Portsdown Hill, Hampshire

Vegetation Survey 2020

For:

Portsmouth City Council

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CONTENTS

1.0 INTRODUCTION

Portsdown (known locally as Portsdown Hill) is a south-facing chalk escarpment lying between Fareham and Purbrook in southern Hampshire. A large part of the hill is included within a Site of Special Scientific Interest (SSSI) designated for its botanical and entomological interest. The site is owned by the MOD and Portsmouth City Council (PCC) and managed by PCC under a Higher Level Stewardship (HLS) agreement.

The management history and current management of Portsdown Hill are described in the 2016-2020 management plan (Jones 2015). Historically, the site was largely short, grazed grassland, but during the 1950s to the early 1990s the site was allowed to revert to rough vegetation and scrub. Since the late 1990s management work has largely focused on removal and management of the scrub to restore the species rich calcareous grassland.

John Norton Ecology was commissioned to carry out a vegetation survey of the PCC land within Portsdown SSSI during 2020. The survey was carried out by John Norton MCIEEM, an experienced botanist and vegetation surveyor, assisted by botanist Debbie Allan. Previous surveys were carried out in 2000 (also by John Norton, through Hampshire County Council) and 2010 by Phil Wilson[1].

2.0 SURVEY SCOPE AND METHODOLOGY

2.1 Survey aims

The main aims and requirements of the survey contract were as follows:

1. To map the vegetation of the PCC site in terms of the National Vegetation Classification (NVC).
2. To record species lists of plants present on the site.
3. To record locations of rare, local or other 'notable' plants (on an incidental basis).
4. To record general notes on vegetation stands or site features as target notes.
5. To map, describe and analyse the results.
6. To assess the condition of the site.
7. To make recommendations for future management.

2.2 Methods

Detailed methodology and some comments on the scope and limitations of the survey are given here to assist with planning future surveys and to aid interpretation of the GIS mapping.

2.2.1 Field survey preparation

The vegetation survey was carried out by means of walkover field surveys, aided by reference to Google Earth satellite imagery. The Google Earth imagery was dated September 2016 and was of high resolution and quality. All mapping (i.e. digitising) for the project was carried out in QGIS (an open source GIS application) using the Google Earth imagery as a reference base layer with the coordinate reference

[1] Wilson, P. 2010. *NVC survey and condition assessment of Portsdown Hill SSSI and High Tor SINC.* Report.

system set to British National Grid (OSGB 1936 / EPSG 27700). The maps attached to this report were also produced in QGIS.

The first stage in preparing field maps was to define and digitise the extent of the survey area (**Map 1**). This was based on the Portsdown SSSI boundary (shapefile available from Natural England) and a hand-drawn compartment map provided by the site manager. The PCC site comprises 10 compartments numbered from west to east. The compartment boundaries were also digitised.

The following areas lying within the SSSI but outside the PCC site (totalling 15.1 ha) were therefore excluded from the survey (**Map 1**):

- Portchester Common at the western end of the SSSI (not fully shown on the map); owned and managed by Fareham Borough Council.
- The MOD area to south of Fort Southwick and the roadway leading to this area.
- The western end of Paulsgrove Quarry (also known as Paulsgrove Chalkpit), and housing to the south of this which was presumably not present when the SSSI was notified in 1984.
- Small areas at the eastern end of the site.
- In addition, all the PCC-managed road verges were excluded from the survey, apart from the embankment on the southern edge of compartments 7-9.

A few small areas lying outside the SSSI but managed by PCC were included in the survey boundary at the western and eastern ends of the site. The resulting total survey area is 55.09 ha.

Note that there are likely to be small inconsistencies in the delineation of the survey boundary where the SSSI boundary was used, but where it may not exactly follow the boundary of the PCC land. There may also be some minor differences between the survey boundary and the 'true' PCC ownership boundary.

A set of 24 maps showing the Google Earth base layer and compartment boundaries was laid out in QGIS for use in the field survey. These were printed at about 70% transparency onto A4 sheets with a 20mm margin, allowing a scale between 1:900 to 1:1000. Each field map was numbered for reference. Ordnance Survey 1km grid lines (generated using the QGIS TomBio plugin) were also included, with manually positioned labels (in a separate point layer) showing the 1km coordinates. It was confirmed during a short field trial that the map scale was sufficient to be able to map and annotate very small areas of habitat.

Before starting the survey a set of vegetation categories and codes was developed for recording purposes. These were further refined during the course of the survey (see **Appendix 3**). The categories mostly follow standard NVC types, but it was necessary to devise some additional ones to record certain types of vegetation that did not clearly fall within the NVC framework or to indicate recent scrub management. The category 'CSE' ('chalk scrub ecotone') was used to map areas of regularly mown calcareous grassland and light scrub which has developed through past scrub clearance and is presently maintained by regular cutting and mowing. This vegetation is a major feature of the site, present particularly as a zone around the numerous clumps of scrub and trees (hence referred to as an 'ecotone'), but also more extensively in some areas of open grassland. 'CX' was used to denote recently cut back areas of scrub which had not yet developed into CSE, and 'CS' for dense scrub without trees

(e.g. which had been recently cut back and regenerated). 'RC' ('*Rubus-Clematis* scrub') was used for scrub dominated by *Rubus fruticosus* agg. (Bramble) and *Clematis vitalba* (Traveller's-joy).

2.2.2 Field survey methodology

All parts of the site were walked (mostly to within about 30m), apart from the large inaccessible areas of scrub and trees, which were digitised with reference to the Google Earth imagery. Photographs were taken to assist with mapping and also to provide some representative images of the different vegetation categories (a small selection are included in this report but a larger set labelled with vegetation type and compartment number will be deposited with PCC).

Field notes were numbered consecutively and marked on the field maps as circled numbers. Most of these were subsequently converted into target notes. During or after each survey visit, dates were noted in the margins of the maps, so that these could be cross-referenced with the field notes.

Boundaries of each discrete parcel of vegetation were drawn onto the field maps and marked with an abbreviated version of the NVC/category code; thus, '21d' denoted W21d chalk scrub and '3a' CG3a chalk grassland. Transitional types (those intermediate between two different types) and mosaics (of two or sometimes more) types were also indicated on the maps.

The intended minimum mapping unit was 25 x 25m, but some parcels smaller than this were also mapped, including small clumps of scrub and trees. Narrow, linear stands of grassland, narrow footpaths and similar features were not possible to map at fine scale, so were sometimes combined as larger features and coded as habitat mosaics. However, some of the main footpaths were mapped to indicate the extent of improved and semi-improved grassland occurring along them. A few small areas of unvegetated substrate (mostly bare chalk) were mapped under a separate bare ground category, but most areas of bare ground along well-used footpaths were not separately mapped.

NVC types (Rodwell 1991, 1992, 2000) and the devised categories (see note on p.2) were assigned to the mapped vegetation parcels in the field, based on the experience of the surveyor and long familiarity with the site. However, assigning NVC types to some of the transitional vegetation was problematic. Although quadrat sampling would have been useful to help confirm NVC types or investigate the NVC relationships of the transitional vegetation, this was not possible in the time available.

It was not intended that the contract would include a detailed botanical survey of the site, since the site is already relatively well recorded and a comprehensive survey would have required multiple visits through the course of the year in different seasons. However, with the help of an assistant, species lists were recorded for each 1km grid square covered by the site so that the records could be passed on to the county vascular plant recorder and in due course to the county environmental records centre (Hampshire Biodiversity Information Centre, HBIC). All species records were therefore input into the Hampshire MapMate recording system. Locations of rare, local or other 'notable' plants were recorded to 8-figure or 10-figure precision using a GPS smartphone and have also been imported into a GIS point layer and mapped for this report. However, these should be regarded as incidental records, since not every part of the site was walked or checked in detail for notable species.

2.2.3 Timing and limitations on recording of flora and vegetation

Field survey preparation (which also included reading past reports and a meeting with the site manager) took about two days in total. Total field survey time was about 50 hours, split over 10 survey visits between 14 June and 14 July 2020, excluding the initial trial visit lasting about two hours on 8 June. Some visits were shortened due to extremely hot weather in July 2020. Two additional visits totalling about a day were made on 8 and 30 August to re-check the mapping in some areas and take the opportunity to make some additional observations of late-flowering plants. The total time required for the field survey was therefore equivalent to around nine 8-hour days. Future surveys following the same methodology would probably take a day or two less than this.

The full survey was commenced about 3-4 weeks earlier than optimal for chalk grassland, because a dry spell in May and June had already caused grassland vegetation to parch off. Consequently, it was considered that if starting the survey any later, continuation of the dry weather would make vegetation difficult to assess. Conditions, however, improved after some rain in late July and August, so that a survey in late August to mid-September would have been possible.

The early timing of the survey made it difficult to assess species richness of some of the grassland during the early part of the survey. Most difficulty was experienced with assigning areas of short, species rich calcareous grassland to the NVC, and distinguishing the calcareous CSE vegetation from the more mesotrophic herb rich MG1e vegetation alongside footpaths and site entrances.

Many late-flowering and late-developing species were not visible or difficult to detect during the survey as they were either below ground or present only as very small leaf rosettes. These included *Spiranthes spiralis* (Autumn Lady's-tresses), *Gentianella amarella* (Autumn Gentian), *Campanula rotundifolia* (Harebell), *Pimpinella saxifraga* (Burnet-saxifrage) and *Knautia arvensis* (Field Scabious). The dry weather at the start also meant that many annual and early-flowering species had already died back and were absent or easily overlooked. Efforts were made to look for early-flowering chalk grassland grasses, such as *Helictochloa pratensis* (Meadow Oat-grass) and *Koeleria macrantha* (Crested Hair-grass), but very few plants were seen. Several other common grasses were also under-recorded, e.g. *Agrostis stolonifera* (Creeping Bent).

2.2.4 Digitising, mapping and data analysis

All digitising and generation of maps to illustrate this report was carried out in QGIS. The shapefile file format was used for digitising to allow maximum compatibility with other GIS systems (PCC currently use MapInfo). The vegetation was digitised as a standard polygon layer (named 'Portsdown vegetation 2020'), with each separate parcel of vegetation drawn as a single feature (rather than combining polygons into multi-part features). Details of the layer structure are given in **Table 1**.

Table 1. Structure of Portsdown vegetation 2020 shapefile layer

Field name	Type	Description
catcode	integer	Code (from 1 to 10) denoting broad class/category of vegetation
veglabel	text	NVC type or devised category
NVC_equiv	text	Closest equivalent NVC type, or majority type for a transition or mosaic
area_m2	decimal	Area in sq. metres (manually calculated within QGIS)

Digitising the vegetation areas from the field maps was made by reference to the Google Earth base layer in QGIS and also to the Google Earth application in order to view at higher resolution.

Digitising was not straightforward due to the large number of scrub 'islands' and the zones of CSE around them (very narrow zones of CSE were not mapped). The islands were initially drawn onto a separate layer, then cut out as 'rings' (i.e. holes) from a layer duplicated from the whole survey area boundary, using a geometry processing tool; then pasted back into this layer as islands. This layer was then used to digitise the remainder of the vegetation.

For mapping purposes the *catcode* field was used to apply different colour shading to the main categories of vegetation (see map legend). Each polygon can be labelled from the *veglabel* field (due to the scale of the maps included in this report, some of the labels are not visible). The *veglabel* field gives either the NVC community or sub-community code, or the code for the devised category, as listed in **Appendix 3**. Transitional vegetation types have been denoted with hyphens (e.g. 'CG3a-CG7'), and mosaics with the slash symbol (e.g. CG3a/CSE). The *NVC_equiv* field shows the nearest appropriate NVC code for all vegetation parcels, except for RC which has no suitable NVC counterpart. This field was added so that the data could be more easily incorporated into other mapping datasets (it is intended that the GIS files will be sent to HBIC in due course).

Species records (1km square lists and other incidental records) were combined and entered into MapMate. These were then exported using a query and imported into a Microsoft Access database for checking against standard lists of taxa and for various querying and sorting. Records for the notable species recorded at higher precision were exported to a csv spreadsheet, then imported into QGIS and saved as a shapefile layer ('Portsdown noteworthy species') so that the species maps could be produced for this report. Species recorded at identical locations have been depicted on different maps so that one record would not obscure another. They are shown as dots of 20m diameter for illustrative purposes.

Target notes were input directly into a GIS point layer ('Portsdown target notes 2020') with fields for date (*TN_date*), the original field note number (*TN_temp*) and the assigned target note number (*Cpt-TN*). The latter consists of the compartment number followed by a hyphen and a consecutive number, so that target notes for compartment 1 are numbered 1-1 to 1-11 and for compartment 2, 2-1 to 2-13. The target note field (*TN_text)* is limited by the shapefile maximum field length of 255 characters, so the notes were edited down so as not to exceed this length. Within QGIS the target notes can be read by clicking on a target note symbol using the Identify Features tool.

When the mapping process had been fully completed the areas of vegetation for each mapped polygon were calculated within the GIS vegetation table for the *area_m2* field using the inbuilt calculation tool (this method was used in preference to automatic calculation within a virtual field, since that method is prone to errors if parcels are split). The table was exported to a Microsoft Excel spreadsheet in order to sum the areas of different categories and NVC types.

3.0 RESULTS SUMMARY

3.1 Target notes and species records

3.1.1 Data presentation

Target notes are shown in **Appendix 1** and their locations on **Map 2**. Species lists tabulated by 1km grid square are presented in **Appendix 2a** and incidental records of notable species in **Appendix 2b;** these are shown on **Maps 3-5**. Calcareous grassland indicator species and species with national and county conservation status are listed in **Appendix 2c**.

3.1.2 Species richness and indicators

The 2020 survey recorded a total of 275 vascular plant species, comprising 3 ferns, 30 graminoids (grasses, rushes and sedges), 180 herbaceous species ('herbs') and 62 trees and shrubs. It is likely that the majority of species currently present on the site were seen, with the omission of a few early and late flowering species, various ruderals and 'casuals', and some rarities. *Phyteuma orbiculare* (Round-headed Rampion) had not been recorded on the site by the site manager for around 20 years. *Filipendula vulgaris* (Dropwort) is rare on the site (in compartment 9) and was not looked for during the survey. During an earlier visit by the author on 22 March 2020, *Viola reichenbachiana* (Early Dog-violet) was recorded in several places in the middle of the site, but not during the main survey. *Ophrys apifera* (Bee Orchid) and *Orchis mascula* (Early Purple-orchid) were not recorded, though Bee Orchid is easily overlooked (it is locally frequent in the surrounding area) and the survey was too late for Early Purple-orchid. *Onobrychis viciifolia* (Sainfoin) was not recorded during the survey, but is known in compartment 8 and had been seen a few years ago by the surveyors in the northern part of compartment 1. This species was historically widely cultivated and is presently frequently sown in wild flower seed mixes, but the populations on Portsdown Hill are likely to be the native subspecies which is strongly associated with calcareous soils. It is also locally frequent in a few locations in the surrounding area.

The total number of calcareous grassland indicators recorded during the survey was 56, out of a total of 100 species (author's own compiled list); to which can be added at least five more species mentioned above (*Phyteuma orbiculare*, *Filipendula vulgaris*, *Ophrys apifera*, *Orchis mascula* and *Onobrychis viciifolia*), making 61 in all (60 recorded recently).

3.1.3 Species with conservation status

Species with county or national conservation status (those recorded during the survey) are summarised in **Table 2** (and see **Appendix 2c**). The site supports at least 17 species listed as threatened or Near Threatened on the England Red List of vascular plants (Stroh et al. 2014). Two of these are classed as Vulnerable: *Onobrychis viciifolia* (see comment above) and *Euphrasia pseudokerneri* (Chalk Eyebright). Chalk Eyebright is one of up to up to three NERC S41 (Priority Species) present on the site. It is common and widespread over the whole site in the shorter chalk grassland. Another S41 species is *Gentianella anglica* (Early Gentian), which occurs in the west of the site but was not looked for during the present survey. It had been put on the Waiting List (WL) of the England Red List (Stroh et al. 2014), pending taxonomic review and is a County Rare species. Following the publication of *Gentians of Britain and Ireland* (Rich & McVeigh 2019) it is now listed as a subspecies of Autumn Gentian *Gentianella amarella* subsp. *anglica*. A further species of importance is *Clinopodium acinos* (Basil Thyme), which is also Vulnerable in England and a S41 Priority Species. It was not recorded during the survey, but has been seen by the author previously within the SSSI at Portchester Common and also occurs on adjacent land

within Portsmouth Water's Fort Southwick Reservoir site. It is very likely to occur within the PCC land as there is plenty of suitable habitat available (disturbed dry chalky soils, including arable fields). The only other County Rare species recorded was a hawkweed *Hieracium sublepistoides*, which occurs in compartments 1-3 and is frequent in compartment 2 (**Map 5**).

Table 2. Totals for calcareous grassland indicators and species with conservation status

Calcareous grassland indicators	56
England Red List: Vulnerable	1
England Red List: Near Threatened	15
NERC S41	1
Hants Notables: County Rare	1
Hants Notables: County Scarce	4
Nationally Scarce	2

3.2 Vegetation

3.2.1 Data presentation

The main categories of vegetation used for the survey (NVC types and other devised categories) are listed with their total area in **Table 2** and illustrated on **Map 6**. Full NVC names and details of the categories are also given in **Appendix 3**. The categories are further grouped by broad vegetation types and by nearest equivalent NVC type in **Table 4**. A set of large-scale vegetation maps are included here as **Maps 7-12**. The site is described in terms of the main vegetation types in **Section 4.0**.

