

A303 Amesbury to Berwick Down

**Applicant's provision of technical reports supporting the
Environmental Information Review**

Countess Cutting - Botanical Monitoring Report (2020)

Document reference: Redetermination 2.4

Planning Act 2008

The Infrastructure Planning (Examination Procedure) Rules 2010

February 2022



Table of contents

Chapter	Pages
1 Introduction	2
2 Methodology	2
2.1 National Vegetation Classification	2
2.2 Habitat Mapping and Condition Assessment Survey	3
2.3 Limitations	4
3 Results	5
3.1 NVC Survey	5
3.2 Habitat description and Mapping	7
3.3 Condition Assessment	8
4 Discussion	9
4.1 NVC survey	9
4.2 Condition Assessment	9
Abbreviations List	10
References	10
Appendix A NVC Quadrat Data	12
Appendix B Figures	15
Appendix C 2017 Report	17

1 Introduction

- 1.1.1 Baseline botanical surveys were undertaken in 2017 of areas of land with potential to be directly or indirectly affected by the proposed alignment options for the A303 Stonehenge to Berwick Down road enhancement scheme¹. One of the areas targeted during the survey was a County Wildlife Site (CWS) known as Countess Cutting (hereafter referred to as the Site). The Site was included in the 2017 survey based on its designation as a CWS. The CWS is a south facing cutting on the northern side of the A303 west of Amesbury which was made as part of upgrading of the A303 in the 1960s. It supports a form of secondary calcareous grassland that has developed naturally over time as the bare chalk face of the cutting has weathered.
- 1.1.2 Part of the cutting will be realigned during the construction of the approach to the eastern portal of the tunnel, leading to the loss of 0.74ha of the existing CWS. Post-construction, there will be a longer, deeper cutting and new calcareous grassland will be created on both sides of the new cutting.
- 1.1.3 This report provides the methods and results of the update botanical monitoring survey of the Site undertaken in 2020. The intent of the monitoring was to:
- update the 2017 baseline survey of the Site; and identify any changes to its vegetative composition that may have occurred since the 2017 survey
 - undertake a condition assessment of the Site (based loosely on the Biodiversity Net Gain condition assessments) to inform the target condition of the grassland to be created as part of the A303 Scheme.

2 Methodology

2.1 National Vegetation Classification

- 2.1.1 The initial baseline survey was undertaken on the 15th June 2017, with the survey approach following the method outlined in the National Vegetation Classification (NVC) handbook². Five 2m x 2m quadrats locations were sampled along the face of the CWS cutting. The quadrat locations were deliberately selected by the surveyors as being representative of the vegetation present along the face of the cutting. The quadrat locations were recorded using a handheld GPS device. The species within each quadrat were identified to species level and the percentage cover within the quadrat by each species estimated.

¹ Arup Atkins Joint Venture, 2017, A303 Botanical Survey Report 2017, The Hub, Aztec West, 500 Park Avenue, Bristol.

² Rodwell, J.S. (2006) NVC Users' Handbook, JNCC, Peterborough, ISBN 978 1 86107 574 1.

- 2.1.2 The update monitoring survey was undertaken on the 8th August 2020. The 2017 quadrat locations were re-located using a handheld GPS device and the quadrats surveyed using the same method as outlined above.
- 2.1.3 The 2017 quadrat data was assessed using MATCH³ software and the 2020 survey data was assessed using Modular Analysis of Vegetation Information System (MAVIS)⁴ software which is comparable as they both follow the same application of the Czekanowski coefficient⁵. This software compares the quadrat data from a given Site and highlight potential affinities with published NVC communities/sub-communities. Such analysis produces a numerical coefficient of similarity on a scale from 0 to 100 for each dataset. It indicates a 'goodness of fit' with documented NVC communities and as a general rule, the higher the number, the more confidence there normally is with the result. MATCH has the additional advantage of being freely available and thus suitable to compare repeated surveys.
- 2.1.4 Although MATCH and MAVIS are comparable, data for the two years was run through MAVIS to facilitate a full comparison of the quadrats. It should be noted that MATCH uses the Domin scale to estimate abundance / cover, where this is the case, an assumption has been made whereby the medium of the range is used, e.g. 4-10% = 7%.

2.2 Habitat Mapping and Condition Assessment Survey

- 2.2.1 In order to establish a baseline for future monitoring of newly created habitats that will form part of the mitigation for the loss of Countess Cutting CWS, the habitats present were assessed against the monitoring targets that are to be used in the A303 post construction monitoring scheme, and the habitats mapped accordingly. During the survey any notable habitat patches e.g. orchid-rich areas, areas that may be suitable to target for seed bank translocation or areas to avoid for translocating due to the presence of negative indicator species, were target noted to help inform future mitigation works concerning Countess Cutting.
- 2.2.2 The floral species was recorded on an encounter basis, with abundance recorded using the DAFOR⁶ method.
- 2.2.3 The monitoring targets are for all areas to have less than 5% cover of injurious weeds or negative calcareous grassland indicator species (e.g. white clover *Trifolium repens*, creeping buttercup *Ranunculus repens* etc.).
- 2.2.4 The following condition targets for different calcareous grassland habitat sub-types are to be used in monitoring:
- CG3 open sward – described as sparsely vegetated open sward calcareous grassland (wildflowers characteristic of calcareous substrate at least 50% of total cover of vegetation; 10-50% bare ground

³ Vegetation analysis software developed by scientists from the University of Lancaster for NVC classification.

⁴ Modular Analysis of Vegetation Information System (MAVIS) software developed by the Centre of Ecology and Hydrology.

⁵ [Redacted] [Accessed October 2020]

⁶ Dominant, Abundant, Frequent, Occasional and Rare

within the sward; negative indicator species for calcareous grassland less than 5% of total cover.)

- CG3 closed sward - defined as closed sward short calcareous grassland (defined as grassland with >30% total cover of wildflowers characteristic of calcareous grassland (including sedges, but not cover of white clover, creeping buttercup and injurious weeds); bare ground <10% of total cover; negative indicators for calcareous grassland <5% of the total cover.)
- CG3 rank sward - much lower cover of herbs and high cover of rank grasses, >50% (any combination of *Bromopsis erecta*, *Brachypodium sylvaticum*, *Arrhenathrum elatius*, *Dactylis glomerata*)
- Scrub (record types, e.g. bramble *Rubus fruticosus* agg.; hawthorn *Crataegus monogyna*/blackthorn *Prunus spinosa*; mixed scrub/natural regeneration, e.g. ash *Fraxinus excelsior* <5m tall; clematis *Clematis vitalba*) recorded as dense scrub if cover is >33%,
- Record grassland with scattered scrub if 4-33% scrub ('transition zone'),
- Patches of tall ruderal herbs, e.g. nettles *Urtica dioica* separately from calcareous grassland with scatter scrub (i.e. as per Phase 1 habitat survey).

In addition to the above, the habitats present have also been assessed using the Biodiversity Net Gain Metric 2.0 habitat condition assessment table.

2.3 Limitations

- 2.3.1 Due to health and safety issues associated with Covid-19, the survey was undertaken on the 8th of August, which while within the optimal period for general botanical survey, is considered to be at the late end of the survey period for calcareous grassland survey, which is generally considered to be late May to late July. The slightly late date of the survey was exacerbated by the survey coinciding with a period of hot dry weather. These factors, combined with the south-facing nature of the Site and the free-draining characteristics of chalk soil, meant that some of the species recorded had already finished flowering and / or were reduced in size and covered less ground. All orchids within the Site had progressed to seed at the time of the survey and could not be accurately identified to species level. This is not considered to have limited the validity of the survey, as apart from the orchids, it was possible to accurately identify the species present.
- 2.3.2 Inaccuracies with handheld GPS devices (normally accurate to + - 5m) mean that while every effort to relocate the original 2017 quadrat location was undertaken, the 2020 quadrat locations could have been as much as 10m out. This is not considered to have limited the validity of the results as the aim of the quadrats was to provide information on the habitat type present, it may however explain some of the variation between the 2017 and 2020 results.

3 Results

3.1 NVC Survey

- 3.1.1 For the full 2017 and 2020 quadrat data please see Appendix A
- 3.1.2 The general species list recorded in 2020 from the walkover survey / condition assessment is outlined below using the DAFOR⁶ method.
- 3.1.3 Mouse-eared hawkweed *Pilosella officinalis* was locally dominant forming sprawling patches over open chalk and areas of shorter grass sward. Abundant wild carrot *Daucus carota* and occasional common centaury *Centaureum erythraea*, dwarf thistle *Cirsium acaule*, selfheal *Prunella vulgaris*, red fescue *Festuca rubra*, field maple *Acer campestre*, hawthorn *Crataegus monogyna*, wild parsnip *Pastinaca sativa*, common knapweed *Centaurea nigra*, yarrow *Achillea millefolium*, dog rose agg *Rosa canina* agg and ash *Fraxinus excelsior*. Rarely occurring were sycamore *Acer pseudoplatanus*, yew *Taxus baccata*, rose species *Rosa* agg. spp. wild privet *Ligustrum vulgare*, beech *Fagus sylvatica* and bramble *Rubus fruticosus* agg.
- 3.1.4 The 2017 quadrat data was assessed as being the best fit to a CG3 *Bromopsis erecta* grassland (coefficient of similarity 42.8) but no sub-community could be confirmed when run through MATCH. When the 2017 quadrat data was re-run with MAVIS the data analysis recorded a best goodness of fit to the CG3d (*Festuca rubra-Festuca arundinacea*) sub-community coefficient score of 42.30, the relatively low coefficient score and similar scores for the CG3 and CG3b (*Centaurea nigra*) sub-communities suggests that this sub-community is a poor fit. The sward was sparse, with patches of bare chalk and was typified by prominent *Bromopsis erecta*, *Poterium sanguisorba* subsp. *sanguisorba*, and hawkweed *Hieracium* sect (not possible to identify to species level at time of survey).
- 3.1.5 The 2020 survey data MAVIS analysis recorded a best goodness of fit to the CG3b sub-community coefficient score of 37.36, the low coefficient score of 37.36 suggests that this sub-community is a poor fit. This is likely due to the low constancy and cover of *Bromus erectus* and *Festuca rubra*, which may have been attributed to the prolonged period of hot dry weather experienced, leading to the reduced cover of these species in the 2020 survey. The 2017 surveys also recorded low covers of these species, indicating that this habitat is a poor fit with this community.
- 3.1.6 Consideration of the 2017 and 2020 results as outlined above suggests that the Countess Cutting LWS has a weak affinity to the CG3 community with the highest goodness of fit values returned all for CG3 communities as shown in Table 1 below. However, none of the values for any particular sub community reached 50 or higher, it was therefore concluded that this habitat has affinities with the CG3 *Bromus erectus* grassland community, with no confirmed sub-community as per the 2017 survey result (Table 1, Appendix A).

- 3.1.7 The lack of a strong fit is considered likely to be due to the oligotrophic soils, which being comprised of partially weathered chalk bedrock with no development of a defined topsoil layer have prevented the establishment of the main grasses common in the CG3 community (*Bromus erectus* and *Festuca ovina* which can be replaced by *Festuca rubra* in some instances).
- 3.1.8 The main differences between the 2017 and 2020 data relate to the different numbers of grass species recorded in the quadrats as well as in terms of reduced percentage cover in 2020. *Bromus erectus* had a constancy value of 5 in 2017 but 1 in 2020. The 2017 data shows that this species was present in low ground covers in all but two quadrats where it reached 20% cover. *Arrhenatherum elatius* had a constancy of 4 in 2017 and 1 in 2020, *Festuca rubra* had a 2017 constancy value of three but was absent from all quadrats in 2020. All three grass species were recorded in 2020 but outside of the quadrats sampled.
- 3.1.9 The main differences between the herbaceous plants recorded in 2017 and 2020 relate to generally lower species counts from each quadrat, with *Achillea millefolium*, *Anacamptis pyramidalis*, *Centaurea erythraea*, *Cirsium acaule*, *Crataegus monogyna*, *Dactylorhiza x grandis*, *Melilotus latissimus*, *Pilosella officinarum*, *Prunella vulgaris* and the mosses *Fissidens dubius* and a *Wessia* species all recorded in 2017 but absent in 2020. Of these species all except *Pilosella officinarum* were only recorded in low numbers of quadrats and very low percentage covers. The three orchid data identified in 2017: *Dactylorhiza fuchsia*, *Dactylorhiza x grandis* and *Anacamptis pyramidalis*, were assumed to be present in similar numbers in 2020 but were not identified to species level as flower spikes were all reduced to seed heads at the time of survey making ID impossible.
- 3.1.10 The majority of the species recorded in 2017 but absent in the 2020 quadrat data were picked up in 2020 during the course of the wider walkover survey (see paragraph 3.1.3 above) with the exception of *Melilotus latissimus* which was not recorded in 2020.
- 3.1.11 Six species were recorded in the 2020 quadrat data that were not recorded in 2017 quadrats including *Passiva sativa*, *Hypericum perforatum*, *Briza media*, *Clinopodium vulgare*, *Hieracium* sp. and *Centaurea nigra*.
- 3.1.12 A number of other species were recorded during the general walkover survey undertaken in 2020 that were not listed in the 2017 report. This is likely due to the 2017 report only detailing the quadrat data as opposed to these species being new additions to the site.
- 3.1.13 CG3 is a characteristic form of unimproved grassland over dry, strongly calcareous soils in the lowlands. It is a qualifying NVC community of the Section 41 important habitat Lowland Calcareous Grassland.

Table 1. MAVIS Result 2017 / 2020

NVC Community	Sub-community	2017 Goodness of Fit (%)	2020 Goodness of Fit (%)
CG3b	<i>Centaurea nigra</i>	38.63	37.36
CG3d	<i>Festuca rubra-Festuca arundinacea</i>	42.30	37.32
CG3	NA	39.54	36.27
CG6	NA	34.09	34.01
CG4	NA	32.58	33.27
CG4b	<i>Centaurea nigra-Leontodon hispidus</i>	-	31.25
CG2d	<i>Dicranum scoparium</i>	-	30.37
CG3c	<i>Knautia arvensis-Bellis perennis</i>	36.07	30.25
CG2a	<i>Cirsium acaule-Asperula cynanchica</i>	32.61	30.14
CG7	NA	-	29.82
CG3a	typical subcommunity	36.16	-
CG5	NA	32.91	-
CG5a	typical subcommunity	32.61	-

3.2 Habitat description and Mapping

- 3.2.1 The Site consists of a southerly facing slope that was found to be broadly homogenous, with a thin sward with herbs dominating. Only a low percentage cover of grasses was noted, with exposed chalk/bare ground that could qualify as CG3 open sward present throughout the majority of the Site (Figure 1). The top and bottom of the slope were found to have much thicker swards (of the same species, with a slightly higher abundance of *Bromus erectus*), with grasses becoming a more dominant component of the sward – both in terms of ground cover and sward height. This is likely attributable to a deeper and nutrient-rich topsoil, either where topsoil from above the cutting has moved down slope via soil creep / surface water flows, or where weathered material has accumulated at the bottom of the slope. These areas are described as a CG3 (Rank) under the condition assessment, with a narrow intermediate strip between the two that would classify as CG3 closed sward (Figure 1).
- 3.2.2 Scrub encroachment across the slope was generally limited to the top and bottom sections (Figure 1). Scrub on the main slope itself was sparse and did not exceed 4% in area, with ash, hawthorn, clematis and yew *Taxus baccata* present. These were typically stunted (generally no higher than 1-2m) due to the droughted nature of the slope and were heavily deer-browsed. The exception to this was the central upper section of the slope, where clematis-dominated scrub approached the 33% threshold to be defined as dense scrub at least in localised patches, with the majority likely to be considered to be grassland with scattered scrub (Figure 1).

- 3.2.3 A few localised patches of chalk dominated areas where the substrate was stonier and less weathered were encountered towards the central - western end of the slope (Figure 1).
- 3.2.4 The main flowering period for orchids had passed at the time of survey, with only seed heads remaining. It is assumed that the species present in the 2017 survey are likely to continue to occur in the same proportions with the vast majority of orchids being *Dactylorhiza fuchsii*. The majority of seed heads appeared to correspond with the distribution of the CG3 – open sward habitats with a higher abundance observed towards the lower half of the habitat band on the slope

3.3 Condition Assessment

- 3.3.1 The majority of the habitat was found to qualify as sparsely vegetated open sward calcareous grassland supporting 50% cover of defined wildflowers characteristic of calcareous substrate; 10-50% bare ground within the sward; and less than 5% percentage cover of negative indicator species⁷ for calcareous grassland with only *Jacobaea vulgaris* being recorded and at very low ground cover with occasional isolated plants being present. Based on the Grassland Habitat Types Condition Table, this habitat type passes all Condition Assessment Criteria and is therefore assessed as **Good Condition**. It is however noted that the Biodiversity Metric 2.0 is a beta version and that Condition criteria 5, should state that the cover of bar ground should not be greater than 10% (this is being updated with the imminent release of Biodiversity Metric 3.0), as such, the habitat would fail this criteria and be assessed as being of **Moderate Condition**.
- 3.3.2 Smaller areas of closed sward short calcareous grassland (defined as grassland with <30% total cover of wildflowers characteristic of calcareous grassland (including sedges, but not cover of white clover, creeping buttercup and injurious weeds); bare ground <10% of total cover; negative indicators for calcareous grassland <5% of the total cover.) were present. Due to the lower cover of wildflowers (<30%) the habitat was assessed as being of **Moderate Condition**.
- 3.3.3 Limited transition zones of tall calcareous grassland between short calcareous open or closed sward and areas of scrub and/or woodland were also present (Figure 1).
- 3.3.4 Whilst not linked to any of the condition assessment criteria, ash trees on the top of the slope and some of the saplings in the drainage ditch at the base of the slope adjacent to the A303 were showing indications of advanced infections with ash die back *Hymenoscyphus fraxinae*.

⁷ As listed within the Grassland Habitat Types Condition Assessment within the Biodiversity Metric 2.0 Technical Supplement.

4 Discussion

4.1 NVC survey

- 4.1.1 The MAVIS re-run of the 2017 MATCH output concludes the 2017 data set, that this habitat has affinities with the CG3 *Bromopsis erecta* grassland community, with no confirmed sub-community.
- 4.1.2 This result is not surprising given the Cuttings steep slopes relatively recent origin having not allowed sufficient time for the development of a defined topsoil layer through both the weathering of the soil and the addition of humus. The lack of humus, combined with the aspect and angle of slope of the Site means that the conditions are very harsh which prevents it from showing any strong affinity to NVC sub-communities the baseline sampling of which was undertaken on established grasslands of less recent origin than the Countess Cutting.
- 4.1.3 The 2020 MAVIS results suggest that the habitat type has not changed substantially from 2017. The raw data however indicates that the Site has become increasingly encroached by clematis, with abundance / cover of upright brome *Bromopsis erecta* and hawkweed species decreasing between 2017 and 2020.

