M42 Junction 6 Development Consent Order

Scheme Number TR010027

8.48 Lichen Survey Report 2019

Planning Act 2008

Rule 8 (1)(k)

The Infrastructure Planning (Examination Procedure) Rules 2010

Volume 8

September 2019

ASPBURY'S COPSE (METROPOLITAN BOROUGH OF SOLIHULL)

LICHEN SURVEY (2019)

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July 2019

A Report from
BOTANICAL INVESTIGATIONS
For the sole use of
AECOM Infrastructure and Environment UK (Ltd)

Report No.: BIREP142-01 (R1)

ASPBURY'S COPSE (METROPOLITAN BOROUGH OF SOLIHULL)

LICHEN SURVEY (2019)

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01 OF 02

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Contract Number BI142

July 2019

EXECUTIVE SUMMARY

In 2019, AECOM Infrastructure and Environment UK Ltd instructed Dr Paul L Smith (Botanical Investigations) to conduct a survey of the lichens of 2.8 hectares of woodland known as Aspbury's Copse (Metropolitan Borough of Solihull). The Copse is an area of broadleaved woodland bisected by the M42 motorway, its northern edge defined by the B4102. It lies approximately 2.4 km south of M42 Junction 6. The habitat is considered 'Ancient replanted woodland' but carries no statutory nature conservation designation.

Powell surveyed the copse as part of a broader survey in 2014 (reported 2015) and found the two halves to differ in lichen-species composition, the eastern half supporting relatively common and widespread species, the western demonstrating a richer species diversity with scarcer species. Powell considered some of the species recorded to be of 'Regional value'.

44 lichen species were recorded for Aspbury's Copse in the present survey, 37 species from the western half and 29 for the eastern. This increases the species list for the site by 12. Of the species noted, *Lecanora barkmaniana* (Nationally scarce), *L. compallens* (Nationally scarce), *L. horiza* (Near threatened/Nationally scarce) and *Opegrapha viridpruinosa* (Nationally scarce) were the most notable. Other species included the lichenicolous fungi *Heterocephalaria physciacearum* and *Illosporiopsis christiansenii*, both Nationally scarce. These are fungi that grow on lichens.

The persistence of some species recorded in 2014 was not confirmed by the present survey but additional species were discovered. This variation is probably the result of minor habitat changes over intervening years and the complexity of the environment which means not all species will be recorded on each survey occasion.

The two sections of Aspbury's Copse show many features characteristic of ancient woodland and the tree canopy is largely native with additional planting of poplars and Scots pine. The lichen flora is relatively poor for an ancient woodland habitat. Tree boles in the interior of the woodland, in both halves, are dominated by crustose lichen species indicative of acidified bark, tolerance to pollution and the influence of nutrient enrichment. Former poor air quality across the Midlands and the current proximity of arable fields and the M42 probably contribute to this character, though the interior of the eastern half is also heavily shaded by dense canopy, a situation suboptimal for many lichen species.

In conclusion, Aspbury's Copse is of significance in the Midlands' landscape. None of the lichen species recorded for the site by Powell (2015) or during the present survey are protected under European legislation, Schedule 8 of the Wildlife and Countryside Act 1981, or listed as species of principal importance under Section 41 of the NERC Act 2006. However, the presence of

'Nationally scarce' lichen species in 'lowland mixed deciduous woodland', the latter regarded as a habitat of principal importance in England (Section 41 of the NERC Act 2006) and now occupying only about 1% of Britain's land area (Forestry Commission, 2003), reinforces the recognition of this site as being of 'County Value'. This accords with Powell's (2015) evaluation.

CONTENTS

1. INTRODUCTION

1.1. PROJECT BACKGROUND

On 30th May 2019, AECOM Infrastructure and Environment UK Ltd (the client) instructed Dr Paul L Smith (Botanical Investigations) to conduct a survey of the lichens of 2.8 hectares of woodland known as Aspbury's Copse (Metropolitan Borough of Solihull). The client requested a field survey for the target organisms and the production of an electronic report including a species list, images and an evaluation of the importance of the copse to lichens.

This survey work is required as part of the Highways England M42 Junction 6 Improvement Development Control Order (DCO) application.

Plans, results and figures arising from the study are included in Appendices 1 – 5 of this report.

1.2 SITE DESCRIPTION

Aspbury's Copse (OS Grid reference: SP 1909 8057), an area of broadleaved woodland, is bisected by the M42 motorway, its northern edge defined by the B4102 road between Catherine-de-Barnes and Hampton in Arden (Metropolitan Borough of Solihull). It lies approximately 2.4 km south of M42 Junction 6 (refer to Botanical Investigations Drawing BI142-D01 in Appendix 1).

The survey area is limited to the two halves of the Copse (refer to Botanical Investigations Drawing BI142-D02 in Appendix 2). The copse is portrayed as 'ancient replanted woodland' on DEFRA's Multi-Agency Geographic Information for the Countryside (MAGIC) website (refer to Appendix 3) but carries no statutory nature conservation designation. The eastern half is adjoined on its eastern edge by an area of 'traditional orchard'. 'Lowland mixed deciduous woodland' and 'traditional orchards' are recognised as priority habitats under the UK Post-2010 Biodiversity Framework[1]. The woodland is also recognised as a potential Local Wildlife Site (pLWS) in the database of Warwickshire Biological Record Centre under the name of Aspbury's Coppice (data search for AECOM, dated 10 October 2017).

[1] http://jncc.defra.gov.uk/page-5706 (accessed 31/05/19)

2. METHODOLOGY

Site Name	Aspbury's Copse, Metropolitan Borough of Solihull.
Client name	AECOM Infrastructure and Environment UK (Ltd)
Topic/Feature	Lichen survey
Surveyors Name, Organisation & Qualifications	2019 – **Dr Paul L. Smith** BSc (Hons), MCIEEM, CEnv (Botanical Investigations), accompanied by D. Reidy and A. Regan-Griffith on the first and second survey visits respectively as health and safety seconds.
Location	OS Grid Reference SP 1909 8057. Botanical Investigations Drawing BI142-D01 (Site location plan) (refer to Appendix 1). Botanical Investigations Drawing BI142-D02 (Survey areas and site observations) (refer to Appendix 2).
Dates & Times Survey	10th June 2019 (east of M42) 8.30 – 17.00 hrs; 17th June 2019 (west of M42) 8.15 – 17.00 hrs.
Weather Conditions at Survey	10th June 2019: 8.30 – 17.00 hrs. Morning 90% cloud, sun visible. 13 – 17 ^{0}C. Light showers began c. 12.30 pm, becoming heavy intermittently in the afternoon. 17th June 2019: 8.15 – 17.00 hrs. Morning 80% cloud, sun visible. 14 – 20 ^{0}C. No rain.
Methodology (in detail)	A desk study and a field survey were carried out. **Desk study**: DEFRA's MAGIC website was interrogated for the presence of designated nature conservation sites and ancient woodland at Aspbury's Copse. A request for relevant lichen species records from Warwickshire Biological Records Centre was initiated. This represented a 1 km radius search area centered on OS grid reference SP 1909 8057. A consultation with the British Lichen Society through Professor Mark Seaward and Dr Janet Simkin was also conducted on 28 – 30th June 2019. These consultations sought to locate existing lichen records for the site and immediate vicinity. Desk study results are presented in Appendix 3. The lichen assemblage of Aspbury's Copse was surveyed in August 2014 by Mark Powell for Wardell Armstong as part of a broader lichen survey relating to proposals for a Motorway Service Area. This report (Powell, 2015) is used as additional desk study data. **Field survey:** The present survey was carried out on: • 10/06/19 (Smith, P.L., Reidy, D.); • 17/06/19 (Smith, P.L., Regan-Griffith, A.) The survey was carried out by field walkover. An illuminated hand lens was used. Samples were collected for microscopy where necessary. The lichen flora of trees was surveyed up to head height. For purposes of survey and reporting, Aspbury's Copse was considered in two parts, i.e.: Area 1 (West of M42, South of B4102) - surveyed on 17th June and Area 2 (East of M42, South of B4102) – surveyed on 10th June. Many lichens cannot be identified in the field. Samples are therefore collected and returned to the laboratory for microscopical examination. *Table continues over page*

	British Lichen Society guidance (Hill, 2006) indicates that for very rich areas up to four days laboratory identification work may be required for every day in the field, though for less rich sites this may be only one or two days. The present survey area represents a woodland habitat and the site is small (< 3 hectares) but the range of crustose species requiring microscopical examination led to a need for four laboratory days for each field day. Species identification was carried out on site during field walkover, or by microscopy, on returning, from fresh and dried specimens. Chemical tests were applied with reference to Smith *et al*. (2009). Field survey results are presented in Appendices 4 and 5.
Guidance Documentation Used	Refer to 'References' at the end of this report
Deviations from Guidance	There were no deviations from the guidance.
Data collected	Records of species present on each occasion
Table of findings	The results are presented in Table A4.1 in Appendix 4.
Plan of findings	See Botanical Investigations Drawing: BI142-D02 in Appendix 2 for notable record locations.
Figures	Figures 1 – 29 (Appendix 5)
Status of Habitat –	Ancient replanted woodland
Status of species (RDB/BAP etc) – Table	Refer to Table A4.1 (Appendix 4)
Comparison with Other Site Data – published & non-published	Local site comparison with existing field records by Powell, M. (2015) *Motorway Service Area (MSA) and New Junction Between Junctions 5 & 6 of the M42, Solihull: Lichen Survey* (Wardell Armstrong)
Additional Notes/Appendices	Refer to appendices at end of report **Appendix 1:** Botanical Investigations Drawing BI142-D01 (Site location plan) **Appendix 2:** Botanical Investigations Drawing BI142-D02 (Survey areas and site observations) **Appendix 3:** Desk study data **Appendix 4:** Results Table A4.1 - Field records from current survey **Appendix 5:** Photographs (Figs. 1 – 29)
STATUS / Approval Signed Off/Date	Dr Paul L Smith (01/07/19)

Table 2.1: Methodological details

3. RESULTS

Refer to Botanical Investigations Drawing BI142-D02 in Appendix 2, Desk study data in Appendix 3, field survey results in Table A4.1 in Appendix 4 and digital images in Appendix 5 (Figs. 1 – 29). In the account below, the term 'Nationally Scarce', as used by Woods and Coppins (2012), refers to lichen species that are known to occur in 16 to 100 ten-km squares (or hectads) in Great Britain. 'Least concern' relates to the threat a species is under and includes widespread and abundant taxa (IUCN, 2014). A species can be 'Nationally Scarce' but not be considered under threat. This can be for various reasons, including under recording of an inconspicuous species, a taxon's exploitation of widely occurring but transient habitats and the fact that a species is under no major threat in a large part of its range (refer to Woods and Coppins (2012) for a discussion).

