Lime Kiln Wood

Management Plan

Date (dd/mm/yyyy)	01/01/2012	To	31/12/2016
Date of last review [1](2.1.3)	n/a		
Owner / tenant	Lime Kiln Wood Trust. (The wood was purchased on 1st October 2010 by a consortium of private individuals who subsequently formed the Trust)		
Agent / contact	Professor Peter Matthiessen		
Signed declaration of tenure rights and agreement to public availability of the plan[2] (UKWAS 1.1.3/1.1.5/2.1.2)	I hereby confirm that the Lime Kiln Wood Trust (LKWT) has sole tenure of Lime Kiln Wood, and agrees to make the management plan publically available when requested. Signed of behalf of LKWT: Peter Matthiessen 29 November 2011		

1 Background information

1.1 Location

Nearest town, village or feature	Approx ¼ mile SSE of Lindale, Cumbria
Grid reference	SD 415 798 (see Map 1, Section 9)
Total area (ha)	5.06

1.2 Description of the woodland(s) in the landscape

The geography of the wood can be seen at Map 1 (Section 9).

The wood is on an easterly-facing slope, rising steeply from the floor of the Winster valley just north of its entry into Morecambe Bay. This slope is at the foot of a gently rising limestone escarpment that forms a striking foreground to the Lakeland fells when viewed across the Bay. The B5277 runs along part of the eastern boundary. Local residents use the wood for gentle recreation and access to Lindale.

[A full description of the wood is given in the Cumbria Woodlands *Silver Birch* report at Appendix 1]

[1] The plan must be reviewed every five years.

[2] As owner, tenant or manager, you have the right to manage the wood in accordance with this plan. At least a summary of the management plan must be made publicly available on request.

1.3 History of management

No documentary evidence of previous management has been located. Independent assessments suggest that there has been little, or no, active management in recent years. However, from a sample-based inventory of trees and ground flora (see Appendix 2), it is evident that Larch (*Larix* spp.) has been planted and that hazel (*Coryllus avellana*), and other broadleaved standards, have been coppiced, but probably not in the last half-century.

The new owners are not aware of any pre-existing legal permissions or consents, nor any Forestry Commission grant schemes or dedications. An application has recently been granted for a licence to fell a few dangerous trees (ref: 010/79/11-12)

2 Woodland information

2.1 Areas and features

2.1.1 Designated areas	In woodland	Adjacent to woodland	Map
Special Areas for Conservation (SACs)	No		
Special Protection Areas (SPAs)	No		
Ramsar Sites (**see note on Guidance)**	No		
National Nature Reserves (NNRs)	No		
Sites of Special Scientific Interest (SSSIs)	No		
Other designations e.g.: National Parks (NPs), Areas of Outstanding Natural Beauty (AONBs), Local Nature Reserves (LNRs)	Yes[1]	Yes[2/3]	Yes

Details

[1] Part of the wood is subject to a Limestone Pavement Order – see Map 3, Section 9, and the whole wood is a Cumbria County Wildlife Site.

[2] The wood lies immediately south of the boundary of the Lake District National Park – see Map 4, Section 9

[3] A local Nature Reserve (Brown Robin) lies about ½ km from the SW corner of the wood.

2.1.2 Rare and important species	In woodland	Adjacent to woodland	Map
Red Data Book or BAP species	Yes[1]	Yes[2]	
Rare, threatened, EPS or SAP species	Yes[3]	unknown	

Details

[1] Yew (*Taxus baccata*) occurs in the woodland canopy (an estimate of 133 trees has been made). Herb Paris (*Paris quadrifolia*) is found in the NE corner of the wood.

[2] In an unimproved meadow to the west, Green-winged orchids (*Anacamptis morio*) are common (along with other, more common, orchid species). No other information is available.

[3] [The only known species of interest are pipistrelle bats (*Pipistrellus pipistrellus* and *P. pygmaeus*) and brown long-eared bats (*Plecotus auritus*) (as identified by members of the Furness and Westmorland Bat Group).

2.1.3 Habitats	In woodland	Adjacent to woodland	Map
Ancient semi-natural woodland (ASNW)	Yes	Yes	
Other semi-natural woodland			
Plantations on ancient woodland sites (PAWS)			
Semi-natural features in PAWS			
Woodland margins and hedges	Yes	Yes	
Veteran and other notable trees	No[1]		
Breeding sites	Probably[2]	Probably[2]	
Habitats of notable species or subject to HAPs	Probably[2]	Probably[2]	
Unimproved grassland		Yes	
Rides and open ground	Yes		
Valuable wildlife communities			
Feeding areas			
Lowland heath			
Peatlands			
Others			

Details

[1] The woodland has been checked by Mrs Vanessa Champion, Ancient Tree Verifier for the Woodland Trust (see Appendix 3).

