A303 Amesbury to Berwick Down

TR010025

Volume 6

6.3 Environmental Statement Appendices

Appendix 8.2C Parsonage Down lichen report

APFP Regulation 5(2)(a)

Planning Act 2008

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

October 2018

Project:	**A303 Amesbury to Berwick Down**				
Title:	**Lichens at Parsonage Down, Winterbourne Stoke**				
Doc ID:	**HE51506-AMW-EBD-SW_GN_000_Z-TN-LE-0002**				
Date:	**01/12/17**	Version:	**1**	Status:	**Draft**

Revision	Date	Prepared by	Reviewed by	Approved by
P01	01/12/17	Mark Powell	James Riley	Stephanie Peay

1 Summary

Only one potentially notable lichen, *Catillaria fungoides* (Nationally Rare), was found at the survey site. This species was added to the British list in 2015 (Powell 2015) and the small flurry of records in the past two years suggests that it was previously overlooked. *C. fungoides* is a corticolous or lignicolous species; it is not terricolous and thus not relevant to maintaining favourable conservation status of Salisbury Plain SAC. The only category of lichens that would be germane to the conservation status of the primary SAC interest feature (calcareous grassland) are terricolous lichens. No terricolous lichens were found at Parsonage Bank.

2 Methods

2.1 The survey was conducted by Mark Powell on the 29th November 2017. All lichens and lichenicolous fungi that were encountered were recorded using the names currently listed in the BLS Taxon Dictionary.

2.2 Lichens were identified with the aid of a x10 hand lens and a set of three spot chemicals. Where relevant, the methodology recommended by BLS (2006) was followed. Some lichen species cannot be reliably identified in the field, therefore required microscopic examination. Frugal specimens were collected and placed into paper packets. Specimens were dried gently but swiftly to prevent degradation and subsequently stored in dry conditions. Standard light microscope techniques (British Lichen Society 2006) were used to confirm identifications.

2.3 The survey of all habitats at Parsonage Bank (southern part of Parsonage Down NNR) was conducted in fine weather conditions.

2.4 The area of Parsonage Down surveyed is shown in Figure 1 Appendix A

3 Results and Discussion

3.1 Forty-six taxa were recorded of which four are lichenicolous fungi and the rest lichenized fungi (lichens). No terricolous lichens were found despite careful searching of the most likely spots (steep banks and eroded paths). The lichens and lichenicolous fungi were all found on substrata common in Wiltshire (fence posts, trees, stones lying on the ground).

3.2 The trunk of a long dead fallen tree (Photograph 1, Appendix B) supports two Nationally Scarce species of lichen (*Caloplaca phlogina* and *Lecanora barkmaniana*). *C. phlogina* has been much under-recorded due to confusion with members of the look-alike *Caloplaca citrina* group, and hence its current status is 'Not Evaluated' and 'Nationally Scarce'. *Lecanora barkmaniana* was described as new to science in 1999, it appears to be common and widespread on nutrient-rich bark and lignum but has been overlooked since it resembles other more commonly recorded sorediate crusts. (Soredium (pl. soredia), a vegetative propagule produced in a soralium (a structure or region of a thallus bearing soredia), generally derived from the medulla, and lacking a cortex. Each soredium consists of a cluster of photobiont cells and hyphae).

3.3 Fence posts along the south side of Parsonage Bank are constructed of unpeeled chestnut (Photograph 1 & 2, Appendix B), their flaking dead bark and exposed lignum provide habitat for a number of lichens, the most interesting of which is *Caloplaca asserigena*, a diminutive species that is more commonly recorded on acid twigs.

3.4 The majority of grassland within Parsonage down forms a dense sward dominated by grasses and other vascular plants with no terricolous lichen present (Photograph 2, Appendix B), this is also the case on the steepest slopes (Photograph 3, Appendix B) and within erosion scars caused by slight land slipping (Photograph 4, Appendix B). Often these erosion scars support terricolous lichens but none were found on such features at Parsonage Down.

3.5 Scattered larch (*Larix decidua*) trees are present on site (Photograph 2, Appendix B), the exposed buttress roots of one of these trees (Photograph 5, Appendix B) supported the Nationally Rare *Catillaria fungoides* and the Nationally Scarce *Bacidia caligans*. Similar habitat in the vicinity supports the Nationally Scarce *Bacidia saxenii*.