3.1 DESK STUDY

Examination of DEFRA's MAGIC website (refer to Appendix 3) indicates that Aspbury's Copse is considered 'ancient replanted woodland' but carries no statutory nature conservation designation. The woodland is also recognised as a potential Local Wildlife Site (PLWS) in the database of Warwickshire Biological record Centre under the name of Aspbury's Coppice (data search for AECOM, dated 10 October 2017).

A request (10/06/19) to Warwickshire Biological Record Centre for lichen species records from a 1 km radius search area centred on Ordnance Survey grid reference SP 1909 8057 revealed that no records were held for Aspbury's Copse.

The British Lichen Society (BLS, Dr Janet Simkin, 30/06/19) has provided permission to use BLS lichen records from the NBN (National Biodiversity Network) Atlas[2] for a 10 km radius search from the centre of Aspbury's Copse (SP 1909 8057) for the present study (1 km is sufficient for the woodland itself, but 10 km gives context to some of the scarcer species records). The relevant databases are: BLS Lichen Database English Churchyards 1650 – 2016, BLS Mapping Scheme Dataset 1750 – 2009, BLS Lichen Database: England 1650 - 2016. Professor Mark Seaward and Dr Simkin have also supplied more recent records for the site. A copy of the BLS lichen species list for the 10 km Ordnance Survey grid square (hectad) within which Aspbury's Copse is located is included in Appendix 3 (courtesy of Professor Seaward). The most notable species record from the hectad list is *Lobaria pulmonaria* (protected under Wildlife and Countryside Act (1981) Schedule 8). This is an old record (Seaward, *pers. com*.) but the species may reappear in the future if air quality in the Midland region ameliorates.

[2] https://species.nbnatlas.org/ (accessed 01/07/19)

Aspbury's Copse was surveyed for lichens in 2014 (reported 2015) by Mark Powell for Wardell Armstrong as part of a broader survey and assessments relating to a new motorway Service Area and junction between Junctions 5 and 6 of the M42 (Powell, 2015). This report listed 32 species of lichen from the copse itself.

A 1 km radius NBN Atlas search (results also included in Appendix 3) provided the following notable[3] records: *Bacidia friesiana* (Least concern/Nationally scarce), *B. sulphurella* (Least concern/Nationally scarce), *Caloplaca phlogina* (Not evaluated/Nationally scarce), *Catillaria nigroclavata* (Least concern/Nationally scarce), *Lecanora hagenii* (Not evaluated), *Opegrapha viridipruinosa* (Least concern/Nationally scarce) and *Xanthoria ucrainica* (Least concern/Nationally scarce). Powell (2015) recorded all of these either in, or near, Aspbury's Copse except for *Xanthoria ucrainica*. The latter is very common but an under-recorded species (see Smith *et al*., 2009).

Powell (2015) found the two halves of the copse to differ in lichen-species composition, the eastern half supporting relatively common and widespread species, the western demonstrating a richer species diversity with scarcer species. That survey reported *Bacidia friesiana* (Nationally scarce), *B. sulphurella* (Nationally scarce), *Catillaria nigroclavata* (Nationally scarce) and *Normadina pulchella* (Least concern) from the Western half of the copse with *Opegrapha viridipruinosa* (Nationally scarce) and *Caloplaca phlogina* (Nationally scarce) on hedgerow trees to the south of the woodland. Powell considered these species to be of 'Regional value' and attributed the woodland as a whole 'County value' status due to the presence of the 'Nationally scarce' species noted in the western half.

3.2 FIELD SURVEY (2019)

The lichen and certain micro-fungi species recorded during the field survey are detailed in Table A4.1 in Appendix 4. These are listed alongside records made by Powell in 2014. The character of the woodland is illustrated in Figs. 1 – 12, Appendix 5 and described here for context.

Area 1: West of M42 (habitat character)

The western half of Aspbury's Copse is an area of mixed species, broad-leaved woodland with a species diverse herbaceous flora. The copse is divided into three sections by a former road and concrete track now largely obscured by leaf-fall and vegetation. A metal cattle-grid marks the junction of the two route-ways, providing a useful feature for orientation (refer to Botanical Investigations Drawing BI142-D02, Appendix 2). The canopy includes: Apple (*Malus* sp.), ash

[3] i.e.: Species with a designation additional to 'Least concern', e.g. 'Nationally scarce'.

(*Fraxinus excelsior*), silver birch (*Betula pendula*), dogwood (*Cornus sanguinea*), elder (*Sambucus nigra*), field maple (*Acer campestre*), hawthorn (*Crataegus monogyna*), hazel (*Corylus avellana*), oak (*Quercus sp.*), pear (*Pyrus* sp.), poplar (*Populus* sp.) and sycamore (*Acer pseudoplatanus*). Fallen trees and branches complicate survey work within this area. Large specimens of poplar and multi-stemmed mature ash were notable features, providing good lichen substrates. A wet ditch penetrates the woodland from the west.

The ground flora includes an ancient woodland indicator assemblage (refer to Smith, 2013) including: bluebell (*Hyacinthoides non-scripta*), broad buckler-fern (*Dryopteris dilatata*), bugle (*Ajuga reptans*), dog's mercury (*Mercurialis perennis*), enchanter's nightshade (*Circaea lutetiana*), germander speedwell (*Veronica chamaedrys*), herb robert (*Geranium robertianum*), male fern (*Dryopteris filix-mas*), moschatel (*Adoxa moschatellina*), wood anemone (*Anemone nemorosa*) and wood millet (*Millium effusum*). Two spikes of a helleborine were emerging, probably broad-leaved helleborine (*Epipactis helleborine*) but not yet sufficiently developed for certain identification. Foxglove (*Digialis purpurea*) was noted at one point, suggestive of some acidic soil conditions.

Non-lichen macro-fungi included jelly ear (*Auricularia auricula-judae*). The slime mould *Lycogala terrestre* was sporulating on rotten wood. Bryophytes noted include: Dilated scalewort (*Frullania dilatata*), wood bristle-moss (*Orthotrichum affine*) and a pincushion moss (*Ulota* cf. *bruchii*).

Adverse ecological issues included dense swathes of cleavers (*Galium aparine*) and some nettle (*Urtica dioica*) growth. This probably indicates soil eutrophication. Air quality is notably poor, especially on the edge of the woodland bordering the motorway. The woodland is bordered to the south and west by agricultural fields and there is some evidence of littering (old metal, glass).

Area 2 East of M42 (habitat character)

The eastern half of Aspbury's Copse is a relatively dense area of mixed-species broad-leaved woodland inter-planted with Scots pine (*Pinus sylvestris*). The canopy includes: Ash (*Fraxinus excelsior*), birch (*Betula* sp.) dogwood (*Cornus sanguinea*), elder (*Sambucus nigra*), field maple (*Acer campestre*), hawthorn (*Crataegus monogyna*), hazel (*Corylus avellana*), holly (*Ilex aquifolium*), pedunculate oak (*Quercus robur*), poplar (*Populus* sp.), sessile oak (*Quercus petraea*) and sycamore (*Acer pseudoplatanus*). A crack willow (*Salix fragilis*) occurs near the southern boundary at the site of a former pond. A large multi-stemmed sycamore dominates the canopy at SP 19180, 80605. Signs of former management are notable in the form of coppiced hazel and other species and earth banks.

The ground flora includes a range of ancient woodland indicator plant species including: bluebell (*Hyacinthoides non-scripta*), broad buckler-fern (*Dryopteris dilatata*), germander speedwell (*Veronica chamaedrys*), wood anemone (*Anemone nemorosa*), wood millet (*Millium effusum*) and wood sorrel (*Oxalis acetosella*). A single specimen of a helleborine (probably *Epipactis helleborine*, but not in flower, Fig. 10, Appendix 5) was noted in the centre of the wood.