Table 2. Total area for main vegetation categories (Map 6)

catcode	Description	Area (m^2)	Area (ha)	% of total
0	Bare ground / unvegetated areas	562	0.06	0.02%
1	Short species rich calcareous grassland (*Festuca ovina* dominated) (CG3a/'CG3aS'/CG2/CG7 transitions)	43157	4.32	7.83%
2	Short species rich calcareous grassland (*Bromopsis erecta* dominated) (CG3a, 'CG3aT')	69809	6.98	12.67%
3	Medium to long species rich calcareous to neutral grassland (CG3b, MG1e)	10794	1.08	1.96%
10	Short herb rich calcareous to neutral grassland (MG5a/b)	2065	0.21	0.37%
4	Rough species poor calcareous to neutral grassland and weed communities (MG1a/b/d, CG3d, OV25)	8358	0.84	1.52%
5	Improved to semi-improved grassland on trampled paths (MG6c/MG7)	8248	0.82	1.50%
6	Chalk scrub ecotone ('CSE' - managed calcareous grassland/scrub mosaic)	123589	12.36	22.43%
7	*Rubus-Clematis vitalba* scrub ('RC' - no NVC equivalent)	30877	3.09	5.60%
8	Recently cleared chalk scrub ('CS' and 'CX' =W21d); gorse & blackthorn scrub (W23)	31681	3.17	5.75%
9	Dense scrub, trees and developing woodland (W21a, W21d)	221760	22.18	40.25%
	Total	**550900**	**55.09**	**1.00**

Table 3. Total area by broad groups of vegetation

catcode	Broad vegetation type	Area (m^2)	Area (ha)	% of total
0	Bare ground / unvegetated areas	562	0.06	0.10%
1, 2, 3, 10	Species rich calcareous (to neutral) grassland (Priority Habitat)	125825	12.58	22.84%
6	Species rich calc grassland/scrub mosaic (CSE)	123589	12.36	22.43%
4, 5	Species poor calcareous to neutral grassland	16606	1.66	3.01%
7	*Rubus-Clematis* scrub (RC)	30877	3.09	5.60%
8,9	Scrub and woodland	253441	25.34	46.01%
	Total	**550900**	**55.09**	**1.00**

3.2.2 Herb rich calcareous grassland and chalk scrub ecotone

Tables 2 and 3 show that the site supports about 25 hectares (ha) of species rich calcareous grassland (or in places calcareous to neutral grassland), amounting to 45% of the total area. This comprises 11.3 ha of short, well-grazed grassland, 1.0 ha of longer swards and 12.4 ha of chalk scrub ecotone (CSE).

The shorter grassland is referable to CG3a (7.0 ha) or transitions of that to CG2 and CG7a (4.3 ha) (**Table 2**). Some of it was recorded as 'CG3aS' (very short) or 'CG3aT' (trampled) (see **Appendix 3**). In **Table 4** it has all been assigned to CG3a, even though some of it is likely to be much closer to CG2 or CG7a. Much of it has been grazed by horses in recent years and it was also evident that many areas are well grazed by rabbits. This grassland also has a quite high proportion of bare ground in places, probably averaging 30-35% in the driest, heavily grazed spots (but locally much more than this and probably affected by dry weather conditions in 2020). There are also very small areas of short, herb rich grassland referable to MG5b, but these grade into the CG3a next to footpaths and were not easy to distinguish, so only a few parcels were actually mapped, totalling 0.21 ha.

The longer herb rich grassland comprises areas of CG3b or MG1e, totalling 1.1 ha (**Table 2**), but invariably, where scrub was present, this vegetation was recorded as CSE. On chalk soils CG3b and MG1e have a very similar herb component, so are only really distinguishable by the dominant grass, either *Bromopsis erecta* (Upright Brome) in CG3b or *Arrhenatherum elatius* (False Oat-grass) in MG1e. These sometimes occurred together in mosaics.

Most of the herb rich calcareous grassland is in good condition although the trampled CG3a is probably in moderate condition. See **Section 5.2** for further comments on habitat condition.

The majority of the CSE vegetation is both species rich and herb rich. It is mostly referable to CG3b, and has been coded as such in **Table 4**. However, see comments in **Section 4.1** below. It covers 12.4 ha, amounting to 22.4% of the site area (**Tables 2 & 3**). However, some mosaic areas of CG3a/CSE were assigned to CG3a, so the overall picture is that the rougher CSE grassland covers a larger area than the shorter CG3a grassland.

3.2.3 Rough species poor grassland and ruderal vegetation

Patches of taller, species poor grassland have developed at the access points onto the site and along the main footpaths, especially where there has been some nutrient enrichment by dogs but also where there is surface water run-off from the adjacent roads. This grassland is referable to various sub-communities of MG1 or to CG3d, or mosaics of these. Also mapped in this group is an area of ruderal vegetation which has developed in compartment 10 in a recently cleared area, assigned to OV25 (this

is currently fairly species rich but the diversity will be short-lived). These types combined amount to 0.84 ha (1.5% of the site area) (**Table 2**).

Another 0.82 ha (1.5%) of grassland has been mapped as semi-improved to improved grassland (transitions and mosaics of MG6c and MG7e) (**Table 2**), mainly associated with footpaths and some larger trampled areas. This grades in to CG3a so could not be mapped accurately. The total area of species poor grassland mapped for the site is therefore 1.66 ha (**Table 3**), but is probably an underestimate.

Table 4. Total area of vegetation types assigned to closest NVC equivalent (where applicable)

NVC code	Area (m^2)	Area (ha)	% of total
n/a	562	0.06	0.10%
CG3a*	110208	11.02	20.01%
CG3b	126231	12.62	22.91%
CG3d	4412	0.44	0.80%
CG7a	2757	0.28	0.50%
MG1a	3846	0.38	0.70%
MG1b	627	0.06	0.11%
MG1d	41	0.00	0.01%
MG1e	6854	0.69	1.24%
MG5b	2065	0.21	0.37%
MG6/7	8248	0.82	1.50%
OV25	732	0.07	0.13%
RC	30877	3.09	5.60%
W21a	7901	0.79	1.43%
W21d	242099	24.21	43.95%
W23	3442	0.34	0.62%
Total	**550900**	**55.09**	**1.00**

* includes all the CG3a-CG2/CG7a transitional grassland

3.2.4 Scrub and woodland

The *Rubus-Clematis vitalba* scrub (RC) appears to be associated mainly with areas that receive surface water runoff from the adjacent roads, particularly along the northern edge of the site, but it also occurs along the southern edge, particularly where the scrub is managed under powerlines and in an old quarry. These areas tend to have deeper, moister and more strongly nutrient-enriched soils. This category has no direct NVC equivalent but is related to OV24b *Urtica dioica-Galium aparine* community, *Arrhenatherum elatius-Rubus fruticosus* agg. sub-community and similarly develops initially from unmanaged swards dominated by *Arrhenatherum elatius* (MG1). It may eventually succeed to hawthorn scrub (W21). *Rubus-Clematis* scrub covers just over 3 ha, which is quite a significant proportion of the site (5.6%) by area (**Tables 2 and 3**).

Other scrub referable to W21d ('chalk scrub'), W21a (developing secondary woodland) and W23 (gorse scrub) makes up the remaining 25.3 ha of the site (46%) (**Table 3**). The combined total scrub and woodland cover (including RC) is therefore 51.6%, but the CSE also supports additional amounts of scrub, though this is rarely very dense and does not necessarily contribute much to the cover.

A rough calculation was made to estimate the total area of the larger blocks of W21 and W23 scrub which are situated around the margins of each compartment. This came to 19 ha out of the total of

25.3 ha, which means that the remaining 6.3 ha occurs mainly as scrub islands with the open grassland areas (this includes some relatively large area in compartments 1, 2 and 10). The total area of all grassland and bare ground combined is 26.7ha, so the proportion of scrub in these areas is 6.3/(26.7+6.3) x 100 = 19%.

At least 2.7 ha of scrub on the site is being actively managed at the present time (coded as CS or CX – see **Appendix 3**), although some of this lies within the larger scrub blocks and 0.7 ha within compartment 6. In addition, most of the CSE is maintained by regular cutting, around once every 1-3 years. Much of the CS, CX and CSE vegetation is likely to develop into herb rich calcareous or neutral grassland (CG3a, CG3b, MG1e) if regular management continues.

Typical view of the site showing habitat mosaic made up of small clumps of chalk scrub, areas of recently cleared scrub with rough grassland ('CSE'), the main slopes supporting shorter, longer-established areas of herb rich calcareous grassland and a lightly trampled footpath at the bottom of the picture.

4.0 VEGETATION DESCRIPTION

4.1 Calcareous grassland

4.1.1 CG3 Bromus erectus [Bromopsis erecta] grassland and related types

CG3 *Bromus erectus* grassland is usually strongly dominated by Upright Brome *Bromopsis erecta* (more than 10% cover), with a herb component of typical chalk grassland calcicoles. It has a predominantly southern and eastern distribution in Britain and consequently was only briefly dealt with in the published chapter (Rodwell 1992) due to the north and west bias of the NVC fieldwork. The described sub-communities are not particularly well defined but do broadly hold true. It is largely a community of ungrazed or infrequently mown sites.

CG3a Typical sub-community occurs most extensively in compartments 3, 4, 5, 7, 9 and 10. It mostly corresponds closely to the published description, but in compartments 3, the western half of compartment 4 and especially the eastern half of compartment 9 it is more heavily grazed, much shorter than usual and is intermediate to **CG7a** *Festuca ovina-Hieracium pilosella-Thymus praecox/pulegioides* grassland, *Koeleria macrantha* sub-community (mainly) or **CG2** *Festuca ovina-Avenula pratensis* grassland (possibly in a few places). This variant was recorded as 'CG3aS'. In compartment 10 and alongside main paths elsewhere there is a heavily trampled, slightly semi-improved and less species rich version, mapped as 'CG3aT'. Due to the parching effects of the dry weather it was difficult assess species richness of the short and trampled grassland, so the mapping of these sub-categories is to some extent provisional.

CG3a grassland, compartment 8

No 'pure' CG2 was identified on the site. This very species rich type occurs on thin rendzina soils on chalk downland and is dominated by Sheep's Fescue, but at Portsdown Hill, *Bromopsis erecta* seems to be present throughout in the sward, so all of the shorter grassland appears to be closer to CG3a or intermediate between that and CG7a (CG2 and CG3a are quite similar in composition and are mainly distinguished by the presence of *Bromopsis erecta*). A small area of CG2 was mapped during the 2000

survey in compartment 1, but this area was looked at again and was found to be partly composed of *Bromopsis erecta*, even though relatively short and species rich, so was mapped as CG3aS (target note 1-1). The 2010 survey only recorded a small area of CG2 in the east of compartment 2, which on this survey was mapped as CSE/CG3a. *Succisa pratensis* (Devil's-bit Scabious), a characteristic species of the CG2b sub-community, was only seen in compartment 4 during the present survey, in an area of species rich short grassland mapped as CG3aS (**Map 3**, target note 4-11). Possibly, therefore, this grassland might be intermediate to CG2b.

Trampled CG3aT grassland, compartment 10

CG3aS grassland, compartment 4

In addition to the taller grasses, the more abundant species in CG3a on the site are *Festuca ovina* (Sheep's Fescue), *Briza media* (Quaking-grass), *Carex flacca* (Glaucous Sedge), *C. caryophyllea* (Spring-sedge), *Poterium sanguisorba* (Salad-burnet), *Plantago lanceolata* (Ribwort Plantain),

Leontodon hispidus (Rough Hawkbit), *Scabiosa columbaria* (Small Scabious), *Anthyllis vulneraria* (Kidney Vetch), *Centaurea nigra* (Common Knapweed), *Lotus corniculatus* (Common Bird's-foot-trefoil), *Campanula rotundifolia* (Harebell), *Cirsium acaule* (Dwarf Thistle) and *Pimpinella saxifraga*. Less conspicuous but probably widespread species include *Polygala vulgaris* (Common Milkwort) and *Viola hirta* (Hairy Violet). Common Rock-rose *Helianthemum nummularium* is also characteristic of CG3a but appears to be fairly local over the site (**Map 4**).

Some of the *Centaurea nigra* on the site undoubtedly refers to *C. debeauxii* (Chalk Knapweed or Slender Knapweed), which has only relatively recently been recognised as a full species. Plants closely resembling this were found in Compartment 4, in the same area as *Succisa pratensis*, but it could be more widespread over the site. However, the characters given in the literature (e.g. Stace 2019), which are used to separate the two species are not clear-cut, and intermediates and hybrids are known to occur.

In the shorter CG3aS grassland a number of species become more prominent and frequent, especially *Thymus drucei* (Common Thyme), *Thesium humifusum* (Bastard-toadflax), *Pilosella officinarum* (Mouse-ear Hawkweed), *Asperula cynanchica* (Squinancywort), *Carlina vulgaris* (Carline Thistle), *Euphrasia pseudokerneri*, *Blackstonia perfoliata* (Yellow-wort), *Hippocrepis comosa* (Horseshoe Vetch) and *Linum catharticum* (Fairy Flax) (e.g. see target notes 1-1, 2-9, 3-2, 3-5, 4-11, 7-2, 9-9, 9-13, 9-17). The CG3a and CG3aS grassland is relatively species rich over the site, probably averaging 20-30 species per 2m x 2m area.

The CG3aT grassland is visually much less herb rich and more grass-dominated than the CG3a and CG3aS. It has the appearance of being 'semi-improved', partly due to its darker green colour. Herbs include most of the CG3a species at lower frequency, plus species associated with MG6c grassland such as *Plantago media* (Hoary Plantain) and *Trisetum flavescens*.

CG3b *Centaurea nigra* sub-community (where distinguished from CSE), is a rougher type of sward, more strongly dominated by *Bromopsis erecta*, which occurs in less regularly cut or grazed areas. The best developed example is at the western end of compartment 7, just east of the roundabout (target note 7-1), though much of this is intermediate to CG3d. It also occurs alongside some of the top footpaths and elsewhere (e.g. target note 4-18). It is characterised by very abundant *Centaurea nigra* and frequent to abundant *C. scabiosa* (Greater Knapweed), together with its root parasite *Orobanche elatior* (Knapweed Broomrape). There is reduced frequency of the more strongly calcicole CG2 and CG7 herbs, which occur in CG3a and CG3aS; however, a variety of additional species typical of rougher, mesotrophic grassland appear or become more frequent, such as *Jacobaea erucifolia* (Hoary Ragwort), *Galium album* (Hedge Bedstraw), *Agrimonia eupatoria* (Common Agrimony), *Hypericum perforatum* (Perforate St John's-wort) and *Daucus carota* (Wild Carrot). Most of these also occur in MG1d/MG1e, and transitions frequently occur between these types.

At Portsdown Hill the CG3b grassland is more species rich than described in the NVC account. Previous quadrat sampling by the author indicates that it can typically support 30+ species and occasionally exceed 40 species per 2m x 2m sample, so can attain a similar diversity to the better examples of CG2.

CG3c *Knautia arvensis-Bellis perennis* sub-community was not recorded during the present survey, but may be present in some areas recorded as CSE. During the 2010 survey it was mainly recorded in the eastern part of compartment 4 and within the grassland in the lower part of Paulsgrove Quarry, outside

the present survey area. It is a sub-community typical of deeper calcareous to neutral soils, so the flora includes various pasture grasses such as *Dactylis glomerata* (Cock's-foot), *Cynosurus cristatus* (Crested Dog's-tail), *Phleum bertolonii* (Small Cat's-tail) and *Trisetum flavescens* (Yellow Oat-grass), with herbs such as *Bellis perennis* (Daisy), *Trifolium pratense* (Red Clover) and *Prunella vulgaris* (Selfheal). *Knautia arvensis* is noted to be especially distinctive, but on the site this species was not flowering during the survey so its frequency could not be assessed. In Hampshire, this sub-community is usually replaced by the chalk version of MG1e described below.

CG3d *Festuca rubra-Festuca arundinacea [Schedonorus arundinaceus]* sub-community is a much ranker and species poor version of CG3, though is sometimes difficult to distinguish from CG3b or grades into it. It was mainly recorded next to footpaths along the northern edge of the site, particularly towards the eastern end of compartment 3 and the western end of compartment 4 (e.g. target note 4-17). In addition to strongly dominant *Bromopsis erecta* it often has tall grasses such as *Schedonorus arundinaceus* (Tall Fescue), *Elymus repens* (Common Couch) and *Brachypodium sylvaticum* (False Brome), and the frequency of herbs is greatly reduced. Rodwell (1992) suggested that *Centaurea scabiosa* is more distinctive of this type, but at Portsdown Hill this species may be almost as abundant in CG3b.

CG3b-CG3d grassland in compartment 7 with abundant *Centaurea scabiosa*

CSE (chalk scrub ecotone) is abundant over the whole site, except compartment 6. More extensive areas occur in compartments 1, 2 and 4. It is broadly similar to CG3b in species composition, often also with frequent *Brachypodium sylvaticum* (particularly where scrub clearance has more recently been carried out), but also with some of the distinctive taller herbs from the MG1e sub-community, especially *Origanum vulgare* (Wild Marjoram), *Clinopodium vulgare* (Wild Basil) and *Galium album*. *Centaurea nigra* is usually abundant and *C. scabiosa* occasional to frequent. In addition, the vegetation supports low, somewhat sprawling scrub of *Rubus* and *Clematis vitalba*, plus regenerating patches of chalk shrubs, particularly *Cornus sanguinea* (Dogwood) and *Ligustrum vulgare* (Wild Privet). Cotoneasters are locally frequent, especially *Cotoneaster simonsii* (Himalayan Cotoneaster) (at least 12 species of Cotoneasters occur over the site).

The CSE at Portsdown Hill also supports a distinctive group of somewhat ruderal calcareous species which benefit from the bare ground created by the occasional disturbance from management, particularly *Arabis hirsuta* (Hairy Rock-cress), *Lithospermum officinale* (Common Gromwell), Tall Melilot (*Melilotus altissimus*), *Picris hieracioides* (Hawkweed Oxtongue), *Reseda lutea* (Wild Mignonette), *Aquilegia vulgaris* (Columbine) and occasionally Annual Wall-rocket (*Diplotaxis muralis*). A variety of more commonplace weedy annuals, biennials and casuals were also recorded in the more recently cleared areas. Many of the CG2 and CG3 calcicoles also benefit from the repeated cutting. A small colony of *Campanula glomerata* (Clustered Bellflower) in a patch of recently established CSE in compartment 1 had increased to more than 100 plants counted during the survey.

CSE (with flora closely resembling CG3b), compartment 1

Recently cut area with CSE just starting to develop, compartment 9

Mosaic of CSE and CG3a, compartment 4.

In places the CSE vegetation also grades into MG1, where *Arrhenatherum elatius* becomes more frequent. Some stands resemble MG5 with locally abundant *Rhinanthus minor* (Yellow-rattle), *Leucanthemum vulgare* (Oxeye Daisy), *Odontites vernus* (Red Bartsia) and *Trifolium pratense*.

4.1.2 CG7 Festuca ovina-Hieracium pilosella [Pilosella officinarum]-Thymus grassland

As noted above CG7 occurs in transitions with CG3a, but some small patches of pure CG7 also occur on the site, which in terms of their species composition are closest to **CG7a** *Koeleria macrantha* sub-community.

CG7 is characteristic of very thin, highly drought-prone soils on chalk and limestone and is a coloniser of bare chalk. It is particularly characteristic of old chalk quarries and road cuttings, but at Portsdown Hill it occurs on some of the south-facing banks and along the old trackways which traverse parts of the site. The best examples are in compartment 9, and other examples occur in compartments 3, 4, 5, 7, 8 and 10 (e.g. see target notes 3-2, 3-9, 4-12, 5-4, 8-2, 9-10, 10-5).