[2] The Lime Kiln Wood Trust has held ownership of the wood for less than 1 year and has yet to carry out an authoritative survey of breeding sites or micro-habitats. However, it seems likely that both will be present for a variety of common mammal, bird and insect species.

2.1.4 Water	In woodland	Adjacent to woodland	Map
Watercourses			
Lakes			
Ponds			
Wetland habitats			

Details

There are no signs of water features on this predominantly limestone site.

2.1.5 Landscape	In woodland	Adjacent to woodland	Map
Landscape designated areas		Yes[1]	
Landscape features	Yes[2]		
Rock exposures	Yes[2]		
Historic landscapes			
Areas of the woodland prominent from roads	Yes[3]		
Areas of the woodland prominent from settlements	Yes[4]		

Details

[1] The wood is immediately South of the Lake District National Park (see Map 4, Section 9).

[2] Locally, there are extensive areas of limestone pavement and outcrop within the woodland (see Map 3, Section 9).

[3] About 75m of the eastern boundary of the wood is immediately adjacent to the B5277 (Lindale to Grange-over-Sands, "bottom road") and the NW corner of the wood is close to the B5271 (Lindale to Grange-over-Sands, "top road") – see Map 1, Section 9.

[4] The wood can be seen from some residents of Lyndene Drive, and from parts of Lindale village.

2.1.6 Cultural features	In woodland	Adjacent to woodland	Map
Public rights of way	Yes[1]	Yes[2]	Map 5, Section 9
Prominent viewing points		Yes[3]	
Permissive footpaths	No[4]		Map 5, Section 9
Areas managed with traditional management systems			

Details

[1] There is a length of footpath (about 125m) that runs just inside, and adjacent to, the northern end of the eastern boundary.

[2] There are rights of way along the eastern and northern boundaries (outside the wood).

[3] There are prominent viewing points adjacent to the wood along the B5271 ("top road").

[4] Although not technically 'Permissive footpaths', several paths within the woodland are used by the local members of the public.

2.1.7 Archaeological features	In woodland	Adjacent to woodland	Map
Scheduled monument			
Historical features	Yes[1]		Map 6, Section 9

Details

[1] As the name confirms, there is an early 19th century lime kiln within the woodland. It is in a poor state of repair and the Trust is investigating the possibility of obtaining a grant to at least stabilise, if not restore, the feature (advice has been taken from John Hodgson, Senior Archaeologist at the Lake District National Park, who has also visited the site). There is an urgent need to remove a large beech (*Fagus sylvatica*) tree which is growing into the kiln. The wood also contains traces of an old limestone quarry which was apparently used to supply the kiln.

2.2 Woodland resource characteristics

The major aim of the Lime Kiln Wood Trust is to manage the woodland for biodiversity, with local access (for peaceful recreation) being a secondary aim. Timber production is not an objective for the Trust although some firewood extraction may result from other management activities.

The Trust's understanding is that Lime Kiln Wood may be managed as a Small and Low Intensity Managed (SLIM) woodland (or even a VSLIM). Accordingly, the UKWAS standard, under Section 6 (Conservation and enhancement of biodiversity) will form the Trust's guidelines. However, given that the main aims are related to biodiversity, the Trust sees few difficulties in meeting these guidelines. In particular, the Trust notes recommendations in relation to mapping, baseline-recording, monitoring, field observation, safeguarding, enhancement, damaging activities, deadwood habitats, non-conversion and record-keeping. It is not proposed that any game species (if present) will

be hunted although pest species may need to be controlled.

Given the relatively small size of the wood, the Trust does not propose to create any sub-divisions, or blocks, within the woodland. It will be managed as a single unit, although management activity may be focussed on different areas of the wood at different times.

The main resource comprises the trees themselves. The sample survey the Trust members have carried out (see Appendix 2) indicates that tree species proportions are appropriate to the site with healthy numbers of oak (*Quercus petraea* or hybrid), ash (*Fraxinus excelsior*), yew (*Taxus baccata*) and hazel) but there is some concern about the abundance of beech (*Fagus sylvatica*) and, especially, sycamore (*Acer pseudoplatanus*). There will need to be some redressing of the balance, especially of younger trees, to ensure an appropriate balance in the future (see Sections 3 & 4 of this Plan). The possibility of exploitation of surplus wood resulting from these biodiversity aims may be considered if it becomes relevant.

Other resources are very secondary and non-timber products (such as foliage, moss, fungi and berries) will not be harvested.