The woodland interior is heavily shaded, a condition not beneficial to lichen diversity. The shade lichen *Lepraria incana* is common on tree boles. Humidity supports a woodland bryophyte flora. Swan's-neck thyme-moss (*Mnium hornum*) is present in the herb layer. The tree boles and lower branches support conspicuous colonies of wood bristle-moss (*Orthotrichum affine*). Occasional colonies of even scalewort (*Radula complanata*) indicate the sheltered nature of the conditions inside the woodland. The presence of minute pouchwort (*Cololejeunea minutissima*), a species undergoing an increase in range, may be indicative of climate change and reduced sulphur dioxide pollution (Blockeel *et al*., 2014 provide a discussion).

Conspicuous macro-fungi noted include: *Phallus impudicus* var. *togatus* (Fig. 11, Appendix 5 - a seldom recorded variety cf. Buczacki, 2012)), *Piptoporus betulinus*, *Trametes versicolor* and *Auricularia auricula-judae.*

Examples of mature ash, oak and poplar were found to be providing the best lichen substrates. These were the older trees in the woodland. Those near the woodland margins were exposed to additional sunlight, beneficial to the lichen assemblages.

Adverse ecological issues include evidence of eutrophication as indicated by colonies of stinging nettle (*Urtica dioica*), ground elder (*Aegopodium podagraria*) and cleavers (*Galium aparine*). Trees and shrubs at the edge of the woodland support the Xanthorion, a colony of nitrophilous lichens made conspicuous by the orange thalli of *Xanthoria parietina* (Fig. 7, Appendix 5). Surrounding agricultural activity, and NO_X (oxides of nitrogen) deposition from vehicles on the motorway (e.g. Holman *et al*. 2019), may contribute to this. Evidence of substantial littering is present in the form of mounds of car tyres and other refuse.

Lichen records

The lichen species recorded during the field survey are presented in Table A4.1 in Appendix 4 alongside those of Powell (2015). A total of 44 lichen species were recorded for Aspbury's Copse in the present survey, 37 lichen species from the western half and 29 for the eastern. This increases the species list for the site by 12 (Figs. 13 – 29, Appendix 5, show some of the species). Of the species noted, *Lecanora barkmaniana* (Nationally scarce), *L. compallens* (Nationally scarce), *L. horiza* (Near threatened/Nationally scarce) and *Opegrapha viridpruinosa* (Nationally

scarce) (Fig. 22, Appendix 5) were the most notable. Other species included the lichenicolous fungi *Heterocephalaria physciacearum* (Fig. 29, Appendix 5) and *Illosporiopsis christiansenii* (Fig. 28, Appendix 5), both Nationally scarce. These are fungi that grow on lichens. Locations are indicated on Botanical Investigations Drawing BI142-D02 in Appendix 2.

With reference to the British Lichen Society Lichen Database for English Churchyards 1650-2016, BLS Mapping Scheme Dataset 1750 – 2009 and BLS Lichen Database England 1650 – 2016[4], and following consultation with the British Lichen Society itself, subject to confirmation, the following are new species records from 10 km Ordnance Survey grid square SP 18: *Arthonia didymia, Bacidia delicata, Hypotrachnya revoluta, Lecanora barkmaniana, L. compallens, L. horiza, Opegrapha ochrocheila, O. rufescens, O. varia, O. viridipruinosa, Phlyctis argena* and *Phyconia perisidiosa.*

No records for the lichenicolous microfungi *Heterocephalaria physciacearum, Illosporiopsis christiansenii* or *Xanthoriicola physciae* are presented on the NBN Atlas from the 10 km radius search area.

The persistence of some species recorded in 2014 was not confirmed by the present survey, i.e. *Bacidia friesiana* (Nationally scarce), *B. sulphurella* (Nationally scarce), *Catillaria nigroclavata* (Nationally scarce) and *Normandina pulchella* (*Least concern*).

The significance of these observations is discussed below.

[4] Interrogated via NBN Atlas with permission of British Lichen Society (Dr Janet Simkin, 28/06/19)

4. DISCUSSION AND CONCLUSIONS

The two sections of Aspbury's Copse show many features characteristic of ancient woodland and the tree canopy is largely native with additional planting of poplars and Scots pine. The herb flora is species diverse, though shows evidence of significant soil eutrophication in places, notably in the western half of the woodland (Fig. 5, Appendix 5). The lichen flora is relatively poor for an ancient woodland habitat (refer to Table A.1, Appendix 4). Tree boles in the interior of the woodland, in both halves, are dominated by crustose lichen species indicative of acidified bark, tolerance to pollution and the influence of nutrient enrichment. Former poor air quality across the Midlands (e.g. Hawksworth (1975) for a discussion) and the current proximity of arable fields and the M42 probably contribute to this character, though the interior of the eastern half is also heavily shaded by dense canopy, a situation suboptimal for many lichen species.

Despite a dense canopy and eutrophication, the lichen assemblage is not without interest and the diverse range of tree bark substrates provides opportunities for re-colonisation if air quality improves. The presence of *Candelaria concolor* (Fig. 16, Appendix 5), a species spreading as atmospheric sulphur dioxide levels diminish (refer to Smith *et al*. 2009), supports the view that conditions may be ameliorating. Variation in the species recorded in the 2014 (Powell, 2015) and 2019 surveys is probably the result of minor habitat changes over the intervening years and the complexity of the environment, which means not all species will be recorded on each survey occasion. The western half of the woodland was notably difficult to survey in places due to fallen dead wood but suitable habitat remains for the species noted in 2014 and the Western half remains the most species diverse for lichens.

Of the notable lichen species recorded in 2019 (refer also to Botanical Investigations Drawing BI142-D02), the following points may be made:

- *Lecanora barkmaniana* (Nationally scarce) (on *Fraxinus excelsior* SP 18939, 80607). A species of nutrient and dust-enriched tree bark (see Smith *at al*., 2009), also recorded by Powell (2015) to the north of the B4102.
- *L. compallens* (Nationally scarce) (on *Fraxinus excelsior* SP 18994, 80539). A species of wayside and parkland trees and shrubs, probably widespread (see Smith *et al*. 2009)
- *L. horiza* (Near threatened/Nationally scarce) (on *Populus*, SP 19175, 80481). A species of deciduous tree bark frequently overlooked for *L. chlarotera* (see Smith *et al*. 2009)
- *Opegrapha viridpruinosa* (nationally scarce) - SP 18965, 80537 & SP 18928, 80643, also recorded by Powell (2015) in a hedgerow south of Aspbury's Copse. Appears to be common on dry bark but only recently described and currently under-recorded (see Dobson, 2018)

The copse supports a relatively diverse array of lirellate (script) lichens and microfungi that are easy to confuse without microscopical examination (Figs. 21 – 27, Appendix 5). Lirellate lichens *Opegrapha herbarum* (many locations), *O. ochrocheila* (on *Fraxinus excelsior* SP 18994, 80575), *O. rufescens* (also on *Fraxinus excelsior* SP 18994, 80575), *O. varia* (on *Fraxinus excelsior* in eastern half of copse) and *O. viridipruinosa* (on *Acer campestre* SP 18965, 80537) are present with the lirellate microfungi *Hysterium angustatum* (on *Quercus* sp. SP 19001, 80569) and *Hysterobrevium mori* (on *Crataegus monogyna* SP 18947, 80590). As explained in the Results section, three of these *Opegrapha* species records (*O. ochrocheila, O. rufescens, O. varia*) are potentially new for OS 10 km grid square SP 18. There is currently no formal assessment of the scarcity of *Hysterium* and *Hysterobrevium* species in Great Britain.

Though only casually examined, the corticolous bryophyte flora also indicates that the copse has some bryological potential. The presence of dilated scalewort (*Frullania dilatata*), even scalewort (*Radula complanata*), minute pouchwort (*Cololejeunea minutissima*), wood bristle-moss (*Orthotrichum affine*) and a pincushion moss (*Ulota* cf. *bruchii*) support the view that the woodland flora retains features of biodiversity interest.

In conclusion, Aspbury's Copse is of significance in the Midlands' landscape. It provides a refuge for relict ancient woodland plant species and a lichen assemblage that, although limited by air pollution and eutrophication from various sources, is still of significance to broader re-colonisation, particularly if and as improvements to air quality occur. Changing air quality has been an important driver of change for bryophytes and lichens in Britain and Ireland over the 20th Century (Pescott *et al.,* 2015).

None of the lichen species recorded for Aspbury's Copse by Powell (2015) or during the 2019 survey is protected under European legislation, Schedule 8 of the Wildlife and Countryside Act 1981 or listed as species of principal importance under Section 41 of the NERC Act 2006 (cf. JNCC (2019) taxon designations spreadsheet *20180725*). However, the presence of Nationally scarce lichen species in 'lowland mixed deciduous woodland', the latter regarded as a habitat of principal importance in England (Section 41 of the NERC Act 2006), supports the site being recognized as a pLWS. The presence of characteristic ancient woodland elements and other species dependent upon lichens (e.g. *Luffia ferchaultella* - Fig. 12, Appendix 5) reinforces this view. CIEEM guidance (2018) on evaluating the importance of ecological features refers to sites that may act as 'stepping stones' allowing species to move through the environment and those that support species that are 'rare or uncommon'. Aspbury's Copse meets both criteria and is also a relict of ancient semi-natural woodland, a vegetation type that now occupies only about 1% of Britain's land area (see Forestry Commission 2003). Considering the above, Powell's (2015) evaluation of the copse as being of 'County Value' seems reasonable.

5. RECOMMENDATIONS

In the absence of information regarding potential effects on the copse woodlands from highway or other works, recommendations are perforce perfunctory. The lichen flora merits consideration in any mitigation strategy for reasons discussed above.