4.2 Condition Assessment

- 4.2.1 The general description of the CWS remains largely unchanged from the 2017 survey. The minor differences between quadrat data are likely attributable to the 2020 survey having been undertaken at the end of a sustained dry period. Some variation is also possible as a result of possible variation in the quadrat location due to GPS inaccuracies (please see Section 2.4 above), although this is unlikely to significantly skew the results as all quadrats were undertaken within the same habitat.
- 4.2.2 The conversion of the 2017 data which recorded using Domin method to percentage cover (taken as the average percentage cover for each Domin score) could have a minor impact when comparing the results between years but this is considered to have less impact than differences expected between surveyors visual estimates and so is not a significant constraint.

Abbreviations List

BNG - Biodiversity Net Gain

CWS - County Wildlife Site

GI - Ground Investigation

MAVIS - Modular Analysis of Vegetation Information System

NVC - National Vegetation Classification

References

Arup Atkins Joint Venture, 2017, A303 Botanical Survey Report 2017, The Hub, Aztec West, 500 Park Avenue, Bristol.

Crosher, I. *et al.* 2019. The Biodiversity Metric 2.0: Auditing and accounting for biodiversity value: technical supplement (Beta version, July 2019). Natural England

Rodwell, J.S. (2006) NVC Users' Handbook, JNCC, Peterborough, ISBN 978 1 86107 574 1.

Rodwell, J. S. *et al.* 1992 British Plant Communities Volume 3 Grasslands and montane Communities. Cambridge University Press, Cambridge ISBN 0521 62719 2

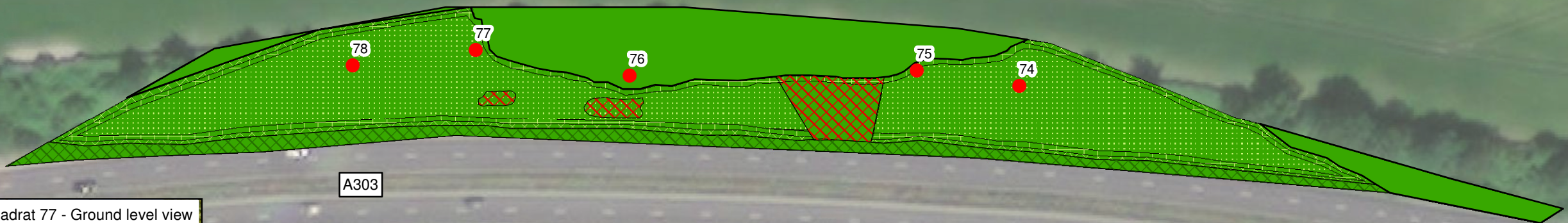
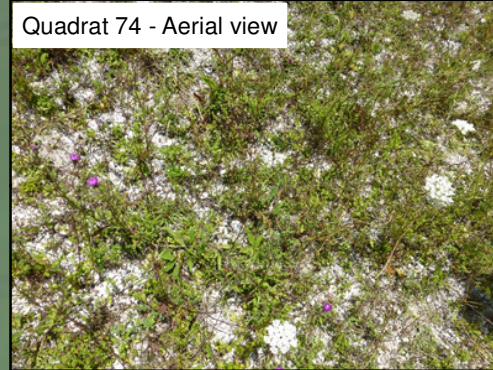
Appendices

Appendix A NVC Quadrat Data

Site Name	Countess Cutting	Countess Cutting		Countess Cutting		Countess Cutting		Countess Cutting		Countess Cutting		Countess Cutting	
Grid reference		SU 14683 42134		SU 14663 42137		SU 14607 42136		SU 14577 42141		SU 14553 42138		Constancy	
Quadrat number		74		75		76		77		78		2017	2020
Year		2017	2020	2017	2020	2017	2020	2017	2020	2017	2020	2017	2020
<i>Achillea millefolium</i>	Yarrow									1		1	
<i>Anacamptis pyramidalis</i>	Pyramidal orchid	1										1	
<i>Anthyllis vulneraria</i>	Kidney vetch							1			1	1	1
<i>Arrhenatherum elatius</i>	False oat-grass	2		2	1			2		7		4	1
<i>Brachypodium sylvaticum</i>	False-brome	2	1	2	5		2	3		1	1	4	4
<i>Bromopsis erecta</i>	Upright brome	7	1	20		20		7		7		5	1
<i>Centaureum erythraea</i>	Common centaury	1				1						2	
<i>Cirsium acaule</i>	Dwarf thistle	1				7						2	
<i>Clematis vitalba</i>	Traveller's-joy	7	25		15	7	5	1	10	7	5	4	5
<i>Crataegus monogyna</i>	Hawthorn									1		1	
<i>Dactylis glomerata</i>	Cock's-foot	1	1					1		2	1	3	2
<i>Dactylorhiza fuchsii</i>	Common Spotted-orchid	3	1	6	1	1		3		7		5	2
<i>Dactylorhiza x grandis</i>	D. Fuchsii x praetermissa	1										1	
<i>Daucus carota</i>	Carrot	2		2			4	3	15	1	7	4	3
<i>Erigeron acris</i>	Blue fleabane		1			1		3	5		4	2	3
<i>Euphrasia nemorosa</i>	Eyebright					1	1	3	1	3	5	3	3
<i>Festuca rubra</i>	Red fescue			2				2		3		3	
<i>Fissidens adianthoides</i>	Rock Pocket-moss					2						1	
<i>Fraxinus excelsior</i>	Ash			1		1	1	2		1	1	4	2
<i>Galium mollugo</i>	Hedge bedstraw		5	1		7	5	7	5	7	15	4	4
<i>Hieracium Section</i>	Hawkweed	40	5	65	10	65	10	40	5	40	2	5	5
<i>Hippocrepis comosa</i>	Horseshoe vetch					7			1			1	1
<i>Inula conyzae</i>	Ploughman's-spikenard		8			1			3		3	1	2

Site Name	Countess Cutting	Countess Cutting		Countess Cutting		Countess Cutting		Countess Cutting		Countess Cutting		Countess Cutting	
Grid reference		SU 14683 42134		SU 14663 42137		SU 14607 42136		SU 14577 42141		SU 14553 42138		Constancy	
Quadrat number		74		75		76		77		78		2017	2020
Year		2017	2020	2017	2020	2017	2020	2017	2020	2017	2020	2017	2020
<i>Leontodon hispidus</i>	Rough hawkbit	3	5	6	1				1	1		3	3
<i>Leucanthemum vulgare</i>	Oxeye daisy	2	5	2		3	8	7	5	7	15	5	4
<i>Linum catharticum</i>	Fairy flax	3	4		2	3	1	3		3		4	3
<i>Melilotus altissimus</i>	Tall melilot					2						1	
<i>Pilosella officinarum</i>	Mouse-ear-hawkweed	30		6		6						3	
<i>Plantago lanceolata</i>	Ribwort plantain	3	3	6	1	2	5	7	3	7	1	5	5
<i>Sanguisorba minor</i>	Salad burnet	20	15	30	10	6	15	20	20	30	10	5	5
<i>Prunella vulgaris</i>	Selfheal	1								3		2	
<i>Jacobaea vulgaris</i>	Common ragwort		2			1	1		1	1	2	2	4
<i>Taraxacum agg.</i>	Dandelion	6		2	1		1	1	1	2		4	3
<i>Weissia species</i>	A moss			3		3		2		6		4	
<i>Pastinaca sativa</i>	Wild parsnip										1		1
<i>Hypericum perforatum</i>	Perfoliate St John's wort										1		1
<i>Briza media</i>	Quaking grass				50								1
	Orchid sp.				1								1
<i>Clinopodium vulgare</i>	Wild basil				1								1
<i>Hieracium sp.</i>	Hawkweed (cordate base)				10		30		5		5		2
<i>Centaurea nigra</i>	Common knapweed								5		5		2
Bare ground		20	45	20	30	20	20	30	20	30	15		
sward height (cm)		NA	30	NA	20	NA	20	NA	15	NA	15		
litter		NA	5	NA	5	NA		NA		NA			

Appendix B Figures



NOTES / LEGEND

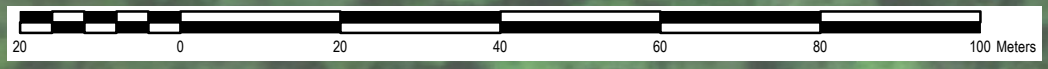
- Site Boundary
- Quadrat Locations
- Exposed chalk
- Scrub - dense/continuous
- Scrub - scattered

Bromopsis erecta grassland (CG3)

- CG3
- CG3 (Open)
- CG3 (Closed)
- CG3 (Rank)

Copyright Notes: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Revision Details	By	Check	Date	Suffix
Purpose of issue				
FOR INFORMATION				
Client		Working on behalf of		
Highways England				
Project Title				
A303 AMESBURY TO BERWICK DOWN				
Drawing Title				
FIGURE 1 - COUNTLESS CUTTING BOTANICAL SURVEY RESULTS				
Designed	Drawn	Checked	Approved	Date
AM	AM	GM	MC	15/02/21
Internal Project No.				
60631413				
Scale @ A3		Zone		
1:944.69		SW		
THIS DOCUMENT HAS BEEN PREPARED PURSUANT TO AND SUBJECT TO THE TERMS OF AECOM'S APPOINTMENT BY ITS CLIENT. AECOM ACCEPTS NO LIABILITY FOR ANY USE OF THIS DOCUMENT OTHER THAN BY ITS ORIGINAL CLIENT OR FOLLOWING AECOM'S EXPRESS AGREEMENT TO SUCH USE, AND ONLY FOR THE PURPOSES FOR WHICH IT WAS PREPARED AND PROVIDED.				
Highways England Temple Quay House 2 The Square, Temple Quay Bristol BS1 6HA				 AECOM + maco + WSP
Drawing Number	Highways England PIN	Originator	Volume	Rev
HE551506	AMW	GEN	GEN	01
Location	Type	Role	Number	
SCHEME WIDE	DR	GI	00806	



Appendix C 2017 Report



VEGETATION SURVEY & ASSESSMENT

A303 STONEHENGE TO BERWICK DOWN ENHANCEMENTS

BOTANICAL ASSESSMENT

November 2017



CONTENTS

	<u>Page</u>
1.0 INTRODUCTION	1
1.1 Scope of Work and Objectives	1
1.2 Legislation and Conservation Context	1
2.0 METHODOLOGY	3
2.1 Survey Area	3
2.2 Survey Types and Methods	3
2.3 Limitations and Assumptions	5
3.0 RESULTS	6
3.1 Chalk Grassland Monitoring	6
3.2 Vegetation Classification	6
3.3 Arable Plants	9
3.4 Portals	13
4.0 CONCLUSIONS	15
4.1 Evaluation of Habitats and Vegetation Communities	15
4.2 Arable Plant Communities	17
4.3 Portals	17
5.0 RECOMMENDATIONS	18
5.1 Calcareous Grassland Enhancement and Creation	18
5.2 Arable Plant Improvements	18
5.3 Wetland Habitat Restoration	18
REFERENCES	19

LIST OF FIGURES

- 1.1 Survey Locations
- 1.2 Survey Locations
- 2 Transects
- 3.1 River Till (north)
- 3.2 River Till (south)
- 3.3 Countess Cutting WS
- 3.4 Countess Swamp and River Avon SAC
- 3.5 Diamond Wood
- 4 Arable Plant Survey Results
- 5.1 Portal Locations
- 5.2 Portal Locations

LIST OF APPENDICES

- I Parsonage Bank Transect Data
- II NVC Data
- III Arable Plant Species List
- IV Portal Data

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

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

Tel: 01373 827074

Mob: 07801 627449

www.vegetationsurvey.co.uk

I. INTRODUCTION

I.1 Scope of Work and Objectives

This report brings together the results of a number of different botanical surveys, all of which were undertaken in 2017 to provide a baseline of information about habitats and species within areas of land with potential to be directly or indirectly affected by the proposed alignment options for the A303 Stonehenge to Berwick Down road enhancement scheme.

The work included the following botanical elements:

- Parsonage Down chalk grassland monitoring: establishing a baseline for monitoring the response of unimproved chalk grassland to changes in air quality;
- National Vegetation Classification of vegetation in potentially sensitive areas including the northern and southern River Till valley, Diamond Wood, Countess Cutting Wildlife Site, Countess Swamp Wildlife Site and adjacent parts of the River Avon Special Area of Conservation;
- Arable plant surveys to identify any particularly diverse assemblages of species of farmland; and
- Characterisation of the species and vegetation communities of land where the proposed portals would be located.

I.2 Legislation and Conservation Context

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

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

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

Conservation Category	Status	Definition	Reference
Extent	Nationally Rare (NR)	A taxon present in 1-15 10km Ordnance Survey grid squares in Britain post-1950	<i>New Atlas of the British and Irish Flora</i> (2002) by C.D. Preston, D.A. Pearman and T.D. Dines.
	Nationally Scarce (NS)	A taxon present in 16-100 10km Ordnance Survey grid squares in Britain post-1950	
	Locally Rare (LR) or Locally Scarce (LS)	LR – a taxon present in 1-3 1km OS squares in South Wiltshire. LS – present in 4-10 squares.	<i>Wiltshire Rare Plant Register</i> (2007) by S. Pilkington
Threat (IUCN Red List)	Critically Endangered (CR)	A taxon facing an extremely high risk of regional extinction in the wild in the near future.	<i>The Vascular Plant Red Data List for Great Britain</i> (2005) by JNCC (Eds. C.M. Cheffings and L. Farrell). Also: <i>A Vascular Plant Red List for England</i> (2014) by BSBI (Eds. P.A. Stroh et al)
	Endangered (EN)	A taxon that is not CR but facing a very high risk of regional extinction in the wild in the immediate future.	
	Vulnerable (VU)	A taxon that is not CR or EN, but facing a high risk of regional extinction in the medium-term future.	
Conservation	NERC Act Section 41	A taxon identified by the Secretary of State as being of principle importance for the purpose of conserving biodiversity in England.	Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006

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

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

2. METHODOLOGY

2.1 Survey Area

Surveys were undertaken in various places, as indicated in Figure 1.1 and 1.2. All work was undertaken by Sharon Pilkington CEnv MCIEEM, a Wiltshire-based professional botanist, bryologist and vegetation ecologist with more than 15 years' experience of botanical assessment.

2.2 Survey Types and Methods

2.2.1 Chalk Grassland Monitoring

Parsonage Down SSSI is an outlying part of Salisbury Plain SAC. Parsonage Bank is the closest part of the site to the A303 and is, historically, one of the most botanically interesting areas of Parsonage Down. Wild (1988) characterised the grassland on its steep north-facing slope largely as the *Succisa pratensis* – *Leucanthemum vulgare* sub-community of CG2 *Festuca ovina* – *Avenula pratensis* grassland, a vegetation type largely confined to chalk and other limestones in south-west Britain. Parsonage Bank historically has supported a fluctuating population of Early Gentian *Gentianella anglica* (thought to be a British endemic) and other Nationally Scarce species including Field Fleawort *Tephrosia integrifolia* subsp. *integrifolia*, Burnt Orchid *Neotinea ustulata* and Dwarf Sedge *Carex humilis*.

Parsonage Bank would most likely show the earliest signs of vegetation change in response to any potential effects of changes in atmospheric pollution levels from the proposed scheme, either in isolation or in combination with some other environmental change (such as agricultural spray drift, climate change etc.).

Three sets of 100 m long linear transects approximately parallel to the A303 were set up across Parsonage Bank. Transects were positioned using a GPS/GLONASS receiver¹ at the bottom, middle and top of the bank over a linear distance of 75m in approximately the same places as in 2002 (NPA 2003). Figure 2 shows these locations.

Twenty quadrats were randomly placed along each transect, each comprising nested sub-quadrats of 10 x 10, 25 x 25, 50 x 50 and 100 x 100 cm. For each size class of sub-quadrat, presence of all vascular plants and bryophytes was recorded. In addition, for the largest size class (100 x 100 cm), percentage cover of each species was also estimated. This nested quadrat design allows changes in frequency of occurrence of rare species in different quadrat size classes to be detected between years. The estimates of percentage cover can be used to detect any changes in the more common species.

The transect series was sampled on 5-7 June 2017, an optimal time of year for identification of species of lowland calcareous grassland.

2.2.2 National Vegetation Classification

Baseline classification of vegetation communities in five different locations was undertaken during the optimal survey period for lowland habitats. Habitats in the River Till valley were surveyed on 12 June (north) and 13 June (south). Chalk grassland in Countess Cutting Wildlife Site (WS²) was surveyed on 15 June and part of Countess Swamp WS and the adjacent River Avon were surveyed on 18 August. Characterisation of Diamond Wood (8 June) also followed NVC methodology as a precautionary approach although it was considered likely to be of mainly planted origin.

¹ Garmin model GPSMAP64S

² In Wiltshire Wildlife Sites are non-statutory sites recognised as being of county importance for wildlife

Standard National Vegetation Classification (NVC) sampling methodology (Rodwell 2006) was employed for all vegetation types likely to fall within the scope of the NVC. None of the wooded habitats was sufficiently large to be sampled by standard means and for these the minimalistic NVC woodland sampling approach set out by Hall, Kirby & Whitbread (2004) was used.

Five quadrats were sampled in most stands of vegetation with distinct floristics and physiognomy although some stands of limited extent were necessarily sampled with fewer quadrats.

MATCH³ software was employed to analyse the quadrat data and to highlight potential affinities with published NVC communities/sub-communities. Such analysis produces a numerical coefficient of similarity on a scale from 0 to 100 for each dataset. It indicates a 'goodness of fit' with documented NVC communities and as a general rule, the higher the number, the more confidence there normally is with the result.

Surveyor experience and detailed descriptions of vegetation communities provided by Rodwell (1991, 1992, 1995 and 2000) were subsequently used to confirm the classification of each stand in NVC terms as appropriate.

2.2.3 Arable Plants

The light soils of south Wiltshire have long been known to be important to communities of declining arable plants (Wilson 1993).

A number of arable fields likely to be impacted by the alignment options were identified from habitat surveys of the area. In addition, as some uncommon arable species are known to persist in short-term pasture laid over former arable land and sometimes in more permanent grassland, pastures that were found to support interesting assemblages of arable species previously (NPA 2003) were also shortlisted for assessment.