2.3 Site description

Factors which may influence woodland (even low-key woodland (SLIM)) management will include:

1. Access – there is unlikely to be a need for access except to remove small quantities of timber on irregular occasions. There are two main vehicular access points (near the NW and SE corners) where domestic vehicles can be parked. It is unlikely that industrial-scale vehicles will need to come into the woodland but, if required, there is an overgrown gateway in the SE corner that could be opened up. There is no metalled access route within the woodland. However, the existence of a Limestone Pavement Order will preclude the use of very heavy machinery.
2. The wood is on a slope (estimated at an average of about 20º across the site). This may have consequences for the removal of any larger timber (down-hill only).
3. The soil is a shallow brown earth on top of limestone which may have consequences for wind-throw and moisture availability, although many trees are rooted in the limestone grykes.
4. The wood faces east and so is protected for much of the time against prevailing south-westerly winds. However, easterly gales could prove hazardous.
5. Uses of the woodland will be restricted to biodiversity enhancement, quiet and casual recreation and occasional fuel-wood collection (as a result of other management).
6. Since we aim to improve ground flora diversity, this will be considered when planning any management interventions which could affect ground quality and plant life.

2.4 Significant hazards, constraints and threats

Hazards: No significant hazards have been identified.

Constraints: The only constraints that have been noted relate to public access which, if over-encouraged, might be detrimental to some wildlife. This does not appear to have been the case to date. Proximity to an industrial site on the south east border will require regular tree safety assessments.

Threats: No significant quantities of pest species have been noted but monitoring will

continue. Some basal stem damage (and subsequent hollowing) has been seen in some sycamore trees in part of the wood. This is being investigated. There has been some minor vandalism (e.g. graffiti) and other activity (e.g. BMX cycle ramps, den-building) but these do not constitute major problems and do not affect the health of the trees. Photographic records are to be maintained.

3 Long term vision, management objectives and strategy

3.1 Long term vision

The long-term vision of the Lime Kiln Trust is to own, manage and improve a wood which has high biodiversity value and is available to its members and the public for peaceful enjoyment, education and research.

3.2 Management objectives

No.	Objective
1	To improve the balance of tree species and their age distribution
2	To improve the number and variety of ground flora species to maximise wildlife potential.
3	To ensure that suitable routes are maintained to allow the public access to the site for peaceful recreation on foot.
4	To improve the landscape character of the woodland and associated features (e.g. walls and the lime kiln).
5	As far as possible, to manage the wood in accordance with (i) the *UK Woodland Assurance Standard*, (ii) the *UK Forest Standard* (iii) the FC's *Managing ancient and native woodland practice guide*, and (iv) the FC's *Forest Practice Guides for Semi-natural woodlands*

3.3 Strategy

Given the relatively simple objectives, and the intention to manage the whole wood as a single block, it is felt that there is no requirement to develop an explicit spatial strategy. Nevertheless, the 2011 tree survey (Appendix 2) shows that certain tree species are more numerous in some areas than others, and this will be taken into account when planning and conducting management operations.

3.4 Woodfuel initiative

Would you be interested in receiving information on funding opportunities for the purchase of harvesting machinery or wood fuel boilers?

~~**Yes**~~ **/ No** (delete as appropriate)

4 Management prescriptions/operations

4.1 Silvicultural systems

4.1.1 Harvesting

The only harvesting that will take place will be coppicing and thinning:

Coppicing: This will take place in an ad-hoc way by members of the Trust with suitable expert guidance (from e.g. Cumbria Woodlands, the Coppice Association). It will be carried out on a rotational basis with small areas being coppiced at intervals with temporary exclosure fencing and/or dead-hedging.

We aim to cut a coppice coupe of at least 2500 m^2 (50x50 m) annually in adjacent areas. Coupes will be located where the canopy of standards is relatively thin.

Thinning and ring-barking: this will be necessary to redress the imbalance between appropriate and inappropriate species and to encourage growth to maturity of desirable species. In particular, sycamore needs to be reduced drastically (especially in the northern half of the wood). Some small-scale felling may also be needed to protect yew in the southern half of the wood, which are being subject to crowding and over-topping. Some ring barking may be performed to enable a balance between canopy thinning (to encourage ground flora) and upright dead wood (to encourage relevant animal species).

The small size of the wood suggests that this could be carried out as a single exercise in the first few years without the need for a regular cycle of thinning. We would aim to remove or ring-bark all sycamore individuals in areas where they are already infrequent (e.g. southern half of the wood), but simply to thin out a proportion of individuals in areas where they are abundant (e.g. northwestern quadrant).

4.1.2 Phased felling and restructuring of plantations

n/a

4.1.3 Establishment, restocking and regeneration

Only natural regeneration will be encouraged, with suitable protection (e.g. dead-hedging) where appropriate.