3.6 Rabbit burrows and areas disturbed by rabbits expose flints of various sizes (Photograph 6, Appendix B), these flints sit in the turf and have acquired a small suite of lichen crusts. One of these *Lecania inundata* is listed as Nationally Scarce (Woods and Coppins, 2012) though this is due to past confusion with *L. erysibe* s. str.

3.7 A water trough with stones surrounding it (Photograph 7, Appendix B) supports a small number of lichens along with an unidentified species of *Verrucaria*. It is not unusual for species new to Britain, and new to science, to be found during lichen surveys. Powell (2015) reported that *V. obfuscans*, added to the British list in 2015, is actually very common in churchyards throughout England. Three species of Verrucaria have been added to the BLS Taxon Dictionary in 2017. The species found beside the drinking trough is in good condition and distinctive but the fact that it is currently unidentified does not imply that it is necessarily of conservation importance.

3.8 A list of all of the lichens and lichenicolous fungi recorded on Parsonage Down can

be found in Table 1 below.

Table 1: Lichens and lichenicolous fungi recorded on Beacon Hill

Standard British Lichen Society (BLS) number	Taxon	Taxon Type1	Conservation designation2	Substratum in which the taxon was growing3	Details of substratum using standard BLS codes4
212	*Amandinea punctata*	L	LC	Lig	LWT,PFp
137	*Bacidia caligans*	L	LC NS	Cort	CLx
1593	*Bacidia saxenii*	L	LC NS	Cort	CLx
207	*Buellia griseovirens*	L	LC	Cort	CLx
2371	*Caloplaca asserigena*	L	LC NS	Lig	LWT,PFp
242	*Caloplaca cerinella*	L	LC	Lig	LWT,PFp
2461	*Caloplaca oasis*	L	LC	Sax	SCk,SBo
2317	*Caloplaca phlogina*	L	NE ?NS	Lig	LDf
277	*Caloplaca saxicola*	L	LC	Sax	SCk,SBo
291	*Candelariella aurella f. aurella*	L	LC	Sax	SCk,SBo
297	*Candelariella reflexa*	L	LC	Lig	LDf
298	*Candelariella vitellina f. vitellina*	L	LC	Cort	CLx
299	*Candelariella xanthostigma*	L	LC	Cort	CLx
2647	*Catillaria fungoides*	L	NE NR	Cort	CLx
384	*Cladonia fimbriata*	L	LC	Lig	LLx,LTs
491	*Diploicia canescens*	L	LC	Cort	CLx
1704	*Halecania viridescens*	L	LC NS	Lig	LDf
2240	*Heterocephalacria physciacearum*	LF	LC NS	Lic	Z1112,CSm
1125	*Hyperphyscia adglutinata*	L	LC	Lig	LDf
2071	*Illosporiopsis christiansenii*	LF	LC NS	Lic	Z1530,CLx
613	*Lecania cyrtella*	L	LC	Lig	LWT,PFp
616	*Lecania erysibe s. str.*	L	LC	Sax	SCk,SBo
1707	*Lecania inundata*	L	LC NS	Sax	SFl,SPe
159	*Lecania naegelii*	L	LC	Cort	CLx
627	*Lecanora albescens*	L	LC	Sax	SCk,SBo
2121	*Lecanora barkmaniana*	L	LC NS	Lig	LDf
635	*Lecanora campestris subsp. campestris*	L	LC	Sax	SFl,SPe
636	*Lecanora carpinea*	L	LC	Lig	LWT,PFp
639	*Lecanora chlarotera*	L	LC	Lig	LWT,PFp
641	*Lecanora confusa*	L	LC	Lig	LWT,PFp
646	*Lecanora dispersa*	L	LC	Lig	LDf
649	*Lecanora expallens*	L	LC	Cort	CLx
672	*Lecanora pulicaris*	L	LC	Lig	LDs,LLx