Species diversity of the Asbury's Copse lichen assemblage could be improved by selective canopy thinning to allow greater penetration of sunlight to the tree boles. The woodland shows evidence of significant tree and branch falls from previous seasons and assembly of these pieces into deadwood piles would benefit a range of lichen and other fungal species. The woodland shows signs of former management such as ancient coppicing and other tree works (many of the mature ash are multi-stemmed examples). Earth banks are also present suggesting some form of compartmentalisation. This history will have helped shape the current lichen community. The individual large trees, including those that have features typical of veteran trees (notably the specimens of ash but also poplar, oak and field maple) in both sides of the copse provide the most species diverse lichen habitats present. Individual tagging and evaluation of these would benefit future lichen survey and management.

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APPENDICES

APPENDIX 1: Location Plan
(Botanical Investigations Drawing BI142-D01)

APPENDIX 2: Survey Areas and Site Observations
(Botanical Investigations Drawing: BI142-D02)

APPENDIX 3: Desk study data
Acknowledged sources:

- DEFRA MAGIC Website,
- British Lichen Society Databases via NBN Atlas and Consultation

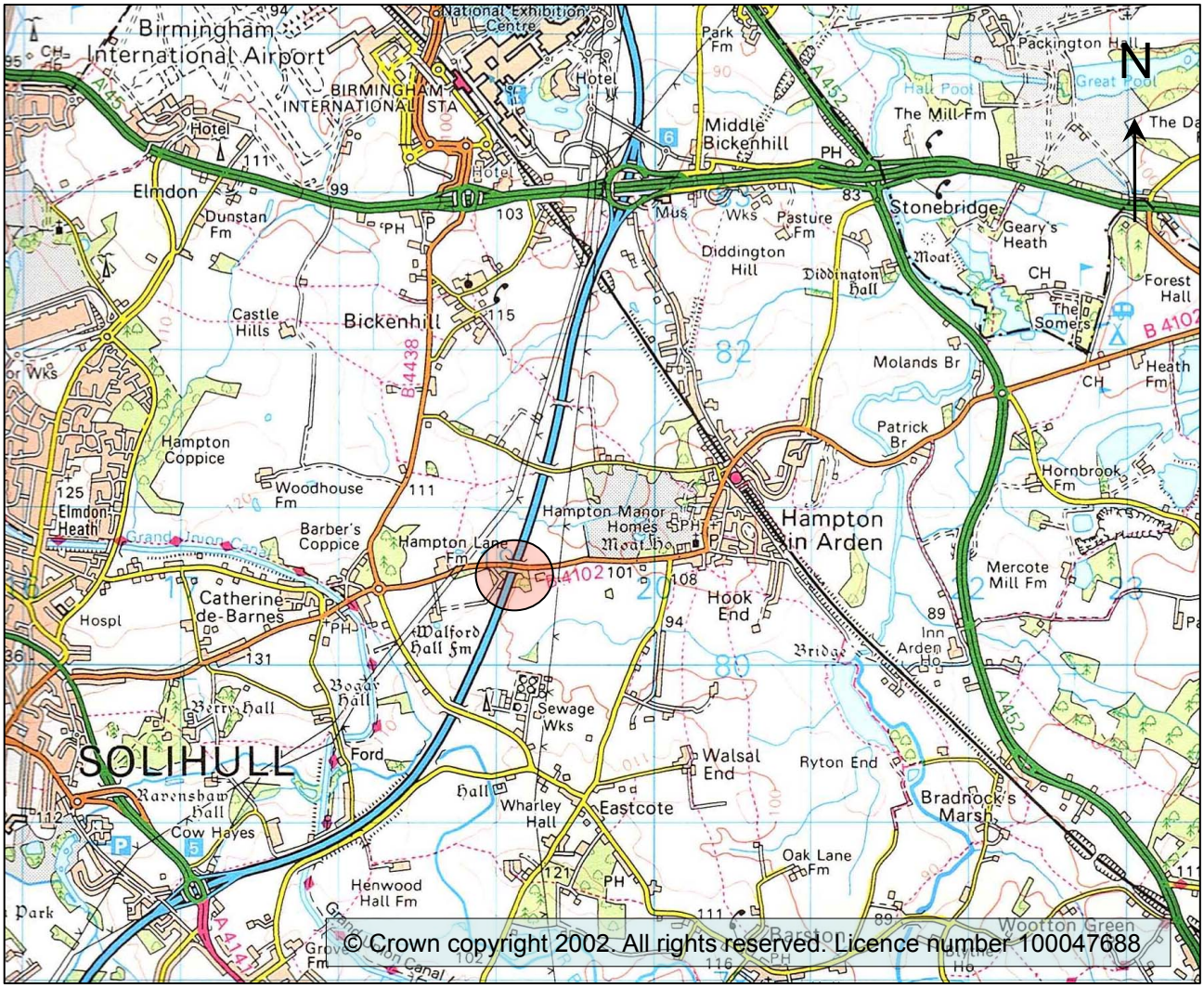
APPENDIX 4: Results
Table A.1: Species Recorded

APPENDIX 5: Photographs (Figures 1 - 29)

APPENDIX 1

Location Plan

(Botanical Investigations Drawing BI142 - D01)



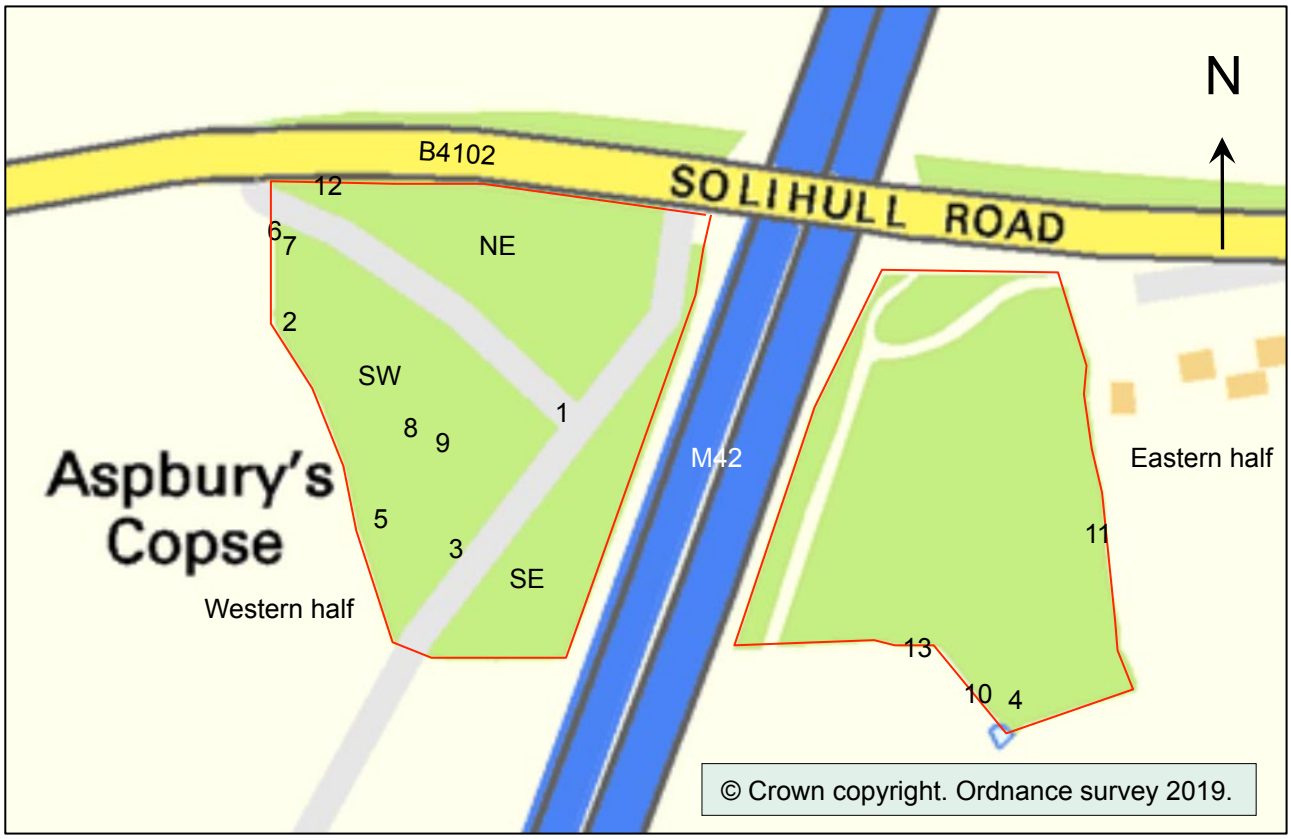
KEY	
	Lichen survey site location

BOTANICAL INVESTIGATIONS (www.botanicalinvestigations.co.uk)	
DWG No.:	BI142-D01
Title:	Location Plan (OGR SP 1909 8057)
Location:	Aspbury's Copse (Solihull, UK)
Client:	AECOM Infrastructure and Environment UK Ltd
Drawn by:	Dr Paul L. Smith
Scale:	Not to Scale
Date:	25/06/19

APPENDIX 2

Survey Areas and Site Observations

(Botanical Investigations Drawing BI142 - D02)



KEY	
◯	Lichen and non-lichen fungus survey site locations
1	Cattle grid
2	*Lecanora barkmaniana*
3/11 /12	*Lecanora compallens*
4	*Lecanora horiza* on poplar
5	*Opegrapha viridipruinosa*
6	*Opegrapha ochrocheila* on oak
7	*Opegrapha viridipruinosa* on elder
8	*Illosporiopsis christiansenii* on fallen branch
9	*Opegrapha ochrocheila & O. rufescens* on ash
10	*Opegrapha varia* on ash
13	*Heterocephalaria physciacearum* & *Xanthoriicola physciae*

The cattle grid (1) provides a useful feature to divide the western half of the copse into North East (NE), South West (SW) and South East (SE) sectors.