4.2 New planting

It might be possible to improve the age structure of oaks by planting, although the total number of oaks is probably typical for alkaline soils of the type found in the wood. This would require careful consideration of the most appropriate genetic stock for planting. However, the initial approach will be to introduce more light by coppicing and thinning, in the expectation that this will encourage oak seedlings to grow.

4.3 Other operations

Maintenance: the site is contained by traditional dry stone walls which, as a result of neglected management over a number of years, are threatened by unrestrained growth of trees and shrubs. Where there is a conflict and damage may result, some trees will be removed. Wall damage will be repaired.

4.4 Protection and maintenance

4.4.1 Pest and disease management

Pests: at present, there is little sign of pest species. There are signs of squirrels (probably Grey) but no sightings. Similarly, there are isolated sightings of Roe deer but it is thought that the numbers of dog-walkers may discourage them. This may change when management is started (e.g. with coppice shoots). If deer become a problem then fencing (e.g. temporary, portable fencing, or dead-hedging) will be put in place. If the problem persists, then culling may be necessary by suitably qualified persons.

Diseases: the only noticeable disease problem is some rotting at the base of a number of sycamores (with subsequent hollowing). This is being investigated. If a cause is identified, then appropriate measures will be put into place to rectify the situation where necessary (according to professional advice). As far as is possible, this will be achieved without the use of synthetic chemicals. However, the tree thinning programme will remove most of the sycamores in due course.

4.4.2 Fire plan

If a fire is detected, or reported, then the Fire Brigade will be contacted.
Glass bottles, and other litter which could start a fire, are being removed.

4.4.3 Waste disposal and pollution

There are no activities proposed within the wood which are likely to produce significant waste or pollution.
Any waste from woodland management activities will be removed from site.

4.4.4 Protection from unauthorised activities

The only unauthorised activity that has been identified to date is the marking of trees and the lime kiln with graffiti. Relationships are being built with local residents (through a regular update in the Parish Magazine) and by chatting to walkers. It is hoped that community pressure will stop this particular activity.
The building of temporary BMX-style bike tracks is intermittent and is discouraged by occasional destruction of the ramps.
Discreet signage at access points indicating the conservationist aims of the Trust will be considered.

4.4.5 Protection of other identified services and values (4.1.1)

n/a

4.5 Game management

No game management is proposed.

4.6 Protecting and enhancing landscape, biodiversity and special features

4.6.1 Management of designated areas

The only designation which affects the woodland is a Limestone Pavement Order. The Trust will comply (and would wish to comply) with the Order so that the limestone pavement is not damaged, and no limestone is removed.

4.6.2 Measures to enhance biodiversity and other special features (2.1.1 and 6.1.1)

Enhancing biodiversity is the major objective that the Trust has identified for this wood. It is, *de facto,* expected to be easy for the Trust to meet all UK Forest Standard and UKWAS requirements in relation to enhancing biodiversity. For example:

(i) 100% of the woodland area has been identified as important for conservation

(ii) Dead wood will not be collected routinely from the woodland floor and a proportion of any fellings or thinnings will be left to lie. Standing dead will not be removed.

(iii) Veteran trees will be encouraged (and welcomed).

(iv) A wide path which runs as a 'chevron' up and down the wood may be managed as a ride. Glades may be considered to increase ground flora and associated insect fauna.

(v) As the well as carrying out sample grid surveys of trees and ground flora at regular intervals, other notable species will be recorded and maintained on a database. This information will be used as a measure of biodiversity, and as a resource for education and research.

(vi) A rolling programme of hazel coppicing and tree thinning (sycamore and beech) will be introduced to encourage the ground flora in some areas (mainly the southern half of the wood)

4.6.3 Special measures for ASNW and SNW

Lime Kiln Wood is classified by Natural England as Ancient Semi-natural Woodland (ASNW). The Trust believes that the measures set out elsewhere in the Plan demonstrate that the UKWAS requirements will be addressed. Specifically:

(i) Enhancement of the semi-natural characteristics of the woodland will be intricately linked with the efforts to maximise biodiversity. It is hoped that the biodiversity of the wood will form a resource for education and research.

(ii) The only trees that might be considered as exotic are beech, sycamore, horse chestnut and larch (and advice will be taken on current status). Anyway, these will be gradually reduced over the long term. The Trust is not proposing to carry out wholesale changes at a stroke, believing that some wildlife that has come to utilise so-called 'exotics' needs time to adapt to their removal.
(iii) All work will comply with the UK Forestry Standard and the Forestry Commission publication Managing ancient and native woodland practice guide.
(iv) Any harvesting (coppicing and thinning) will use lower impact systems.
(v) Some oaks (and possibly other species) may be planted and, if done, then seed of local provenance may be used (although it could be argued that resilience to climate change would be improved by introducing non-local southern strains). However, this approach would only be considered if coppicing and tree thinning were ineffective in encouraging existing oak seedlings to grow.