CG7a has more frequent *Koeleria macrantha*, though as mentioned above, this grass was difficult to find during the survey. The herb component is similar to that described above for CG3aS, with *Festuca ovina*, *Thymus drucei*, *Pilosella officinarum*, *Carlina vulgaris* and *Euphrasia pseudokerneri* being especially characteristic. *Thymus pulegioides* (Large Thyme) is also characteristic of the community (particularly on sandy soils of the Brecks in East Anglia), but does not occur on Portsdown Hill. The short, open vegetation also suits species such as *Spiranthes spiralis* (Autumn Lady's-tresses) and *Gentianella amarella* (Autumn Gentian), though these late-flowering species were mostly missed by the survey. Other species occasional in the barer areas of vegetation, especially next to worn paths, include annuals such as *Centaurium pulchellum* (Lesser Centaury) and *Arenaria leptoclados* (Small Thyme-leaved Sandwort). The species richness of CG7 is moderate according to the NVC floristic table (ranging from 18 to 22 species per sample for the five sub-communities), but these figures are likely to be underestimates since some species will be missed at any one time of year.

CG7 grassland, compartment 7. This area supports several rare and local bryophytes.

CG7a and CG3a are also important for communities of mosses of dry chalk grassland, of which *Homalothecium lutescens*, *Fissidens dubius* and *Weissia* spp. are particularly distinctive and are common and widespread over the site. Several other mosses that are either very local or rare in Hampshire have been recorded Portsdown Hill in recent years by the author, mainly in the patches of CG7 or on bare chalk. To date, however, only relatively small parts of the site in compartments 7 and 9 have been looked at in any detail by the author in his capacity as VC11 bryophyte recorder (very little work on bryophytes had been carried out in the past). Local and rare mosses recorded recently include *Microbryum starckeanum* (Nationally Scarce, now recorded from here and one other Hampshire site), *Encalypta vulgaris* (the only VC11 site), *Didymodon acutus* (second British record, but a split from another more widespread species, but possibly nationally rare), *Pottiopsis cespitosa* (Nationally Scarce, first modern record for the county) and *Pleurochaete squarrosa* (Nationally Scarce; elsewhere only recently recorded from Butser Hill). The CG7 vegetation also supports soil-dwelling lichens including *Cladonia* spp., *Collema/Leptogium* spp. and fungi.

In the 2000 survey CG7 was only noted as being present in a few very small areas of bare, broken-up chalk, and no mention was made of its presence on the site during the 2010 survey. Due to the finer scale mapping carried out for the 2020 survey a total of 0.28 ha of CG7 was recorded, but as noted above, some areas of CG3a grassland are clearly transitional to this type. Increased grazing on the site in recent years is clearly contributing to the development of larger patches of CG7.

4.2 Rough species poor grassland and ruderal vegetation

4.2.1 MG1 Arrhenatherum elatius grassland

MG1 *Arrhenatherum elatius* grassland comprises most types of rough, dry grassland on neutral soils. It develops on under-managed sites where the relatively low frequency of mowing or grazing allows taller-growing tussocky grasses to thrive, but is sufficient enough to prevent succession to scrub. Herb richness varies greatly according the different sub-communities. At Portsdown Hill it is mostly dominated by *Arrhenatherum elatius*, though *Dactylis glomerata* (Cock's-foot) and other tall grasses can also be

frequent. There is usually also an underlayer dominated by common pasture grasses, which due to the calcareous soils on this site mainly comprises *Agrostis stolonifera* with some *Festuca rubra* (Red Fescue) and *Poa trivialis* (Rough Meadow-grass). Bramble and other scrub may be present.

The community is also characterised by the presence of medium to tall biennial and perennials herbs, especially umbellifers, and sprawlers, both of which have life cycles and habits that can allow them to co-exist with the tussock-forming grasses. The most frequent tall herbs in the described community are *Heracleum sphondylium* (Hogweed) and *Cirsium arvense* (Creeping Thistle), and occasionally *Dipsacus fullonum* (Teasel) or *Artemisia vulgaris* (Mugwort). These are all present and locally frequent on the site. Characteristic medium-sized species include *Daucus carota*, *Centaurea nigra*, *Agrimonia eupatoria*, *Hypericum perforatum* and *Jacobaea erucifolia* (also common on the site). Also abundant are shorter herbs associated with the 'pasture' component, particularly *Plantago lanceolata* and *Achillea millefolium* (Yarrow). The main sprawlers are *Lathyrus pratensis* (Meadow Vetchling), *Convolvulus arvensis* (Field Bindweed) and *Clematis vitalba*.

MG1a *Festuca rubra* sub-community and **MG1b** *Urtica dioica* sub-community are the most species poor communities, and often indicative of moderate levels of nutrient enrichment. They occur locally in small patches along the northern edge of the site, usually next to footpaths. MG1b is distinguished by the greater abundance of tall ruderals, including *Urtica dioica* (Common Nettle) and on this site, by large clonal patches of *Symphyotrichum* sp. (Michaelmas-daisy). **MG1d** *Pastinaca sativa* sub-community is a characteristic type on calcareous soils, with low to moderate species richness, characterised by *Pastinaca sativa* (Wild Parsnip). During the survey only one small patch of this type was mapped in compartment 2 and a patch intermediate with MG1a in compartment 5; however, due to the late flowering period of *Pastinaca* it is possible that some of the MG1a or MG1b would have been this type.

MG1a grassland (and RC scrub on bank), compartment 9.

MG1e *Centaurea nigra* sub-community is a relatively species rich sub-community characterised by abundant *Centaurea nigra* and on calcareous soils especially by the presence of *Origanum vulgare* and *Galium album*. *Heracleum sphondylium* is less frequent and *Daucus carota* more frequent on calcareous soils. As such, it is somewhat similar to CSE and CG3b, and in some cases it was difficult to decide

which of these was the most appropriate to assign when mapping. MG1e often develops from under-managed MG5 and it should probably be regarded as being of Priority Habitat status, even though MG1 as a whole is not included in the published definition (Maddock 2011). MG1e was recorded in various compartments, including compartments 1 and 4 (target notes 1-6, 1-8, 4-25).

MG1e grassland, compartment 3

4.2.2 MG5 Cynosurus cristatus-Centaurea nigra grassland

A few small areas of short to medium length neutral herb rich grassland recorded during the survey are referable to **MG5b** *Cynosurus cristatus-Centaurea nigra* grassland, *Galium verum* sub-community. This sub-community is the most typical on calcareous soils. The grass component is made up of various common pasture grasses, including species such as *Festuca rubra* and *Agrostis capillaris* (Common Bent), which is replaced on calcareous soils by *A. stolonifera*. Characteristic herbs include *Centaurea nigra*, *Leucanthemum vulgare*, *Galium verum* (Lady's Bedstraw), *Leontodon hispidus*, *Rhinanthus minor* and *Trifolium pratense*. It was difficult to map on the site as it was mainly only present in small patches or linear strips next to footpaths where it graded into other types of grassland. In these cases it was merged with larger adjacent areas of CG3aT or CG3aS. Some small areas are present in compartments 4 and 7 (e.g. see target notes 4-9, 4-24, 7-4), and a larger area occurs above the entrance gate at the southern end of compartment 6 (target note 6-2).

4.2.3 MG6/7 grassland

This category was used to record areas of trampled grassland along the main footpaths and in the north of compartment 10. The more heavily trampled areas are composed of *Lolium perenne* (Perennial Rye-grass) with *Trifolium repens* (White Clover), *Plantago lanceolata* and *P. major* (Greater Plantain), referable to **MG7e** *Lolium perenne-Plantago lanceolata* grassland. Less trampled areas correspond to **MG6c** *Lolium perenne-Cynosurus cristatus* grassland, *Trisetum flavescens* sub-community. This type is fairly species poor, but supports locally frequent *Medicago lupulina* (Black Medick), *Ranunculus bulbosus* (Bulbous Buttercup), *Achillea millefolium* and the grasses *Phleum bertolonii*, *Cynosurus cristatus*, *Festuca rubra* and *Trisetum flavescens* (e.g. see target notes 4-1, 8-3, 10-7 and 10-14).

MG6/7 grassland along heavily used footpath, compartment 10

4.2.4 OV25 Urtica dioica-Cirsium arvense community

Ruderal ('weedy') vegetation was recorded widely over the site in recently cut scrub areas, but was usually mapped as MG1 or CSE. One recently cut area in compartment 10 (target note 10-11) on nutrient-rich soil had colonised with a variety of annual and biennial weedy herbs, including *Cirsium arvense, C. palustre* (Marsh Thistle), *Urtica dioica*, *Ballota nigra* (Black Horehound) and *Arctium minus* (Lesser Burdock). This was mapped as OV25 but is different to the described sub-communities.

OV25 ruderal vegetation in recently cleared area, compartment 10

4.3 Scrub and woodland

4.3.1 W21 Crataegus monogyna-Hedera helix scrub

This is the predominant type of scrub on the site, which falls under two sub-communities, **W21a** *Hedera helix-Urtica dioica* sub-community and **W21d** *Viburnum lantana* sub-community (chalk scrub). W21d is much the dominant type, occurring on the drier, calcareous slopes. It covers 24.2 ha, which also includes the areas of recently cut scrub, coded as CS and CX. W21a occurs much more locally on moister, deeper soils, covering a total of at least 0.8 ha. About 1 ha of scrub and secondary woodland in the north of compartment 1 was coded as W21a-W21d, but counted as W21d in Table 4.

The W21a on the site is composed of *Crataegus monogyna* (Hawthorn), *Fraxinus excelsior* (Ash) and *Acer pseudoplatanus* (Sycamore) with a ground layer of *Hedera helix* (Ivy) in the more heavily shaded areas, or with some *Urtica dioica* and *Brachypodium sylvaticum* in more open areas, but very few other ground flora species. *Ruscus aculeatus* (Butcher's-broom) is occasional and *Sanicula europaea* (Sanicle) rare. A variety of other trees and shrubs occur, including frequent *Quercus robur* (Pedunculate Oak) and *Sambucus nigra* (Elder) and occasional *Acer campestre* (Field Maple), *Ilex aquifolium* (Holly), *Prunus avium* (Wild Cherry) and *Ulmus* spp. (elms). *Corylus avellana* (Hazel) appears to be rare on the site. The main examples of W21a are in the north of compartment 1, along the southern edge of compartment 4 and along the southern and eastern margins of compartment 10 (target notes 1-11, 4-13, 10-4).

Path through chalk scrub (W21d) at western end of compartment 3

The W21d is composed of *Crataegus monogyna*, with abundant to co-dominant *Cornus sanguinea* and *Ligustrum vulgare*, frequent to locally abundant *Rhamnus cathartica* (Buckthorn) and occasional *Euonymus europaeus* (Spindle), *Rosa* spp. (roses), *Taxus baccata* (Yew) and *Quercus ilex* (Evergreen Oak). In addition, *Clematis vitalba* is abundant. Although the sub-community is named after *Viburnum lantana* (Wayfaring-tree), this species is often quite local on chalk sites, and this is also the case at Portsdown Hill (it was recorded from four of the five 1km squares as 'rare'). The W21d scrub also supports several of the larger species of Cotoneasters, as well as other berry-bearing and fruit-bearing shrubs which are spread by birds, especially *Sorbus aria* and *S. intermedia* (Whitebeams), *Pyracantha*

coccinea (Firethorn) and *Malus pumila* (Apple). *Buddleja davidii* (Butterfly-bush), which is invasive on chalk soils, is fairly local on the site, occurring mainly in more recently cut or cleared scrub. Most of the W21d is heavily shaded under the scrub canopy, so supports a ground layer of *Hedera helix*.

4.3.2 RC Rubus-Clematis scrub

This is composed of bramble and *Clematis vitalba*, and is dominant in nutrient-enriched areas on deeper soils, covering 3 ha in total. It occurs along the entire northern margin of the site and in the south of compartments 1, 2, 4, 6 and 10. Another frequently associated species is *Eupatorium cannabinum* (Hemp-agrimony), which forms dense stands in the more recently cut areas (e.g. in compartment 10). One strip of RC was also mixed in with *Cornus sanguinea* (target note 3-6). The bramble is mainly Elm-leaved Bramble *Rubus ulmifolius*, a very common species and one of relatively few which tolerate calcareous soils and open, sunny habitats.

RC scrub in an old chalk pit, compartment 1

4.3.3 W23 Ulex europaeus-Rubus fruticosus scrub

W23 is gorse scrub dominated by *Ulex europaeus* (Gorse) and *Rubus* agg. (Bramble). It occurs on the site mainly in compartment 2 where it fringes larger blocks of W21. Here it is also mixed with frequent *Prunus spinosa* (Blackthorn) and appears to have developed on stony, less strongly calcareous soils. There is some *Hedera helix* in the ground layer and *Teucrium scorodonia* (Wood Sage), a typical associate of the community, was recorded in one of the stands. The W23 at Portsdown Hill is not typical of the types which normally occur on heathy, acidic soils in acid grassland mosaics, but it corresponds most closely to the species poor **W23c** *Teucrium scorodonia* sub-community (it has been mapped at community level only).

W23 gorse scrub fringing W21, compartment 2

5.0 DISCUSSION AND RECOMMENDATIONS

5.1 General conclusions and evaluation

5.1.1 Floristic diversity

Although Portsdown Hill supports relatively few rare plant species, the overall species diversity is very high, with 275 species recorded during the survey and the total recent site list probably exceeding 300 species. The indicator list of 60 calcareous grassland species is exceptionally high. Portsdown Hill is likely to be one of the richest chalk grassland sites in Hampshire, on a par with or supporting more species than other important chalk grassland sites such as Porton Down, Old Winchester Hill and Butser Hill. The site may hold the largest British population of the nationally declining S.41 species *Euphrasia pseudokerneri* (Chalk Eyebright) and the Hampshire county scare species *Thesium humifusum* (Bastard-toadflax).

5.1.2 Species rich grassland

The 2020 vegetation survey has shown that the current total area of species rich grassland qualifying as Priority Habitat on the PCC site is about 25 ha, amounting to 45% of the total site area (see **Section 3.2**). A little less than half of this is shorter CG3a *Bromus erectus* grassland or transitions to very short CG2 and CG7 types (these are all of high ecological value), whilst the remainder is made up of rougher sward types, largely mapped here as 'CSE' chalk scrub ecotone (essentially *Bromus* grassland with scrub regeneration).

The CSE grassland has developed as a result of past scrub clearance but is now subject to regular management with the intention of slowly restoring back to shorter calcareous grassland. However, it is a distinctive and important feature of the site and also of high intrinsic ecological value, due to its high vascular plant diversity and importance for invertebrates. It supports an interesting group of calcareous ruderal plants, including local species such as *Arabis hirsuta*. The species richness of the CSE may exceed that of the CG3a grassland on the site. CSE is likely to be extremely important for its support of insect and invertebrate communities, due to the high structural diversity of the vegetation and the greater availability of pollen and nectar sources (especially from plants such as *Origanum vulgare*). In combination with the associated scrub it also provides increased warmth and cover for insects (i.e. on cold or windy days insects can bask and feed on flowers within the zones of CSE bordering the scrub islands).

5.1.3 Vegetation changes

At the time of the 2000 survey, which followed shortly after the commencement of management on the site, the total proportion of scrub was much higher than at present, and the majority of the grassland was of rougher sward types, particularly CG3b. Data from the 2010 survey was mapped and used to calculate proportions of different vegetation types for the site management plan (Jones 2015). This reports that the total proportion of scrub on the site was 41%; CG3 grassland, cleared scrub and scrub regrowth 33%; species rich CG2/CG3a grassland 17% and mesotrophic grassland 9% (it should be borne in mind that these figures relate to a different survey area than used in 2020 and may not be fully accurate). The present survey recorded total scrub cover as 51.6% by area. This is higher than the 2010 figure, but includes RC scrub, which may have been mapped differently in 2010. Overall, however, the scrub is likely to have decreased since 2010. It is possible that some of the discrepancy is due to the more detailed mapping carried out in 2020, which included most of the smaller clumps of scrub within

the open grassland which were not mapped separately for the 2010 survey, so would have been counted as grassland.

This also means that the figure of 17% for short, herb rich grassland in 2010 was probably an overestimate; it could have been as little as 10-12% at that time. The 2020 figure of 23% for this habitat shows that there has been a significant increase in the last 10 years. Moreover, there is a strong indication that some of this grassland is progressing towards strongly herb-dominated CG7 and CG2 types, which are important for rare and declining chalk plants, such as *Thesium humifusum* and *Euphrasia pseudokerneri*.

The 33% of (rougher) CG3 grassland (including recently cleared areas) in 2010 largely corresponds with the present CSE area, which covers at least 22% of the site area. Some of the difference in the two figures is because some of it will have developed into the shorter grassland in 2020.

The 9% mesotrophic grassland in 2010 can be compared with the 3% species poor calcareous to neutral grassland mapped in 2020, but this type of vegetation was interpreted differently in each survey and was difficult to map precisely (in 2020 for example, some of it was included within the broad CSE category).

5.2 Condition Assessment

5.2.1 Introduction

An assessment of site condition is made here following recent guidance and best practice published as part of the current move towards incorporating principles of Biodiversity Net Gain (BNG) into UK planning policy and hence into ecological impact assessment and habitat enhancement (Baker at al. 2019, Crosher et al. 2019a). The condition assessment tables for grassland and scrub habitats are shown in **Appendix 4**, taken from the *Biodiversity Metric 2.0* technical supplement, with corrections (Crosher et al. 2019*b*).

5.2.2 Grassland

Grassland condition is assessed on the basis of six key criteria. The majority of the open grassland on the site can be considered to meet criteria 1 and 2, as a good, recognisable example of calcareous grassland, having the characteristics of Lowland Calcareous Grassland Priority Habitat.

Criterion 3 states that the sward should have high cover and frequency of wild flowers and sedges, i.e. a high herb to grass ratio. This does apply to most of the site, though it was noted that some areas of grassland were a little less rich, possibly as a result of recent heavy grazing but also due to dry weather at the time of the survey and the effects of trampling. In addition some of the CG3a and CG3aS grassland is naturally grass-dominated and with rather low herb cover. The areas of semi-improved to improved species poor grassland along trampled paths are part of the overall grassland habitat and are not significant in terms of total area (about 1.7 ha out of nearly 27 ha total, about 6%; see **Table 4**); however, about 1.16 ha of CG3a grassland was mapped as herb poor CG3aT, mainly in compartments 9 and 10, so would further increase this percentage.

Undesirable species (such as thistles) which should be below 5% cover (criterion 4) are restricted to the species poor grassland areas and this criteria is certainly achieved over the site as a whole. The amount of bare ground is very low and therefore meets criterion 5.