Table 2. Scoring categories for arable plant species

Score	Species Status
9	Threatened: Critically Endangered (CR)
8	Threatened: Endangered (EN)
7	Threatened: Vulnerable
6	Near Threatened (NT)
5	Additional Nationally Scarce, in 16-100 10km squares; change index < -1.0
4	Additional Nationally Scarce: in 51-100 10km squares, change index > -1.0
3	Species of local concern: in 101 to 500 10km squares
2	Species of local concern: in 501 to 1000 10km squares
1	Species of local concern: in 1001 to 1500 10km squares, change index < 0.0 i.e. negative

From Byfield & Wilson (2005)

³ Vegetation analysis software developed by scientists from the University of Lancaster for NVC classification.

Plantlife has developed a methodology for determining sites of importance for arable plant conservation (Byfield & Wilson, 2005). Although it is aimed principally at identifying nationally important sites (Important Arable Plant Areas), the methodology works equally well on a smaller scale. It works on the premise that certain rare and declining plants indicative of arable habitats are assigned a numerical score between 1 and 9 (Table 2). When assessing the arable plant assemblage of a site (at farm, field or field margin level), the individual scores are summed to give an overall score.

Figures 1.1 and 1.2 show the field margins that were surveyed using this methodology. Others were discounted on the grounds that habitat was found to be unsuitable for arable species. Surveys for arable plants were undertaken during the period 17 – 19 July 2017, the timing of which is optimal for identification of the majority of species in this group.

2.2.4 Portals

Three potential portal impact areas were surveyed on 7 July 2017 by means of a species inventory survey. The purpose of these surveys was to characterise the floristic and structural composition of the vegetation and to identify any habitats or populations of species of particular conservation importance, against the criteria set out in Table 1 and described in Section 1.2.

2.3 Limitations and Assumptions

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

At Parsonage Down, placement of all transects could not be made entirely within calcareous grassland likely to be classified as CG2 across the part of Parsonage Bank that was monitored previously. Placement of the transects was based on an NVC survey of Parsonage Down from nearly thirty years ago (Wild 2008) and it is highly probable that vegetation communities on Parsonage Bank have changed in floristic composition and/or extent since then.

Although the fieldwork was undertaken at a good time of year for finding *Gentianella anglica* and *Neotinea ustulata*, none were seen within any quadrats on Parsonage Bank. It is possible that cold, dry weather in the preceding months may have delayed or inhibited flowering of these species.

During the arable plant survey, certain fields were in the process of being harvested and so could not be accessed.

At Countess Swamp WS, it was difficult to sample quadrats in some vegetation that had been recently cut. Nearby, tall beds of emergent vegetation below the banks of the River Avon meant that aquatic macrophyte communities in the main flow of the river were only partially visible from the banks and so could only be subjectively described.

3. RESULTS

Botanical nomenclature used in this report follows Stace (2010) for vascular plants and Hill *et al* (2008) for bryophytes.

3.1 Chalk Grassland Monitoring

The quadrat data are presented in Appendix I.

3.2 Vegetation Classification

Appendix II provides tabulated data collected from all sites where NVC sampling was undertaken.

3.2.1 River Till (north)

Figure 3.1 shows the vegetation communities present in and around the River Till. At this point the winterbourne flowed through cattle-grazed pasture of low botanical interest characterised by MG7b *Lolium perenne* – *Poa trivialis* leys (coefficient of similarity 56.0). The sward was of low diversity and characterised by high cover of Perennial Rye-grass *Lolium perenne*, Yorkshire-fog *Holcus lanatus*, Cock's-foot *Dactylis glomerata* and Red Fescue *Festuca rubra* with few associated forbs.

MG7b is typically highly productive agricultural grassland that has very low botanical or ecological value.

The periodically inundated bed of the Till supported discontinuous beds of wet grassland. These were variably diverse and classified as MG13 *Agrostis stolonifera* – *Alopecurus geniculatus* grassland (coefficients of similarity 42.0 and 46.3). The vegetation was typically associated with low silt shelves deposited at the edge of the river, giving way to MG7b on higher ground. Constant and preferential species included Creeping Bent *Agrostis stolonifera*, Marsh Foxtail *Alopecurus geniculatus*, Rough Meadow-grass *Poa trivialis* and locally prominent Water Forget-me-not *Myosotis scorpioides*, Fool's Water-cress *Apium nodiflorum* and Brooklime *Veronica beccabunga*.

Fragmentary stands of MG13 are frequently associated with sluggish lowland streams and rivers and field ponds where fluctuating water levels keep silty soils moist or waterlogged.

Upstream, vegetation in the channel became complex and could not be referred to any NVC community. It included small patches of Reed Canary-grass *Phalaris arundinacea*, *Apium nodiflorum*, Fat Duckweed *Lemna gibba* and gravelly islands supporting MG7 grassland.

Where deeper water was ponded in the Till at the upper end of the survey area, a poorly developed form of A19 *Ranunculus aquatilis* community was present (coefficient of similarity 33.4). It was characterised by significant amounts of Common Water-crowfoot *Ranunculus aquatilis*, Pond Water-crowfoot *R. peltatus* and *Lemna gibba* as well as plants more typical of inundation vegetation e.g. *Alopecurus geniculatus*, *Apium nodiflorum* and Common Water-cress *Nasturtium officinale*.

The River Till SSSI forms part of the River Avon SAC and water-crowfoot beds such as those represented by the A19 community fall within the Annex I habitat 3260 *Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion* vegetation for which the SAC has been designated in part.

3.2.2 River Till (south)

Figure 3.2 shows the vegetation communities associated with this section of the Till. In this part of the valley the river flowed through wet woodland that could not be confidently classified as any NVC type. Its canopy was dominated by sprawling Crack Willow *Salix fragilis* agg. with local occurrences of White Willow *Salix alba* over an understorey of Grey Willow *Salix cinerea* subsp. *oleifolia*. The field layer was dominated by tall herbs including Common Nettle *Urtica dioica* and Hemlock Water-dropwort *Oenanthe crocata*. The woodland also supported diverse communities of common epiphytic and ground-dwelling mosses and liverworts.

Because the riverbed was mostly in deep shade cast by overhanging trees and shrubs, it did not support any well-developed aquatic macrophyte communities and negligible emergent/marginal vegetation.

Grazed pasture east of the river supported typical grassland communities of floodplain pasture. MG9 *Holcus lanatus* – *Deschampsia cespitosa* grassland was characterised by mixtures of *Agrostis stolonifera*, *Holcus lanatus*, Tufted Hair-grass *Deschampsia cespitosa*, *Poa trivialis*, and Hard Rush *Juncus inflexus* along with a limited array of herbs e.g. Amphibious Bistort *Persicaria amphibia*, *Urtica dioica* and Wild Angelica *Angelica sylvestris*. The analysis of the data confirmed a reasonable goodness of fit to MG9 (similarity coefficient 50.8) but no sub-community could be confirmed.

MG9 grassland is a distinctive kind of vegetation that is highly characteristic of permanently moist, gleyed clay soils, often in floodplains where there is periodic flooding.

On slightly higher ground MG9 was replaced by species-poor MG1b *Arrhenatherum elatius* grassland, placed with a high level of confidence in the *Urtica dioica* sub-community (coefficient of similarity 57.1). Dominant species of the tall, coarsely-structured sward included False Oat-grass *Arrhenatherum elatius*, *Poa trivialis*, *Holcus lanatus*, *Urtica dioica* and various large common umbellifers.

MG1 is a ubiquitous and low value type of lowland grassland typical of fertile, well-drained neutral soils with light or negligible grazing. The *Urtica* sub-community is particularly common in areas of intensive arable agriculture where there is enrichment from run-off or spray drift of fertilisers.

Where a plantation of poplar trees had been recently felled, an ill-defined form of open vegetation characterised by mixtures of rushes, wet-ground forbs and tall perennial herbs was present. This was classified as OV26 *Epilobium hirsutum* vegetation (coefficient of similarity 53.9). Dominants included *Oenanthe crocata*, *Phalaris arundinacea*, *Angelica sylvestris* and *Urtica dioica*. Great Willowherb *Epilobium hirsutum* was locally prominent. Many of the poplars were beginning to re-grow from the cut stumps.

OV26 is a very common kind of tall herb vegetation that occurs in well-lit situations on moist and fertile soils around ponds and by watercourses, in silting ditches and in transition mires.

The remainder of the survey area to the west of the river was cultivated farmland.

3.2.3 Countess Cutting WS

Countess Cutting (Figure 3.3) lies on the northern side of the A303 and faces south. It supported a form of secondary calcareous grassland that had developed naturally over time as the bare chalk face of the cutting has weathered.

Analysis of quadrats placed the vegetation in CG3 *Bromopsis erecta* grassland (coefficient of similarity 42.8) but no sub-community could be confirmed.

The CG3 was moderately rich in species and also supported swarms of two common orchid species near the bottom of the slope. The sward was sparse, with patches of bare chalk and was typified by prominent Upright Brome *Bromopsis erecta*, Salad Burnet *Poterium sanguisorba* subsp. *sanguisorba*,

hawkweed *Hieracium* Sect. *Hieracium*⁴ and locally, Mouse-ear Hawkweed *Pilosella officinarum*. Scrub, tree saplings and Traveller's-joy *Clematis vitalba* were beginning to advance across the face of the cutting from both top and the bottom.

CG3 is a characteristic form of unimproved grassland over dry, strongly calcareous soils in the lowlands. It is a qualifying NVC community of the Section 41 important habitat *Lowland Calcareous Grassland*.

3.2.4 Countess Swamp WS and River Avon SAC

Countess Swamp WS supported a mosaic of tall sedge and herb vegetation typical of lowland riverside habitats (Figure 3.4). It included stands of S28b *Phalaris arundinacea* tall-herb fen (*Epilobium hirsutum* – *Urtica dioica* sub-community) were characterised by mixtures of *Phalaris arundinacea*, *Urtica dioica*, Cleavers *Galium aparine* and Hedge Bindweed *Calystegia sepium*. Lesser Pond-sedge *Carex acutiformis* was over-represented in the community, and probably spreading into it due to increased soil waterlogging in the area as a result of blocked drains. Data analysis returned a good coefficient of similarity (49.3) to S28b.

S28 is a frequent vegetation type alongside fluctuating watercourses and standing water, often on alluvial mineral soils which are seasonally wet but not waterlogged. The *Epilobium hirsutum* – *Urtica dioica* sub-community is the most frequent form of S28 in situations where there is some enrichment from nitrates and phosphates.

Other tall vegetation included communities without NVC classification including *Glyceria maxima* – *Galium aparine* vegetation. This community supported abundant Reed Sweet-grass *Glyceria maxima* alongside several weedy species including *Calystegia sepium* and *Galium aparine*; *Carex acutiformis* was also locally frequent. A small population of Meadow Rue *Thalictrum flavum*, which is a local and declining species in Wiltshire, was present in this community.

Mature willow-dominated woodland could not be assigned with confidence to any NVC type. Its canopy was characterised by tall, sprawling hybrid willows (*Salix x rubens*), suggesting a history of planting. Below, the poorly-developed understorey and field layer supported a suite of species typical of relatively dry secondary woodlands on fertile soils.

Dense stands of S14 *Sparganium erectum* swamp (coefficient of similarity 55.0) dominated both river margins north of the A303 road bridge and in places grew several metres out into deeper water. Branched Bur-reed *Sparganium erectum* was dominant, with few associates: Bittersweet *Solanum dulcamara* and *Myosotis scorpioides* were the most frequent. *Lemna gibba* was also frequent where the stems of *Sparganium* provided some respite from the water current.

S14 is highly tolerant of moderate currents and is one of the commonest emergent vegetation types along lowland watercourses. It occurs widely in shallow, mesotrophic to eutrophic waters on mineral substrates.

The extensive beds of *Sparganium erectum* obscured much of the deeper water from the riverbank. It was not therefore possible to attempt to classify the aquatic community by sampling. However, visible species included many typical of chalk rivers including abundant Unbranched Bur-reed *Sparganium emersum*, *Elodea canadensis*, one or more water-starworts *Callitriche*, Stream Water-crowfoot *Ranunculus penicillatus* Perfoliate Pondweed *Potamogeton perfoliatus*, Fennel Pondweed *P. pectinatus* and Arrowhead *Sagittaria sagittifolia*.

South of the A303 road bridge, riverbank vegetation in Lords Walk was disturbed and shaded by numerous introduced poplars and other riverside trees and shrubs. Vegetation on the banks and

⁴ At the time of survey it was not possible to identify this plant to species level.

between paths and woodland/pasture was characterised by patchy *Epilobium hirsutum* over tall weedy mixtures of *Urtica dioica*, *Galium aparine* and Common Comfrey *Symphytum officinale*. Analysis of two sets of quadrats from stands of this vegetation affirmed a reasonable match with undifferentiated OV26 *Epilobium hirsutum* vegetation (coefficients of similarity 53.4 and 59.9).

3.2.5 Diamond Wood

Prior to the survey, it was unclear if Diamond Wood (Figure 3.5) was of semi-natural or planted origins. However, its floristic composition and structure offered strong evidence for the latter and plantings within the wood suggest that it may have been planted as a game covert.

The majority of the woodland appeared to be less than 100 years old, although a few of the trees looked a little older. Its canopy species included Scots Pine *Pinus sylvestris*, Beech *Fagus sylvatica* and Silver Birch *Betula pendula* over an understorey of shrubs often planted in groups. These included native species of local provenance including Buckthorn *Rhamnus cathartica*, Wayfaring-tree *Viburnum opulus* and Hawthorn *Crataegus monogyna*. Plantings also included a variegated-leaved form of Wild Privet *Ligustrum vulgare*. Elder *Sambucus nigra* and Blackthorn *Prunus spinosa* had probably colonised the wood naturally.

The field layer was quite grassy in character and lacked any species indicative of old woodland. Prominent species included *Urtica dioica*, Wood Avens *Geum urbanum*, *Poa trivialis* and False Brome *Brachypodium sylvaticum*. The woodland appeared almost entirely unmanaged and fallen dead wood was common. There were also a few small glades of rough unmanaged neutral grassland not sampled but likely to be referable to a species-poor form of MG1 *Arrhenatherum elatius* grassland.

Quadrats were sampled in Diamond Wood as a means of characterising its flora in detail but as expected it could not be classified with any confidence as any NVC woodland type.

A linear earthwork marks the western edge of Diamond Wood. Although outside the wood itself and not part of the formal NVC sampling, this bank was noted to support unimproved calcareous grassland dominated by *Bromopsis erecta* and referable to CG3d, the *Festuca rubra* – *Schedonorus arundinaceus* sub-community of *Bromopsis erecta* grassland. This sub-community is typical of places where there has been little or no recent grazing.

3.3 Arable Plants

Margins in 27 fields were surveyed; another 4 fields were not surveyed as habitat no longer appeared suitable for arable species or because harvesting operations were underway. Appendix III provides a record of all plants recorded in the course of the fieldwork.

Figure 4 ranks each field according to its arable plant score, with results provided on a field-by-field basis in Tables 3.1 and 3.2.

Field 18 (wheat) had the highest score (25) and supported 7 species of interest in its margins. Its eastern margin was particularly interesting, with a wide weedy margin supporting strong populations of Corn Parsley *Petroselinum segetum* and Venus's-looking-glass *Legousia hybrida*. It was the only field in the survey area to support a population of Narrow-fruited Cornsalad *Valerianella dentata* and one of only 3 to support Prickly Poppy *Papaver argemone*.

An oat crop nearby (Field 26) also had a rich community of arable plants in its weedy margins (scoring 20). Six species of interest were present, with most interest in the corners, where strong populations of Dense-flowered Fumitory *Fumaria densiflora*, Rough Poppy *Papaver hybridum*, *P. argemone* and *Petroselinum segetum* were found.

Three other fields achieved a score of 10-19. Field 5, another cultivated field, supported the only population of Rye Brome *Bromus secalinus*⁵ found in the survey area but its margins were not particularly diverse. Field 9 (wheat) at the time of survey, only scored 14 (6 species) but was of particular note for its very large population of *Petroselinum segetum* (numbering hundreds of plants along the elevated western crop margin). It also supported substantial populations of Round-leaved Fluellen *Kickxia spuria*, only found in 4 fields and Maple-leaved Goosefoot *Chenopodium hybridum*.

Sixteen other fields had more limited arable plant interest, with an overall score of 9 or less. These fields almost exclusively supported between 1 and 3 of the species of interest, with *Chenopodium hybridum* and *Petroselinum segetum* being seen most frequently. Field 29, which comprised disturbed ground around the boundaries of a large pig enclosure, was an exception with 6 low-scoring species found, including Dwarf Mallow *Malva neglecta* and Common Broomrape *Orobanche minor*, which were not seen anywhere else.

Five of the fields supported only common arable plants and were considered to be of negligible interest.

⁵ Numerous new populations of this species have been reported throughout the UK since 2000 and a review of its conservation status is required.

Table 3.1 Field Scores

Species	Common name	Score	Field Reference															
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>Alopecurus myosuroides</i>	Black-grass	2																
<i>Bromus secalinus</i>	Rye Brome	7																
<i>Chaenorhinum minus</i>	Small Toadflax	1																
<i>Chenopodium hybridum</i>	Maple-leaved Goosefoot	3																
<i>Euphorbia exigua</i>	Dwarf Spurge	6																
<i>Fumaria densiflora</i>	Dense-flowered Fumitory	3																
<i>Kickxia spuria</i>	Round-leaved Fluellen	3																
<i>Lamium amplexicaule</i>	Henbit Dead-nettle	1																
<i>Legousia hybrida</i>	Venus's-looking-glass	3																
<i>Malva neglecta</i>	Dwarf Mallow	2																
<i>Mercurialis annua</i>	Annual Mercury	2																
<i>Orobanche minor</i>	Common Broomrape	2																
<i>Papaver argemone</i>	Prickly Poppy	7																
<i>Papaver hybridum</i>	Rough Poppy	3																
<i>Petroselinum segetum</i>	Corn Parsley	3																
<i>Sherardia arvensis</i>	Field Madder	1																
<i>Valerianella dentata</i>	Narrow-fruited Cornsalad	8																
<i>Veronica polita</i>	Grey Field-speedwell	2																
Field assemblage score			2	7	0	NS	11	7	3	4	14	3	7	0	3	8	5	NS

NS= Not surveyed

Table 3.2 Field Scores

Species	Common name	Score	Field Reference														
			17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
<i>Alopecurus myosuroides</i>	Black-grass	2															
<i>Bromus secalinus</i>	Rye Brome	7															
<i>Chaenorhinum minus</i>	Small Toadflax	1															
<i>Chenopodium hybridum</i>	Maple-leaved Goosefoot	3															
<i>Euphorbia exigua</i>	Dwarf Spurge	6															
<i>Fumaria densiflora</i>	Dense-flowered Fumitory	3															
<i>Kickxia spuria</i>	Round-leaved Fluellen	3															
<i>Lamium amplexicaule</i>	Henbit Dead-nettle	1															
<i>Legousia hybrida</i>	Venus's-looking-glass	3															
<i>Malva neglecta</i>	Dwarf Mallow	2															
<i>Mercurialis annua</i>	Annual Mercury	2															
<i>Orobanche minor</i>	Common Broomrape	2															
<i>Papaver argemone</i>	Prickly Poppy	7															
<i>Papaver hybridum</i>	Rough Poppy	3															
<i>Petroselinum segetum</i>	Corn Parsley	3															
<i>Sherardia arvensis</i>	Field Madder	1															
<i>Valerianella dentata</i>	Narrow-fruited Cornsalad	8															
<i>Veronica polita</i>	Grey Field-speedwell	2															
Field assemblage score			0	25	NS	3	0	3	0	3	7	20	2	0	9	10	NS

3.4 Portals

Data collected during the portal surveys are tabulated in Appendix IV, whilst Figures 5.1 and 5.2 indicate areas of botanical interest as described below.

