Veronica chamaedrys	Germander Speedwell							2		3	1	
Veronica serpyllifolia	Thyme-leaved Speedwell									1		
Vicia sepium	Bush Vetch								4			