BOTANICAL INVESTIGATIONS (www.botanicalinvestigations.co.uk)	
DWG No.:	BI142-D02
Title:	Survey areas & site observations
Location:	Aspbury's Copse (Solihull, UK)
Client:	AECOM Infrastructure and Environment UK Ltd
Drawn by:	Dr Paul L. Smith
Scale:	Not to Scale
Date:	21/06/19

APPENDIX 3

Desk study data

DEFRA MAGIC Search for designated nature conservation areas.

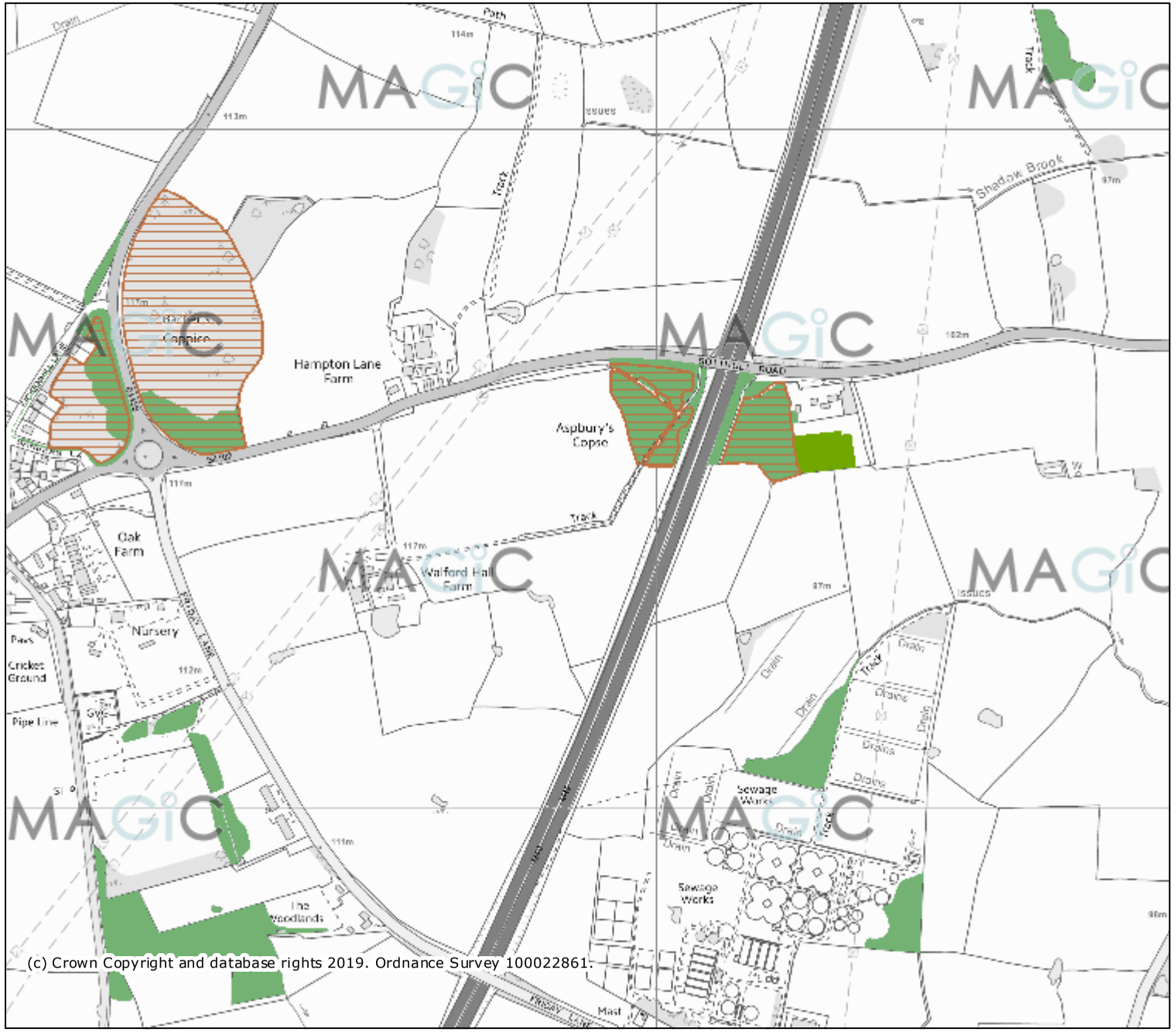
DEFRA MAGIC search for ancient woodland

British Lichen Society Data

Summary of Species at British Location SP(42)18 (10 km OS Grid Square) –
courtesy of Professor Mark Seaward (British Lichen Society, 28 June 2019).

Results of 1 km radius species record search centred on SP 1909 8057
from NBN Atlas - courtesy of Dr Janet Simkin (British Lichen Society, 20 June 2019).

Aspbury's Coppice Designations



Legend

- Local Nature Reserves (England)
- National Nature Reserves (England)
- Sites of Special Scientific Interest (England)
- Special Areas of Conservation (England)
- Possible Special Areas of Conservation (England)
- Special Protection Areas (England)
- Potential Special Protection Areas (England)
- Biosphere Reserves (England)
- Community Forests (England)

Ancient Woodland (England)

- Ancient and Semi-Natural Woodland
- Ancient Replanted Woodland
- Priority Habitat Inventory - Deciduous Woodland (England)
- Priority Habitat Inventory - Traditional Orchards (England)

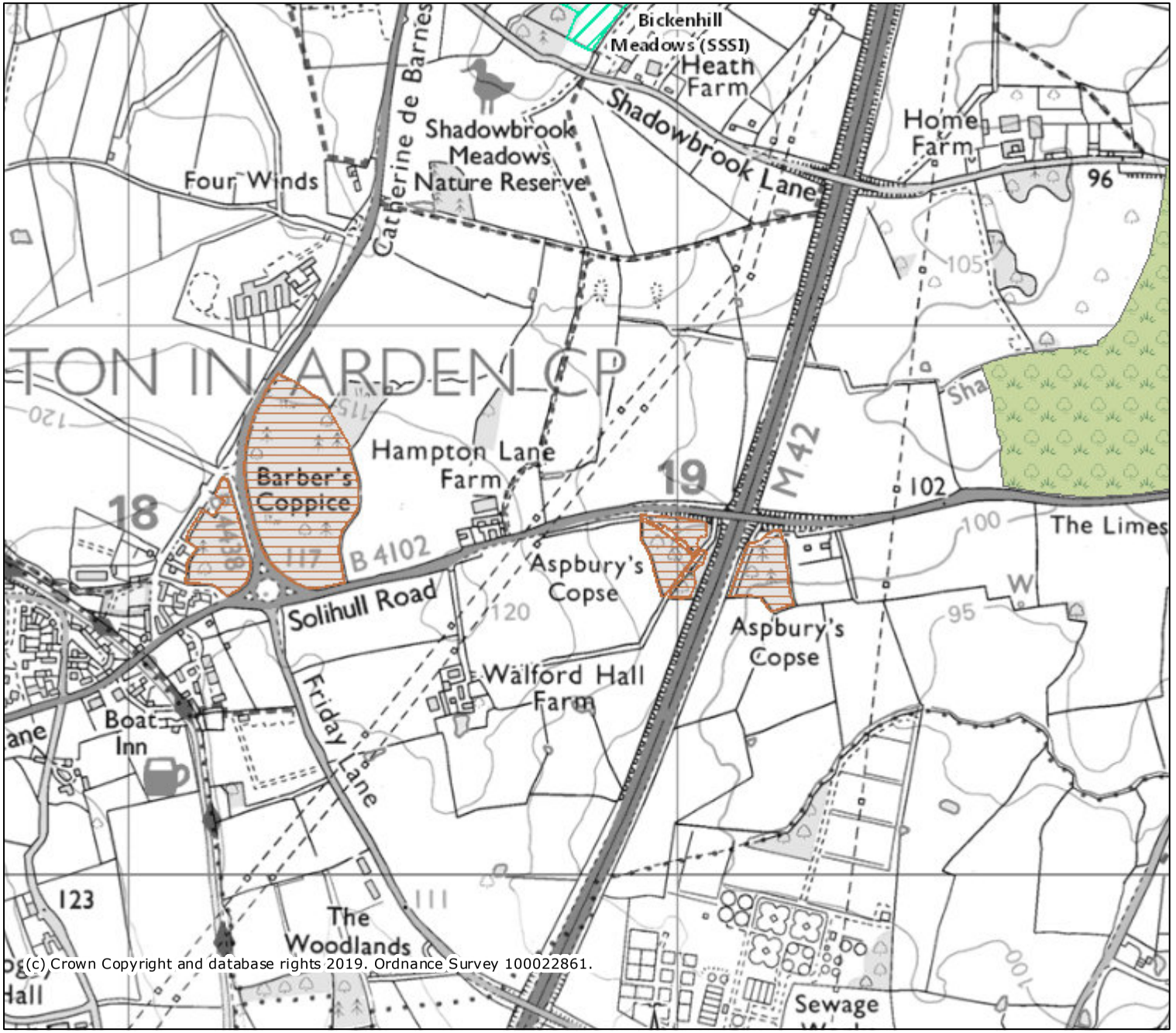
Projection = OSGB36
xmin = 417100
ymin = 279100
xmax = 420700
ymax = 281800

0 0.15 0.3
km

Map produced by MAGIC on 31 May, 2019.