3.4.1 Western Portal Option INA

This portal area fell completely within arable land which at the time of survey was under cultivation of wheat and oilseed rape. Both crops appeared to be intensively managed and there were very few non-crop plants within the crops. An uncultivated margin between the fields supported a mixed community of arable plants, including some of interest (see Field 30, Section 3.3 and Figure 4).

All other species recorded in this area were considered to be common and widespread species.

A population of Red Duckweed *Lemna turionifera* covered the surface of a water-filled trough at Ordnance Survey grid reference SU1124 4104, just outside the portal area. This species was first recorded in Britain in 2008 and Rumsey & Lansdown (2012) consider it to be either previously overlooked as a more common species or a natural colonist. It has no formal conservation status as yet but its current distribution in Britain matches that of recognised Nationally Scarce species. In South Wiltshire it has so far been reported in 3 1km OS grid squares so can be regarded as Locally Rare (Pilkington (2007)).

3.4.2 Western Portal Option IND

Although smaller than Option INA, this area included arable land, with a herb-rich sown uncultivated margin, a permanent grassy bank and National Trust land under reversion from farmland to calcareous grassland.

Some botanical interest was found in the crop margins, which supported a diverse community of arable plants. This field was not covered by the arable plant survey but had it been, it would have achieved a score of 11, based on the presence of 5 indicator species (Field Madder *Sherardia arvensis*, Henbit Dead-nettle *Lamium amplexicaule*, Papaver hybridum, Dwarf Spurge *Euphorbia exigua* and Small Toadflax *Chaenorhinum minus*).

The reversion grassland was not without botanical interest although it supported no populations of species of conservation interest. It would probably not be classifiable in NVC terms as it was intermediate between neutral and calcareous grassland. It comprised a cattle-grazed dense sward averaging 80cm high, with abundant *Holcus lanatus*, *Arrhenatherum elatius*, *Bromopsis erecta*, Crested Dog's-tail *Cynosurus cristatus*, *Dactylis glomerata* and *Festuca rubra*. Prominent forbs included Sainfoin *Onobrychis viciifolia*, Red Clover *Trifolium pratense*, Ribwort Plantain *Plantago lanceolata* and Meadow Buttercup *Ranunculus acris*.

3.4.3 Eastern Portal (Bowtie Field)

Habitats within this portal area included cultivated land (barley), rough neutral grassland and scrub margins and a small planted copse.

The barley field supported a diverse community of arable weeds along its southern edge. In one place (SU1412 4207) the margin was 3-4 m wide and the crop weak. Strong populations of *Fumaria densiflora*, *Chaenorhinum minus*, *Legousia hybrida* and *Euphorbia exigua* were present there. If the field had been included in the arable plant assessment it would have achieved a score of 17, which would have been the third highest of all fields. Widespread species elsewhere in the crop included Perennial Sow-thistle *Sonchus arvensis*, Field Bindweed *Convolvulus arvensis*, Charlock *Sinapis arvensis* and Scarlet Pimpernel *Anagallis arvensis*.

No populations of any notable species were found elsewhere in the survey area and other habitats were of low botanical interest. The rough grassland and scrub was unmanaged and supported abundant *Arrhenatherum elatius*, Hogweed *Heracleum sphondylium*, *Urtica dioica* and *Clematis vitalba* in a matrix of scattered calcicolous scrub (*Crataegus monogyna*, *Ligustrum vulgare*, *Rhamnus cathartica*, Spindle *Euonymus europaeus* etc.).

The copse was fenced off and included a single planted mature Beech *Fagus sylvatica* tree over many recently planted and mostly dead Beech saplings. The understorey was lacking and the field layer comprised ruderal mixtures of *Urtica dioica*, *Galium aparine*, *Convolvulus arvensis*, *Heracleum sphondylium* and Black Horehound *Ballota nigra*.

4. CONCLUSIONS

4.1 Vegetation Communities

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

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

Table 4.1 River Till (north)

Vegetation Community	Botanical Value	Rationale
A19 community	High	<ul style="list-style-type: none"> • Water-crowfoot vegetation qualifying as Annex I habitat • 3260 Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation
Dense <i>Apium nodiflorum</i>	Negligible	<ul style="list-style-type: none"> • Not referable to any NVC type • Very low diversity
Indeterminate inundation vegetation	Low	<ul style="list-style-type: none"> • Not referable to any NVC type • Very low diversity
MG13 grassland	Low	<ul style="list-style-type: none"> • Common wet grassland type • Moderately diverse
MG7b grassland	Low	<ul style="list-style-type: none"> • Ubiquitous type of agricultural grassland • Low diversity • Supports a small population of locally uncommon/declining herb (<i>Petroselinum segetum</i>) on its northern boundary bank

Table 4.2 River Till (south)

Vegetation Community	Botanical Value	Rationale
Cultivated land	Negligible	<ul style="list-style-type: none"> • Intensively managed crop • Margins support common arable plants
MG1b grassland	Negligible	<ul style="list-style-type: none"> • Ubiquitous kind of rough neutral grassland • Low diversity
MG9 grassland	Low	<ul style="list-style-type: none"> • Frequent kind of floodplain grassland • Moderate diversity but grasses over-represented
Mixed <i>Salix</i> woodland	Low-Moderate	<ul style="list-style-type: none"> • Wet woodland of any kind is rare in Wiltshire • Moderate diversity • Not referable to any NVC type
OV26 community	Low	<ul style="list-style-type: none"> • Very common kind of wet-ground vegetation • Of relatively recent origin • Moderate diversity

Table 4.3 Countess Cutting WS

Vegetation Community	Botanical Value	Rationale
CG3 grassland	High	<ul style="list-style-type: none"> • Qualifying NVC type in Section 41 important habitat <i>Lowland Calcareous Grassland</i> • Secondary origins – atypical example of CG3 • Moderate - high diversity

Table 4.4 Countess Swamp WS and River Avon SAC

Vegetation Community	Botanical Value	Rationale
<i>Glyceria – Galium</i> swamp	Low	<ul style="list-style-type: none"> • Not referable to any NVC type • Degraded by invasion of <i>Carex acutiformis</i> • Supports population of locally uncommon plant (<i>Thalictrum flavum</i>)
Mixed <i>Salix</i> woodland	Low	<ul style="list-style-type: none"> • Possibly of planted origin • Moderate diversity • Not referable to any NVC type
OV26 community	Negligible	<ul style="list-style-type: none"> • Very common kind of wet-ground vegetation • Low diversity
<i>Populus x canadensis</i> plantation	Negligible	<ul style="list-style-type: none"> • Planted, mature non-native trees • OV26 vegetation/scrub below
S14 swamp	Low	<ul style="list-style-type: none"> • Common riparian vegetation community
S28b tall-herb fen	Low	<ul style="list-style-type: none"> • Common wetland vegetation type • <i>Epilobium – Urtica</i> sub-community indicates enrichment • Degraded by invasion of <i>Carex acutiformis</i>
Submerged aquatic vegetation	High	<ul style="list-style-type: none"> • Well-developed submerged vegetation community • High diversity, includes species indicative of high-quality chalk river • Vegetation likely to fall within Annex I habitat 3260 <i>Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion</i> vegetation • Established population of Schedule 9 invasive plant (<i>Elodea canadensis</i>) present

Table 4.5 Diamond Wood

Vegetation Community	Botanical Value	Rationale
CG3d grassland	High	<ul style="list-style-type: none"> • Not sampled but distinctive kind of vegetation qualifying as Section 41 important habitat <i>Lowland Calcareous Grassland</i> • Unmanaged • Moderate diversity
Broad-leaved plantation woodland	Low	<ul style="list-style-type: none"> • Secondary planted woodland • Not referable to any NVC type • Rare example of wooded habitat in intensively arable area

4.2 Arable Plant Communities

The light chalky soils of farmland across the survey area and further afield (for example east towards Andover and south towards Salisbury) have long been known to support diverse communities of uncommon and declining arable plant species. Some of the interest of the A303 road corridor was characterised during the previous road enhancement ecological assessment (NPA 2003). The findings of the current survey indicate that much of the farmland in the survey area is intensively managed, with high levels of fertiliser input and /or herbicide application likely to be the main reason for poorly developed communities of arable plants in many of the fields.

A few arable landholdings retain some fields with high arable plant diversity. Although no populations of any particularly rare species were seen in the course of the assessment, it is clear that these fields retain a valuable seed bank of a number of declining species that are nowadays rarely encountered in Wiltshire's arable habitats.

Table 5 provides a broad evaluation of the arable plant communities using individual field scores. These valuations are relative to arable communities in the Stonehenge A303 area / south Wiltshire chalk farmland.

Table 5. Valuation of Arable Plant Communities

Field/Margin Score	Value	Field Reference	No. of fields
20+	High	18, 26	2
10-19	Moderate	5, 9, 30	3
1-9	Low	1, 2, 6-8, 20, 11, 13-15, 20, 22, 24, 25, 27, 29	16
0	Negligible	3, 12, 17, 21, 23, 28	6

4.3 Portals

Where portals would include land take of cultivated ground (farmland), communities of declining arable plants were relatively diverse, but otherwise these areas should be considered to be of low botanical interest.

Vegetation communities within these areas are generally of low intrinsic value, although the reversion grassland at Normanton Down should be regarded as being of low to moderate value having developed some of the floristic character of lowland calcareous grassland.

5. RECOMMENDATIONS

This section is concerned with recommending some generic mitigation proposals that could be used to offset as yet unknown impacts on ecological receptors of significant botanical value as a result of the proposed road enhancements.

5.1 Calcareous Grassland Enhancement and Creation

Loss of, or damage to, calcareous grassland such as at Countess Cutting WS and the earthwork alongside Diamond Wood could be mitigated by creation of new calcareous grassland alongside the new road alignment. The development of chalk grassland on the steep road bank at Countess Cutting has taken place naturally over many years and there are local seed sources in the area e.g. at Parsonage Down, Yarnbury Castle and nearby on Salisbury Plain. It is therefore recommended that similar chalk grassland is allowed to develop naturally i.e. without any deliberate seeding or planting on any freshly exposed chalk cuttings or embankments associated with the new road alignment.

If Countess Cutting is unaffected by the road enhancements then it is recommended that its condition is improved by implementation of scrub and tree clearance. At present the bank is unmanaged and tree saplings and native scrub are beginning to encroach on its open chalk grassland.

5.2 Improving Farmland for Arable Plants

To mitigate loss of any arable land supporting diverse communities of declining arable plants, it is recommended that local farmers should be encouraged to take up any relevant agri-environment options promoting such communities in working farmland.

The A303 corridor lies within an area identified by Natural England as being a high priority for arable plants. Although closed to new applicants, Entry-level Stewardship Options promoting arable plant diversity on cultivated land include EF10 *Unharvested cereal headlands for birds and rare arable plants* and EF11 *Uncropped Cultivated Margins for Rare Arable Plants*.

5.3 Wetland Habitat Restoration



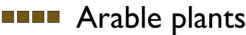

Although Countess Swamp WS has been identified as an area of high conservation value, its botanical interest appears to be in decline because of the advance of tall rhizomatous sedges (mainly *Carex acutiformis*) across open riverside habitats. The spread of such tall pond-sedges is normally an indicator of increased soil waterlogging.

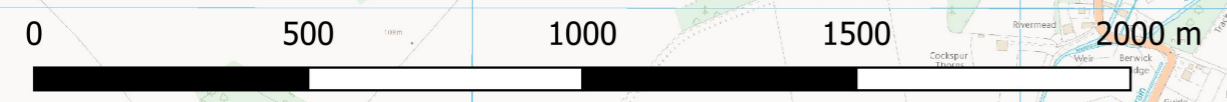
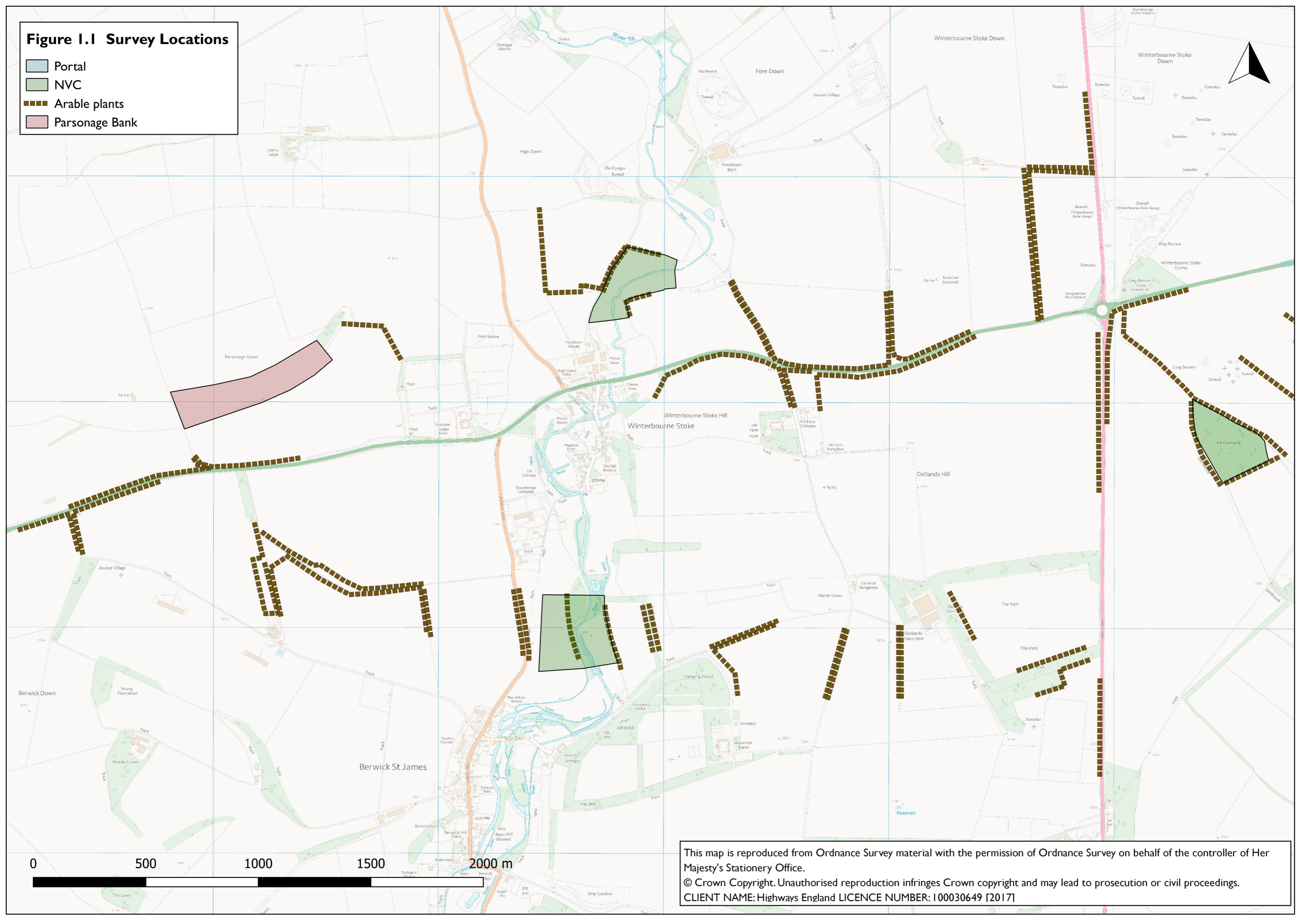
It is therefore recommended that waterlogging in Countess Swamp is addressed by restoring regular clearance management of drains in the site to allow water to drain into the River Avon.

REFERENCES

- Byfield A. and Wilson P. 2005. **Important Arable Plant Areas: Identifying priority sites for arable plant conservation in the United Kingdom.** Plantlife, Salisbury.
- Hall J.E., Kirby K.J., and Whitbread A.M. 2004 (revised). **National Vegetation Classification: Field Guide to Woodland.** Joint Nature Conservation Committee.
- Hill M.O., Blackstock T.H., Long D.G. and Rothero G.P. 2008. **A Checklist and Census Catalogue of British and Irish Bryophytes.** British Bryological Society.
- NPA. 2003. **A303 Stonehenge Improvement: Environmental Statement Volume 2 Part 3 Nature Conservation and Biodiversity.** Unpublished report for Mott MacDonald/Highways Agency. Nicholas Pearson Associates Ltd, Bath.
- Pilkington S.L. 2007. **Wiltshire Rare Plant Register.** Privately published, Westbury.
- Rodwell J.S. (Ed.) 1991. **British Plant Communities Volume 1: Woodlands and scrub.** Cambridge University Press.
- Rodwell J.S. (Ed.) 1992. **British Plant Communities Volume 3: Grasslands and montane communities.** Cambridge University Press.
- Rodwell J.S. (Ed.) 1995. **British Plant Communities Volume 4: Aquatic communities and tall-herb fens.** Cambridge University Press.
- Rodwell J.S. (Ed.) 2000. **British Plant Communities Volume 5: Maritime communities and vegetation of open habitats.** Cambridge University Press.
- Rodwell J.S. 2006. **National Vegetation Classification Users' handbook.** Joint Nature Conservation Committee, Peterborough.
- Rumsey F. and Lansdown R.V. 2012. **Identification: Duckweeds and other simple floating aquatic plants.** British Wildlife 23:5 pp326-334. British Wildlife Publishing.
- Stace C.A. 2010. **New Flora of the British Isles** (3rd edition). Cambridge University Press.
- Wild, R. 1988. **Parsonage Down NNR Grassland National Vegetation Classification.** Unpublished report.
- Wilson P. 1993. **Wiltshire's Arable Weed Flora.** In The Wiltshire Flora pp 43–48. Pisces Publications, Newbury.