797	*Lecidella elaeochroma f. elaeochroma*	L	LC	Lig	LWT,PFp
953	*Opegrapha niveoatra*	L	LC	Cort	CLx
1022	*Parmelia sulcata*	L	LC	Cort	CLx
1107	*Phaeophyscia orbicularis*	L	LC	Lig	LWT,PFp
1112	*Physcia adscendens*	L	LC	Cort	CLx
1127	*Physconia grisea*	L	LC	Cort	CLx
1235	*Ramalina fastigiata*	L	LC	Cort	CLx
2514	*Verrucaria nigrescens f. tectorum*	L	LC	Sax	SFl,SPe
2261	*Vouauxiella lichenicola*	LF	LC	Lic	Z0639,CLx
1530	*Xanthoria parietina*	L	LC	Lig	LWT,PFp
1531	*Xanthoria polycarpa*	L	LC	Lig	LWT,PFp
2272	*Xanthoriicola physciae*	LF	LC	Lic	Z1530,CLx
	Verrucaria sp.	#N/A	#N/A	Sax	SCk,SBo

[1] F= Fungus, LF= Lichenicolous fungus L= lichen

[2] DD = Data Deficient, LC = Least Concern, NE = Not Evaluated, VU = IUCN Vulnerable, IR = International Responsibility, NS = Nationally Scarce, NR = Nationally Rare.

[3] Cort = corticolous (growing on bark), Lic = lichenicolous (growing on or in lichens), Sax = saxicolous (growing on rocky substrata), Terr = terricolous (growing on the ground).

[4] CLX = Corticolous on *Larix,* CSm = Corticolous on *Sambucus,* LDf = Lignicolous on fallen dead tree trunk, LLx = Lignicolous on *Larix,* LTs = Lignicolous on tree stump, LWT = Lignicolous on worked timber, SBo = Saxicolous on a boulder, SCk = Saxicolous on chalk, SFl = Saxicolous on flint, SPe = Saxicolous on a pebble, Z1112 = Lichenicolous on *Physcia adscendens,* Z1530 = Lichenicolous on *Xanthoria parietina,* Z0639 = Lichenicolous on *Lecanora chlarotera.*

3.9 All the taxa are listed by Woods & Coppins (2012) as IUCN Least Concern, except for one case (*Caloplaca phlogina*) which is Not Evaluated. *Catillaria fungoides* (added to the British list in 2015) is also listed as Not Evaluated in the British Lichen Society (BLS) Taxon Dictionary. It is currently categorized as Nationally Rare (recorded in 1-15 British hectads, based on post-1960 records held by the BLS Mapping Scheme Database). *C. fungoides* is probably much under-recorded, and probably spreading, occurring on nutrient-rich bark. Nine of the taxa recorded are Nationally Scarce (recorded in 16-100 British hectads). Most of these are thought to be significantly under-recorded due to their inconspicuous nature and difficulties in accurate identification (requiring microscopic or other lab-based procedures for identification). One specimen (a species of *Verrucaria*) remains unidentified; it was found on stones used as rough paving beside a drinking trough.

3.10 Lichens are sensitive to changes in the environment and have often been used as environmental indicators (Hawksworth & Rose 1970, Nimis *et al*. 2002). Traffic creates dust and gaseous compounds of nitrogen, which can cause changes in lichen communities leading to a predominance of nitrophilic ruderal species (Angold 1997). Lichen communities have changed dramatically in lowland England in the past two decades due to the reduction in acidic atmospheric pollution (especially sulphur dioxide from coal burning) and the increasing influence of compounds of nitrogen (especially from the burning of fossil fuels and agricultural activities). The changes are most marked on relatively young bark of trees (Vilsholm *et al*. 2009,

Skinner 2016).

3.11 The Centre for Ecology and Hydrology (CEH) has developed an app which defines some nationally common species as either nitrogen sensitive or nitrogen tolerant. The app is a tool for assessing the status of nitrogen in an area by surveying lichens on trees. By identifying the presence or absence of nine nitrogen-sensitive and eight non-sensitive lichens on tree trunks and branches, nitrogen pollution can be estimated. www.apis.ac.uk/lichen-app/main