4.6.4 Special measures for PAWS

n/a

4.6.5 Measures to mitigate impacts on landscape and neighbouring land (3.1.2)

The management proposals for Lime Kiln Wood are unlikely to have any impacts on neighbouring land, or the local landscape.

4.7 Management of social and cultural values

4.7.1 Archaeology and sites of cultural interest

The only archaeological or cultural site associated with the wood is the lime kiln. As described above, this has been visited by a senior archaeologist from the Lake District National Park. His view was that the kiln is of local archaeological interest and that the Trust should apply for a suitable grant to stabilise the kiln which is in a state of partial collapse. Restoration, or partial restoration, would need to be undertaken by experts with specialist knowledge and skills. Meanwhile, one or two beech trees in the immediate vicinity will be removed as they are rooted in the structure and contributing to its degradation. Assuming the grant application is successful, and work has been carried out, the structure will need little maintenance but will be monitored at annual intervals.

4.7.2 Public access and impacts on local people

There is 125m of public right of way (footpath) in the NE corner of the wood. In addition, two major informal paths together forming a chevron through the whole wood are used extensively by local people, as well as other ad hoc and shifting minor paths.

The Trust notes the UKWAS requirement that all existing permissive or traditional uses of the woodland are sustained, unless they are threatening the integrity of the woodland, or the achievement of management objectives. To this end, all paths that are used routinely in the wood are to remain un-blocked. For example, where walls have been knocked down over the years, to allow unauthorised access to the woodland, the walls have

recently been re-built with a tidy opening for pedestrian access.

For the record, the site is not 'Open Access' woodland under the CROW Act.

5 Consultation

Organisation/individual	Date received	Comment	Response/action
David Harpley, Cumbria Wildlife Trust	15/10/10	Various ideas on management (Appendix 4).	Ideas included in this Plan.
Ed Mills, Cumbria Woodlands	22/12/10	Silver Birch report, including recommendation to carry out tree safety survey (Appendix 1).	Commissioned tree safety survey.
Andrew Wilkinson, Ranger, LDNPA	12/04/11	Informal wall-building course.	Filling wall-gaps.
Jackie Dunne, Dunnewoods	09/07/11	Carried out tree safety survey and identified trees that should be felled (see Appendix 5)	Have commissioned local firm to remove trees. (Work carried out 24/10/2011).
John Hodgson, LDNPA archaeologist	17/12/10	Suggested applying for grant to stabilise lime kiln.	Researching grants.
Vanessa Champion, Woodland Trust	01/09/11	No veteran trees but lots of interesting observations (see Appendix 3).	Comments fed into this Plan.
John Martin, Furness and Westmorland Bat Group	15/07/11 and 28/8/11	See 2.2.2 above	Repeat survey in Summer 2012.
Upper Allithwaite PC	21/05/11	Two articles in Parish Council Newsletter setting out our aims.	Sympathetic verbal response from local residents.

6 Monitoring plan summary

Objective number, issue or UKWAS Requirement	Indicator	Method of assessment	Monitoring period	Respons-ibility	How will information be used?
1	Numbers of desirable tree species	Tree survey of fixed point quadrats (85 on a grid)	Periodic	Trust members	To improve or change management operations if necessary
2	Other species	Surveys by experts	As and when possible	Trust members	as above
3	Unimpeded access	Visual assessment	At least monthly	Trust members	Any obstructions will be removed.
4	Walls in good condition	Visual assessment	At least biannually	Trust Members	Any repairs deemed necessary will be carried out

4	Lime Kiln in satisfactory condition	Visual assessment	At least biannually	Trust Members	Any repairs deemed necessary will be carried out if affordable
5	Management in accordance with guidelines	Revue of operations at Trust AGM	Annually	Trust Members	Practices will be amended if necessary

7 Work programmes

7.1 Outline long-term work programme (2017 to 2037)

Compartment or area	Activity	Year		
		6-10	11-15	16-20
Whole wood	Coppice as part of cycle (mainly hazel)	Yes	Yes	Yes
Whole wood	Thinning of undesirable species (mainly sycamore)	Yes	Possibly, if still necessary	
Whole wood	Creation of glade(s)	No	Possibly.	Possibly, if earlier success
Whole wood	Removal of hazardous/damaging trees	Yes, if present	Yes, if present	Yes, if present
Perimeter of wood	Repair of wall-gaps	If necessary	If necessary	If necessary