Figure I.1 Survey Locations

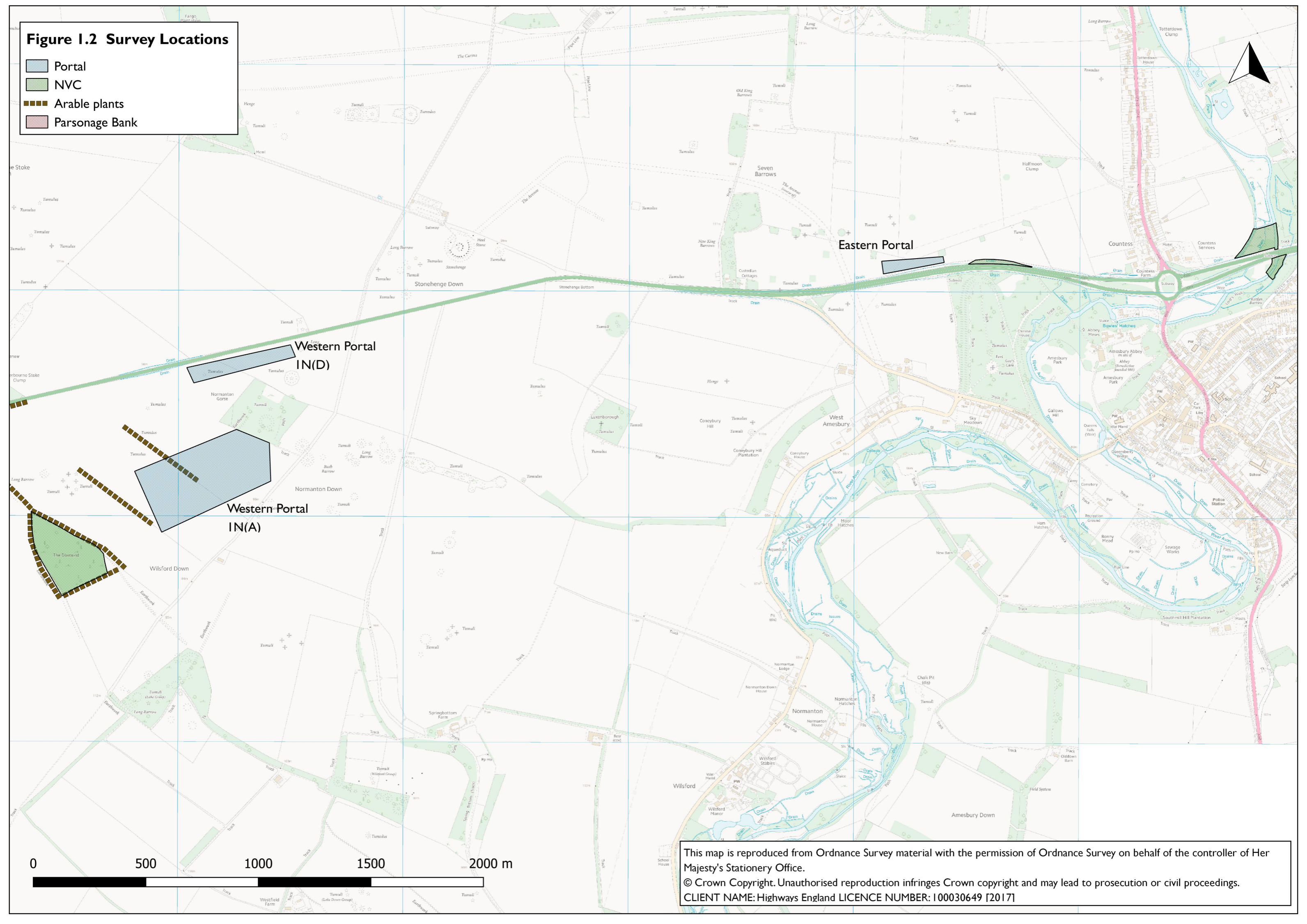
-  Portal
-  NVC
-  Arable plants
-  Parsonage Bank



This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the controller of Her Majesty's Stationery Office.
 © Crown Copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings.
 CLIENT NAME: Highways England LICENCE NUMBER: 100030649 [2017]

Figure I.2 Survey Locations

-  Portal
-  NVC
-  Arable plants
-  Parsonage Bank









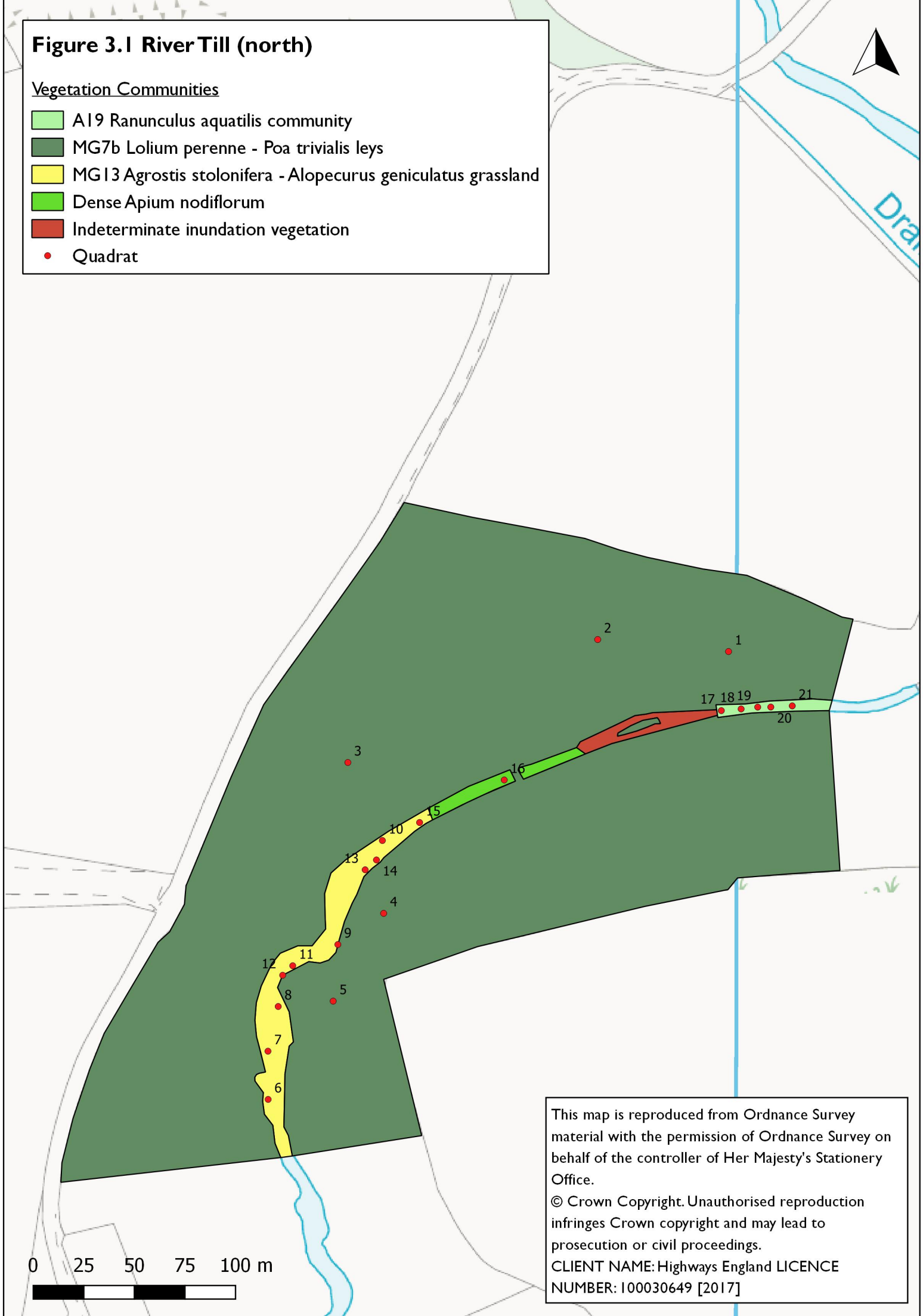
0 500 1000 1500 2000 m

This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the controller of Her Majesty's Stationery Office.
 © Crown Copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings.
 CLIENT NAME: Highways England LICENCE NUMBER: I00030649 [2017]

Figure 3.1 River Till (north)

Vegetation Communities







-  A19 *Ranunculus aquatilis* community
-  MG7b *Lolium perenne* - *Poa trivialis* leys
-  MG13 *Agrostis stolonifera* - *Alopecurus geniculatus* grassland
-  Dense *Apium nodiflorum*
-  Indeterminate inundation vegetation
-  Quadrat

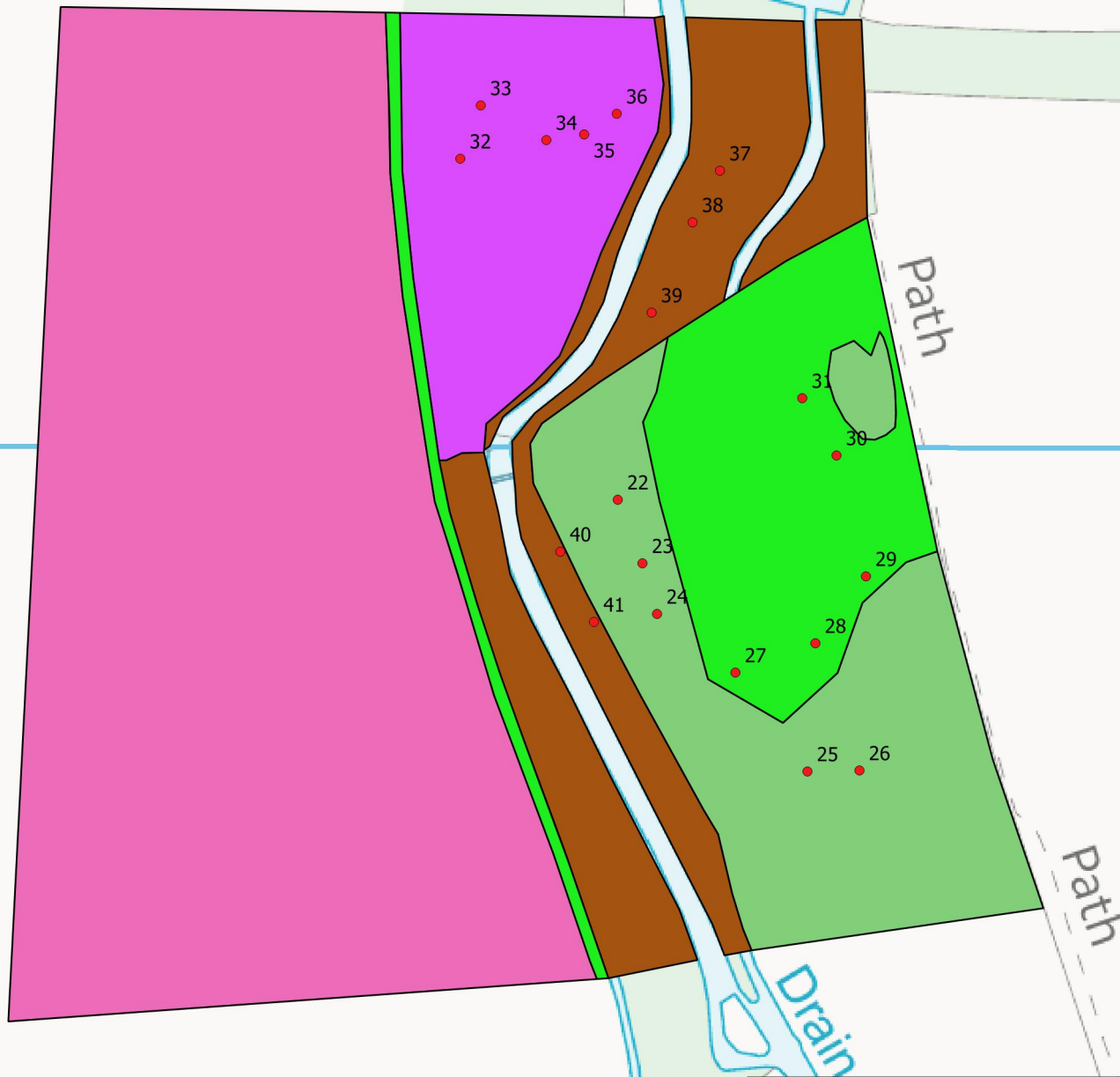


This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the controller of Her Majesty's Stationery Office.
© Crown Copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings.
CLIENT NAME: Highways England LICENCE NUMBER: 100030649 [2017]

Figure 3.2 River Till (south)

Vegetation Communities

-  MG1b *Arrhenatherum elatius* grassland
-  MG9 *Holcus lanatus* - *Deschampsia cespitosa* grassland
-  OV26 *Epilobium hirsutum* community
-  Cultivated land
-  Mixed *Salix* woodland
-  Quadrat



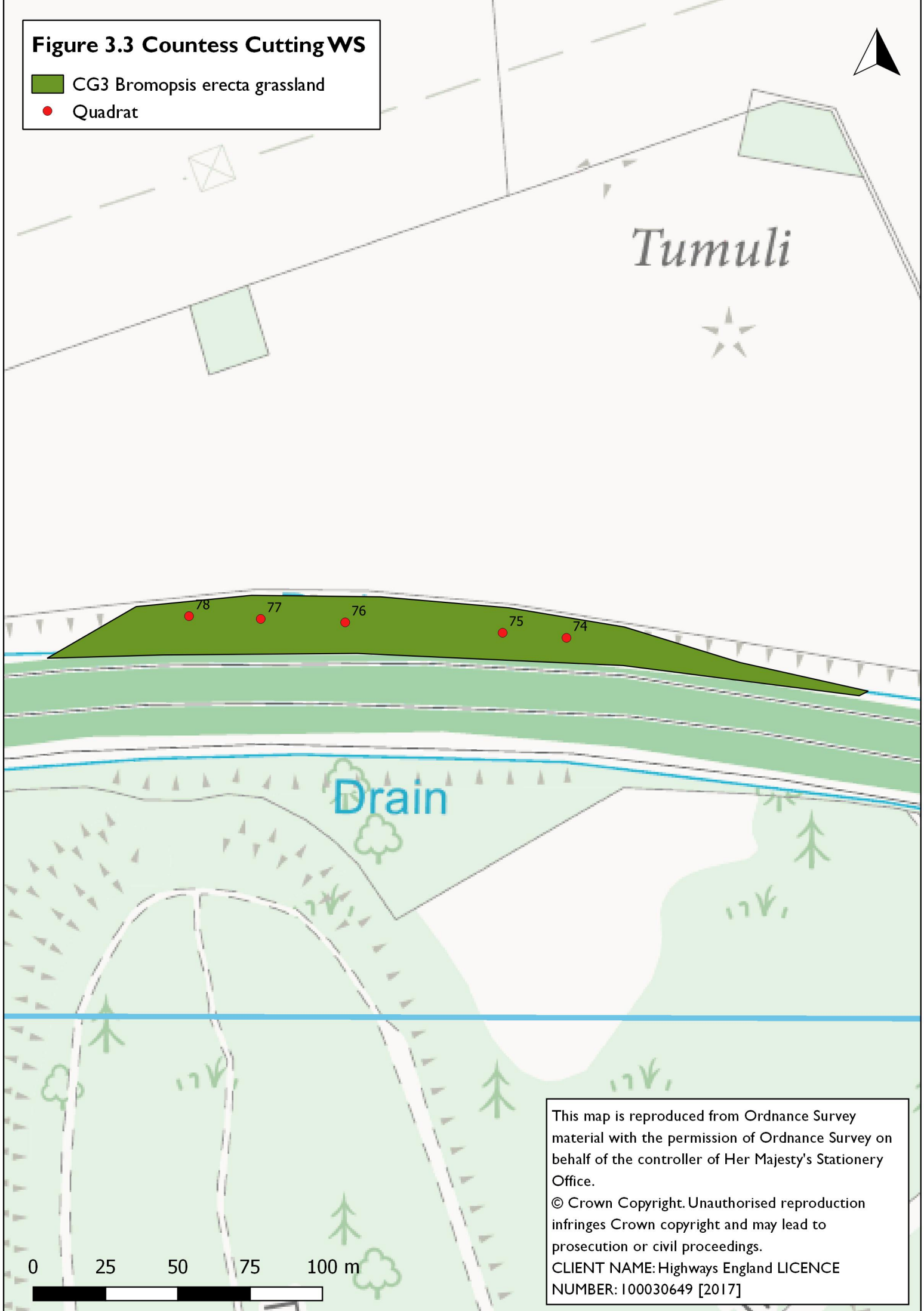
This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the controller of Her Majesty's Stationery Office.
© Crown Copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings.
CLIENT NAME: Highways England LICENCE
NUMBER: 100030649 [2017]