3.12 The trees and shrubs at Parsonage Down are dominated by nitrogen tolerant species and very few nitrogen sensitive ones are present. Of the latter, at Parsonage Down there is just one sensitive species (*Parmelia sulcata* on the exposed acid bark of Larix). The nitrogen sensitive species are restricted to niches which have retained some acidity due to the nature and position of the particular trunk or branch. *Bacidia saxenii* and *Buellia griseovirens* and were recorded on *Larix* trunks at Parsonage Down. These species are usually recorded in communities which are somewhat nitrogen sensitive, especially where the substratum is 'acidic', such as lignum. It is likely that *B. saxenii* and *B. griseovirens* are nitrogen sensitive but there appears to be no published information regarding the sensitivity of these two species. The situation is complicated because the *Larix* trunks also support various nitrogen tolerant species (both CEH listed ones, and ones that I consider so). It all depends on the position on the trunk, whether it is a part of the trunk which dries rapidly, or which receives water via a rain track, or experiences animal activity near its base. The CEH app stresses the necessity to record on individuals of a single species of tree growing in similar ecological conditions in order for the assessment of local nitrogen pollution to be reliable.

3.13 The proposed works (upgrading of the A303, Amesbury to Berwick Down) present no significant threats to lichens at Parsonage Down.

4 References

Angold, P.G. (1997) The impact of a road upon adjacent heathland vegetation: effects on plant species composition. *Journal of Applied Ecology* 34: 409-417.

British Lichen Society (2006) *Surveying and Report Writing for Lichenologists* (D.J. Hill, ed). British Lichen Society, London.

Fletcher, A. & Laundon, J.R. (2009) Caloplaca. In The Lichens of Great Britain and Ireland. (C.W. Smith, A. Aptroot, B.J. Coppins, A. Fletcher, O.L. Gilbert, P.W. James & P.A. Wolseley, eds): 245-273. London: British Lichen Society.

Hawksworth, D.L. & Rose, F. (1970) Qualitative scale for estimating sulphur dioxide air pollution in England and Wales using epiphytic lichens. *Nature* 227: 145-148.

Nimis, P.L., Scheidegger, C. & Wolseley, P.A. (2002) *Monitoring with Lichens – Monitoring Lichens*. Dordrecht: Kluwer Academic Publishers.

Powell, M. (2015). Two overlooked but widespread crusts: *Verrucaria obfuscans* and *V. ochrostoma*. *Bull. Brit. Lichen Soc*. 117: 2-6.

Powell, M. (2015). *Catillaria fungoides*. In New, rare and interesting lichens (ed.

C.J.B. Hitch), *Bull. Brit. Lichen Soc.* 116: 59.