Criterion 6 concerns the percentage cover of scrub and bramble which should be less than 5%; however, in the older CSM guidance (JNCC 2004), this figure was given as a 'generic standard', with some variation allowed according to the specific site conditions. It was noted that '… at some sites (usually of large extent) there may be an aim to increase the cover of scrub somewhat, especially when this is required for qualifying invertebrates or other associated features.' At Portsdown Hill the amount of scrub in the main open areas is around 19% (see **Section 3.2.4**), which may be too high to assess this criterion as being achieved. However, the scrub 'islands' are clearly very important for insects and other invertebrates as they provide cover from strong winds and contribute to the species richness and structural diversity of the chalk scrub ecotone (CSE) around them, which is also highly important for invertebrates, as discussed above.

Taking the above into account, the overall assessment for the grassland is that it varies from Moderate to Good condition over the site, due mainly to either reduced herb diversity and cover (e.g. in compartment 10 or in some of the CG3a areas) or because of the relatively large proportion of scrub.

5.2.3 Scrub

The scrub on the site can be assessed as a habitat of ecological value in its own right. Following the guidance given in the table in **Appendix 4**, the W21d scrub which predominates over the site would be classed as 'scrub of high (distinctiveness) environmental value' as 'scrub on calcareous soils' and is assessed according to five criteria.

Criteria 1 concerns the relative dominance of species, with none comprising more than 75% cover. This is probably achieved over most of the site. Criteria 2 (age range variation) is reasonably well met over most of the site, due to the presence of recently cut regenerating areas and abundant seedlings and saplings in the CSE zone around each clump. However, some of the larger blocks of scrub have poor structural diversity and would not meet this criterion. Criterion 3 (weeds and invasive species less than 5% cover) is achieved in terms of the species listed. Other invasives, such as *Buddleja davidii* and *Cotoneaster* spp. are also mostly kept below 5% in any one area by regular management. Criterion 4 (scrub has a well-developed edge with ungrazed tall herbs) is certainly met throughout the whole site due to the well-managed CSE zones and the presence of herb rich rough grassland and weedy vegetation in more recently cut areas (e.g. in compartment 10). Criterion 5 (many clearings and glades within the scrub) is irrelevant for the smaller clumps and islands. Glade habitat does occur within the larger blocks, especially alongside the footpaths which run through most of them, and in some areas specifically managed to open up paths and clearings. Therefore this criterion is just about achieved on the site, but more glade creation would be desirable.

Overall, therefore, the W21d scrub can be assessed to be in Good condition with a score of 3 over most of the site (meets all five criteria with only minor variation and invasive species are below 20% cover). Some of the larger, unmanaged blocks, especially the areas of W21a and W21d-W21a will be in Moderate or Fairly Good condition. Obviously some of these will have potential for future clearance and restoration of calcareous or neutral herb rich grassland. The *Rubus-Clematis* scrub can probably be considered to be in Moderate condition generally, in view of its poor structural diversity and low species diversity.

5.3 Management recommendations

The present management has generally been very successful in maintaining the site in good condition in terms of its vegetation types and support of a diverse flora typical of lowland chalk and limestone sites. It has also significantly increased the proportion of open grassland of high botanical value in recent years. The main recommendation would therefore be to continue with the current programme of grazing management and further scrub reduction through continued clearance work and follow-up management.

The current management plan (Jones 2015) states the overall objective is to have 70% species rich calcareous grassland and 30% scrub on the site. This may need to be revised slightly to take into account the findings of this survey. Some of the scrub has developed into secondary woodland, which should be retained for its intrinsic value. A figure of 5ha would be suggested, leaving 23.4 ha out of 50 ha of the site remaining (46.8%). This would therefore entail the removal of a further 8.4 ha of scrub to reduce it to 30% of the remaining 50 ha. It should be noted, however, that the 70% grassland remaining will include some small areas of species poor and improved grassland. The proportion of these types (particularly the trampled CG3aT) should be monitored and not allowed to increase significantly.

It should be borne in mind that some of the scrub clearance in the southern part of the site will lead to the development of neutral grassland rather than calcareous grassland due to different soil characteristics and conditions; however, this could still provide grassland of Priority Habitat quality (i.e. MG5/Lowland Meadows, rather than CG3/Lowland Calcareous Grassland). Evidence for this comes from the more recent scrub clearance in compartment 6 which appears to be producing mainly neutral grassland of MG1 and MG5 types.

There will also be the possibility that soil conditions (e.g. higher moisture content and nutrient status) could lead to the development of *Rubus-Clematis* scrub and species poor (MG1a/b) grassland rather than herb rich grassland when scrub is cleared. Such habitat may not be worthwhile managing in the long term because it would either take many years to reduce the nutrient status and create species rich grassland, or it may not be possible at all if nutrient sources cannot be controlled (e.g. from run-off from roads or if soils are too deep). Such areas might be better retained as scrub or allowed to develop into secondary woodland and should therefore form part of the 5ha discounted or the 30% scrub proportion.

The chalk scrub ecotone (CSE) grassland/scrub mosaic is an important ecological feature, so when the desired ratio of scrub to grassland is achieved, management of the CSE will need to be relaxed slightly to maintain a fixed proportion of this habitat rather than to continue converting it to shorter calcareous CG3a grassland (it may in any case be very difficult for practical and ecological reasons to reach a point where all the CSE is converted to CG3a grassland).

Some recommendations for future management (relating to the objectives for enhancing and maintaining the vegetation and flora) are therefore as follows:

- Remove c.6.4 ha of scrub from the remaining larger blocks around the margins of the site and c.2 ha from the scrub islands within the open grassland areas. The latter removal would reduce the proportion of scrub in those areas from 19% to 13% (see **Section 3.2.4**) and overall would create an approximate 30% to 70% scrub to grassland ratio, excluding c.5 ha of secondary woodland.

- Continue with practice of creating paths, rides and glades within the larger blocks of scrub, and scalloping the margins to increase the structural diversity of the scrub.

- The current area of 12.4 ha of CSE (22.4% of total site area) could be reduced slightly to c.10 ha, which would therefore amount to 20% of the total site area (excluding woodland). The CSE should continue to be managed by cutting and mowing on various rotations around the site (e.g. annually to every 3-4 years) to maintain its structural diversity.

- Some of the scrub could be cut on longer rotations, so that cutting will create soil disturbance and open up patches of bare ground, suitable for annual and ruderal species. These areas will therefore cycle between ruderal vegetation, CSE and scrub.

- Consideration should also be given to increasing the level of soil disturbance in some parts of the site, to benefit annual and ruderal plant species, including calcareous arable weeds, such as the Vulnerable S.41 species *Clinopodium acinos* (Basil Thyme). This management could be part of the regular scrub removal, but may be better achieved by rotavating plots of ground on a rotational basis (annually or every 2-3 years). Plots should be monitored annually to record the species composition and abundance.

- It would be recommended to reduce the grazing intensity in compartments 9 and 10 to encourage a taller sward to develop. This may therefore also allow the herb richness to increase in the trampled areas. To some extent, however, some of the grassland in the north of these compartments will be viewed as ‘sacrificial habitat’ to service the high visitor pressure in this part of the site.

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Appendix 1. Target notes

Taken from the target notes GIS table (unformatted plain text). Locations of target notes are shown on **Map 2**. For DAFOR codes see **Appendix 2**.

TN no.	Date	Target note text
1-1	14/07/2020	Herb rich short calc grassland. Onobrychis viciifolia previously seen here. Lotus A, Blackstonia F, Pilosella A, Thymus F, Carlina O, Leontodon hispidus F, F. ovina, Briza, Poterium F, Koeleria, Viola hirta F, P. media, Linum A, Asperula, etc.
1-2	14/07/2020	Fairly short, herb rich CG3a with frequent bare patches. Similar flora to previous note with Thymus, Asperula, etc.; Carex flacca LA
1-3	14/07/2020	Area by pylon - mixture of shorter grass, recently managed scrub and CSE/low scrub. Large patch of Campanula glomerata near centre and another patch in the shorter grassland at NE corner.
1-4	14/07/2020	Typical younger CSE with dense Dogwood regen and abundant Centaurea nigra, C. scabiosa and Origanum.
1-5	14/07/2020	Herb rich CG3a with Scabiosa, Leucanthemum, Asperula, Lotus, Leontodon hispidus, Thymus, Polygala, Galium verum, Poterium A, Carex spp., Primula veris, Euphrasia.
1-6	14/07/2020	MG1e with Daucus A, Origanum A, Galium album A, Torilis japonica A, Picris hieracioides, Pastinaca, Senecio spp.
1-7	14/07/2020	Old quarry, completely dominated by Clematis.
1-8	14/07/2020	Rough grass and tall herb (MG1e) and area of RC with Buddleja, Eupatorium and Aegopodium podagraria next to road.
1-9	14/07/2020	Wide path through scrub with Melilotus altissimus A; closer to MG1e than CSE.
1-10	14/07/2020	Path goes up to road, through CSE, then with rough grass and tall herb (MG1d/e) either side and scrub.
1-11	14/07/2020	Older trees and scrub with tall Sycamore, Pedunculate Oak and Elder =W21a.
2-1	11/07/2020	Steep slope with Cotoneaster scrub on sparsely vegetated chalk; chalk grassland spp. include Euphrasia, Ononis, Scabiosa, Asperula, Lotus, plus Hieracium spp.
2-2	11/07/2020	Mosaic of recently cut and regen scrub, with CSE and rough grassy patches. Difficult to map. Cotoneaster spp. F.
2-3	11/07/2020	CSE with fairly dense scrub regen (mainly Dogwood) on flinty area; Origanum F, Centaurea scabiosa, Leucanthemum vulgare, Leontodon hispidus, Anthyllis, Scabiosa, Trisetum.
2-4	11/07/2020	Acidic scrub with Gorse, Bracken and Teucrium scorodonia present; W23.
2-5	11/07/2020	Small strip of species rich short CG3a with Thesium, Hieracium spp., etc.
2-6	11/07/2020	Species rich CSE with low scrub of Gorse, bramble, Dogwood, Cotoneasters; some patches of CG3a developing; Pilosella and Carlina colonising on bare patches of soil; Leucanthemum A, Leontodon hispidus A, Scabiosa F, Origanum F, etc.
2-7	11/07/2020	Developing woodland, probably intermediate between W21a and W21d with Pedunculate Oak, Sycamore, Sorbus spp., Buckthorn F and Gorse along edge.
2-8	10/07/2020	Southern margin of scrub in this compartment has frequent Gorse and Blackthorn, with Holly, Dogwood, etc. Mapped as W23, though intermediate to W21d.
2-9	10/07/2020	Short, herb rich CG3a, somewhat intermediate to CG7 in places, with Thymus, Carlina, etc. Worn paths are MG6/7 but not separately mapped here.
2-10	11/07/2020	Similar to 2-5 - short CG3a with Thesium.
2-11	10/07/2020	CSE/CG3a mosaic (part of extensive area in this compartment); moderately species rich with patches of short turf spp. including Pilosella, Leontodon hispidus A, Scabiosa A, Leucanthemum A, Briza F, Poterium F, Carex spp. and Cotoneaster horizontalis.
2-12	10/07/2020	CSE and Dogwood regen with Origanum A, Knautia arvensis (apparently R over site generally), Centaurea scabiosa F. MG7 on worn path going W through scrub.
2-13	10/07/2020	CSE/CG3a mosaic with some grassy areas maybe closer to CG3b - Centaurea nigra F; small Gorse bushes.
3-1	10/07/2020	Short CG3a with small clumps of chalk scrub; Thesium F with occasional Hieracium spp.
3-2	07/07/2020	CG7, intermediate to CG3a with Thymus A, Lotus A, Asperula, Plantago media, P. lanceolata, Leucanthemum A, Carlina, Cirsium acaule, Linum catharticum A, Galium verum, Carex spp., F. ovina, Euphrasia, Poterium, Thesium, Briza.

TN no.	Date	Target note text
3-3	07/07/2020	Regularly mown CSE with c.20% low scrub cover of Dogwood & bramble; Leontodon hispidus A-D, Linum A, Galium album A, Origanum A, Centaurea nigra F, rank grasses, Pulicaria dysenterica (patch), Brachypodium sylvaticum F.
3-4	07/07/2020	Large area of CSE with Gorse scrub.
3-5	05/07/2020	Very short species rich CG3a with low scrub; Asperula A, Thesium LF, Leucanthemum A, Pilosella, Thymus, Poterium Anthyllis O-LF, Carlina, Carex flacca, C. caryophyllea, Viola hirta, Koeleria, Lotus, Avenula pratensis, Briza; no Scabiosa.
3-6	07/07/2020	RC with Dogwood. Narrow path (not mapped) between here and CG3a grassland to south.
3-7	05/07/2020	CSE with Centaurea nigra A, Dogwood scrub A.
3-8	05/07/2020	Yew tree, Hawthorn, Gorse and Cotoneaster scrub.
3-9	05/07/2020	Narrow 'gully' along E edge of compartment; short, herb rich dry calcareous grassland, CG7-CG3a intermediate. Hieracium spp. frequent here westwards through site. Thesium, Thymus F, Campanula rotundifolia, Carlina F, Cirsium acaule F, Asperula.
4-1	04/07/2020	Trampled paths tending to MG6c either side, with Phleum bertolonii LF and Cynosurus cristatus LF.
4-2	05/07/2020	Species rich CG3a with patches of CSE and scrub regen with Echium & Reseda lutea; Carex flacca, C. caryophyllea, Anthyllis A, Leucanthemum A, Scabiosa A, Poterium A, Galium verum LA, Plantago media, Festuca rubra LA, Briza, Lotus A, Linum A, Asperula F.
4-3	05/07/2020	Continuation of previous note (4-2). Also: Pilosella, Thymus R, Blackstonia, Leontodon hispidus, Rhinanthus, Senecio jacobaea, Trifolium pratense, Euphrasia, Ononis; Also CSE spp. including Centaurea spp., Origanum, etc.
4-4	05/07/2020	Recently cleared ride through scrub. Interesting mixture of weedy annuals and CSE spp.
4-5	05/07/2020	Gorse invading disturbed CG3a/MG6c grassland either side of footpath.
4-6	05/07/2020	Good quality long established CG3a grassland, shorter by paths, herb rich; Cirsium acaule F, Anthyllis A, Thesium F, Thymus LF, Hippocrepis LA in large patches, Carlina O. No well-defined patches of CG7.
4-7	05/07/2020	Rough CG3a developed from CSE with which it grades into.
4-8	05/07/2020	Past scrub clearance with dense regen and rough fairly species poor grass (MG1a); Centaurea scabiosa present.
4-9	04/07/2020	Herb rich grassland along top edge of site and in front of entrance gate, CG3a but intermediate to MG5b with Galium verum LA, Leucanthemum vulgare A, Trifolium pratense LF.
4-10	04/07/2020	Clump of leggy Hawthorn over disturbed patches of Arrhenatherum, bramble, Echium, Reseda lutea, etc.
4-11a	04/07/2020	Good quality CG3a, short, herb rich with Bromopsis A, Thesium LA (large patches), Danthonia, Carlina, Asperula, Scabiosa F, Leontodon hispidus A, Euphrasia F, Briza, Anthyllis A, Carex flacca A, Ononis, Lotus, Polygala, Thymus. V. little Centaurea nigra.
4-11b	30/08/2020	Patch of Succisa pratensis in short, species rich CG3a (intermediate to CG2). Other additions to 4-11a include F. ovina, Campanula rotundifolia, Viola sp. (likely to be V. reichenbachiana), Pilosella, Blackstonia, Cirsium acaule, Pimpinella saxifraga.
4-12	07/07/2020	Patch c. 6 x 3m of CG7 centred on SU 6411 0662 with Pilosella A, Thymus F.
4-13	04/07/2020	Scrub along S edge of site here is more neutral and nutrient-enriched in character with Elder F, so closer to W21a. May extend further east.
4-14	04/07/2020	Herb rich medium length mown grassland along lower footpath; slightly calcareous and tending towards MG1e in character, though also close to CSE. Centaurea nigra A.
4-15	04/07/2020	Short CG3a grassland on steep slope, herb rich and intermediate to CG7 in places with Thymus, Pilosella, Asperula, Thesium LF; appears to be good for bryophytes; lower down a lot of low Cotoneaster regen and less herb rich.
4-16	04/07/2020	Developing woodland with semi-mature Ash trees over Ivy, Ruscus, bramble, Urtica dioica, Brachypodium sylvaticum, with Apple, Clematis, Hawthorn, Dogwood.
4-17	07/07/2020	Rank Bromopsis grassland (CG3d) grading in to richer Arrhenatherum grassland (MG1e) with Centaurea scabiosa A, Agrimonia F, Hypericum perforatum, Linaria vulgaris, Clematis, Dogwood, etc. plus strip of RC and hawthorn hedge next to road.
4-18	04/07/2020	CG3b on bank below road with Bromopsis erecta A, Centaurea scabiosa, C. nigra LF, Leucanthemum vulgare, Leontodon hispidus, Galium album, Briza, Anthyllis, Rhinanthus.
4-19	04/07/2020	Small pit within herb rich short CG3a area; some Dogwood scrub; Festuca ovina, Polygala, Hippocrepis, Poterium, Asperula, Briza, Anacamptis pyramidalis, Cirsium acaule present. Some CG7 species present.