0 25 50 75 100 m



Figure 3.3 Countess Cutting WS

- CG3 Bromopsis erecta grassland
- Quadrat

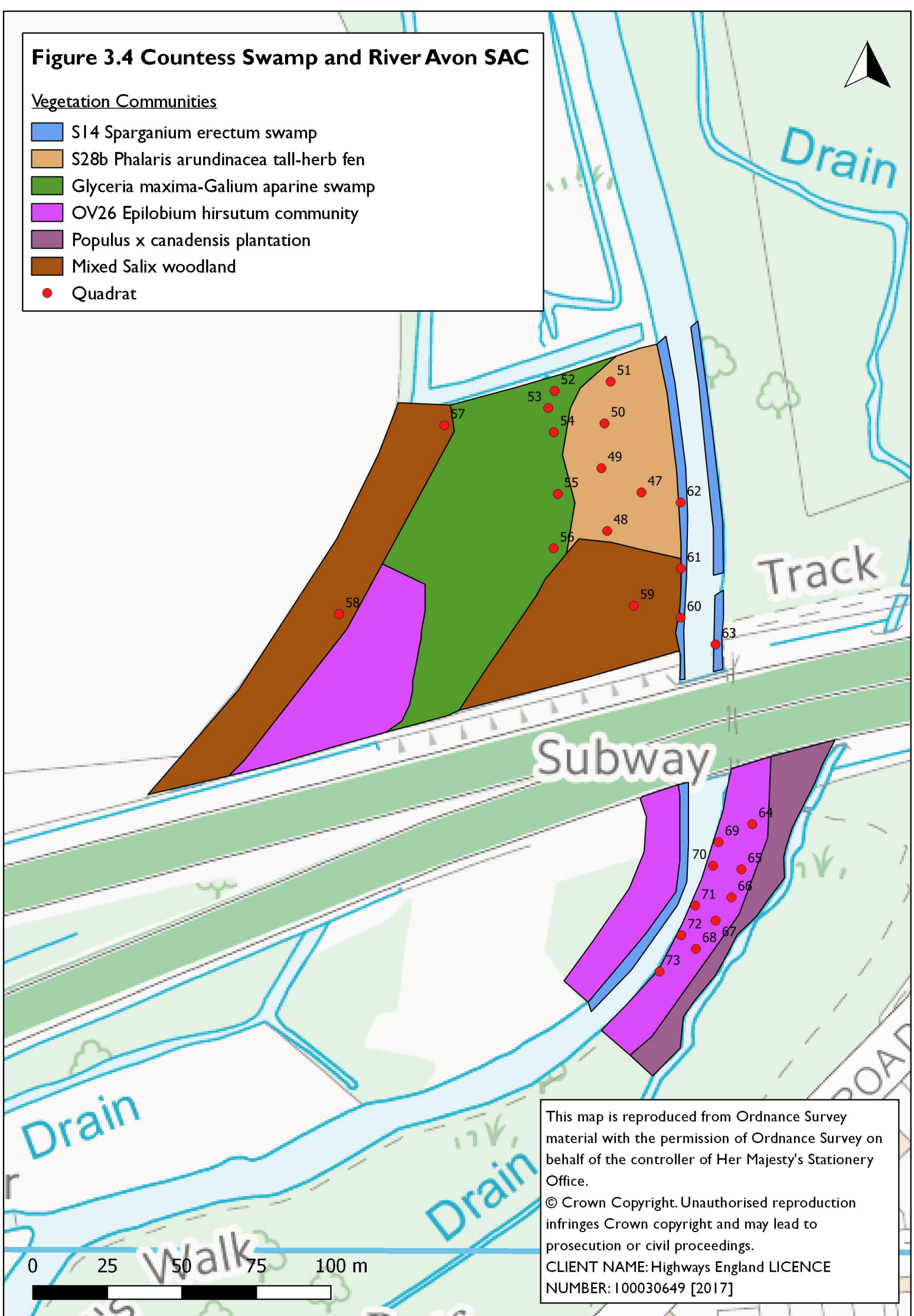


This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the controller of Her Majesty's Stationery Office.
© Crown Copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings.
CLIENT NAME: Highways England LICENCE
NUMBER: 100030649 [2017]

Figure 3.4 Countess Swamp and River Avon SAC

Vegetation Communities

- S14 Sparganium erectum swamp
- S28b Phalaris arundinacea tall-herb fen
- Glyceria maxima-Galium aparine swamp
- OV26 Epilobium hirsutum community
- Populus x canadensis plantation
- Mixed Salix woodland
- Quadrat






This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the controller of Her Majesty's Stationery Office.

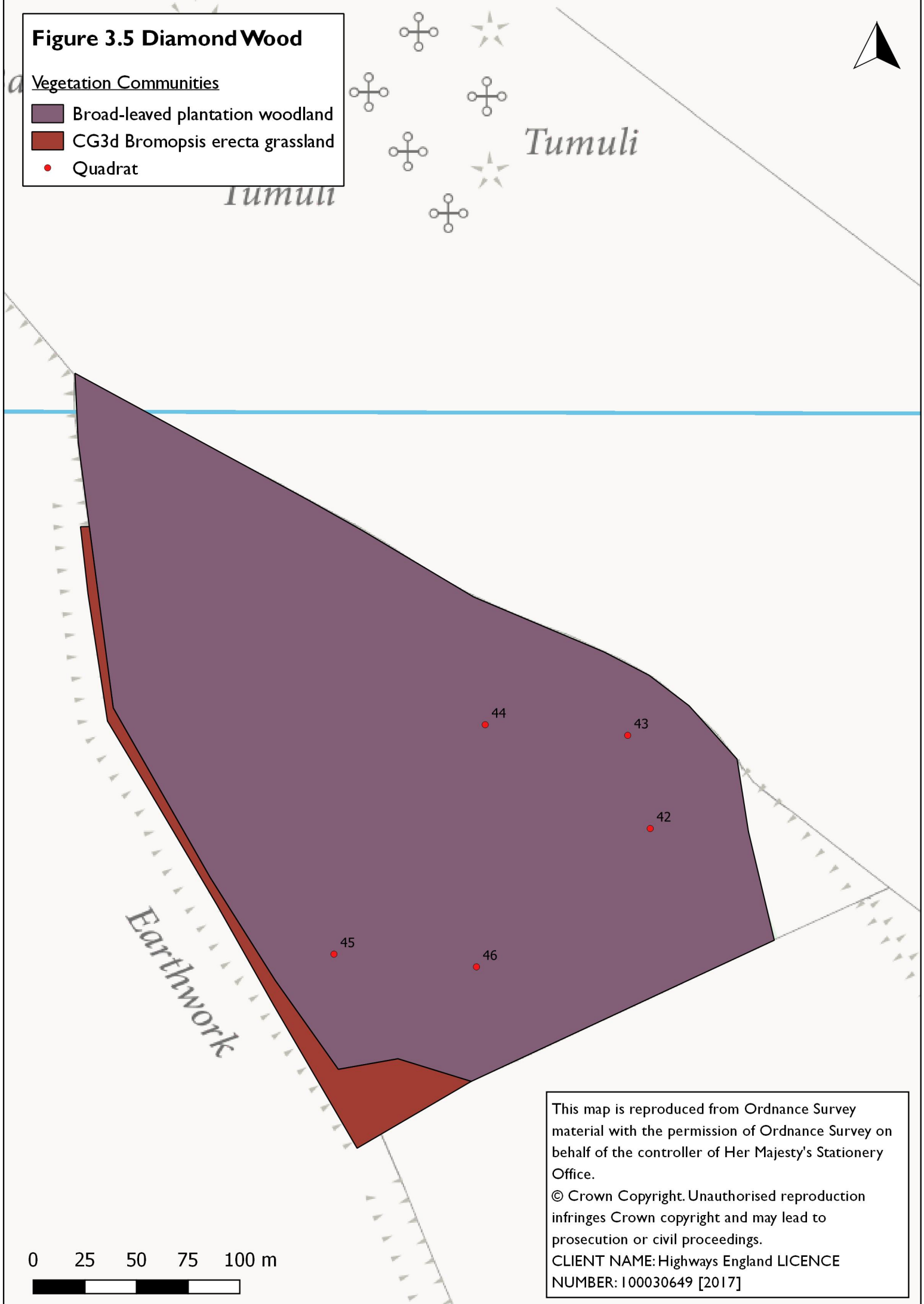
© Crown Copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings.

CLIENT NAME: Highways England LICENCE NUMBER: 100030649 [2017]

Figure 3.5 Diamond Wood

Vegetation Communities

-  Broad-leaved plantation woodland
-  CG3d Bromopsis erecta grassland
-  Quadrat

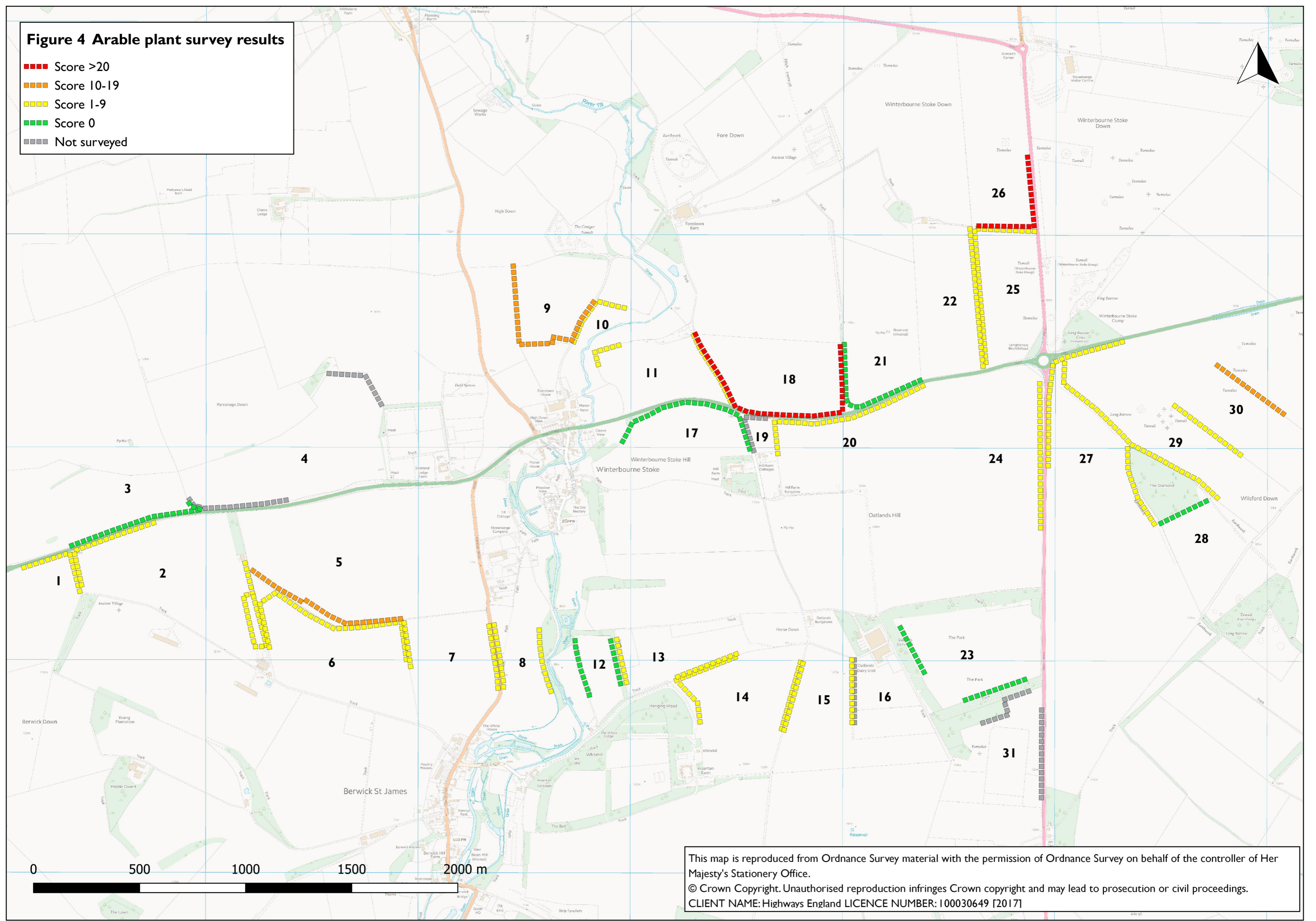


This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the controller of Her Majesty's Stationery Office.
© Crown Copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings.
CLIENT NAME: Highways England LICENCE
NUMBER: 100030649 [2017]

0 25 50 75 100 m




Figure 4 Arable plant survey results

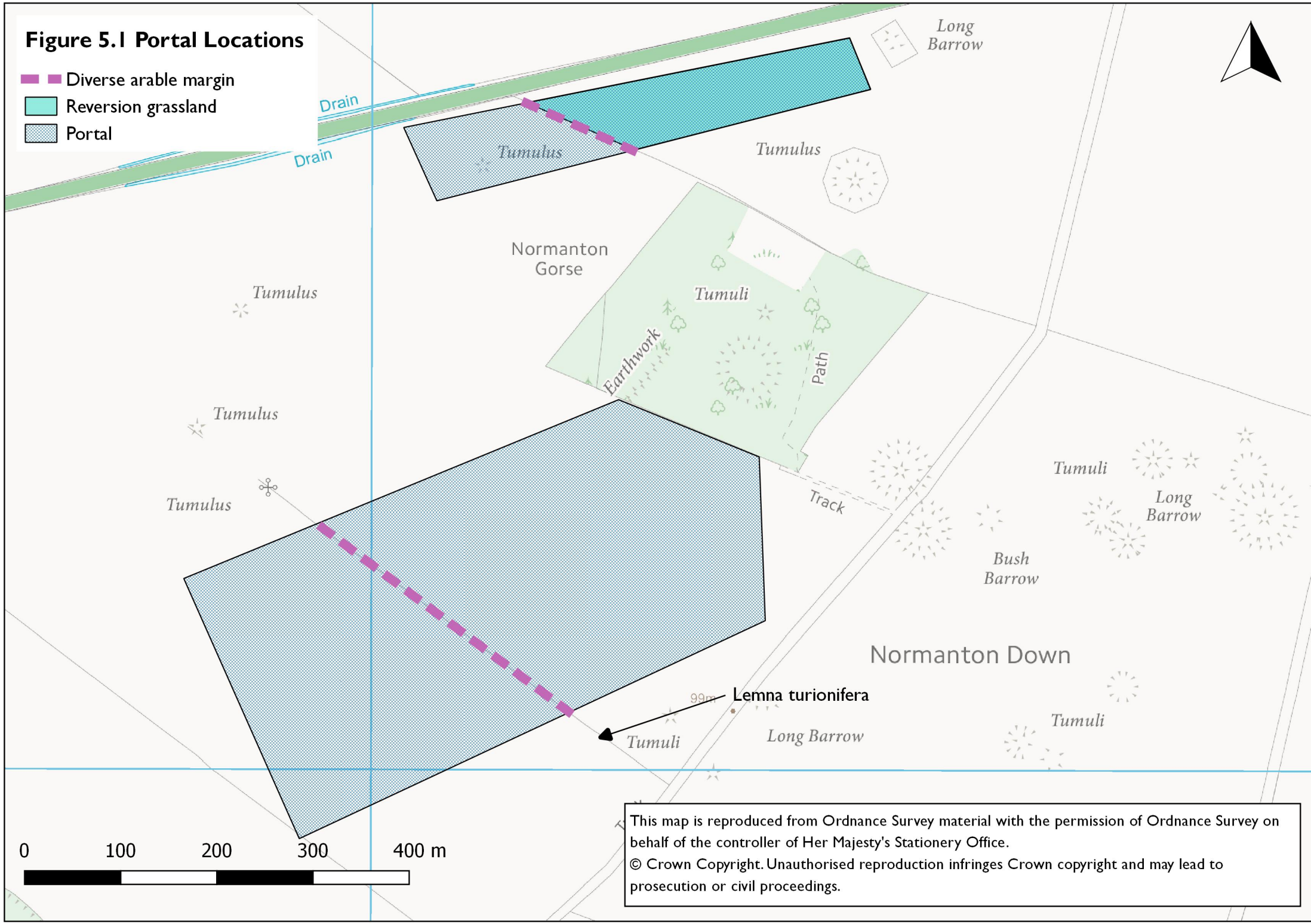
- Score >20
- Score 10-19
- Score 1-9
- Score 0
- Not surveyed



This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the controller of Her Majesty's Stationery Office.
© Crown Copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings.
CLIENT NAME: Highways England LICENCE NUMBER: 100030649 [2017]



Figure 5.1 Portal Locations

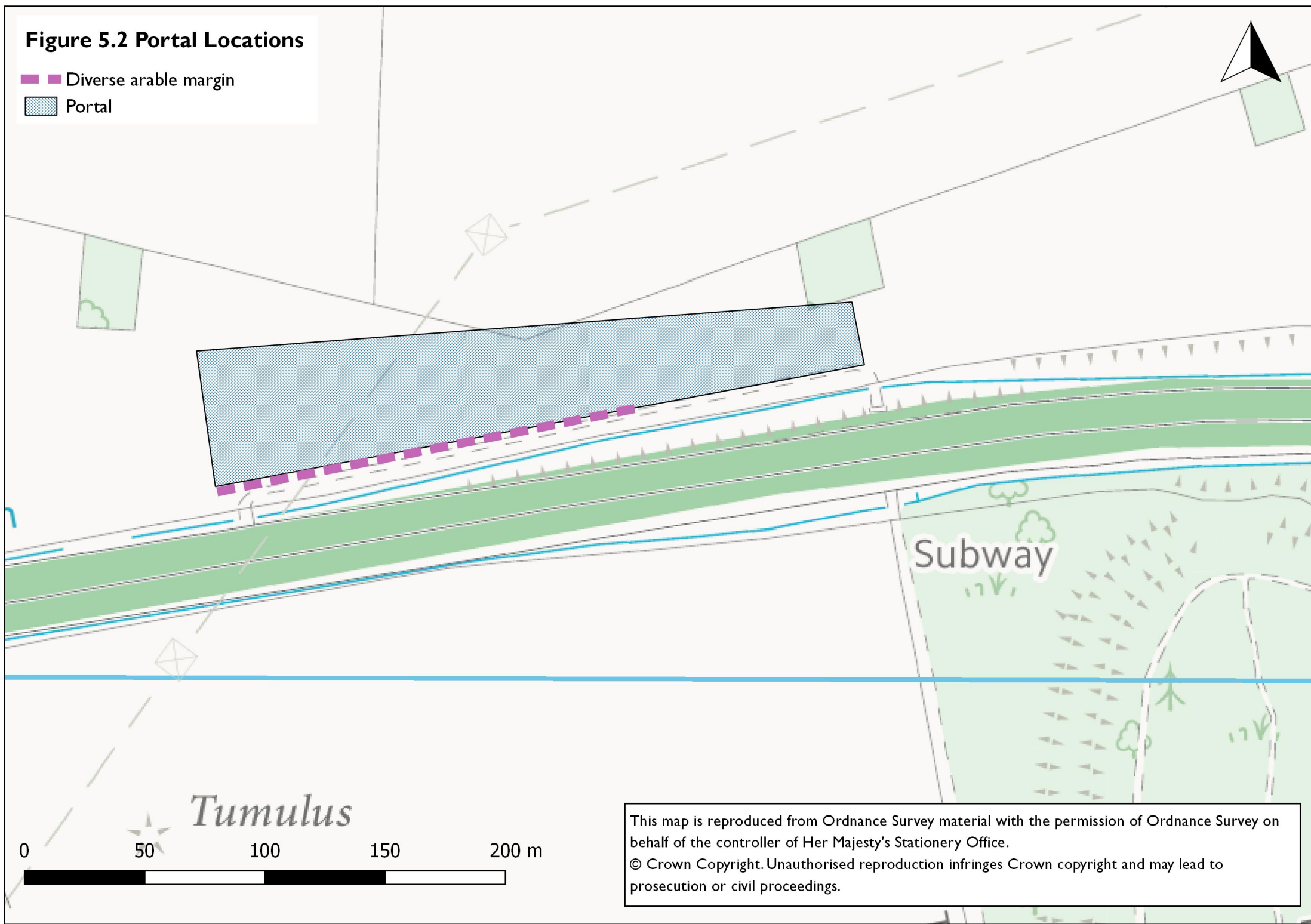
-  Diverse arable margin
-  Reversion grassland
-  Portal



This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the controller of Her Majesty's Stationery Office.
© Crown Copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings.