7.2 Short-term work programme (2012 to 2016)

Compartment or area	Activity	Year				
		1	2	3	4	5
Whole wood	Coppice as part of cycle (mainly hazel)	✓	✓	✓	✓	✓
Whole wood	Thinning of undesirable species (mainly sycamore)	✓	✓	✓	✓	✓
Whole wood	Removal of hazardous/damaging trees	✓	✓	✓	✓	✓
Perimeter	Repair wall-gaps	✓	✓	✓	✓	✓
At site	Have Lime Kiln repaired, if affordable		✓	✓		

8 Costing Operations

Most of the management activity will be carried out by the members of the Lime Kiln Trust who are a mixture of retired professionals (including ecologists) and enthusiasts. Such work will include coppicing, ring-barking, thinning of saplings and smaller trees, wall building and estate maintenance. Time will be given freely.

The removal of larger trees will be carried out by external professionals. This may be carried out in exchange for the resultant timber or by using the Trust's own funds (members contribute monthly) or by seeking grants.

The repair of the Lime Kiln is specialist work and will require a successful grant application.

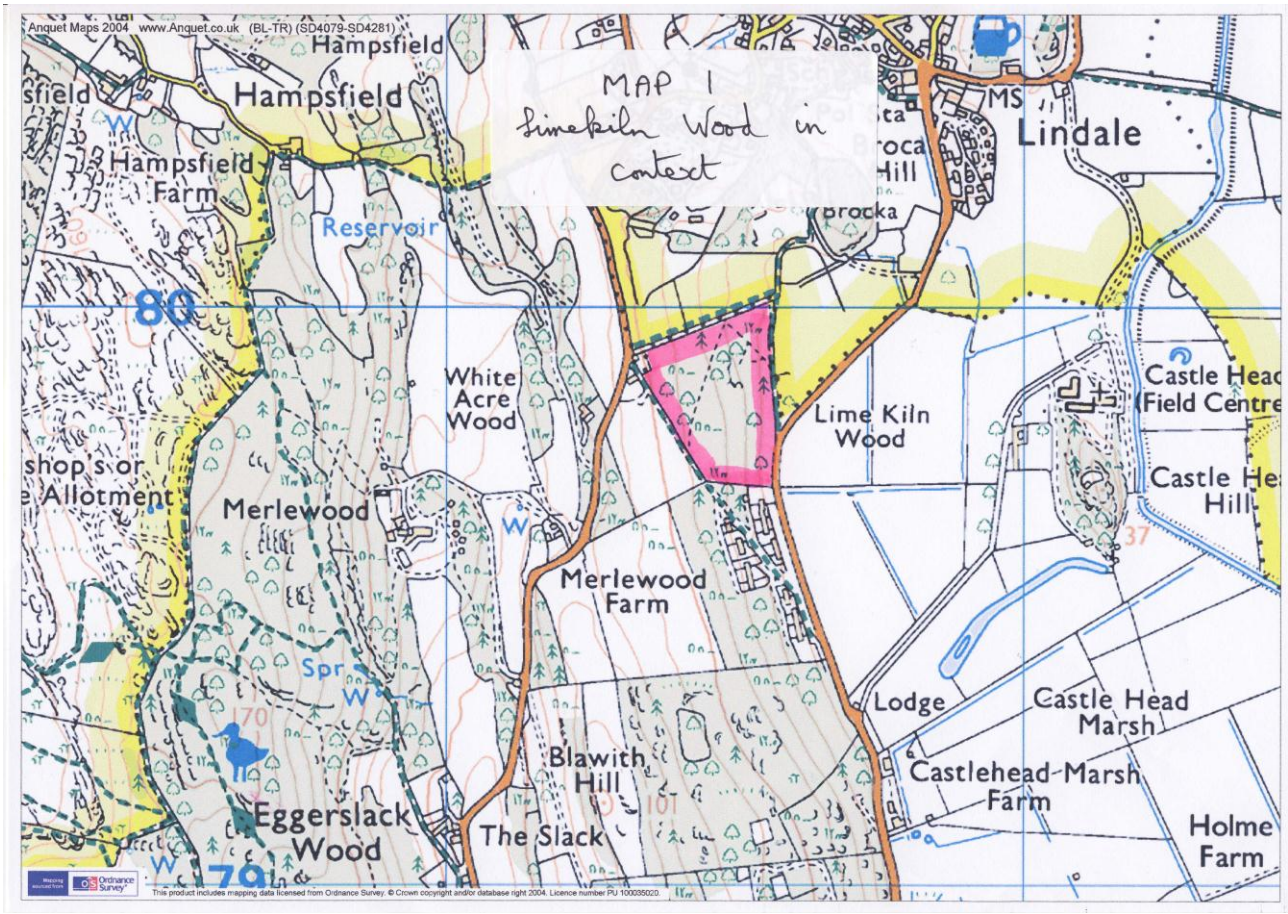
Estate management costs (e.g. temporary fencing, maintenance of tools) will be paid through the Trust's funds.