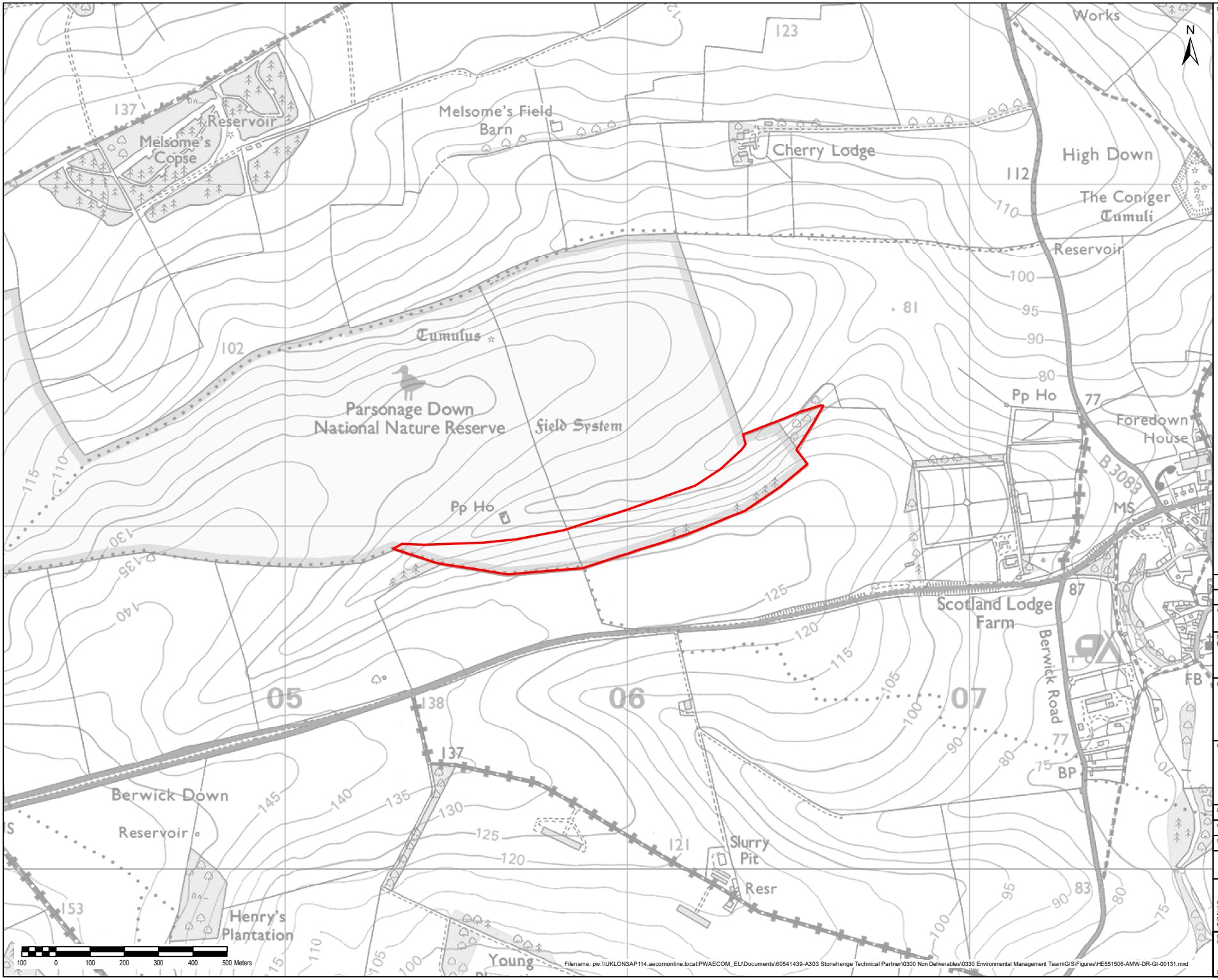
Skinner, J.F. (2016) Observations on changes in the lichen flora of Hatfield Forest, Essex, over a nineteen year period. *Bull. Brit. Lichen Soc.* 119: 42-48.

Smith, C. W., Aptroot, A., Coppins, B. J., Fletcher, A., Gilbert, O. L., James, P. J. & Wolseley, P. A., (eds) (2009) *The Lichens of Great Britain and Ireland*. London: British Lichen Society.

Woods, R. G. & Coppins, B. J. (2012). A Conservation Evaluation of British Lichens and Lichenicolous Fungi. Species Status 13. Joint Nature Conservation Committee, Peterborough.

Vilsholm, L., Wolseley, P.A., Søchting, U. & Chimonides, P.J. (2009) Biomonitoring with lichens on twigs. *Lichenologist* 41: 189-202.

Appendix A	Location of Survey



NOTES / LEGEND

Lichen Survey Extent

© Crown copyright and database rights 2017 Ordnance Survey 100030649.

Revision Details	By / Check	Date	Suffix

Purpose of issue: FINAL

Client: Highways England

Working on behalf of: highways england

Project Title:

A303 STONEHENGE
AMESBURY TO BERWICK DOWN

Drawing Title:

FIGURE 1
LICHEN SURVEY EXTENT
AT PARSONAGE DOWN

Designed	Drawn	Checked	Approved	Date
MLS	KD	CC	CC	23/01/2018

Internal Project No. 60547200

Scale @ A3 1:10,000 | Zone 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 Temple Quay
Bristol
BS1 6PN

AmW
AECOM + mace + WSP

Drawing Number Highways England PIN	Originator	Volume	Rev
HE551506	AMW	GEN	01
Location: SCHEME WIDE	Type: DR	Role: GS	Number: 131

Filename: pw:\\UKLON3AP114.aecomonline.local:PWAECOM_EU\Documents\60541439-A303 Stonehenge Technical Partner\0300 Non Deliverables\0330 Environmental Management Team\GIS\Figures\HE551506-AMW-DR-GI-00131.mxd

Appendix B	Photographs

Photograph 1: A long-dead fallen tree at SU 0644 4112

Photograph 2: Fence posts and isolated larch trees at the top (south edge) of Parsonage Bank