Figure 5.2 Portal Locations

-  Diverse arable margin
-  Portal



This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the controller of Her Majesty's Stationery Office.
© Crown Copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings.

APPENDIX II: NVC DATA

Site name		Till N	Till N	Till N	Till N	Till N	Till N	Till N	Till N	Till N	Till N	Till N	Till N	Till N	Till N	Till N	Till N	Till N	Till N	Till N	Till N	Till N
Grid reference		SU 07997 41620	SU 07933 41626	SU 07809 41565	SU 07820 41492	SU 07802 41448	SU 07772 41407	SU 07771 41422	SU 07771 41447	SU 07804 41476	SU 07823 41524	SU 07782 41462	SU 07780 41457	SU 07817 41515	SU 07824 41518	SU 07845 41536	SU 07884 41553	SU 07994 41591	SU 08004 41593	SU 08011 41595	SU 08017 41595	SU 08030 41595
Quadrat number		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Veg unit		MG7b	MG7b	MG7b	MG7b	MG7b	MG13	MG13	MG13	MG13	MG13	MG13	MG13	MG13	MG13	MG13	N/A	A19	A19	A19	A19	A19
Agrostis stolonifera																						
Alopecurus geniculatus	Creeping Bent	2	4	3	4	5	7	6	5	1		4	1	2	2							
Apium nodiflorum	Marsh Foxtail							3	1	5	5	7	5	6	7		1	5	5	4	4	5
Arrhenatherum elatius	Fool's-water-cress						2	4			4		2				9	5	5	5	4	6
Brachythecium rutabulum	False Oat-Grass		2	6	7																	
Bromus hordeaceus	Rough-stalked Feather-moss				3																	
Carex hirta	Soft-brome	2				2																
Cerastium fontanum	Hairy Sedge				5																	
Cladophora agg.	Common Mouse-ear	1		1		1						1	1									
Convolvulus arvensis	A filamentous green alga																	6		4		
Cratoneuron filicinum	Field Bindweed					4																
Dactylis glomerata	Fern-leaved Hook-moss						2							3	3	2						
Epilobium parviflorum	Cock's-foot	6	4	4	4	4																
Festuca rubra	Hoary Willowherb											4	4	5	5							
Fontinalis antipyretica	Red Fescue	7	7	5	5	5																
Galium palustre	Greater Water-moss									2							2					
Geranium dissectum	Marsh-bedstraw											2	4									
Glyceria fluitans	Cut-leaved Crane's-bill		1		2	4																
Holcus lanatus	Floating Sweet-grass									1		7	8	9	6	7	2	3		5		5
Lemna gibba	Yorkshire-fog	5	6	5	4	8			1			4	2		4	2						
Leptodictyum riparium	Fat Duckweed								3	1	2						2	4	8	8	9	9
Lolium perenne	Kneiff's Feather-moss						2						4	3	3	3	2	3				
Mentha aquatica	Perennial Rye-grass	3	5	6	5	4							1									
Myosotis scorpioides	Water Mint						4		2													
Nasturtium officinale	Water Forget-me-not						7	6	9	7	8		4	3	5		4	1	4	2	3	4
Phalaris arundinacea	Water-cress							6	2				1	4				1	4	4	6	1
Phleum bertolonii	Reed Canary-grass														2	1	5					
Poa trivialis	Smaller Cat's-tail	2			4	2																
Potentilla anserina	Rough Meadow-grass	3	4	4	3	4	3	3	2		1	3	4	4	5	4						
Ranunculus acris	Silverweed											4										
Ranunculus aquatilis	Meadow Buttercup	4		1																		
Ranunculus peltatus	Common Water-crowfoot										1						1	4	3	3	4	3
Ranunculus repens	Pond Water-crowfoot																	2	4	3	4	2
Rumex conglomeratus	Creeping Buttercup		4	4	1							1	1									
Schedonorus arundinaceus	Clustered Dock						1	4	1				2	1							1	1
Senecio aquaticus	Tall Fescue	2																				
Taraxacum agg.	Marsh Ragwort								1				5	4		1	1					
Veronica anagallis-aquatica	Dandelion				1																	
Veronica beccabunga	Blue Water-speedwell								5	4	1				1							
Thatch	Brooklime						7	4			4	2										
Bare ground		5	4	4	5	5																
Unvegetated open water			4				5	4	4	2	4	5	4	5	4	5	5					

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

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

Site name		Till S	Till S	Till S	Till S	Till S	Till S	Till S	Till S	Till S	Till S	Till S
Grid reference		SU 07653	SU 07661	SU 07666	SU 07715	SU 07734	SU 07692	SU 07718	SU 07736	SU 07726	SU 07714	
Quadrat number		39987	39967	39950	39898	39898	39931	39940	39963	40002	40023	
Veg unit		MG9	MG9	MG9	MG9	MG9	MG1b	MG1b	MG1b	MG1b	MG1b	
	Structural unit											
Agrostis stolonifera	Creeping Bent	6	8	8	6	5						
Alopecurus pratensis	Meadow Foxtail						2					2
Amblystegium serpens	Creeping Feather-moss											
Angelica sylvestris	Wild Angelica	4		4		5						
Anisantha sterilis	Barren Brome							4	3			
Anthriscus sylvestris	Cow Parsley							4	1	1	1	
Arrhenatherum elatius	False Oat-Grass	4	5	3	4	4	6	7	9	5	8	
Brachypodium sylvaticum	False-brome											
Brachythecium rutabulum	Rough-stalked Feather-moss	3	3	3	2	3						
Calliergonella cuspidata	Pointed Spear-moss			2								
Calystegia sepium	Hedge Bindweed											
Cardamine pratensis	Cuckooflower											
Carex hirta	Hairy Sedge	4	2		2							
Cerastium fontanum	Common Mouse-ear				2	1						
Cirsium arvense	Creeping Thistle		1			1			4			
Cirsium palustre	Marsh Thistle											
Cirsium vulgare	Spear Thistle					1	4	1	1	2	1	
Conocephalum conicum	Great Scented Liverwort											
Crataegus monogyna	Hawthorn											
Cryphaea heteromalla	Lateral Cryphaea											
Dactylis glomerata	Cock's-foot							5		7		
Deschampsia cespitosa	Tufted Hair-grass	4	2	4	4	2			4			
Eleocharis palustris	Common Spike-rush			3	4							
Epilobium hirsutum	Great Willowherb											
Equisetum arvense	Field Horsetail											
Equisetum palustre	Marsh Horsetail			4	1							
Eupatorium cannabinum	Hemp-agrimony											
Festuca rubra	Red Fescue											4
Filipendula ulmaria	Meadowsweet		4									
Fraxinus excelsior	Ash											
Fraxinus excelsior	Ash											
Fraxinus excelsior	Ash											
Frullania dilatata	Dilated Scalewort											
Galium aparine	Cleavers	2	1		4	3	1					2
Galium palustre	Marsh-bedstraw	1	1			2						
Galium uliginosum	Fen Bedstraw											
Geranium pyrenaicum	Hedgerow Crane's-bill							1	1	4	1	
Geranium robertianum	Herb-Robert											
Glyceria maxima	Reed Sweet-grass											
Hedera helix	Common Ivy											
Heracleum sphondylium	Hogweed								2	6	4	
Holcus lanatus	Yorkshire-fog	4	5	5	7	5	8	4	4	5	5	
Homalothecium sericeum	Silky Wall Feather-moss											
Hypnum cupressiforme agg.												
Hypnum cupressiforme var. r	Supine Plait-moss											
Iris pseudacorus	Yellow Iris											
Juncus acutiflorus	Sharp-flowered Rush											
Juncus inflexus	Hard Rush	8	7	7	6	7						
Kindbergia praelonga	Common Feather-moss											
Lunularia cruciata	Crescent-cup Liverwort											
Lycopus europaeus	Gypsywort											
Mentha aquatica	Water Mint											
Metzgeria consanguinea	Whiskered Veilwort											
Metzgeria furcata	Forked Veilwort											
Myosotis arvensis	Field Forget-me-not									1	3	
Myosotis scorpioides	Water Forget-me-not											
Oenanthe crocata	Hemlock Water-dropwort											
Orthotrichum affine	Wood Bristle-moss											
Orthotrichum diaphanum	White-tipped Bristle-moss											
Orthotrichum lyellii	Lyell's Bristle-moss											
Oxyrrhynchium hians	Swartz's Feather-moss				2							
Pellia endiviifolia	Endive Pellia											
Persicaria amphibia	Amphibious Bistort	1	5		5							
Phalaris arundinacea	Reed Canary-grass		2	4	4	1						
Phleum bertolonii	Smaller Cat's-tail	2										
Plagiomnium undulatum	Hart's-tongue Thyme-moss											
Plantago lanceolata	Ribwort Plantain		2									
Poa trivialis	Rough Meadow-grass	5	4	5	4	5	5	4	4	4	4	
Ranunculus repens	Creeping Buttercup		2		2	2						2
Rhizomnium punctatum	Dotted Thyme-moss											
Rumex obtusifolius	Broad-leaved Dock								4			
Rumex sanguineus	Wood Dock					2			4			
Salix alba	White Willow											
Salix alba	White Willow											
Salix cinerea subsp. oleifolia	Grey Willow											
Salix cinerea subsp. oleifolia	Grey Willow											
Salix triandra	Almond Willow											
Salix fragilis agg.	Crack Willow											
Salix fragilis agg.	Crack Willow											
Sambucus nigra	Elder											
Schedonorus giganteus	Giant Fescue											
Scleropodium cespitosum	Tufted Feather-moss											
Scrophularia auriculata	Water Figwort											
Senecio aquaticus	Marsh Ragwort											
Senecio jacobaea	Common Ragwort											1
Silene flos-cuculi	Ragged-Robin											
Solanum dulcamara	Bittersweet											
Stachys palustris	Marsh Woundwort											
Stachys sylvatica	Hedge Woundwort											
Taraxacum agg.	Dandelion				1				1	1		
Ulmus procera	English Elm											
Urtica dioica	Common Nettle	2	1	4	1	6	4	8	5	5	4	
Veronica chamaedrys	Germander Speedwell											2
Viburnum opulus	Guelder-rose											
Zygodon viridissimus	Green Yoke-moss											
Thatch		4	4	2	4	4		4	3	3	4	
Bare ground							4		4	4	1	

Site name		Countess Cutting	Countess Cutting	Countess Cutting	Countess Cutting	Countess Cutting
Grid reference		SU 14683 42134	SU 14663 42137	SU 14607 42136	SU 14577 42141	SU 14553 42138
Quadrat number		74	75	76	77	78
Veg unit		CG3	CG3	CG3	CG3	CG3
<i>Achillea millefolium</i>	Yarrow					1
<i>Anacamptis pyramidalis</i>	Pyramidal Orchid	1				
<i>Anthyllis vulneraria</i>	Kidney Vetch				1	
<i>Arrhenatherum elatius</i>	False Oat-Grass	2	2		2	4
<i>Brachypodium sylvaticum</i>	False-brome	2	2		3	1
<i>Bromopsis erecta</i>	Upright Brome	4	5	5	4	4
<i>Centaurium erythraea</i>	Common Centaury	1		1		
<i>Cirsium acaule</i>	Dwarf Thistle	1		4		
<i>Clematis vitalba</i>	Traveller's-joy	4		4	1	4
<i>Crataegus monogyna</i> (seedling)	Hawthorn					1
<i>Dactylis glomerata</i>	Cock's-foot	1			1	2
<i>Dactylorhiza fuchsii</i>	Common Spotted-orchid	3	4	1	3	4
<i>Dactylorhiza x grandis</i>	D. fuchsii x praetermissa	1				
<i>Daucus carota</i>	Carrot	2	2		3	1
<i>Erigeron acris</i>	Blue Fleabane			1	3	
<i>Euphrasia nemorosa</i>	Eyebright			1	3	3
<i>Festuca rubra</i>	Red Fescue		2		2	3
<i>Fissidens dubius</i>	Rock Pocket-moss			2		
<i>Fraxinus excelsior</i> (seedling)	Ash		1	1	2	1
<i>Galium album</i>	Hedge Bedstraw		1	4	4	4
<i>Hieracium</i> Section <i>Hieracium</i>	Hawkweed	7	8	8	7	7
<i>Hippocrepis comosa</i>	Horseshoe Vetch			4		
<i>Inula conyzae</i>	Ploughman's-spikenard			1		
<i>Leontodon hispidus</i>	Rough Hawkbit	3	4			1
<i>Leucanthemum vulgare</i>	Oxeye Daisy	2	2	3	4	4
<i>Linum catharticum</i>	Fairy Flax	3		3	3	3
<i>Melilotus altissimus</i>	Tall Melilot			2		
<i>Pilosella officinarum</i>	Mouse-ear-hawkweed	6	4	4		
<i>Plantago lanceolata</i>	Ribwort Plantain	3	4	2	4	4
<i>Poterium sanguisorba</i> subsp.	Salad Burnet	5	6	4	5	6
<i>Prunella vulgaris</i>	Selfheal	1				3
<i>Senecio jacobaea</i>	Common Ragwort			1		1
<i>Taraxacum</i> agg.	Dandelion	4	2		1	2
<i>Weissia</i> species	A moss		3	3	2	4
Bare ground		5	5	5	6	6

Site name			Diamond Wood	Diamond Wood	Diamond Wood	Diamond Wood	Diamond Wood
Grid reference			SU 10625 40799	SU 10614 40844	SU 10545 40849	SU 10472 40738	SU 10541 40732
Quadrat number			42	43	44	45	46
Veg unit			BL Plantation	BL Plantation	BL Plantation	BL Plantation	BL Plantation
		Structural unit					
<i>Agrimonia eupatoria</i>	Agrimony						1
<i>Anisantha sterilis</i>	Barren Brome						2
<i>Betula species</i>	Birch	Understorey			1	5	
<i>Arrhenatherum elatius</i>	False Oat-Grass						3
<i>Betula pendula</i>	Silver Birch	Canopy		5			
<i>Brachypodium sylvaticum</i>	False-brome		6	5	3	3	4
<i>Brachythecium rutabulum</i>	Rough-stalked Feather-moss		4	3	3	3	2
<i>Bryonia dioica</i>	White Bryony						1
<i>Chaerophyllum temulum</i>	Rough Chervil			4			2
<i>Corylus avellana</i>	Hazel	Understorey		4			
<i>Crataegus monogyna</i>	Hawthorn	Understorey	7	8	7	7	5
<i>Cryphaea heteromalla</i>	Lateral Cryphaea		2	2	2		2
<i>Dactylis glomerata</i>	Cock's-foot			1			4
<i>Euonymus europaeus</i>	Spindle	Understorey			4		
<i>Fagus sylvatica</i>	Beech	Canopy			7	4	
<i>Galium aparine</i>	Cleavers		4	7	4	1	4
<i>Geranium robertianum</i>	Herb-Robert		1	5	1	1	3
<i>Geum urbanum</i>	Wood Avens		4	4	1	1	3
<i>Glechoma hederacea</i>	Ground-ivy		3	2	4	3	3
<i>Hedera helix</i>	Common Ivy	Field layer		2		8	
<i>Hedera helix</i>	Common Ivy	Canopy				4	
<i>Heracleum sphondylium</i>	Hogweed						1
<i>Hypnum cupressiforme</i> agg.			2		2		
<i>Kindbergia praelonga</i>	Common Feather-moss		5	3	4	4	
<i>Ligustrum vulgare</i>	Wild Privet	Understorey	1		4	1	1
<i>Lophocolea heterophylla</i>	Variable-leaved Crestwort				3		
<i>Metzgeria consanguinea</i>	Whiskered Veilwort		2	2	3		3
<i>Metzgeria furcata</i>	Forked Veilwort		3				
<i>Orthotrichum affine</i>	Wood Bristle-moss		3	2	2	3	3
<i>Orthotrichum diaphanum</i>	White-tipped Bristle-moss					3	
<i>Orthotrichum pulchellum</i>	Elegant Bristle-moss			1			
<i>Orthotrichum tenellum</i>	Slender Bristle-moss						1
<i>Pinus sylvestris</i>	Scots Pine	Canopy	8	5	6	8	5
<i>Poa trivialis</i>	Rough Meadow-grass			2			4
<i>Prunus spinosa</i>	Blackthorn	Understorey	4		5		4
<i>Radula complanata</i>	Even Scalewort		2				
<i>Rhamnus cathartica</i>	Buckthorn	Understorey	5	4			4
<i>Rhynchostegium confertum</i>	Clustered Feather-moss					3	
<i>Rubus fruticosus</i> agg.	Bramble	Field layer	2	5	2		4
<i>Sambucus nigra</i>	Elder	Understorey	4	2	4	4	1
<i>Urtica dioica</i>	Common Nettle		7	6	7	9	6
<i>Veronica chamaedrys</i>	Germander Speedwell		1				3
<i>Viburnum lantana</i>	Wayfaring-tree	Understorey	4	4	4		1
<i>Zygodon viridissimus</i>	Green Yoke-moss				2	2	