TN no.	Date	Target note text
4-20	04/07/2020	Very herb rich CSE on cleared/regularly mown strip.
4-21	28/06/2020	Older CSE now almost fully developed into CG3a.
4-22	04/07/2020	Upper path (below road verge) not mapped (within RC zone). Nutrient enriched, overgrown Arrhenatherum with Cirsium arvense (MG1b).
4-23	04/07/2020	Species poor fairly rough grassland alongside path (MG1a).
4-24	28/06/2020	Herb rich MG5 grassland with Leontodon hispidus, Rhinanthus and Trifolium pratense, both sides of path. Merges into MG1a.
4-25	28/06/2020	Managed strip of more neutral rough grassland and footpath, closest to MG1e with Odontites vernus A, Galium album, Centaurea nigra, Hypericum perforatum, Daucus, Origanum, Picris, Linaria spp., Verbena officinalis; plus weedy species.
4-26	28/06/2020	Older CSE forming mosaics with CG3a but still with a lot of Dogwood regen; quite grassy with Bromopsis erecta A, Briza, Carex flacca, Leontodon hispidus, Leucanthemum, Linum, Plantago media, Picris hieracioides, Reseda lutea, etc.
5-1	28/06/2020	Species rich CSE with some bare soil, regen Dogwood, Clematis, Origanum, Leucanthemum, Rhinanthus A, Daucus, Galium album, Centaurea scabiosa, C. nigra, Anacamptis pyramidalis, Arabis hirsuta, Odontites, Trifolium pratense.
5-2	28/06/2020	Shorter CSE developing into herb rich grassland. Hippocrepis present, Echium vulgare O, Reseda lutea O-LF, Euphrasia, Arenaria leptoclados, Leontodon hispidus A.
5-3	28/06/2020	Old trackway with dense scrub either side; grassy path through with Brachypodium sylvaticum, Inula conyzae, Cotoneasters.
5-4	28/06/2020	Small patch of CG7 on S-facing bank of old trackway, with Pilosella, Thyme and Hippocrepis nearby.
5-5	28/06/2020	Footpath (MG6/7) with patches of herb rich grassland (MG5) and CSE either side, S side of path is CG3a with Hippocrepis and Galium verum present.
5-6	28/06/2020	Open area below road of nutrient enriched species poor MG1a (-MG1d) with Arrhenatherum, Dactylis glomerata, Lolium, Pastinaca, Centaurea scabiosa, Daucus, Clematis, Artemisia vulgaris, etc.
5-7	28/06/2020	Herb rich CG3a, here quite short with large patch of Thesium, some Thymus and Asperula F.
5-8	28/06/2020	Shortish CG3a, species rich with Leontodon hispidus A, Anthyllis A, Carex flacca, C. caryophyllea, Trifolium pratense, Briza, Dactylis glomerata, Lotus, Centaurea scabiosa, Leucanthemum, Linum catharticum, Ononis repens.
5-9	28/06/2020	Trampled CG3a with Arabis hirsuta, Linum catharticum, Euphrasia, Gentianella amarella, Anthyllis F, Leontodon hispidus A, Achillea millefolium, Briza, Scabiosa, etc.
6-1	24/06/2020	Mosaic of scrub regen and rough MG1a/1e grassland with occasional patches of Tansy.
6-2	24/06/2020	Herb rich partly trampled grassland on less calcareous, moister soil, with Trisetum flavescens, Trifolium pratense, Centaurea nigra, Leontodon hispidus, Plantago lanceolata all F. MG5b with MG6c along paths.
6-3	24/06/2020	Recently cleared scrub on slightly calcareous, moister soil; recolonising with species poor rough grassland, weedy species including Tansy and scrub, including Dogwood and Wild Privet. Also patches of Eupatorium.
7-1	28/06/2020	Herb rich rougher grassland (CG3b or probably intermediate to CG3d) with Bromopsis A, Centaurea scabiosa A, but not much C. nigra, Orobanche elatior, Picris hieracioides, Daucus F, Galium album, Rhinanthus, Anacamptis pyramidalis, etc.
7-2	28/06/2020	Short turf, with some bare chalk. Some Carlina, Blackstonia, Pilosella, Weissia mosses. Intermediate CG7-CG3a.
7-3	24/06/2020	Rougher Bromus grassland next to road, with Centaurea scabiosa =CG3b or intermediate to CG3d. Patches of Aster due to local enrichment.
7-4	24/06/2020	Slightly mesotrophic grassland next to path, with Leontodon hispidus A = MG5b.
7-5	24/06/2020	Short (recently mown) CSE, developing towards CG3a.
7-6	24/06/2020	Shallow ridge supporting herb rich CG3a and extremely rich bryophyte community on N side (Didymodon acutus previously recorded, with several other local spp.)
7-7	24/06/2020	Partly nutrient enriched grassland alongside path with Arrhenatherum abundant; intermediate between MG1a and CSE.
7-8	24/06/2020	Patchy short CG3a and bare paths on SW-facing banks.
7-9	24/06/2020	Herb rich shorter grassland next to paths, probably intermediate between MG5b and CG3a.
8-1	24/06/2020	S-facing road bank. Not looked at in detail but generally appears to be high quality herb rich CG3a. Managed by regular mowing. Some scrub encroachment further up bank.

TN no.	Date	Target note text
8-2	24/06/2020	Steep, very dry S-facing bank, sparsely vegetated with CG7 species, including Thymus, Pilosella, Carlina and Festuca ovina; also abundant Weissia sp.
8-3	24/06/2020	Trampled/disturbed, part bare path (MG6/7) with Lolium, Dactylis glomerata, Medicago lupulina, Ranunculus bulbosus F, Trifolium repens A, Plantago lanceolata A, Achillea millefolium A.
8-4	24/06/2020	CSE with Centaurea scabiosa F, C. nigra A, Arrhenatherum (replacing Bromopsis in places), Orobanche elatior, Galium album, Reseda lutea, bramble, Odontites F, Brachypodium sylvaticum LF, Origanum, Arabis hirsuta.
8-5	24/06/2020	Well-worn wide paths with trampled CG3a and MG6/7.
8-6	24/06/2020	Recent clearance and ground disturbance. Area with bare chalk and colonising vegetation, including Cirsium arvense, Potentilla reptans and Centaurea scabiosa.
9-1	22/06/202	Steep-sided cutting with short CG3a on S-facing side; scattered scrub; CSE in bottom and on N bank. No CG7 apart from a few small patches of Thymus.
9-2	22/06/202	Taller Bromus-dominated CG3a, on steep S-facing bank.
9-3	22/06/202	Old trackway with short CG3a and occasional Thymus.
9-4	22/06/202	Longer grassland probably intermediate between CG3b and CG3a, with a lot of low scrub.
9-5	22/06/202	Rough, nutrient enriched grassland with large patches of Aster (MG1a), grading into richer CSE and MG1e.
9-6	22/06/202	Large area in S of site of recently cut (CX) and past cut (CSE/CG3b mosaic) with Centaurea scabiosa F, Leucanthemum vulgare A, Leontodon hispidus A, Anthyllis LA.
9-7	22/06/2020	Herb rich rough grassland along path (CSE/MG1e mosaic).
9-8	22/06/2020	CSE/CG3b along N edge of site, with tall Bromopsis erecta, Brachypodium sylvaticum F, Centaurea spp, slightly nutrient enriched with Aster sp. and Ononis present. Anacamptis pyramidalis and Orobanche minor also noted.
9-9	22/06/2020	Species rich short grassland on bank, intermediate CG7-CG3a with Thymus, Thesium, Cirsium acaule, Pilosella, Carex flacca, C. caryophyllea, Lotus, Poterium, Blackstonia.
9-10	22/06/2020	Very small patch CG7 with Pilosella and Thesium, SU 6591 0634.
9-11	22/06/2020	CG7-CG3a on dry bank with Pilosella, Thymus, Hippocrepis & Asperula.
9-12	22/06/2020	Short, rabbit grazed turf with bramble and other low scrub, not strongly calcareous, improved along path. Tending towards MG5, with e.g. Plantago lanceolata, Odontites, Centaurea nigra, Achillea millefolium.
9-13	22/06/2020	Old trackway with SW-facing bank; short mosaic of CG3a and CG7, including Danthonia, Thymus, Asperula, Festuca ovina, Cirsium acaule, Lotus, Carlina, Linum catharticum, Koeleria macrantha.
9-14	22/06/2020	Large patch of past cleared scrub, now mostly CSE grading in to CG3a around margins. Brachypodium sylvaticum F, Origanum A, Rhinanthus F, Plantago lanceolata, Centaurea nigra A, C. scabiosa O, Orobanche elatior, with sprawling Clematis & Rubus.
9-15	22/06/2020	Paths in this area well trampled, effectively MG7 or MG6, grading in to CG3a.
9-16	14/06/2020	Herb rich short, horse/rabbit grazed CG3a with Carex flacca A, Centaurea spp., Poterium, Blackstonia, Leontodon hispidus, Lotus, Plantago media, Linum catharticum, Euphrasia, Briza, Danthonia, Scabiosa, Polygala, etc.
9-17	14/06/2020	S-facing bank with short CG3a intermediate to CG7, with Thymus F, Pilosella, Cirsium acaule, Festuca ovina, Carlina R, Linum catharticum A, Euphrasia pseudokerneri.
9-18	08/08/2020	South-facing bank with species rich short CG3a. Typical range of species present during first visit. Campanula rotundifolia and Pimpinella saxifraga present on second visit.
10-1	14/06/2020	E-facing bank with short CG3a, intermediate to CG7 with Thymus, Cirsium acaule, etc.
10-2	14/06/2020	CSE developing after fairly recent clearance with Brachypodium sylvaticum and abundant chalk herbs, especially Centaurea nigra.
10-3	14/06/2020	Short, trampled, grazed CG3a, but relatively herb rich, with Bromopsis erecta, Carex flacca A, C. caryophyllea LF, Viola hirta, Centaurea nigra F, Blackstonia O, Poterium A, Leontodon hispidus A, Cirsium acaule O.
10-4	08/06/2020	Developing Ash woodland with tall, semi-mature Ash over Hawthorn, Blackthorn and Dogwood. Closer to W21a than W21d.
10-5	08/06/2020	Old cutting/trackway with short herb rich grassland on banks and light scrub. Well-developed CG7 on S-facing bank. Patches of Helianthemum nummularium on N-facing bank.
10-6	08/06/2020	Short, trampled, rabbit-grazed, slightly impoverished CG3a with Lotus corniculatus F, Plantago lanceolata F, Poterium sanguisorba A, Blackstonia, Cirsium acaule R, Plantago media.

TN no.	Date	Target note text
10-7	08/06/2020	Trampled improved to semi-improved grassland with LF Ranunculus bulbosus MG7e-MG6/MG5.
10-8	08/06/2020	Recently cleared scrub with rough grass, weedy herbs, Clematis, LA Eupatorium, Arctium, Hypericum perforatum, thistles including Cirsium palustre.
10-9	08/06/2020	Very small patch of CG7 on bank of bare path, with Pilosella.
10-10	08/06/2020	Short/trampled CG3a but tending towards MG5 in places. Main path bare.
10-11	08/06/2020	Recently cleared area, moderately nutrient-enriched, recolonising with rough grass (MG1a/e), bramble and weedy herbs including thistles (W24/W25), plus Sycamore saplings/small trees.
10-12	08/06/2020	Scrub regen following past clearance. Dense Rubus, Buddleja, Clematis, Sycamore saplings, some Dogwood.
10-13	08/06/2020	MG1a with scrub regeneration, including Prunus avium saplings.
10-14	08/06/2020	Trampled path south of gate with Lolium and Plantago major =MG7e/f; further along more like MG6 in character with LF Ranunculus bulbosus.
10-15	08/06/2020	Species rich rougher CG3a with light scrub (outside PCC area).

Appendix 2. Species lists

Species names follow Stace (2019), with older names in brackets.

Frequency codes (DAFOR): D = dominant, A = abundant, F = frequent, O = occasional, R = rare, L = locally, P = present (frequency not able to be estimated).

(a) Tabulated records for 1km squares

Taxon	English	SU6206	SU6306	SU6406	SU6506	SU6606
Ferns & horsetails						
Asplenium scolopendrium	Hart's-tongue					R
Dryopteris filix-mas	Male-fern					R
Pteridium aquilinum	Bracken	R				
Grasses, rushes & sedges						
Agrostis gigantea	Black Bent				R	
Agrostis stolonifera	Creeping Bent	P	P	O		
Anisantha sterilis	Barren Brome	LF	R	LA	R	O
Arrhenatherum elatius	False Oat-grass	LF	LA	LA	A	A
Avena fatua	Wild Oat	R				
Avenula pubescens	Downy Oat-grass	P	P	P	P	
Brachypodium sylvaticum	False Brome	A	LF	A	A	A
Briza media	Quaking-grass	LF	A	A	F	F
Bromopsis erecta	Upright Brome	A	D	A	A	A
Bromus hordeaceus	Soft-brome	R	R	O	R	P
Carex caryophyllea	Spring Sedge	P	A	LA	A	LF
Carex flacca	Glaucous Sedge	A	A	A	A	A
Catapodium rigidum	Fern-grass		R	R	R	
Cynosurus cristatus	Crested Dog's-tail		LF	LF	R	
Dactylis glomerata	Cock's-foot	O	R	F	P	F
Danthonia decumbens	Heath-grass	P	LF	P	P	
Elymus repens (Elytrigia repens)	Common Couch			R	R	R
Festuca ovina	Sheep's Fescue	LF	A	LF	A	LA
Festuca rubra	Red Fescue	P	F	F	LF	P
Helictochloa pratensis (Avenula pratensis)	Meadow Oat-grass		P			P
Holcus lanatus	Yorkshire-fog	O	R	O	P	P
Hordeum murinum	Wall Barley	R	R	R		LF
Koeleria macrantha	Crested Hair-grass	P	F		P	
Lolium perenne	Perennial Rye-grass	LF	LA	LA	LF	P
Phleum bertolonii	Smaller Cat's-tail	R	O	R	P	P
Poa annua	Annual Meadow-grass		R	P	LF	
Poa pratensis	Smooth Meadow-grass	P	LF	P		
Poa trivialis	Rough Meadow-grass	P	R	LF	P	P
Schedonorus arundinaceus	Tall Fescue			R	R	
Trisetum flavescens	Yellow Oat-grass	F	LF	O	O	P
Herbs						
Achillea millefolium	Yarrow		R	F	F	O
Aegopodium podagraria	Ground-elder	LA				LA
Agrimonia eupatoria	Agrimony	LF	O	LF	A	F
Alliaria petiolata	Garlic Mustard	R				
Allium vineale	Wild Onion			R	R	R
Anacamptis pyramidalis	Pyramidal Orchid	R	F	LF	O	LF

Taxon	English	SU6206	SU6306	SU6406	SU6506	SU6606
Anagallis arvensis	Scarlet Pimpernel	R	R		R	
Anthyllis vulneraria	Kidney Vetch	A	A	A	A	LF
Aquilegia vulgaris	Columbine	R	R	LF	R	R
Arabis hirsuta	Hairy Rock-cress		O	LF	LF	
Arctium minus	Lesser Burdock	R	R	R	R	R
Arenaria leptoclados	Small Thyme-leaved Sandwort		R	O	R	
Artemisia vulgaris	Mugwort	LF	R	R	LA	LF
Arum maculatum	Lords-and-ladies	R		R		R
Asparagus officinalis subsp. officinalis	Garden Asparagus					R
Asperula cynanchica	Squinancywort	LF	A	O	O	
Ballota nigra	Black Horehound			R		LF
Bellis perennis	Daisy		R			R
Betonica officinalis	Betony	LF	LA			
Blackstonia perfoliata	Yellow-wort	LF	F	O	A	F
Bryonia dioica	White Bryony	O	R	R	R	O
Calystegia sepium	Hedge Bindweed		R			
Calystegia silvatica	Large Bindweed	R	R	R	R	LF
Campanula glomerata	Clustered Bellflower	LF				
Campanula rotundifolia	Harebell	P	P		F	F
Campanula trachelium	Nettle-leaved Bellflower			R	R	
Capsella bursa-pastoris	Shepherd's-purse		R			
Carduus crispus	Welted Thistle	R				
Carduus nutans	Musk Thistle	R	R	R	R	
Carlina vulgaris	Carline Thistle	O	F	O	LF	P
Centaurea debeauxii	Chalk Knapweed			LF		
Centaurea nigra	Common Knapweed	LF	F	A	A	A
Centaurea scabiosa	Greater Knapweed	LF	O	A	F	F
Centaurium erythraea	Common Centaury	R	O		P	
Centaurium pulchellum	Lesser Centaury				O	
Centranthus ruber	Red Valerian	R	R	R	R	
Cerastium fontanum	Common Mouse-ear		R	P		R
Chaerophyllum temulum	Rough Chervil	R				
Chamaenerion angustifolium (Chamerion angustifolium)	Rosebay Willowherb	R		R		
Chenopodium album	Fat-hen	R				R
Cirsium acaule	Dwarf Thistle	LF	F	O	A	LA
Cirsium arvense	Creeping Thistle	O	R	O	O	O
Cirsium palustre	Marsh Thistle					R
Cirsium vulgare	Spear Thistle	R	R	R	R	R
Clinopodium vulgare	Wild Basil	F	O	O	LF	P
Convolvulus arvensis	Field Bindweed		R	R	LF	P
Crepis capillaris	Smooth Hawk's-beard			R	R	P
Crocosmia x crocosmiiflora	Montbretia				R	
Cruciata laevipes	Crosswort			R	LF	R
Cynoglossum officinale	Hound's-tongue				R	
Dactylorhiza fuchsii	Common Spotted-orchid				R	R
Daucus carota subsp. carota	Wild Carrot	A	O	F	O	P
Diplotaxis muralis	Annual Wall-rocket		R	R	R	
Dipsacus fullonum	Wild Teasel	R		R	R	R

Taxon	English	SU6206	SU6306	SU6406	SU6506	SU6606
Echium vulgare	Viper's Bugloss	F	O	O	LF	O
Epilobium hirsutum	Great Willowherb	R	R		R	
Erigeron acris	Blue Fleabane	R				
Erigeron floribundus (Conyza floribunda)	Bilbao Fleabane					R
Eupatorium cannabinum	Hemp-agrimony	F	LF	LF	A	LA
Euphorbia helioscopia	Sun Spurge	R				
Euphrasia pseudokerneri	Chalk Eyebright	A	A	A	A	O
Galium album	Hedge Bedstraw	O	O	F	A	A
Galium aparine	Cleavers	R	R	R	R	LF
Galium verum	Lady's Bedstraw	R	F	O	O	P
Gentianella amarella	Autumn Gentian	LF		P		
Geranium dissectum	Cut-leaved Crane's-bill				R	R
Geranium molle	Dove's-foot Crane's-bill					R
Geranium pyrenaicum	Hedgerow Crane's-bill				R	
Geranium robertianum	Herb-Robert	R		R		
Geum urbanum	Wood Avens	R		R		R
Glechoma hederacea	Ground-ivy				R	
Helianthemum nummularium	Common Rock-rose	R				LF
Helminthotheca echioides	Bristly Oxtongue	R		R	R	
Heracleum sphondylium	Hogweed		R	R	O	R
Hieracium argillaceum	a hawkweed	R	P			
Hieracium spilophaeum	a hawkweed	O	LF			
Hieracium sublepistoides	a hawkweed	F	LF			
Hippocrepis comosa	Horseshoe Vetch		R	LA	R	
Hypericum androsaemum	Tutsan				R	
Hypericum hirsutum	Hairy St John's-wort	R		R	R	P
Hypericum perforatum	Perforate St John's-wort	O	O	O	O	O
Inula conyzae	Ploughman's-spikenard	O	O	O	R	F
Iris foetidissima	Stinking Iris					R
Jacobaea erucifolia (Senecio erucifolius)	Hoary Ragwort	O	O	F	LF	F
Jacobaea vulgaris (Senecio jacobaea)	Ragwort	R	R	O	P	O
Knautia arvensis	Field Scabious	R	R		P	F
Lactuca serriola	Prickly Lettuce	R	R			R
Lamium album	White Dead-nettle		R			
Lapsana communis	Nipplewort	R		R	R	R
Lathyrus latifolius	Broad-leaved Everlasting Pea			R		
Lathyrus pratensis	Meadow Vetchling		LF	R	LF	
Leontodon hispidus	Rough Hawkbit	A	A	A	A	A
Lepidium campestre	Field Pepperwort				R	
Lepidium draba	Hoary Cress			R	LF	
Leucanthemum vulgare	Oxeye Daisy	A	A	A	F	O
Linaria purpurea	Purple Toadflax	R	R	O	R	R
Linaria sp.	Toadflax				R	
Linaria vulgaris	Common Toadflax	LF	R	F	R	P
Linum catharticum	Fairy Flax	A	A	A	A	A
Lithospermum officinale	Common Gromwell		R	LF	O	LF
Lotus corniculatus	Common Bird's-foot-trefoil	O	A	O	A	LF
Malva sylvestris	Common Mallow			R	R	