MAGIC

Aspbury's Copse



Legend

- Local Nature Reserves (England)
- Sites of Special Scientific Interest (England)

Ancient Woodland (England)

- Ancient and Semi-Natural Woodland
- Ancient Replanted Woodland
- Woodpasture and Parkland BAP Priority Habitat (England)

Projection = OSGB36
xmin = 417300
ymin = 279300
xmax = 420400
ymax = 282000

0 0.2 0.4
km

Map produced by MAGIC on 11 March, 2019.

Summary of species at British location 4218

212		AMAND PUNC
45	*	ANAP CILI CILI
247		CALO CITR S.L.
259		CALO FLAVES
261		CALO HOLO S.L.
291		CANDELARIEL AURE AUR
298		CANDELARIEL VITE VIT
371		CLAD CHLO S.L.
375		CLAD CONIO
426	*	CLAD UNCI BIUN
474	*	CYPH INQU
491	*	DIPLOI CANE
511		EVERNIA PRUN
987		FLAVOPARM CAPE
555		HAEM OCHR PORP
578		HYPOCEN SCAL
582		HYPOGY PHYS
2468		HYPOTR AFRO
627		LECANORA ALBESCENS
636	*	LECANORA CARPI
643		LECANORA CONIZ CONIZ
646		LECANORA DISP
661		LECANORA MURA
757		LECANORA OROS
667		LECANORA POLY
621		LECANORA UMBR
738		LECIDEA LAPIC
802		LECIDELLA SCAB
803		LECIDELLA STIG
820		LEPRAR INCA S.L.
857	*	LOBA PULM
998		MELANELIX FULI
997		MELANELIX GLAB
1020		MELANELIX SUBAUR
1022		PARMELIA SULC
1024	*	PARMELINA TILI
1107		PHAEOPH ORBI
1114		PHYSCIA CAES
1120		PHYSCIA TENE TENE
1127	*	PHYSCON GRIS
1139		PLACYNTHIUM NIGR
572		PORP TUBE
1200		PSIL LUCI
1234		RAMA FARI
1235	*	RAMA FAST
1236	*	RAMA FRAX
1289		RINO OLEAE
1320		SCOL CHLO
630		TEPH ATRA ATRA
1431		TRAPELIA COAR
1595		TRAPELIA PLAC
727		TRAPELIOP GRAN
1582		TRAPELIOP PSEU
1507		VERRUCAR MURA
1510		VERRUCAR NIGR NIGR
1526		XANTHORIA CALC
1527		XANTHORIA CAND S.L.
1530		XANTHORIA PARI
1531		XANTHORIA POLY
1978		CH'YARD SURVEY
1535	*	PROGRESS MAP

NBN Lichen data for 1 km radius search centred on SP 1909 8057 with permission of:
Dr Janet Simkin, British Lichen Society, 30 June 2019

Species Name	Scientific Name Authorship
Amandinea punctata	(Hoffm.) Coppins & Scheid.
Anisomeridium polypori	(Ellis & Everh.) M.E. Barr
Arthonia radiata	(Pers.) Ach.
Arthonia spadicea	Leight.
Bacidia friesiana	(Hepp) Kí_rb.
Bacidia sulphurella	Samp.
Caloplaca cerinella	(Nyl.) Flagey
Caloplaca flavocitrina	(Nyl.) H. Olivier
Caloplaca obscurella	(J. Lahm ex Kí_rb.) Th. Fr.
Caloplaca phlogina	(Ach.) Flagey
Candelaria concolor	(Dicks.) Stein
Candelariella reflexa	(Nyl.) Lettau
Catillaria nigroclavata	(Nyl.) Schuler
Cladonia coniocraea	(Flí_rke) Spreng.
Cliostomum griffithii	(Sm.) Coppins
Dimerella pineti	(Ach.) VÛ_zda
Evernia prunastri	(L.) Ach.
Flavoparmelia caperata	(L.) Hale
Flavoparmelia soredians	(Nyl.) Hale
Fuscidea lightfootii	(Sm.) Coppins & P. James
Hyperphyscia adglutinata	(Flí_rke) H. Mayrhofer & Poelt
Hypogymnia tubulosa	(Schaer.) Hav.
Hypotrachyna afrorevoluta	(Krog & Swinscow) Krog & Swinscow
Lecania cyrtella	(Ach.) Th. Fr.
Lecania naegelii	(Hepp) Diederich & van den Boom
Lecanora chlarotera	Nyl.
Lecanora dispersa	(Pers.) Sommerf.
Lecanora expallens	Ach.
Lecanora hagenii	(Ach.) Ach.
Lecidella elaeochroma	(Ach.) M. Choisy
Lepraria finkii	(B. de Lesd. ex Hue) R.C. Harris
Lepraria incana s. str.	(L.) Ach.
Lichen (unidentified)	
Melanelixia subaurifera	(Nyl.) O. Blanco et al.
Melanohalea exasperatula	(Nyl.) O. Blanco et al.
Micarea byssacea	(Th. Fr.) Czarnota, Guzow-Kreminska & Coppins
Micarea micrococca	(Kí_rb.) Gams ex Coppins
Normandina pulchella	(Borrer) Nyl.
Opegrapha herbarum	Mont.
Opegrapha viridipruinosa	Coppins & R. Yahr
Parmelia sulcata	Taylor
Parmotrema perlatum	(Huds.) M. Choisy
Physcia adscendens	H. Olivier

Physcia tenella	(Scop.) DC.
Physconia grisea	(Lam.) Poelt
Placynthiella icmalea	(Ach.) Coppins & P. James
Porina aenea	(Wallr.) Zahlbr.
Punctelia jeckeri	(Roum.) Kalb
Punctelia subrudecta s. str.	(Nyl.) Krog
Ramalina farinacea	(L.) Ach.
Ramalina fastigiata	(Pers.) Ach.
Trapeliopsis flexuosa	(Fr.) Coppins & P. James
Xanthoria parietina	(L.) Th. Fr.
Xanthoria polycarpa	(Hoffm.) Th. Fr. ex Rieber
Xanthoria ucrainica	S.Y. Kondr.

NBN Lichen data for 1 km radius search centred on SP 1909 8057 with permission of:
Dr Janet Simkin, British Lichen Society, 30 June 2019

APPENDIX 4

Table A4.1: Species Recorded in Field

Table A4.1: List of lichen species from Aspbury's Copse. Records from 2015 made by Mark Powell for Wardell Armstrong and relating to a broader survey area. Records for 2019 made by Paul L Smith for AECOM and focus on Asbury's Copse					
Lichens	Status	West of M42 (2015)	West of M42 (2019)	East of M42 (2015)	East of M42 (2019)
Amandinea punctata	LC		1		
Anisomeridium polypori	LC	1	1		1
Arthonia didymia	LC		1		
Arthonia radiata	LC	1	1	1	1
Arthonia spadicea	LC	1	1	1	1
Bacidia delicata	LC		1		
Bacidia friesiana	NS	1			
Bacidia sulphurella	NS	1			
Caloplaca obscurella	LC	1		1	
Candelaria concolor	LC	1	1		1
Candelariella reflexa	LC		1	1	1
Catillaria nigroclavata	NS	1			
Cladonia coniocraea	LC				1
Cliostomum griffithii	LC	1			
Dimerella pineti	LC	1		1	1
Hyperphyscia adglutinata	LC	1	1	1	1
Hypotrachnya revoluta	LC				1
Lecania cyrtella	LC	1	1		1
Lecania naegelii	LC	1	1	1	
Lecanora barkmaniana	NS		1		
Lecanora carpinea	LC				1
Lecanora chlarotera	LC	1	1	1	1
Lecanora compallens	LC/NS		1		1
Lecanora expallens	LC	1		1	
Lecanora hagenii	NE			1	
Lecanora horiza	NT/NS				1
Lecidella elaeochroma f. elaeochroma	LC	1	1	1	1
Lepraria incana	LC	1	1	1	1
Lepraria lobificans	LC		1	1	
Melanelixia glabratula	LC				1
Melanelixia subaurifera	LC		1		
Micarea micrococca	LC	1	1		
Micarea prasina sensu lato	LC		1		1
Normandina pulchella	LC	1			
Opegrapha herbarum	LC	1	1		1
Opegrapha ochrocheila	LC		1		
Opegrapha rufescens	LC		1		

Table A4.1: List of lichen species from Aspbury's Copse. Records from 2015 made by Mark Powell for Wardell Armstrong and relating to a broader survey area. Records for 2019 made by Paul L Smith for AECOM and focus on Asbury's Copse					
Lichens	Status	West of M42 (2015)	West of M42 (2019)	East of M42 (2015)	East of M42 (2019)
Opegrapha varia	LC				1
Opegrapha viridipruinosa	NS		1		1
Parmelia sulcata	LC	1	1		
Parmotrema perlatum	LC		1	1	
Phaeophyscia orbicularis	LC	1	1	1	1
Phlyctis argena	LC		1		
Physcia adscendens	LC	1	1	1	1
Physcia tenella	LC	1	1		1
Physconia grisea	LC		1		1
Physconia perisidiosa	LC		1		
Porina aenea	LC	1	1	1	1
Punctelia subrudecta	LC		1		1
Ramalina farinacea	LC	1	1		1
Ramalina fastigiata	LC	1	1		
Xanthoria parietina	LC	1	1	1	1
Totals		28	37	18	29