Any timber resulting from management activity (not forming part of an exchange with contractors) will be offered to Trust members at a cost less than local suppliers currently charge. Any surplus timber will be offered to the public at standard local rates.

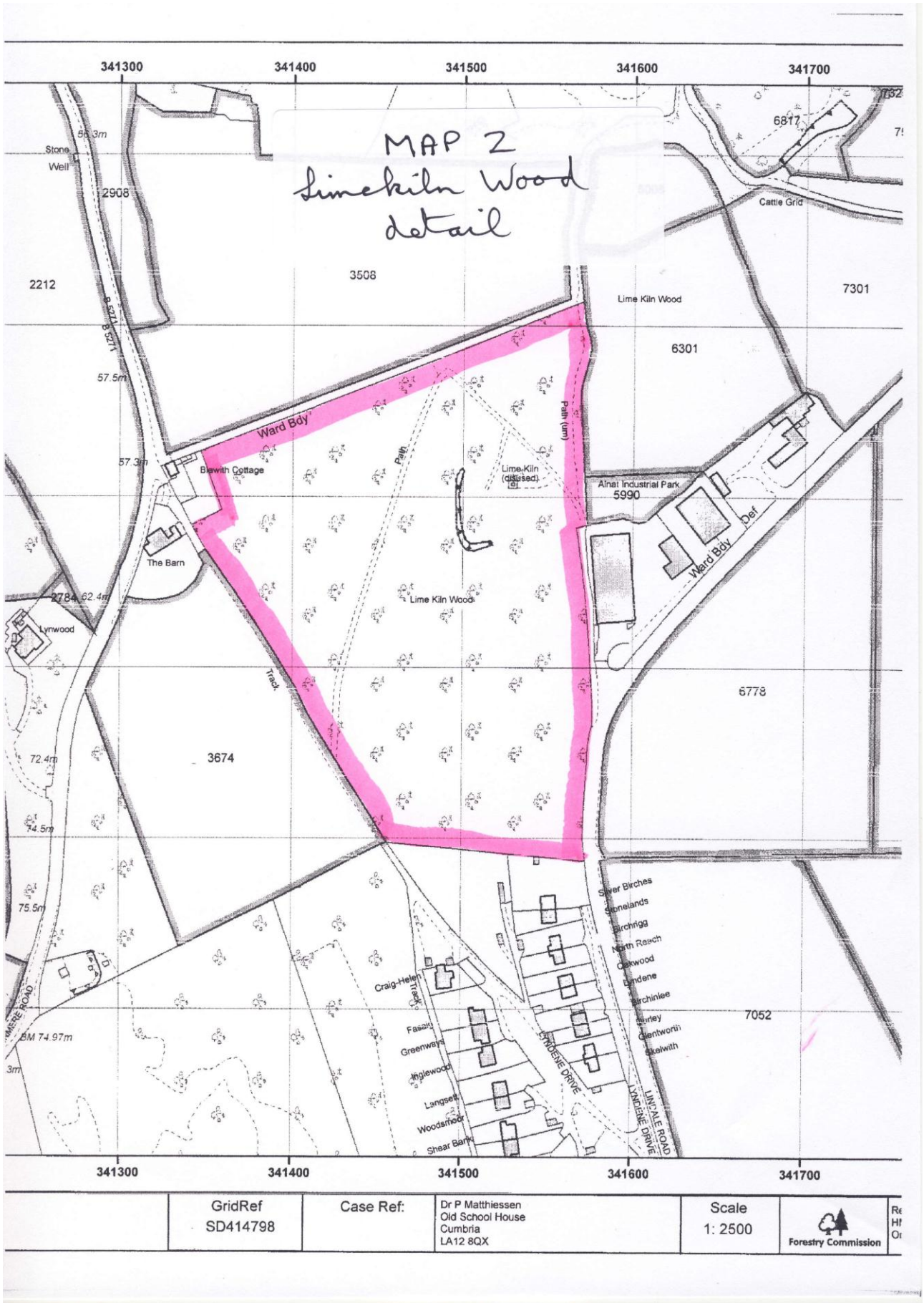
9 Maps

Map No./Title	Description
1	Ordnance Survey map showing Lime Kiln Wood in context
2	Map showing details of Lime Kiln Wood
3	Map showing the geographical extent of the Limestone Pavement Order
4	Map showing the Lake District National Park boundary
5	Rights of Way (RoWs) and other routes
6	Location of Lime Kiln