Taxon	English	SU6206	SU6306	SU6406	SU6506	SU6606
Medicago lupulina	Black Medick	LF	F	F	A	A
Medicago sativa subsp. sativa	Lucerne		LF			
Melilotus altissimus	Tall Melilot	O	R	O	LF	P
Mentha spicata	Spearmint					R
Myosotis arvensis	Field Forget-me-not			R		R
Odontites vernus	Red Bartsia	F	O	LA	A	F
Ononis repens	Common Restharrow	O	LF	F	A	O
Origanum vulgare	Wild Marjoram	A	LF	A	A	A
Orobanche elatior	Knapweed Broomrape		R	LF	O	R
Orobanche minor	Common Broomrape			R	R	
Papaver dubium	Long-headed Poppy	R				
Papaver rhoeas	Common Poppy	R				R
Pastinaca sativa	Wild Parsnip	O	O	O	O	P
Petasites pyrenaicus (Petasites fragrans)	Winter Heliotrope				LD	
Picris hieracioides	Hawkweed Oxtongue		O	A	F	F
Pilosella officinarum	Mouse-ear Hawkweed	A	A	LA	LF	F
Pimpinella saxifraga	Burnet Saxifrage		O		LF	F
Plantago lanceolata	Ribwort Plantain	A	A	A	A	F
Plantago major	Greater Plantain	LF	R	LF	R	O
Plantago media	Hoary Plantain	F	A	F	A	F
Polygala vulgaris	Common Milkwort	R	O	O	F	P
Polygonum aviculare	Knotgrass	R				
Potentilla anserina	Silverweed				R	
Potentilla reptans	Creeping Cinquefoil	R	R	R	R	
Poterium sanguisorba subsp. sanguisorba	Salad Burnet	A	F	LF	A	A
Primula veris	Cowslip	O	O	R	R	R
Prunella vulgaris	Selfheal	O	O	O	O	P
Pulicaria dysenterica	Common Fleabane	R	R		R	R
Ranunculus bulbosus	Bulbous Buttercup		P	O	F	A
Ranunculus repens	Creeping Buttercup	R	R	R	R	R
Reseda lutea	Wild Mignonette	LF	O	O	LF	O
Reseda luteola	Weld		R	R	R	
Rhinanthus minor	Yellow-rattle	LF	O	A	F	F
Rumex crispus	Curled Dock	R	R	R	R	R
Rumex obtusifolius	Broad-leaved Dock		R		R	R
Rumex sanguineus	Wood Dock	R		R		
Sanicula europaea	Sanicle	R		R		
Scabiosa columbaria	Small Scabious	F	F	A	A	F
Scorzoneroides autumnalis	Autumn Hawkbit	R			P	O
Silene coronaria	Rose Campion				R	
Silene latifolia	White Campion			R	R	R
Silene vulgaris	Bladder Campion	R	R	R	R	R
Sinapis alba	White Mustard			R		
Sinapis arvensis	Charlock	R		R	R	R
Sison amomum	Stone Parsley					O
Sisymbrium officinale	Hedge Mustard	R	R	R	R	O
Smyrnium olusatrum	Alexanders			R		R
Solanum dulcamara	Bittersweet	R	R	R		O
Solidago canadensis	Canadian Golden Rod	R				P
Solidago gigantea	Early Goldenrod			R		R

Taxon	English	SU6206	SU6306	SU6406	SU6506	SU6606
Sonchus arvensis	Perennial Sow-thistle	LA	R	LA	LF	O
Sonchus asper	Prickly Sow-thistle	R		R	R	P
Sonchus oleraceus	Smooth Sow-thistle	R	R	R	R	R
Spiranthes spiralis	Autumn Lady's-tresses		P	P	LF	P
Stachys sylvatica	Hedge Woundwort	R		R	R	R
Succisa pratensis	Devil's-bit Scabious			LF		
Symphyotrichum sp. (Aster)	Michaelmas-daisy		LF	R	LA	LD
Tamus communis	Black Bryony	F	O	R	R	
Tanacetum vulgare	Tansy	R		R	LD	
Taraxacum agg.	Dandelion	O	R	P	LF	P
Teucrium scorodonia	Wood Sage	R				
Thesium humifusum	Bastard-toadflax	F	F	F	R	R
Thymus drucei (Thymus polytrichus)	Wild Thyme	LF	A	LF	F	LF
Torilis japonica	Upright Hedge-parsley	O	R	R		P
Tragopogon pratensis	Goat's-beard	R	R	O	O	R
Trifolium pratense	Red Clover	O	O	F	LF	R
Trifolium repens	White Clover	R	R	O	F	O
Tussilago farfara	Colt's-foot	LF	R	R	LD	
Urtica dioica	Common Nettle	R	R	R	R	LF
Valeriana officinalis	Common Valerian					LF
Verbascum nigrum	Dark Mullein			R		
Verbascum thapsus	Great Mullein	O	R	LF	R	R
Verbena officinalis	Vervain	R	R	LF	F	
Veronica chamaedrys	Germander Speedwell	R				
Veronica persica	Common Field-speedwell	R	R			
Vicia cracca	Tufted Vetch	O	LF	R	LF	
Vicia sativa	Common Vetch			P		
Viola hirta	Hairy Violet	F	LF	P	P	P
Trees & shrubs						
Acer campestre	Field Maple		R	R	R	
Acer platanoides	Norway Maple			R	R	P
Acer pseudoplatanus	Sycamore	F	R	LF	F	O
Betula pendula	Silver Birch				R	
Buddleja davidii	Butterfly-bush	LF	R	R	O	LA
Clematis vitalba	Traveller's-joy	F	A	A	A	A
Cornus sanguinea	Dogwood	A	A	A	A	A
Corylus avellana	Hazel		R			
Cotoneaster bullatus	Hollyberry Cotoneaster	R	R	P	R	
Cotoneaster dielsianus	Diel's Cotoneaster	R		R		
Cotoneaster divaricatus	Spreading Cotoneaster	R	R			
Cotoneaster franchetii	Franchet's Cotoneaster		R	R		
Cotoneaster hjelmqvistii	Hjelmqvist's Cotoneaster	LF	P	R		
Cotoneaster horizontalis	Wall Cotoneaster	LA	R	R	O	
Cotoneaster lacteus	Late Cotoneaster		R	P	R	
Cotoneaster obtusus	Dartford Cotoneaster		R		LF	
Cotoneaster salicifolius	Willow-leaved Cotoneaster		R		R	
Cotoneaster simonsii	Himalayan Cotoneaster		R	P		
Cotoneaster sp.	cotoneaster species	R			O	LF
Cotoneaster sternianus	Stern's Cotoneaster	LF	P			P
Cotoneaster vilmorinianus	Vilmorin's Cotoneaster	LF	P			
Crataegus monogyna	Hawthorn	F	A	A	F	F

Taxon	English	SU6206	SU6306	SU6406	SU6506	SU6606
Euonymus europaeus	Spindle		R	O	O	R
Fagus sylvatica	Beech			LF		R
Fraxinus excelsior	Ash	R	O	O	LF	LF
Fraxinus ornus	Manna Ash		R	P		
Hedera helix	Ivy	LA	LF	LA	LF	O
Ilex aquifolium	Holly	R	R	O	O	O
Juglans regia	Walnut			R	R	O
Leycesteria formosa	Himalayan Honeysuckle			R		
Ligustrum vulgare	Wild Privet	F	A	A	A	F
Lonicera japonica	Japanese Honeysuckle			R	R	
Lonicera nitida	Wilson's Honeysuckle	R		R		
Lonicera periclymenum	Honeysuckle					P
Malus domestica (Malus pumila)	Apple	O	R	O	R	O
Populus sp.	Poplar species					R
Prunus avium	Wild Cherry	R		LF	R	R
Prunus cerasifera	Cherry Plum					R
Prunus spinosa	Blackthorn	LF	R	O	LF	O
Pyracantha coccinea	Firethorn				R	
Quercus ilex	Evergreen Oak		R		R	
Quercus robur	Pedunculate Oak	LF	R	R		
Rhamnus cathartica	Buckthorn	F	F	F	O	O
Rosa arvensis	Field Rose	O	P	R	P	O
Rosa canina	Dog Rose		O	O	O	O
Rosa micrantha	Small-flowered Sweet-briar	R		R		P
Rosa rubiginosa	Sweet Briar					R
Rosa stylosa	Short-styled Field-rose	P	R		P	
Rubus armeniacus	'Himalayan Giant' Bramble	O	R	O		
Rubus fruticosus agg.	Bramble	F	F	A	A	A
Ruscus aculeatus	Butcher's-broom		LF	R		
Sambucus nigra	Elder	O	R	R	R	O
Sorbus aria	Common Whitebeam	O	O	R	R	R
Sorbus intermedia	Swedish Whitebeam	R	F	O	O	
Taxus baccata	Yew	R	O	R		
Ulex europaeus	Gorse	F	LA	R		R
Ulmus agg.	Elm species					R
Ulmus glabra	Wych Elm			R		
Ulmus procera	Elm				R	
Viburnum lantana	Wayfaring-tree	R	R		R	R
Viburnum opulus	Guelder-rose		R		R	
Vinca major	Greater Periwinkle				R	

Summary

Ferns	3
Grasses, rushes & sedges	30
Herbs	180
Trees & shrubs	62
Total vascular plants	275

(b) Selected records for local and rare species

Records are shown on **Maps 3-5**.

Taxon	English	Date	Grid ref	Freq.	Count	Comment
Arabis hirsuta	Hairy Rock-cress	24-Jun-20	SU 6525 0648	R	20	Edge of recently cut scrub.
Arabis hirsuta	Hairy Rock-cress	28-Jun-20	SU 6483 0646	LF	12	Disturbed (cut) area.
Arabis hirsuta	Hairy Rock-cress	28-Jun-20	SU 64619 06442	F	15	At least 15 plants in recently cleared scrub.
Arabis hirsuta	Hairy Rock-cress	28-Jun-20	SU 6462 0644	F		Locally frequent in good chalk grassland.
Arabis hirsuta	Hairy Rock-cress	28-Jun-20	SU 6496 0648	O		Disturbed chalky area (track junction), just west of pylon.
Arabis hirsuta	Hairy Rock-cress	28-Jun-20	SU 64500 06559	LF		
Arabis hirsuta	Hairy Rock-cress	04-Jul-20	SU 6434 0647	A	600	Abundant in area c.10m x 50m (600 plants counted/estimated) in cleared 'ride' between scrub strips.
Arabis hirsuta	Hairy Rock-cress	05-Jul-20	SU 6391 0661	LF		Near east end of quarry.
Arabis hirsuta	Hairy Rock-cress	05-Jul-20	SU 6394 0652	R		E of Paulsgrove Quarry.
Arabis hirsuta	Hairy Rock-cress	05-Jul-20	SU 6394 0658	R		E of Paulsgrove Quarry.
Arabis hirsuta	Hairy Rock-cress	05-Jul-20	SU 6396 0650	R		E of Paulsgrove Quarry.
Arabis hirsuta	Hairy Rock-cress	10-Jul-20	SU 6322 0670	R		
Arabis hirsuta	Hairy Rock-cress	10-Jul-20	SU 6327 0668	P		
Arabis hirsuta	Hairy Rock-cress	08-Jun-20	SU 6618 0622	R		
Campanula glomerata	Clustered Bellflower	11-Jul-20	SU 62912 06686	R	1	Single plant in cleared scrub edge. Photographed.
Campanula glomerata	Clustered Bellflower	14-Jul-20	SU 62912 06686	LA	108	NE of pylon, at least 108 flower stems mostly in dense patch and some additional non-flowering rosettes. Photographed.
Campanula glomerata	Clustered Bellflower	14-Jul-20	SU 62510 06654	LF	23	At least 23 plants (some in flower). Photographed.
Campanula glomerata	Clustered Bellflower	14-Jul-20	SU 62500 06646	P	4	4 in flower. Photographed.
Campanula trachelium	Nettle-leaved Bellflower	22-Jun-20	SU 65815 06354	R		Photographed.
Campanula trachelium	Nettle-leaved Bellflower	28-Jun-20	SU 64619 06442	R	2	1 plant at edge of scrub and 2nd nearby in cleared scrub. Photographed.
Cynoglossum officinale	Hound's-tongue	22-Jun-20	SU 65878 06262	R		2 plants in cleared scrub.
Helianthemum nummularium	Common Rock-rose	14-Jun-20	SU 6602 0635	LF		Grassy slopes (some scrub).
Helianthemum nummularium	Common Rock-rose	14-Jun-20	SU 6618 0622	LF		On bank.
Helianthemum nummularium	Common Rock-rose	14-Jul-20	SU 62747 06617	R		Edge of barish chalky pathway, and few seen (to west) on adjacent slope.
Hieracium argillaceum	a hawkweed	10-Jul-20	SU 63094 06698	P		Specimen with inflorescence. Herb. JAN H0007.
Hieracium argillaceum	a hawkweed	11-Jul-20	SU 62851 06622	R		Specimen taken, well developed inflorescence. Herb. JAN H0009.
Hieracium argillaceum	a hawkweed	14-Jul-20	SU 6270 0670	LF		On N side of road.
Hieracium argillaceum	a hawkweed	07-Jul-20	SU 63919 06681	P		Specimen collected (lvs only), Herb. JAN H0003. Photographed.

Taxon	English	Date	Grid ref	Freq.	Count	Comment
Hieracium spilophaeum	a hawkweed	11-Jul-20	SU 62912 06686	O		
Hieracium spilophaeum	a hawkweed	05-Jul-20	SU 6391 0668	P		E-facing bank in deep, steep-sided ditch on E edge of cpt 3. Photographed.
Hieracium spilophaeum	a hawkweed	05-Jul-20	SU 6398 0662	P	1	Single plant in cpt 4. Photographed.
Hieracium spilophaeum	a hawkweed	05-Jul-20	SU 63803 06650	LF		Photographed.
Hieracium spilophaeum	a hawkweed	05-Jul-20	SU 6390 0666	LF		E-facing banks in deep, steep-sided ditches. Photographed.
Hieracium spilophaeum	a hawkweed	10-Jul-20	SU 63295 06687	P	4	At least 4 plants.
Hieracium spilophaeum	a hawkweed	10-Jul-20	SU 63348 06679	LF	10	10+ rosettes, but probably more. Specimen taken. Herb. JAN H0005.
Hieracium spilophaeum	a hawkweed	10-Jul-20	SU 63374 06689	P		Specimen (well-developed lvs). Herb. JAN H0004. Photographed.
Hieracium sublepistoides	a hawkweed	05-Jul-20	SU 6392 0660	P		
Hieracium sublepistoides	a hawkweed	11-Jul-20	SU 6293 0667	F		Frequent between SU 6293 0667 and SU 6297 0668, with other two taxa.
Hieracium sublepistoides	a hawkweed	11-Jul-20	SU 6297 0668	LF		Frequent between SU 6293 0667 and SU 6297 0668, with other two taxa.
Hieracium sublepistoides	a hawkweed	05-Jul-20	SU 63803 06650	LF		Specimen taken (flowering, 3 capitula). Herb. JAN H0001. Photographed.
Hieracium sublepistoides	a hawkweed	10-Jul-20	SU 63295 06687	LF		Specimen (well-developed lvs and inflorescence). Herb. JAN H0006. Photographed.
Hieracium sublepistoides	a hawkweed	10-Jul-20	SU 63374 06689	LF		
Hieracium sublepistoides	a hawkweed	10-Jul-20	SU 63348 06679	LF		
Hieracium sublepistoides	a hawkweed	11-Jul-20	SU 6292 0668	F		
Hieracium sublepistoides	a hawkweed	11-Jul-20	SU 6293 0667	F		
Hieracium sublepistoides	a hawkweed	11-Jul-20	SU 6289 0664	P		Edge of scrub.
Hieracium sublepistoides	a hawkweed	11-Jul-20	SU 62851 06622	P		Specimen taken. Herb. JAN H0008.
Hieracium sublepistoides	a hawkweed	14-Jul-20	SU 6260 0678	F		Frequent in bare patches in chalk grassland.
Hieracium sublepistoides	a hawkweed	14-Jul-20	SU 6274 0662	F		Beside barish pathway and to W of here across slope.
Hieracium sublepistoides	a hawkweed	07-Jul-20	SU 63874 06661	P		Specimen collected (lvs only), Herb. JAN H0002. Photographed.
Hieracium sublepistoides	a hawkweed	07-Jul-20	SU 63825 06644	LF		Several patches in area.
Hippocrepis comosa	Horseshoe Vetch	22-Jun-20	SU 65921 06357	R		
Hippocrepis comosa	Horseshoe Vetch	28-Jun-20	SU 6459 0654	LF		LF in area c.2 x 0.5 metres.
Hippocrepis comosa	Horseshoe Vetch	28-Jun-20	SU 6441 0647	LA		
Hippocrepis comosa	Horseshoe Vetch	28-Jun-20	SU 6462 0644	R		By track on steeply sloping area.