Lichenicolous and associated microfungi	Status	West of M42 (2015)	West of M42 (2019)	East of M42 (2015)	East of M42 (2019)
Heterocephalaria physciacearum on *Physcia adscendens*	NS				1
Hysterium angustatum	*1		1		1
Hysterobrevium mori	*2		1		
Illosporiopsis christiansenii	NS		1		
Xanthoriicola physciae on *Xanthoria parietina*	LC				1
Totals		0	3	0	3

LC: Least concern (widespread species)
NE: Not evaluated
NS: Nationally scarce
NT: Near threatened
LC/NS: Red listing based on IUCN 2001 Guidelines/GB status
*1: Status 'common' - Ellis and Ellis (1997)
*2: Status 'uncommon' - Ellis and Ellis (1997)
Status of lichens and lichenicolous fungi according to: JNCC Taxon Designations Spreadsheet 20180725

APPENDIX 5

Photographs (Figures 1 - 29)

ASPBURY'S COPSE (HABITAT)

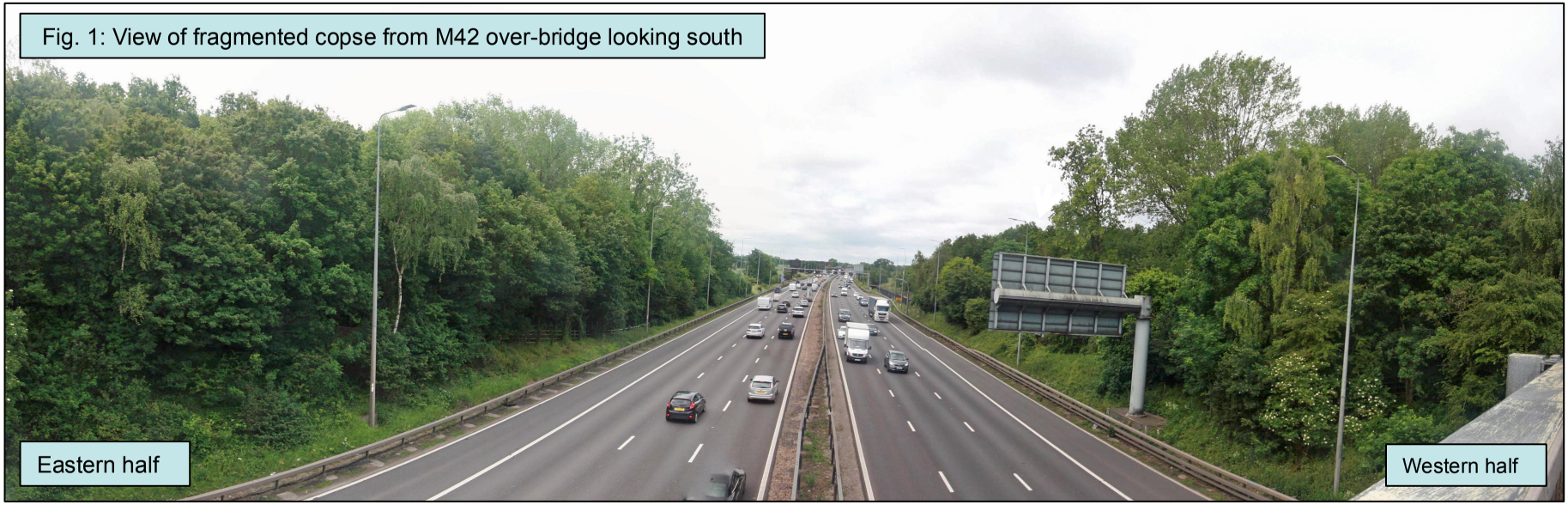


Fig. 1: View of fragmented copse from M42 over-bridge looking south

Fig. 2: View into eastern half of copse from northern access track looking south. *Aeogpodium podagraria* in foreground

Fig. 3: View into western half of copse from western edge. Dense growths of *Galium aparine* indicate nutrient enrichment

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ASPBURY'S COPSE (HABITAT DETAIL)

Fig. 4: Copse is bordered by agricultural fields

Fig. 5: Ruderal proilferation indicates nutrient enrichment

Fig. 6: Some well lit trees with crustose lichens (*Porina aenea* is shown)

Fig. 7: Xanthorion lichen community of well lit nutrient rich areas

Fig. 8: Mature and veteran trees present both halves

Fig. 9: Dead wood

Fig. 10. *Epipactis* sp.

Fig. 11. *Phallus impudicus* var. *togatus*

Fig. 12. Larva of *Luffia ferchaultella* in lichen fragment case

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ASPBURY'S COPSE (LICHENS)

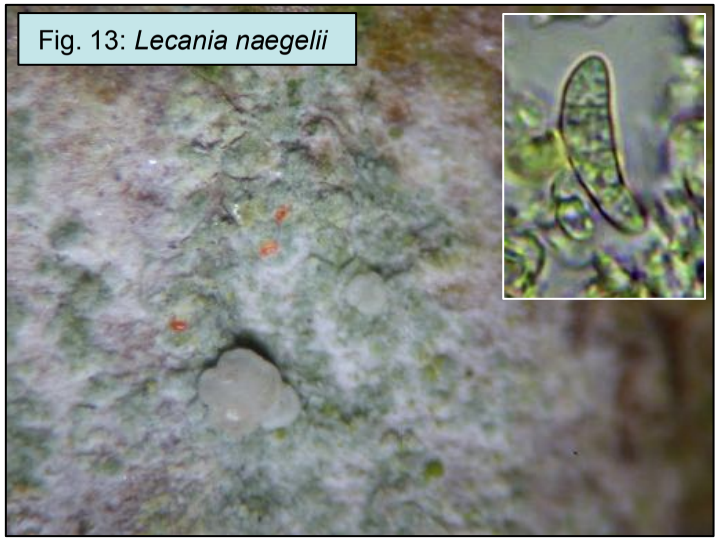

Fig. 13: *Lecania naegelii*

Fig. 14: *Lecanora carpinea*

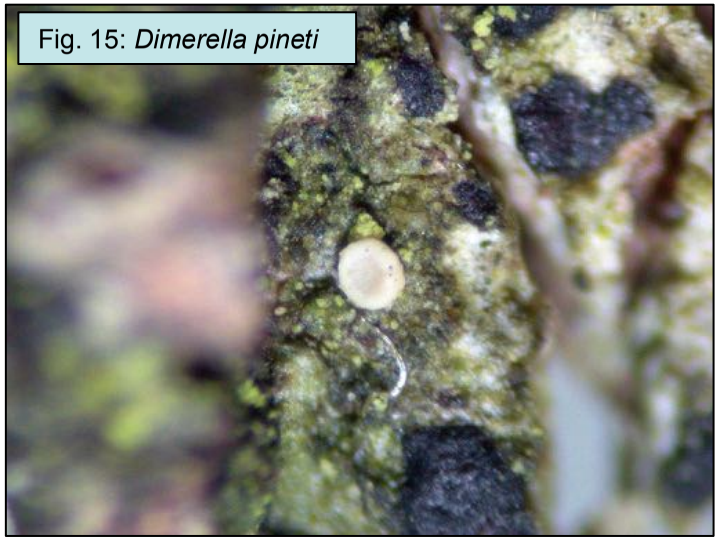

Fig. 15: *Dimerella pineti*

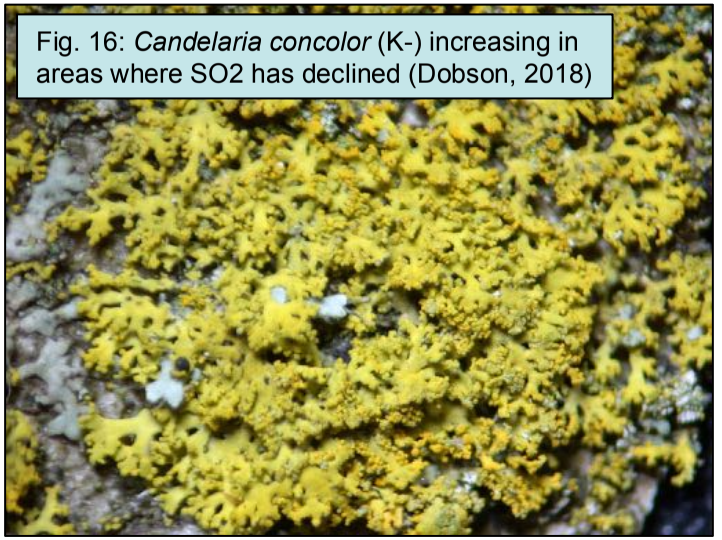

Fig. 16: *Candelaria concolor* (K-) increasing in areas where SO2 has declined (Dobson, 2018)

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ASPBURY'S COPSE (LICHENS)