Photograph 3: View from SU 0588 4099

Photograph 4: Small erosion scar caused by slight land slipping at SU 057 410

Photograph 5: Base of one of the larch trees at the top (south side) of Parsonage Bank (SU 0620 4101)

Photograph 6: A 'dell' and rabbit burrows at SU 0597 4099

Photograph 7: Drinking trough at SU 0580 4109

Appendix B

Lichens are curious dual organisms, a close association between a fungus and a photosynthetic partner (usually a green alga). This association is so intimate that Victorian biologists argued about whether lichens were a single organism or a partnership. One school of thought maintained that the microscopic green cells within them were organelles produced by the fungus while others argued that the green cells were algae that had been entrapped by the fungus. We now know that the latter is correct but the degree to which the algae are exploited is still a matter for debate.

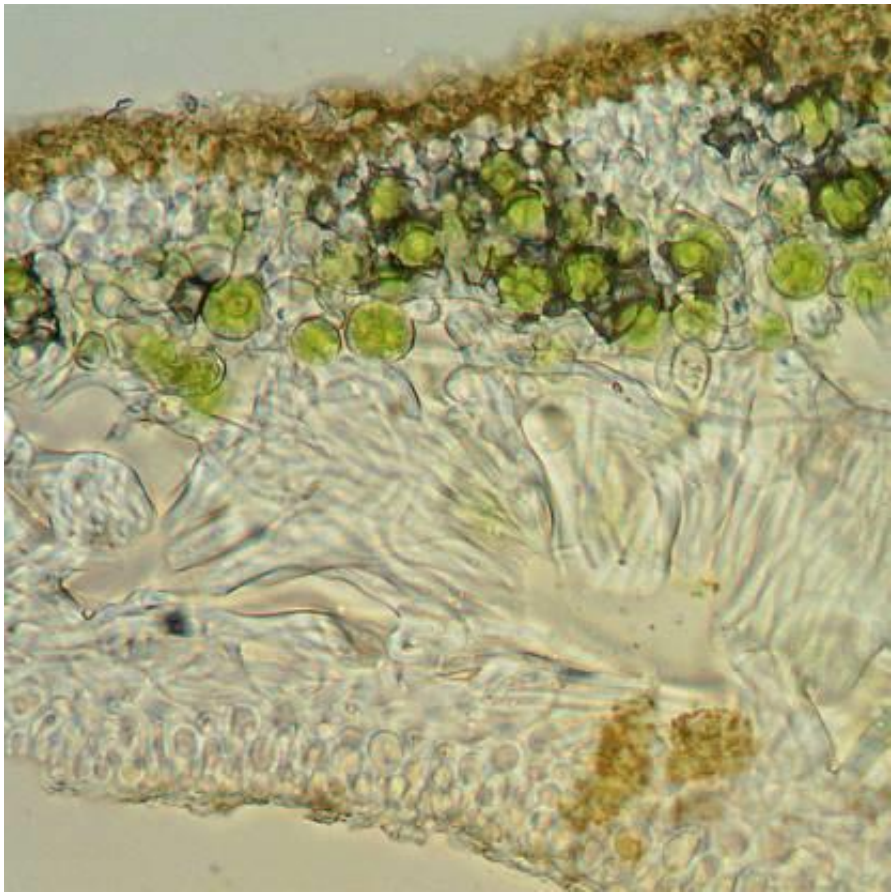


Fig B1. A cross section through a lobe of *Xanthoria parietina* (an extremely common lichen) as seen through a microscope. The thin section was cut by hand using a razor blade and mounted on a microscope slide. The algal cells (looking rather like peas but only one thousandth of the size) are seen in a layer towards the upper part. The glassy structures forming the bulk of the lichen are the fungal hyphae.

If you need help accessing this or any other Highways England information, please call **0300 123 5000** and we will help you.

© Crown copyright 2018.
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**.

This document is also available on our website at **www.gov.uk/highways**

If you have any enquiries about this document email **info@a303stonehenge.co.uk** or call **0300 123 5000***.

*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.

Registered office Bridge House, 1 Walnut Tree Close, Guildford GU1 4LZ
Highways England Company Limited registered in England and Wales number 09346363