Taxon	English	Date	Grid ref	Freq.	Count	Comment
Hippocrepis comosa	Horseshoe Vetch	28-Jun-20	SU 6462 0648	R		By track on steeply sloping area.
Hippocrepis comosa	Horseshoe Vetch	28-Jun-20	SU 6455 0647	LF		LF within area of c.1.5 x 1.5 metres.
Hippocrepis comosa	Horseshoe Vetch	04-Jul-20	SU 6400 0653	LF		Sample grid ref.
Hippocrepis comosa	Horseshoe Vetch	04-Jul-20	SU 6437 0654	R		Few vegetative plants.
Hippocrepis comosa	Horseshoe Vetch	05-Jul-20	SU 6396 0660	R		Rare but locally abundant at this location.
Lepidium campestre	Field Pepperwort	24-Jun-20	SU 6525 0648	R		
Lepidium campestre	Field Pepperwort	22-Jun-20	SU 6525 0648	R		SU 6525 0648 and one other record.
Sanicula europaea	Sanicle	11-Jul-20	SU 6277 0660	R		A few rosettes in scrub by pathway.
Sanicula europaea	Sanicle	28-Jun-20	SU 6453 0644	R		Under scrub.
Sanicula europaea	Sanicle	28-Jun-20	SU 64952 06502	R		Under scrub.
Thesium humifusum	Bastard-toadflax	14-Jun-20	SU 66246 06244	R		Single plant on sparsely vegetated area of lower part of slope.
Thesium humifusum	Bastard-toadflax	22-Jun-20	SU 6596 0629	LF		Sample grid ref. Photographed.
Thesium humifusum	Bastard-toadflax	22-Jun-20	SU 6589 0629	LF		Sample grid ref.
Thesium humifusum	Bastard-toadflax	22-Jun-20	SU 6590 0637	R	20	Sample grid ref.
Thesium humifusum	Bastard-toadflax	22-Jun-20	SU 65910 06338	R	4	Sample grid ref.
Thesium humifusum	Bastard-toadflax	24-Jun-20	SU 6538 0639	R		Sample grid ref.
Thesium humifusum	Bastard-toadflax	24-Jun-20	SU 6530 0640	R		Sample grid ref.
Thesium humifusum	Bastard-toadflax	24-Jun-20	SU 6518 0649	R		Sample grid ref.
Thesium humifusum	Bastard-toadflax	28-Jun-20	SU 6482 0650	LA		LA in area of 6m x 2m - short chalk grassland (above quarry).
Thesium humifusum	Bastard-toadflax	04-Jul-20	SU 6409 0650	R	66	Sample count of 66+ plants in area of 5 x 4m; widespread in area of at least 100 x 50 metres on these slopes.
Thesium humifusum	Bastard-toadflax	04-Jul-20	SU 6400 0653	R		Sample grid ref; widespread in area of at least 100 x 50 metres on these slopes.
Thesium humifusum	Bastard-toadflax	04-Jul-20	SU 6403 0659	R		Sample grid ref; widespread in area of at least 100 x 50 metres on these slopes.
Thesium humifusum	Bastard-toadflax	04-Jul-20	SU 6406 0662	R		Sample grid ref.
Thesium humifusum	Bastard-toadflax	04-Jul-20	SU 6402 0649	A		Sample grid ref; abundant from lower parts of slopes upward to higher parts.
Thesium humifusum	Bastard-toadflax	04-Jul-20	SU 6414 0654	F		Sample grid ref. Frequent and widely spread over the general area of these slopes.
Thesium humifusum	Bastard-toadflax	04-Jul-20	SU 6402 0649	F		Sample grid ref. Frequent and widely spread over the general area of these slopes.
Thesium humifusum	Bastard-toadflax	04-Jul-20	SU 6409 0650	F		Sample grid ref. Frequent and widely spread over the general area of these slopes.
Thesium humifusum	Bastard-toadflax	04-Jul-20	SU 6400 0653	F		Sample grid ref. Frequent and widely spread over the general area of these slopes.
Thesium humifusum	Bastard-toadflax	05-Jul-20	SU 6396 0660	F	9	Sample grid ref; at least 9 plants seen here.

Taxon	English	Date	Grid ref	Freq.	Count	Comment
Thesium humifusum	Bastard-toadflax	05-Jul-20	SU 6390 0666	F		Sample grid ref; occasional to locally frequent over wide area.
Thesium humifusum	Bastard-toadflax	05-Jul-20	SU 6384 0664	F		Sample grid ref; occasional to locally frequent over wide area.
Thesium humifusum	Bastard-toadflax	05-Jul-20	SU 6389 0668	F		Sample grid ref; occasional to locally frequent over wide area.
Thesium humifusum	Bastard-toadflax	05-Jul-20	SU 6384 0664	LF		Sample grid ref; a few here.
Thesium humifusum	Bastard-toadflax	05-Jul-20	SU 6385 0662	LF		Sample grid ref; at E end of quarry and elsewhere nearby.
Thesium humifusum	Bastard-toadflax	05-Jul-20	SU 6375 0667	LF		Sample grid ref; generally locally frequent in this area.
Thesium humifusum	Bastard-toadflax	05-Jul-20	SU 6398 0662	LF		Sample grid ref.
Thesium humifusum	Bastard-toadflax	10-Jul-20	SU 6330 0668	A		Here and locally abundant for at least 50m westwards to SU 6327 0668.
Thesium humifusum	Bastard-toadflax	10-Jul-20	SU 6327 0668	A		Locally abundant here eastwards for at least 50m.
Thesium humifusum	Bastard-toadflax	10-Jul-20	SU 6325 0669	LF		
Thesium humifusum	Bastard-toadflax	10-Jul-20	SU 6302 0665	R		
Thesium humifusum	Bastard-toadflax	10-Jul-20	SU 6344 0666	A		
Thesium humifusum	Bastard-toadflax	11-Jul-20	SU 6293 0667	F		Sample grid ref.
Thesium humifusum	Bastard-toadflax	11-Jul-20	SU 6294 0667	F		Sample grid ref.
Thesium humifusum	Bastard-toadflax	11-Jul-20	SU 6297 0665	F		Sample grid ref.
Thesium humifusum	Bastard-toadflax	11-Jul-20	SU 6299 0664	F		Sample grid ref.
Thesium humifusum	Bastard-toadflax	07-Jul-20	SU 63490 06670	P		Patch by fence.
Valeriana officinalis	Common Valerian	14-Jun-20	SU 66208 06291	LF		Patch of c.30 plants; lower (south) edge of scrub.

(c) List of calcareous grassland indicator species and taxa of conservation importance (recorded during the 2020 survey)

C-ind (Calcareous grassland indicator species): C = species characteristic of unimproved chalk downland or having a strong affinity to calcareous soils [author's unpublished list of 100 species based on HCC/HBIC recording card].

ERL (England Red List of vascular plants, Stroh et al. 2014): NT = Near Threatened; VU = Vulnerable.

S41 = species of principal importance in England, listed under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006.

Hants Notables list: CS = County Scarce; CR = County Rare (Rand 2017).

Nationally scarce: NS = species recorded in 16-100 10km squares of the Ordnance Survey British grid (no nationally rare species recorded for the site).

Species	English name	C-ind	ERL	S41	Hants Notable	NS
Grasses, rushes & sedges						
Avenula pratensis	Meadow Oat-grass	C				
Avenula pubescens	Downy Oat-grass	C				
Briza media	Quaking-grass	C	NT			
Bromopsis erecta	Upright Brome	C				
Carex caryophyllea	Spring Sedge	C				

Species	English name	C-ind	ERL	S41	Hants Notable	NS
Carex flacca	Glaucous Sedge	C				
Catapodium rigidum	Fern-grass	C				
Danthonia decumbens	Heath-grass	C				
Festuca ovina	Sheep's Fescue	C				
Koeleria macrantha	Crested Hair-grass	C				
Herbs						
Anacamptis pyramidalis	Pyramidal Orchid	C				
Anthyllis vulneraria	Kidney Vetch	C				
Arabis hirsuta	Hairy Rock-cress	C	NT		CS	
Arenaria leptoclados	Small Thyme-leaved Sandwort	C				
Asperula cynanchica	Squinancywort	C				
Betonica officinalis	Betony	C				
Blackstonia perfoliata	Yellow-wort	C				
Campanula glomerata	Clustered Bellflower	C				
Campanula rotundifolia	Harebell	C	NT			
Carlina vulgaris	Carline Thistle	C	NT			
Centaurea debeauxii	Chalk Knapweed	C				
Centaurea scabiosa	Greater Knapweed	C				
Centaurium pulchellum	Lesser Centaury	C				
Cirsium acaule	Dwarf Thistle	C				
Clinopodium vulgare	Wild Basil	C				
Cruciata laevipes	Crosswort		NT			
Cynoglossum officinale	Hound's-tongue	C	NT			
Dactylorhiza fuchsii	Common Spotted-orchid	C				
Echium vulgare	Viper's Bugloss	C				
Erigeron acris	Blue Fleabane	C				
Euphrasia pseudokerneri	Chalk Eyebright	C	VU	Y	CS	NS
Galium verum	Lady's Bedstraw	C				
Gentianella amarella	Autumn Gentian	C	NT			
Helianthemum nummularium	Common Rock-rose	C	NT			
Hieracium spilophaeum	a hawkweed				CS	
Hieracium sublepistoides	a hawkweed				CR	
Hippocrepis comosa	Horseshoe Vetch	C				
Inula conyzae	Ploughman's-spikenard	C				
Knautia arvensis	Field Scabious		NT			
Leontodon hispidus	Rough Hawkbit	C				
Lepidium campestre	Field Pepperwort		NT			
Linum catharticum	Fairy Flax	C				
Lithospermum officinale	Common Gromwell	C				
Origanum vulgare	Wild Marjoram	C				
Orobanche elatior	Knapweed Broomrape	C				
Pilosella officinarum	Mouse-ear Hawkweed	C				
Pimpinella saxifraga	Burnet Saxifrage	C				
Plantago media	Hoary Plantain	C	NT			
Polygala vulgaris	Common Milkwort	C				
Poterium sanguisorba subsp. sanguisorba	Salad Burnet	C				
Primula veris	Cowslip	C				
Rhinanthus minor	Yellow-rattle	C				
Sanicula europaea	Sanicle		NT			

Species	English name	C-ind	ERL	S41	Hants Notable	NS
Scabiosa columbaria	Small Scabious	C				
Spiranthes spiralis	Autumn Lady's-tresses	C	NT			
Succisa pratensis	Devil's-bit Scabious	C	NT			
Thesium humifusum	Bastard-toadflax	C			CS	NS
Thymus polytrichus	Wild Thyme	C				
Valeriana officinalis	Common Valerian		NT			
Verbascum nigrum	Dark Mullein	C				
Verbena officinalis	Vervain	C				
Viola hirta	Hairy Violet	C				

Summary

Calcareous grassland indicators	56
England Red List: Vulnerable	1
England Red List: Near Threatened	15
NERC S41	1
Hants Notables: County Rare	1
Hants Notables: County Scarce	4
Nationally Scarce	2

Appendix 3. NVC types and vegetation categories

List of NVC types and vegetation categories used for field recording.

Type	NVC name / details
bare	bare ground / unvegetated areas
CG3a	*Bromus erectus* grassland, Typical sub-community
CG3aS	*Bromus erectus* grassland, Typical sub-community – short-grazed stands including those intermediate to CG2a *Festuca ovina-Avenula pratensis* grassland, *Cirsium acaule-Asperula cynanchica* sub-community, CG7a (see below) and locally also to CG2b *Festuca ovina-Avenula pratensis* grassland, *Succisa pratensis-Leucanthemum vulgare* sub-community.
CG3aT	*Bromus erectus* grassland, Typical sub-community – trampled, semi-improved version with locally frequent MG6/7 species
CG3b	*Bromus erectus* grassland, *Centaurea nigra* sub-community
CG3d	*Bromus erectus* grassland, *Festuca rubra-Festuca arundinacea* sub-community
CG7a	*Festuca ovina-Hieracium pilosella-Thymus praecox/pulegioides* grassland, *Koeleria macrantha* sub-community
CS	Chalk scrub (W21d) – dense stands of regeneration from recently cut back areas and those without taller saplings and trees
CSE	Chalk scrub ecotone – regularly mown rougher calcareous grassland and areas of scrub regeneration forming the edge zone around clumps of scrub and trees, and areas of past scrub removal now developing into grassland. Mostly equivalent to CG3b.
CX	Scrub (W21d) cut back in last year or so with CSE not yet fully developed
MG1a	*Arrhenatherum elatius* grassland, *Festuca rubra* sub-community
MG1b	*Arrhenatherum elatius* grassland, *Urtica dioica* sub-community
MG1d	*Arrhenatherum elatius* grassland, *Pastinaca sativa* sub-community
MG1e	*Arrhenatherum elatius* grassland, *Centaurea nigra* sub-community
MG5a	*Cynosurus cristatus-Centaurea nigra* grassland, *Lathyrus pratensis* sub-community
MG5b	*Cynosurus cristatus-Centaurea nigra* grassland, *Galium verum* sub-community
MG6/7	Mosaics and transitions between (mainly) MG6c *Lolium perenne-Cynosurus cristatus* grassland, *Trisetum flavescens* sub-community and MG7e *Lolium perenne-Plantago lanceolata* grassland
OV25	*Urtica dioica-Cirsium arvense* community (a calcareous type not assignable to any of the three published sub-communities)
RC	*Rubus fruticosus* agg.-*Clematis vitalba* scrub (no NVC equivalent, but related to OV24b *Urtica dioica-Galium aparine* community, *Arrhenatherum elatius-Rubus fruticosus* agg. sub-community and W21a/d)
W21a	*Crataegus monogyna-Hedera helix* scrub, *Hedera helix-Urtica dioica* sub-community
W21d	*Crataegus monogyna-Hedera helix* scrub, *Viburnum lantana* sub-community ('chalk scrub')
W23	*Ulex europaeus-Rubus fruticosus* scrub (with affinity to W23c *Teucrium scorodonia* sub-community)

Current names of plants (following Stace 2019) are as follows:

Bromus erectus = Bromopsis erecta

Avenula pratensis = Helictochloa pratensis

Festuca arundinacea = Schedonorus arundinaceus

Hieracium pilosella = Pilosella officinarum

Thymus praecox = Thymus drucei

Appendix 4. Condition assessment tables

Guidance tables for condition assessment of grassland and scrub habitats are shown below, taken from the *Biodiversity Metric 2.0* technical supplement (Crosher et al. 2019b); with corrections and the addition of some scientific and English plant names.

When used in conjunction with the Biodiversity Metric Calculation Tool v.2 there is an option to enter intermediate condition types. The full list is as follows (with scores): Good (3), Fairly Good (2.5), Moderate (2), Fairly Poor (1.5), Poor (1), N/A - Agricultural, N/A - Other.

Grassland Habitat Types

Habitat Description
• Includes agricultural, recreational, amenity, road verges and semi-natural grassland types; Priority Habitat grasslands on all soil types. • Will be dominated by grassland species with very little (if any) dwarf shrub, wetland or woodland species within the sward. • Will exist above and below the level of enclosure at all altitudes.
Condition Assessment Criteria
1. The area is clearly and easily recognisable as a good example of this type of habitat and there is little difference between what is described in the relevant habitat classifications and what is visible on site. 2. The appearance and composition of the vegetation on site should very closely match the characteristics for the specific Priority Habitat [i.e. as described by either the Phase 1 Habitat Classification or the UK Habitat Classification] (where applicable), with species typical of the habitat representing a significant majority of the vegetation. 3. Wild flowers, sedges and indicator species for the specific Priority grassland habitat are very clearly and easily visible throughout the sward and occur at high densities in high frequency. See relevant Habitat Classification for details of indicator species for specific habitat. 4. Undesirable species (see list below) and physical damage (see Notes) is below 5% cover. 5. Cover of bare ground is less than 10% (including localised areas, for example, rabbit warrens). 6. Cover of bracken less than 20% and cover of scrub and bramble less than 5%.

Condition	Assessment Criteria	Score
Good	• Species-rich grassland of all Priority Habitat Types. Of high to moderate quality. • Wildflower and sedges above 30% (total cover), excluding White Clover *Trifolium repens*, Creeping Buttercup *Ranunculus repens* and injurious weeds. • Meets all the condition criteria (above) with only minor variation. • None of the indicators of poor condition apply (4, 5 & 6 above).	**3**
Moderate	• Semi-improved grasslands. These occur on a wide range of soils and may be derived from higher quality Priority Habitat grassland habitats in poor condition. Often as they deteriorate following nutrient inputs.	**2**

Condition	Assessment Criteria	Score
	Typical grasses include: Cock's-foot *Dactylis glomerata*, Common Bent *Agrostis capillaris*, Creeping Bent *A. stolonifera*, Crested Dog's-tail *Cynosurus cristatus*, False oat-grass *Arrhenatherum elatius*, Meadow Fescue *Schedonorus pratensis*, Meadow Foxtail *Alopecurus pratensis*, Red Fescue *Festuca rubra*, Sweet Vernal-grass *Anthoxanthum odoratum*, Timothy *Phleum pratense*, Tufted Hair-grass *Deschampsia cespitosa* and Yorkshire-fog *Holcus lanatus*. • Total cover of wild flowers and sedges less than 30%, excluding White Clover, Creeping Buttercup and injurious weeds. • Rye-grass *Lolium* spp. cover is less than 25%, including amenity grasslands. • OR clearly fails at least one of the condition criteria. • OR The grassland type has some differences between what is described in the relevant habitat classifications and what is visible on site. It is a Lower Quality Priority Habitat, but clearly recognisable as such. • Potentially restorable to grassland Priority Habitat with improved management. • Cover of undesirable species (see list below) at 5-15%.	
Poor	• Agricultural grasslands. These are characterised by vegetation dominated by a few fast-growing grasses on fertile, neutral soils. They are frequently characterised by an abundance of Rye-grasses *Lolium* spp. (above 25% cover) and White Clover *Trifolium repens*. These grasslands are typically either managed as pasture or mown regularly for silage production or in non-agricultural contexts for recreation and amenity purposes; they are often periodically re-sown and are maintained by fertiliser treatment and weed control. They may also be temporary and sown as part of the rotation of arable crops but they are only included in this broad habitat type if they are more than one year old. • Amenity and road verge grasslands with similar species to description for agriculture grasslands. • OR Most of the condition criteria are being failed. • Cover of undesirable species (see list below) above 15%, usually resulting in a dense scrub or tree cover, or high cover of exotic species.	**1**
Undesirable species Creeping Thistle *Cirsium arvense*, Spear Thistle *C. vulgare*, Curled Dock *Rumex crispus*, Broad-leaved Dock *R. obtusifolius*, Common Ragwort *Senecio jacobaea*, Common Nettle *Urtica dioica*, Creeping Buttercup, White Clover, Cow Parsley *Anthriscus sylvestris*, Marsh Thistle *Cirsium palustre* and Marsh Ragwort *Senecio aquaticus*.		
Notes Physical damage to the vegetation from: excessive poaching, damage from machinery use or storage, or any other damaging management activities.		

Scrub Habitat Types

Habitat Description

This covers Biodiversity Metric (UK Habitats Classification) scrub categories, including the following (for hedgerows see User Guide Chapter 7).