Fig. 17: *Physconia grisea*

Fig. 18: *Hyperphyscia adglutinata*

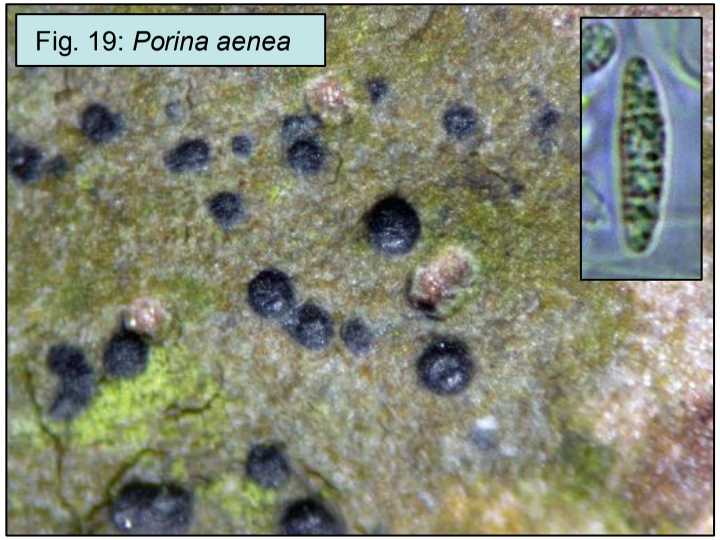

Fig. 19: *Porina aenea*

Fig. 20: Bacidia delicata

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ASPBURY'S COPSE (LICHENS)

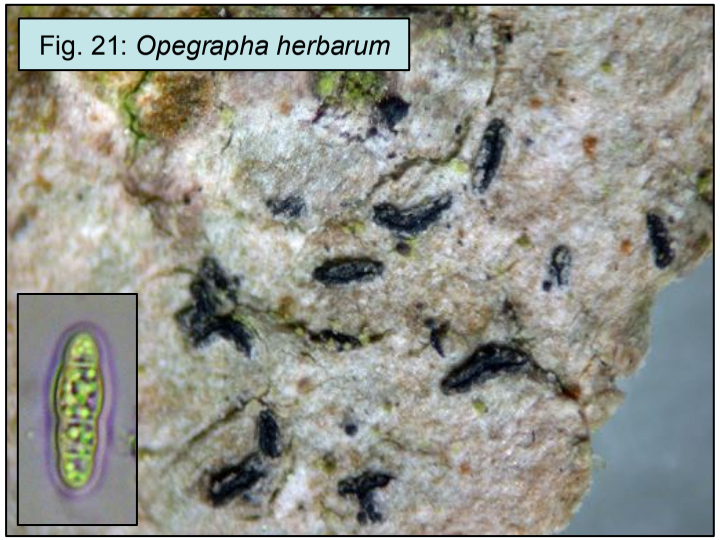

Fig. 21: *Opegrapha herbarum*

Fig. 22: *Opegrapha viridipruinosa*

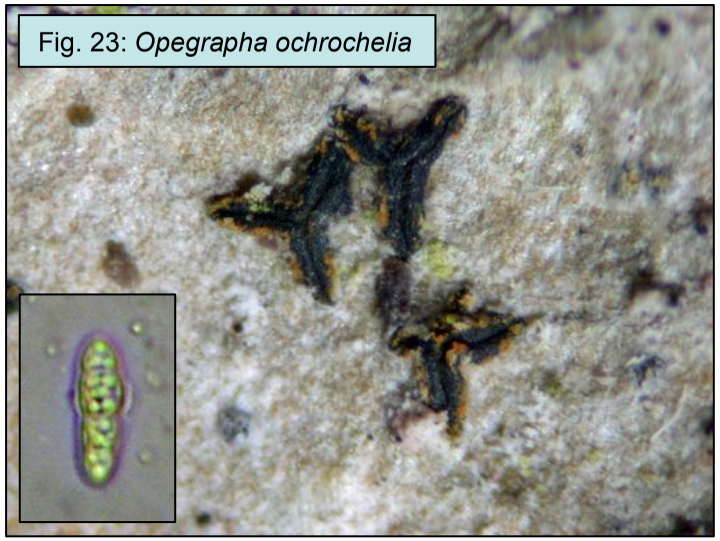

Fig. 23: *Opegrapha ochrochelia*

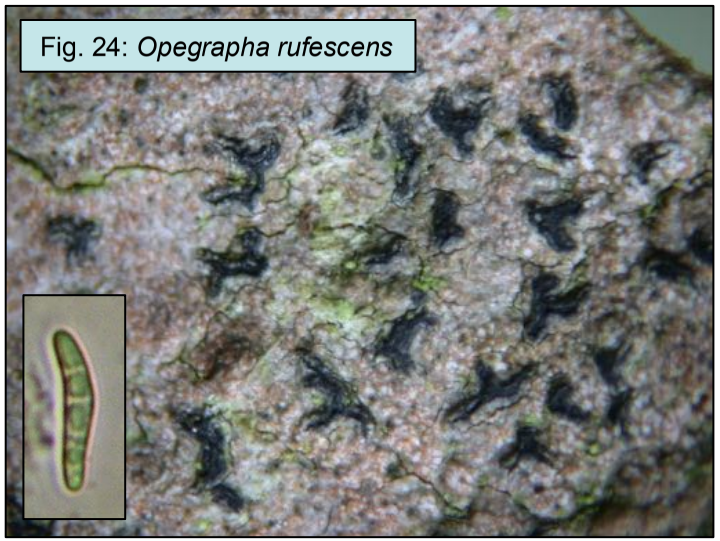

Fig. 24: *Opegrapha rufescens*

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ASPBURY'S COPSE (LICHENS)

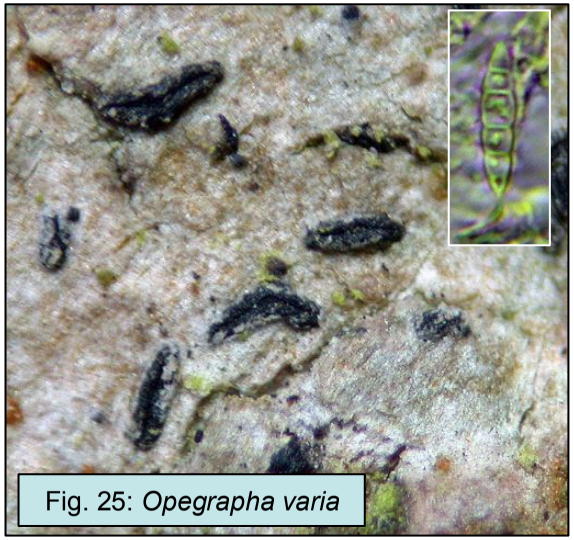


Fig. 25: *Opegrapha varia*

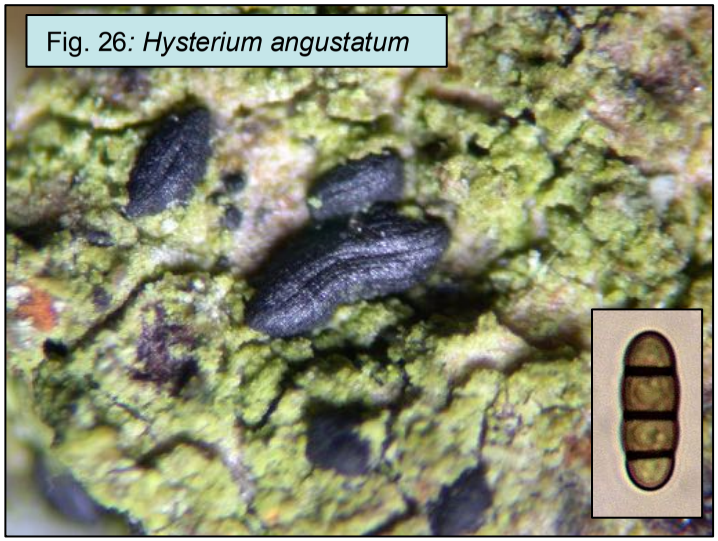
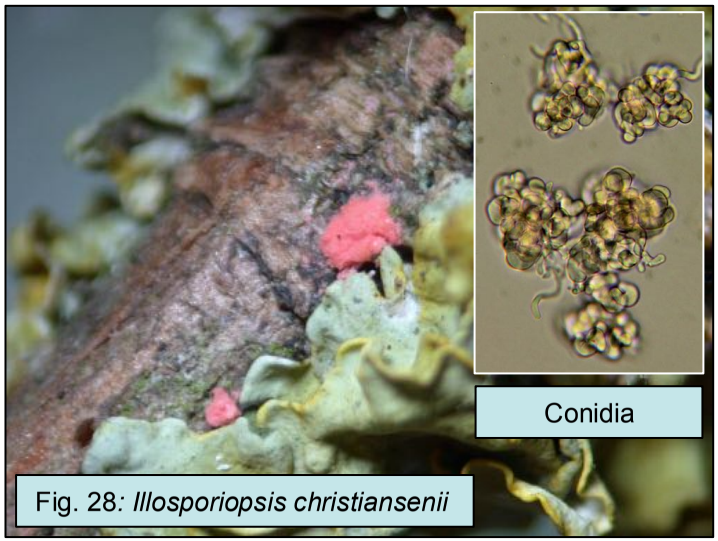


Fig. 26*: Hysterium angustatum*

Fig. 27: *Hysterobrevium mori*



Conidia

Fig. 28*: Illosporiopsis christiansenii*

Fig. 29*: Heterocephalaria physciacearum*

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ASPBURY'S COPSE
(METROPOLITAN BOROUGH OF SOLIHULL)
LICHEN SURVEY

Researched and Prepared by

Dr Paul L Smith BSc MCIEEM CEnv

July 2019

A Report from

BOTANICAL INVESTIGATIONS

For the sole use of

AECOM Infrastructure & Environment UK (Ltd)

Report No.: BIREP142-01 (R1)