APPENDIX III: ARABLE PLANT SPECIES LIST

Scientific Name	Common Name
<i>Aethusa cynapium</i>	Fool's Parsley
<i>Agrostis stolonifera</i>	Creeping Bent
<i>Alopecurus myosuroides</i>	Black-grass
<i>Anagallis arvensis</i>	Scarlet Pimpernel
<i>Anisantha diandra</i>	Great Brome
<i>Anisantha sterilis</i>	Barren Brome
<i>Anthriscus sylvestris</i>	Cow Parsley
<i>Aphanes arvensis</i>	Parsley-piert
<i>Arctium minus</i>	Lesser Burdock
<i>Arenaria serpyllifolia</i>	Thyme-leaved Sandwort
<i>Arrhenatherum elatius</i>	False Oat-Grass
<i>Artemisia vulgaris</i>	Mugwort
<i>Atriplex prostrata</i>	Spear-leaved Orache
<i>Avena fatua</i>	Wild-oat
<i>Bromus hordeaceus</i>	Soft-brome
<i>Bromus secalinus</i>	Rye Brome
<i>Bryonia dioica</i>	White Bryony
<i>Capsella bursa-pastoris</i>	Shepherd's-purse
<i>Carduus nutans</i>	Musk Thistle
<i>Cerastium fontanum</i>	Common Mouse-ear
<i>Chaenorhinum minus</i>	Small Toadflax
<i>Chaerophyllum temulum</i>	Rough Chervil
<i>Chenopodium album</i>	Fat-hen
<i>Chenopodium hybridum</i>	Maple-leaved Goosefoot
<i>Cirsium arvense</i>	Creeping Thistle
<i>Cirsium vulgare</i>	Spear Thistle
<i>Convolvulus arvensis</i>	Field Bindweed
<i>Dactylis glomerata</i>	Cock's-foot
<i>Dipsacus fullonum</i>	Wild Teasel
<i>Elytrigia repens</i>	Common Couch
<i>Epilobium ciliatum</i>	American Willowherb
<i>Epilobium parviflorum</i>	Hoary Willowherb
<i>Epilobium tetragonum</i>	Square-stalked Willowherb
<i>Euphorbia exigua</i>	Dwarf Spurge
<i>Euphorbia helioscopia</i>	Sun Spurge
<i>Euphorbia peplus</i>	Petty Spurge
<i>Fallopia convolvulus</i>	Black-bindweed
<i>Festuca rubra</i>	Red Fescue
<i>Fraxinus excelsior</i>	Ash
<i>Fumaria densiflora</i>	Dense-flowered Fumitory
<i>Fumaria officinalis</i>	Common Fumitory
<i>Galium aparine</i>	Cleavers
<i>Geranium dissectum</i>	Cut-leaved Crane's-bill
<i>Geranium molle</i>	Dove's-foot Crane's-bill
<i>Geranium pyrenaicum</i>	Hedgerow Crane's-bill
<i>Geum urbanum</i>	Wood Avens
<i>Glechoma hederacea</i>	Ground-ivy
<i>Heracleum sphondylium</i>	Hogweed
<i>Holcus lanatus</i>	Yorkshire-fog
<i>Kickxia spuria</i>	Round-leaved Fluellen
<i>Lamium amplexicaule</i>	Henbit Dead-nettle
<i>Lamium purpureum</i>	Red Dead-nettle
<i>Lapsana communis</i>	Nipplewort
<i>Legousia hybrida</i>	Venus's-looking-glass

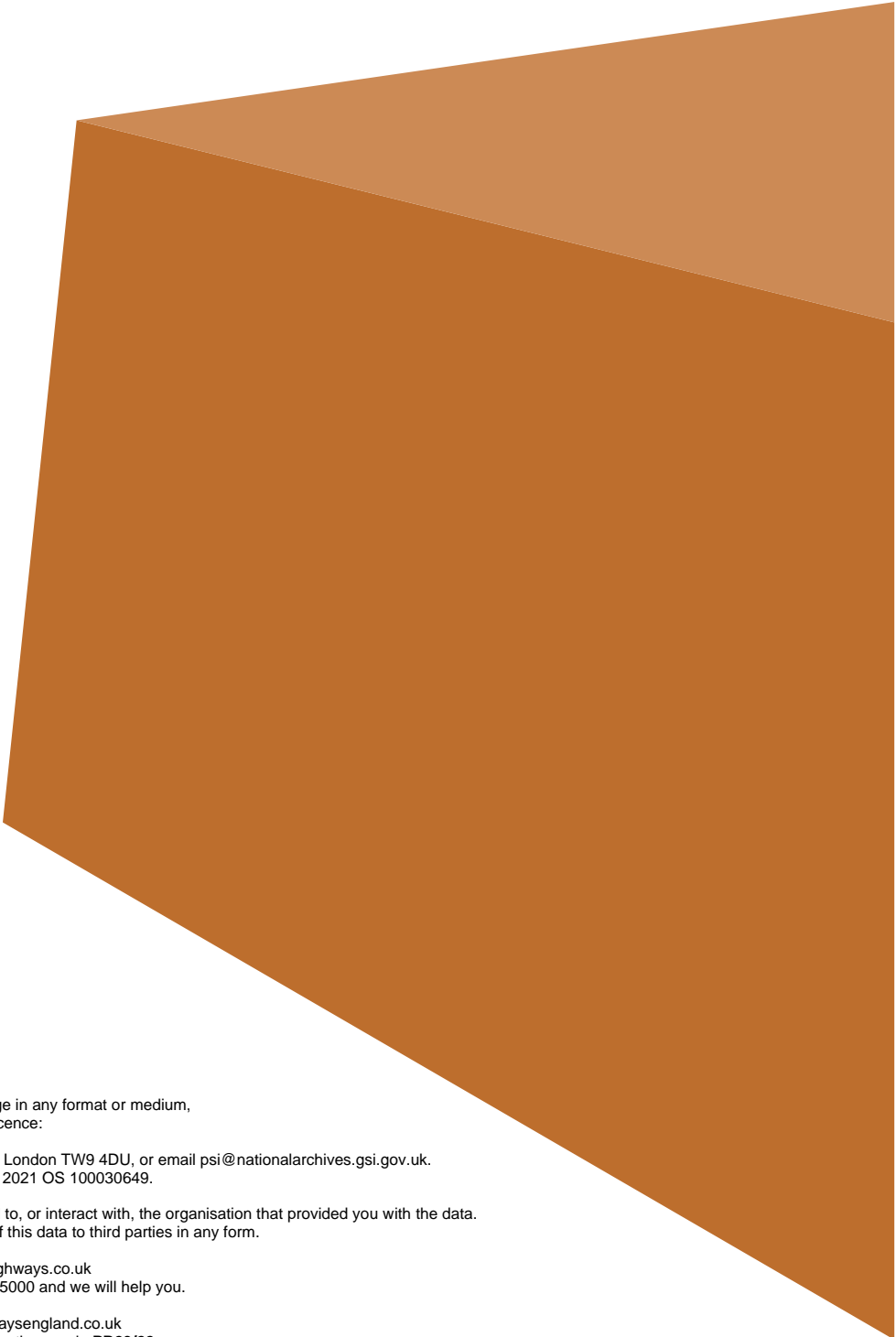
Scientific Name	Common Name
<i>Lepidium coronopus</i>	Swine-cress
<i>Linaria vulgaris</i>	Common Toadflax
<i>Lolium perenne</i>	Perennial Rye-grass
<i>Malva neglecta</i>	Dwarf Mallow
<i>Malva sylvestris</i>	Common Mallow
<i>Matricaria chamomilla</i>	Scented Mayweed
<i>Matricaria discoidea</i>	Pineappleweed
<i>Medicago lupulina</i>	Black Medick
<i>Mercurialis annua</i>	Annual Mercury
<i>Myosotis arvensis</i>	Field Forget-me-not
<i>Orobanche minor</i>	Common Broomrape
<i>Papaver argemone</i>	Prickly Poppy
<i>Papaver dubium</i>	Long-headed Poppy
<i>Papaver hybridum</i>	Rough Poppy
<i>Papaver rhoeas</i>	Common Poppy
<i>Pastinaca sativa</i> subsp. <i>sylvestris</i>	Wild Parsnip
<i>Petroselinum segetum</i>	Corn Parsley
<i>Pimpinella saxifraga</i>	Burnet-saxifrage
<i>Plantago lanceolata</i>	Ribwort Plantain
<i>Plantago major</i>	Greater Plantain
<i>Poa annua</i>	Annual Meadow-grass
<i>Poa trivialis</i>	Rough Meadow-grass
<i>Polygonum aviculare</i>	Knotgrass
<i>Prunus spinosa</i>	Blackthorn
<i>Ranunculus repens</i>	Creeping Buttercup
<i>Reseda lutea</i>	Wild Mignonette
<i>Rumex crispus</i>	Curled Dock
<i>Rumex obtusifolius</i>	Broad-leaved Dock
<i>Senecio jacobaea</i>	Common Ragwort
<i>Senecio vulgaris</i>	Groundsel
<i>Sherardia arvensis</i>	Field Madder
<i>Silene latifolia</i>	White Campion
<i>Sinapis arvensis</i>	Charlock
<i>Sisymbrium officinale</i>	Hedge Mustard
<i>Solanum nigrum</i>	Black Nightshade
<i>Sonchus arvensis</i>	Perennial Sow-thistle
<i>Sonchus asper</i>	Prickly Sow-thistle
<i>Stellaria media</i>	Common Chickweed
<i>Taraxacum agg.</i>	Dandelion
<i>Trifolium repens</i>	White Clover
<i>Tripleurospermum inodorum</i>	Scentless Mayweed
<i>Urtica dioica</i>	Common Nettle
<i>Urtica urens</i>	Small Nettle
<i>Valerianella dentata</i>	Narrow-fruited Cornsalad
<i>Veronica arvensis</i>	Wall Speedwell
<i>Veronica persica</i>	Common Field-speedwell
<i>Veronica polita</i>	Grey Field-speedwell
<i>Vicia cracca</i>	Tufted Vetch
<i>Viola arvensis</i>	Field Pansy
<i>Vulpia myuros</i>	Rat's-tail Fescue

APPENDIX IV: PORTAL DATA

Presence of species is indicated by |

Species	Common name	Western Portal	Western Portal	Western Portal	Western Portal	Eastern Portal	Eastern Portal	Eastern Portal
		IN(A)	IN(D)	IN(D)	IN(D)	Bowtie Field	Bowtie Field	Bowtie Field
		Arable	Arable and sown headlands	Permanent Grassland	Reversion grassland	Arable	Scrub and rough grassland	Broad-leaved plantation
<i>Acer campestre</i>	Field Maple							
<i>Acer pseudoplatanus</i>	Sycamore							
<i>Achillea millefolium</i>	Yarrow							
<i>Aethusa cynapium</i>	Fool's Parsley							
<i>Agrimonia eupatoria</i>	Agrimony							
<i>Agrostis stolonifera</i>	Creeping Bent							
<i>Alliaria petiolata</i>	Garlic Mustard							
<i>Alopecurus myosuroides</i>	Black-grass							
<i>Anagallis arvensis</i>	Scarlet Pimpernel							
<i>Anisantha sterilis</i>	Barren Brome							
<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass							
<i>Anthriscus sylvestris</i>	Cow Parsley							
<i>Anthyllis vulneraria</i>	Kidney Vetch							
<i>Aphanes arvensis</i>	Parsley-piert							
<i>Arctium minus</i>	Lesser Burdock							
<i>Arenaria serpyllifolia</i>	Thyme-leaved Sandwort							
<i>Arrhenatherum elatius</i>	False Oat-Grass							
<i>Artemisia vulgaris</i>	Mugwort							
<i>Asperula cynanchica</i>	Squinancywort							
<i>Atriplex prostrata</i>	Spear-leaved Orache							
<i>Avena fatua</i>	Wild-oat							
<i>Ballota nigra</i>	Black Horehound							
<i>Brachypodium sylvaticum</i>	False-brome							
<i>Briza media</i>	Quaking-grass							
<i>Bromopsis erecta</i>	Upright Brome							
<i>Bromus hordeaceus</i>	Soft-brome							
<i>Bryonia dioica</i>	White Bryony							
<i>Calystegia sepium</i>	Hedge Bindweed							
<i>Capsella bursa-pastoris</i>	Shepherd's-purse							
<i>Carduus nutans</i>	Musk Thistle							
<i>Centaurea nigra</i>	Common Knapweed							
<i>Centaurea scabiosa</i>	Greater Knapweed							
<i>Cerastium fontanum</i>	Common Mouse-ear							
<i>Chaenorhinum minus</i>	Small Toadflax							
<i>Chaerophyllum temulum</i>	Rough Chervil							
<i>Chamerion angustifolium</i>	Rosebay Willowherb							
<i>Chenopodium album</i>	Fat-hen							
<i>Chenopodium hybridum</i>	Maple-leaved Goosefoot							
<i>Cirsium arvense</i>	Creeping Thistle							
<i>Cirsium vulgare</i>	Spear Thistle							
<i>Clematis vitalba</i>	Traveller's-joy							
<i>Clinopodium vulgare</i>	Wild Basil							
<i>Conium maculatum</i>	Hemlock							
<i>Convolvulus arvensis</i>	Field Bindweed							
<i>Cornus sanguinea</i>	Dogwood							
<i>Corylus avellana</i>	Hazel							
<i>Crataegus monogyna</i>	Hawthorn							
<i>Crepis capillaris</i>	Smooth Hawk's-beard							
<i>Crepis vesicaria</i>	Beaked Hawk's-beard							
<i>Cynosurus cristatus</i>	Crested Dog's-tail							
<i>Dactylis glomerata</i>	Cock's-foot							
<i>Daucus carota</i>	Carrot							
<i>Elytrigia repens</i>	Common Couch							
<i>Epilobium ciliatum</i>	American Willowherb							
<i>Epilobium parviflorum</i>	Hoary Willowherb							
<i>Euonymus europaeus</i>	Spindle							
<i>Euphorbia exigua</i>	Dwarf Spurge							
<i>Euphorbia helioscopia</i>	Sun Spurge							
<i>Fagus sylvatica</i>	Beech							
<i>Fallopia convolvulus</i>	Black-bindweed							
<i>Festuca rubra</i>	Red Fescue							
<i>Fraxinus excelsior</i>	Ash							
<i>Fumaria densiflora</i>	Dense-flowered Fumitory							
<i>Fumaria officinalis</i>	Common Fumitory							
<i>Galium album</i>	Hedge Bedstraw							
<i>Galium aparine</i>	Cleavers							

		Western Portal	Western Portal	Western Portal	Western Portal	Eastern Portal	Eastern Portal	Eastern Portal
Species	Common name	IN(A)	IN(D)	IN(D)	IN(D)	Bowtie Field	Bowtie Field	Bowtie Field
		Arable	Arable and sown headlands	Permanent Grassland	Reversion grassland	Arable	Scrub and rough grassland	Broad-leaved plantation
Galium verum	Lady's Bedstraw							
Geranium dissectum	Cut-leaved Crane's-bill							
Geranium molle	Dove's-foot Crane's-bill							
Geranium pyrenaicum	Hedgerow Crane's-bill							
Geum urbanum	Wood Avens							
Glechoma hederacea	Ground-ivy							
Hedera helix	Common Ivy							
Heracleum sphondylium	Hogweed							
Holcus lanatus	Yorkshire-fog							
Hypericum hirsutum	Hairy St John's-wort							
Hypericum perforatum	Perforate St John's-wort							
Knautia arvensis	Field Scabious							
Lamium album	White Dead-nettle							
Lamium amplexicaule	Henbit Dead-nettle							
Lapsana communis	Nipplewort							
Legousia hybrida	Venus's-looking-glass							
Lepidium coronopus	Swine-cress							
Leucanthemum vulgare	Oxeye Daisy							
Ligustrum vulgare	Wild Privet							
Lolium perenne	Perennial Rye-grass							
Lotus corniculatus	Common Bird's-foot-trefoil							
Malva sylvestris	Common Mallow							
Matricaria discoidea	Pineappleweed							
Medicago lupulina	Black Medick							
Mercurialis perennis	Dog's Mercury							
Myosotis arvensis	Field Forget-me-not							
Onobrychis viciifolia	Sainfoin							
Papaver dubium	Long-headed Poppy							
Papaver hybridum	Rough Poppy							
Papaver rhoeas	Common Poppy							
Pastinaca sativa subsp. sylvestris	Wild Parsnip							
Persicaria maculosa	Redshank							
Plantago lanceolata	Ribwort Plantain							
Plantago major	Greater Plantain							
Plantago media	Hoary Plantain							
Poa annua	Annual Meadow-grass							
Poa pratensis	Smooth Meadow-grass							
Polygonum arenastrum	Equal-leaved Knotgrass							
Polygonum aviculare	Knotgrass							
Potentilla reptans	Creeping Cinquefoil							
Prunus spinosa	Blackthorn							
Ranunculus acris	Meadow Buttercup							
Reseda lutea	Wild Mignonette							
Rhamnus cathartica	Buckthorn							
Rosa canina	Dog-rose							
Rubus fruticosus agg.	Bramble							
Rumex acetosa	Common Sorrel							
Rumex crispus	Curled Dock							
Sambucus nigra	Elder							
Scabiosa columbaria	Small Scabious							
Schedonorus pratensis	Meadow Fescue							
Senecio jacobaea	Common Ragwort							
Senecio vulgaris	Groundsel							
Sherardia arvensis	Field Madder							
Silene latifolia	White Campion							
Sinapis arvensis	Charlock							
Sisymbrium officinale	Hedge Mustard							
Sonchus arvensis	Perennial Sow-thistle							
Sonchus asper	Prickly Sow-thistle							
Sonchus oleraceus	Smooth Sow-thistle							
Stachys palustris	Marsh Woundwort							
Stellaria media	Common Chickweed							
Taraxacum agg.	Dandelion							
Torilis japonica	Upright Hedge-parsley							
Trifolium campestre	Hop Trefoil							
Trifolium pratense	Red Clover							
Trifolium repens	White Clover							
Tripleurospermum inodorum	Scentless Mayweed							
Trisetum flavescens	Yellow Oat-grass							
Urtica dioica	Common Nettle							
Veronica arvensis	Wall Speedwell							
Veronica chamaedrys	Germander Speedwell							
Veronica persica	Common Field-speedwell							
Veronica polita	Grey Field-speedwell							
Viburnum lantana	Wayfaring-tree							
Viburnum opulus	Guelder-rose							
Vicia sativa	Common Vetch							
Viola arvensis	Field Pansy							



You may re-use this information (not including logos) free of charge in any format or medium, under the terms of the Open Government Licence. To view this licence:

visit www.nationalarchives.gov.uk/doc/open-government-licence/

write to the Information Policy Team, The National Archives, Kew, London TW9 4DU, or email psi@nationalarchives.gsi.gov.uk.

Mapping (where present): © Crown copyright and database rights 2021 OS 100030649.

You are permitted to use this data solely to enable you to respond to, or interact with, the organisation that provided you with the data. You are not permitted to copy, sub-licence, distribute or sell any of this data to third parties in any form.

This document is also available on our website at www.nationalhighways.co.uk

For an accessible version of this publication please call 0300 123 5000 and we will help you.

If you have any enquiries about this publication email info@highwaysengland.co.uk or call 0300 123 5000*. Please quote the National Highways publications code **PR26/22** National Highways creative job number **BRS17_0027**

*Calls to 03 numbers cost no more than a national rate call to an 01 or 02 number and must count towards any inclusive minutes in the same way as 01 and 02 calls.

These rules apply to calls from any type of line including mobile, BT, other fixed line or payphone. Calls may be recorded or monitored.

Printed on paper from well-managed forests and other controlled sources when issued directly by National Highways.

Registered office Bridge House, 1 Walnut Tree Close, Guildford GU1 4LZ

National Highways Limited registered in England and Wales number 09346363