- Bracken *Pteridium aquilinum*, Blackthorn *Prunus spinosa*, Bramble *Rubus* agg., Gorse *Ulex europaeus*, Hawthorn *Crataegus monogyna*, Hazel *Corylus avellana*, mixed scrub, Sea Buckthorn *Hippophae rhamnoides* and Rhododendron *Rhododendron ponticum*.
- Scrub of high (distinctiveness) environmental value such as:
  - Juniper *Juniperus communis* or Box *Buxus sempervirens* scrub.
  - Scrub on calcareous soils with three or more of Wayfaring-tree *Viburnum lantana*, Wild Privet *Ligustrum vulgare*, Dogwood *Cornus sanguinea*, Buckthorn *Rhamnus cathartica*, Hawthorn *Crataegus monogyna* and Spindle *Euonymus europaeus*.
  - Native Sea Buckthorn scrub (on the east coast).
  - Hazel.
- Scrub on peat soils with two or more of Alder Buckthorn *Frangula alnus*, Eared Willow *Salix aurita*, Goat Willow *S. caprea*, Grey Willow *S. cinerea*, Bay Willow *S. pentandra*, Purple Willow *S. purpurea* and Osier *S. viminalis*. It excludes montane scrub (above 600 m altitude) which is covered under Heathland.
- South-facing Bracken stands with Violets *Viola* spp. when associated with UK Priority butterfly species: High Brown Fritillary, Pearl-bordered Fritillary and Small Pearl-bordered Fritillary.
- Scrub of lower (distinctiveness) environmental value such as:
  - The majority of Bracken stands.
  - Bramble.
  - Blackthorn, Hawthorn.
  - Gorse (unless as a low growing component of heathland habitat).
  - Mixed scrub.

Condition Assessment Criteria

1. There are at least three woody species, with no one species comprising more than 75% of the cover (except Common Juniper, Sea Buckthorn or Box, which can be 100% cover).
2. There is a good age range, i.e. a mixture of seedlings, saplings, young shrubs and mature shrubs.
3. Pernicious weeds and invasive species make up less than 5% of the ground cover.
4. The scrub has a well-developed edge with ungrazed tall herbs.
5. There are many clearings and glades within the scrub.

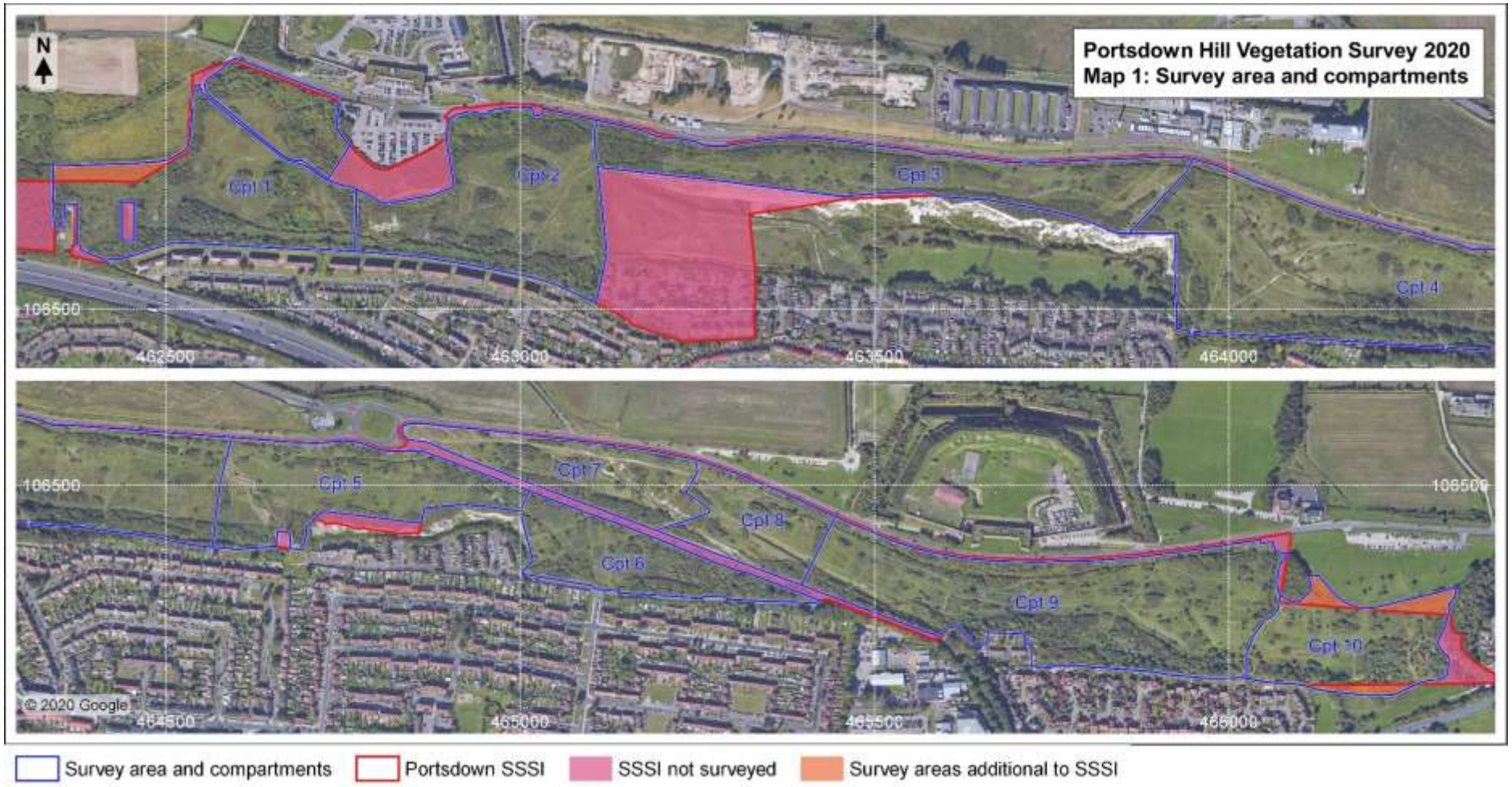
Condition	Assessment Criteria	Score
Good	• Meets all of the five criteria (above) with only minor variation. • Scrub type of high biodiversity value in good condition. • None of the indicators of poor condition are present.	**3**

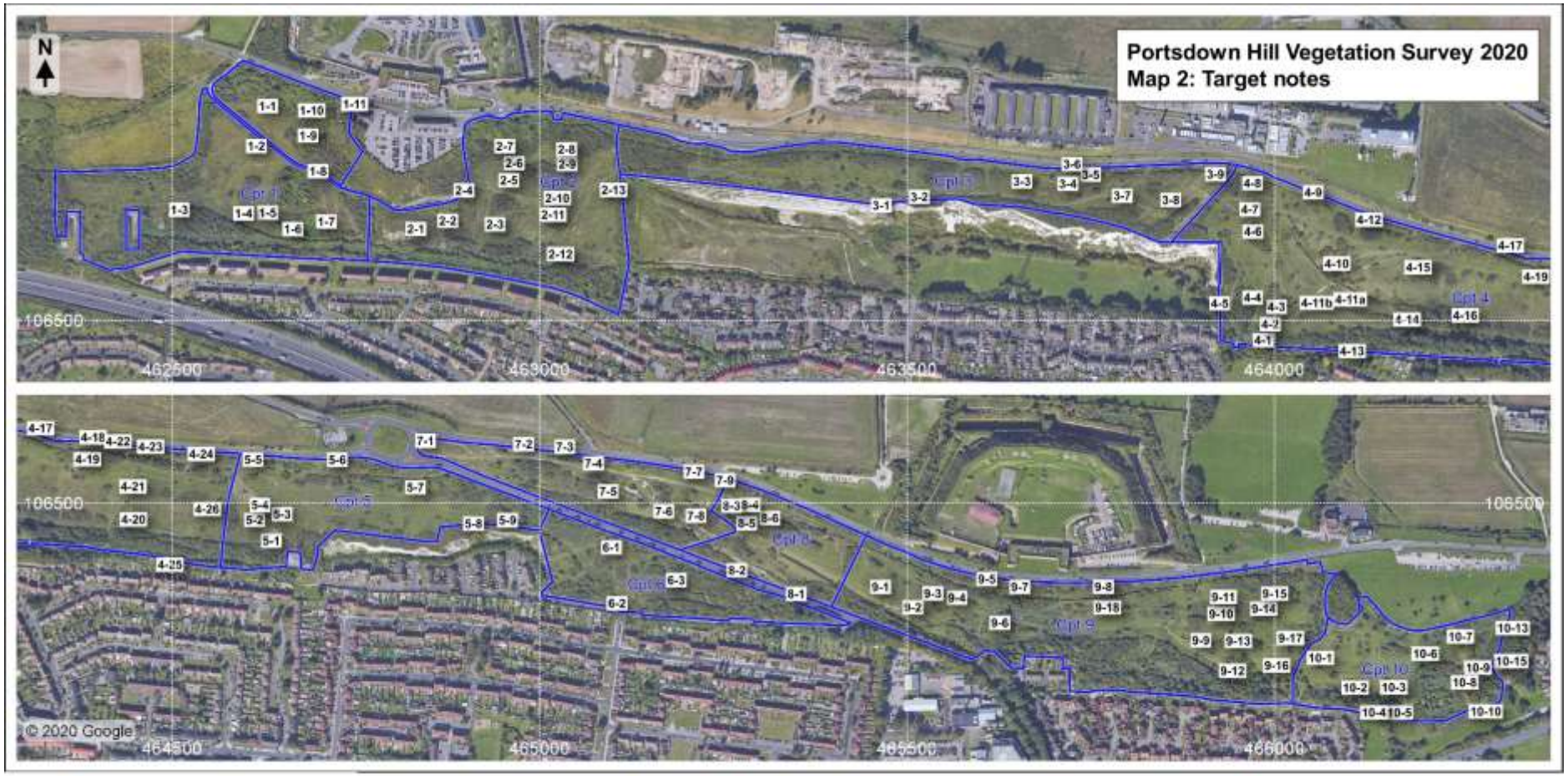
Condition	Assessment Criteria	Score
Moderate	• The single woody species cover is greater than 75%. • The age range is missing some size classes. • Scrub type of high biodiversity value in poor condition. • The scrub type has minor differences between what is described in the relevant habitat classifications and what is visible on site. • Cover of undesirable (see list below) and invasive species at 5-20%.	**2**
Poor	• Single-age scrub present. • Potentially restorable to improved scrub habitat with improved management. • All of the condition criteria are being failed. • The scrub type has major differences between what is described in the relevant habitat classifications and what is visible on site. • Cover of undesirable (see list below) and invasive species above 20%. • All Rhododendron stands will be in this condition.	**1**

Undesirable species

- Creeping Thistle *Cirsium arvense*
- Common Nettle *Urtica dioica*
- Himalayan Balsam *Impatiens glandulifera*
- Japanese Knotweed *Fallopia japonica*
- Cherry Laurel *Prunus laurocerasus*
- Rhododendron *Rhododendron ponticum*

Maps


N
Portsdown Hill Vegetation Survey 2020
Map 1: Survey area and compartments
Cpt 1
Cpt 2
Cpt 3
Cpt 4
Cpt 5
Cpt 6
Cpt 7
Cpt 8
Cpt 9
Cpt 10
106500
462500
463000
463500
464000
464500
465000
465500
466000
© 2020 Google
Survey area and compartments
Portsdown SSSI
SSSI not surveyed
Survey areas additional to SSSI

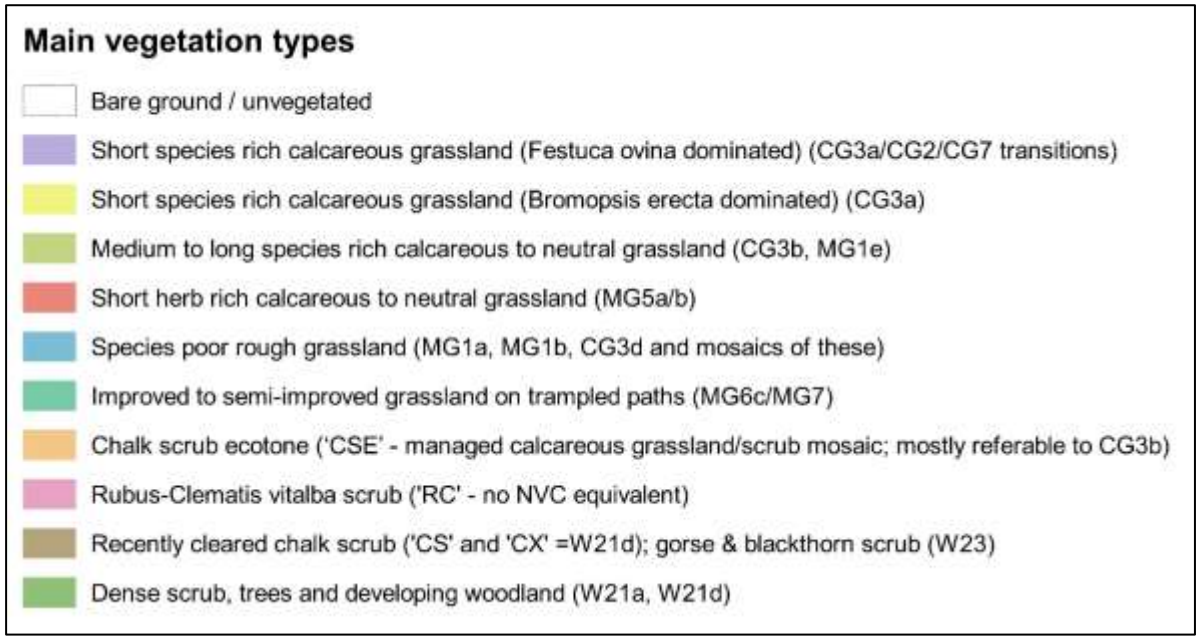

Portsdown Hill Vegetation Survey 2020
Map 2: Target notes
N
106500
462500
463000
463500
464000
464500
465000
465500
466000
© 2020 Google
Survey area and compartments

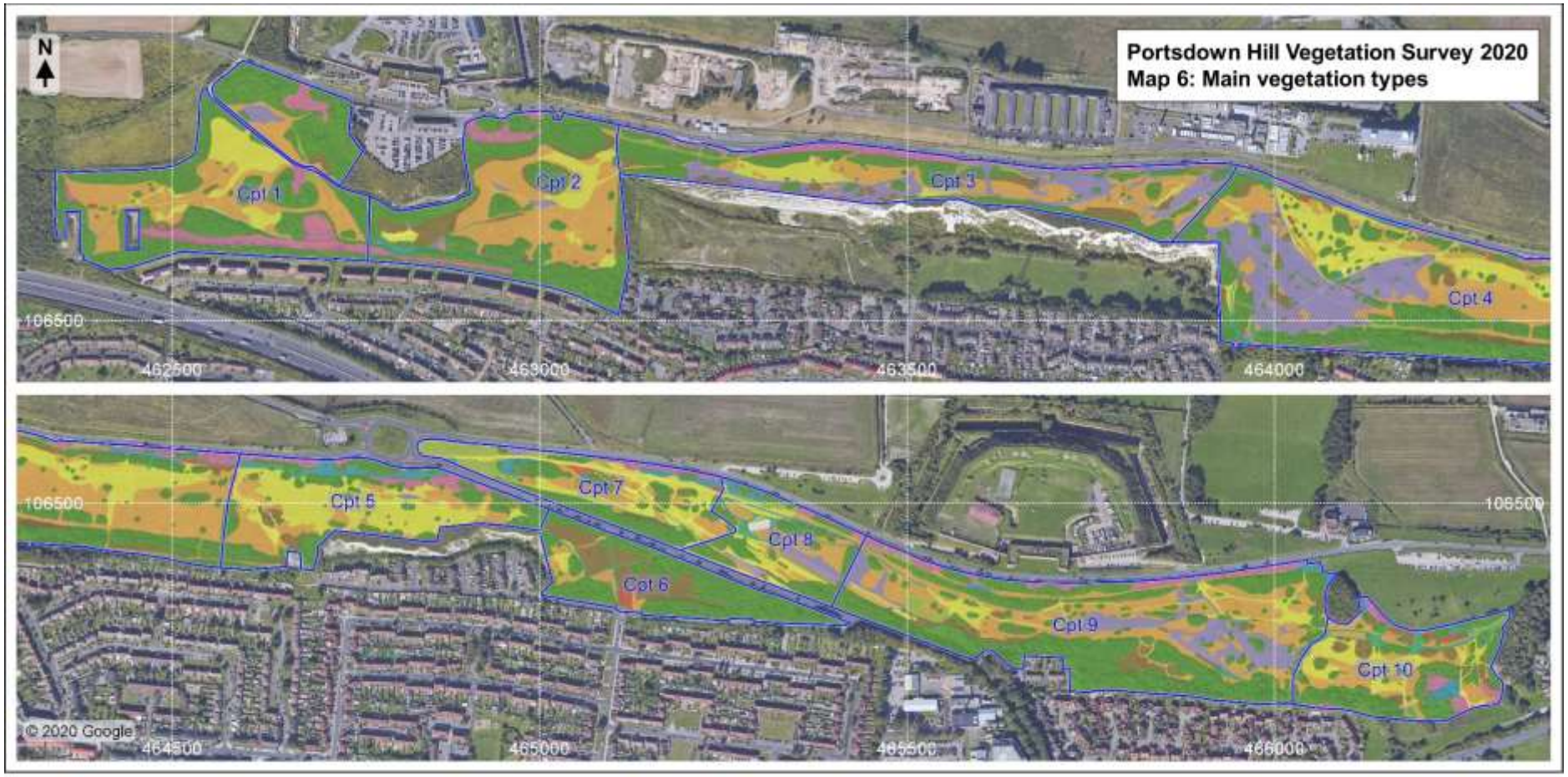

N
Portsdown Hill Vegetation Survey 2020
Map 3: Species records (1 of 3)
106500
462500
463000
463500
464000
106500
106500
464500
465000
465500
466000
© 2020 Google
Arabis hirsuta
Campanula glomerata
Cynoglossum officinale
Hippocrepis comosa
Sanicula europaea
Succisa pratensis


N
Portsdown Hill Vegetation Survey 2020
Map 4: Species records (2 of 3)
106500
462500
463000
463500
464000
106500
106500
© 2020 Google
464500
465000
465500
466000
Campanula trachelium
Helianthemum nummularium
Lepidium campestre
Thesium humifusum
Valeriana officinalis

Hieracium argillaceum *Hieracium spilophaeum* *Hieracium sublepistoides*

Legend to vegetation maps





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