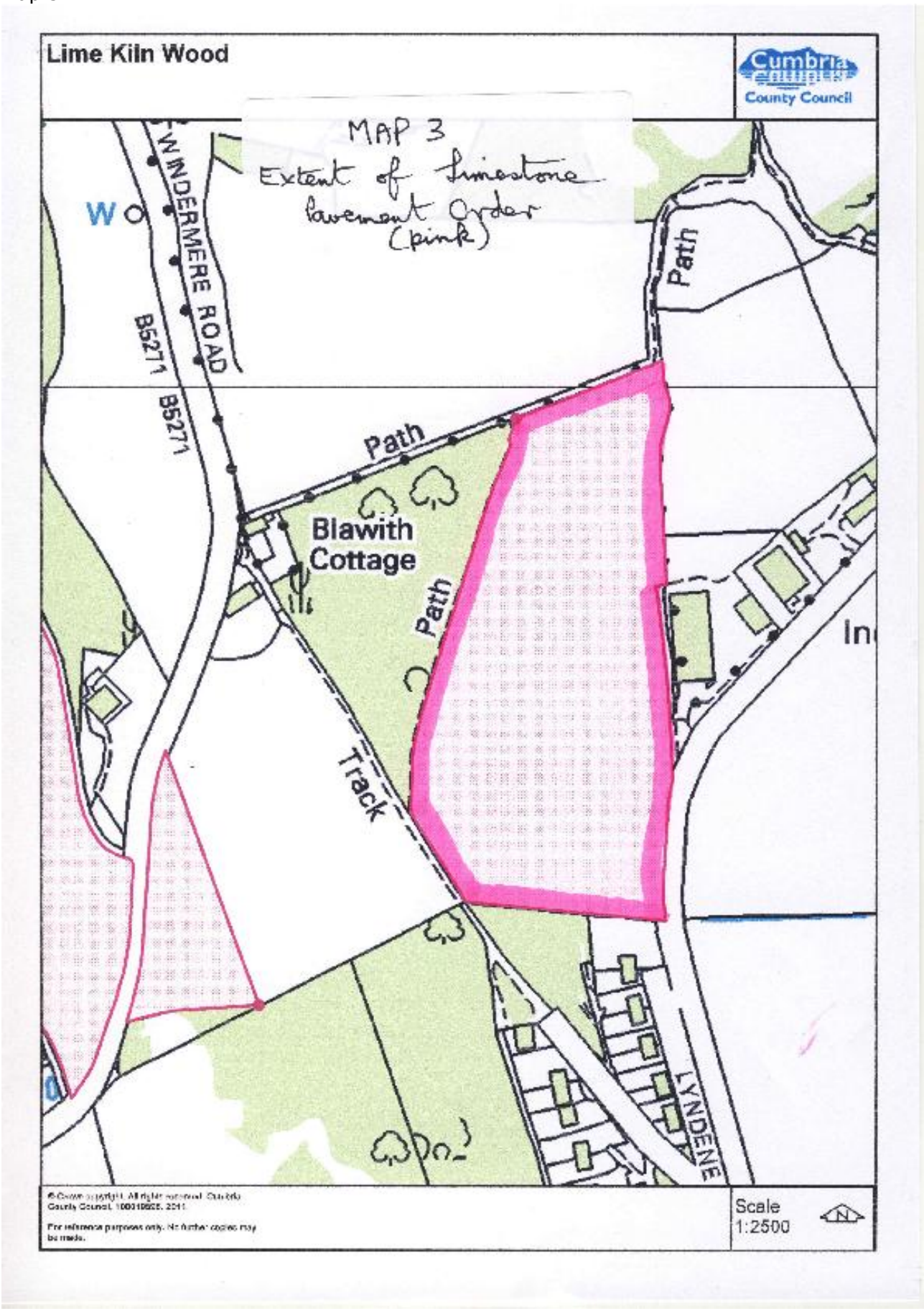
Map 1.


Anquet Maps 2004 www.Anquet.co.uk (BL-TR) (SD4079-SD4281)
MAP 1
limekiln Wood in context
Hampsfield
Hampsfield
Hampsfield Farm
Reservoir
Lindale
White Acre Wood
Lime Kiln Wood
Castle Head (Field Centre
Castle Hill
shop's or Allotment
Merlewood
Merlewood Farm
Spr
Lodge
Castle Head Marsh
Blawith Hill
Castlehead Marsh Farm
Eggerslack Wood
The Slack
Holme Farm
This product includes mapping data licensed from Ordnance Survey. © Crown copyright and/or database right 2004. Licence number PU 100035020.

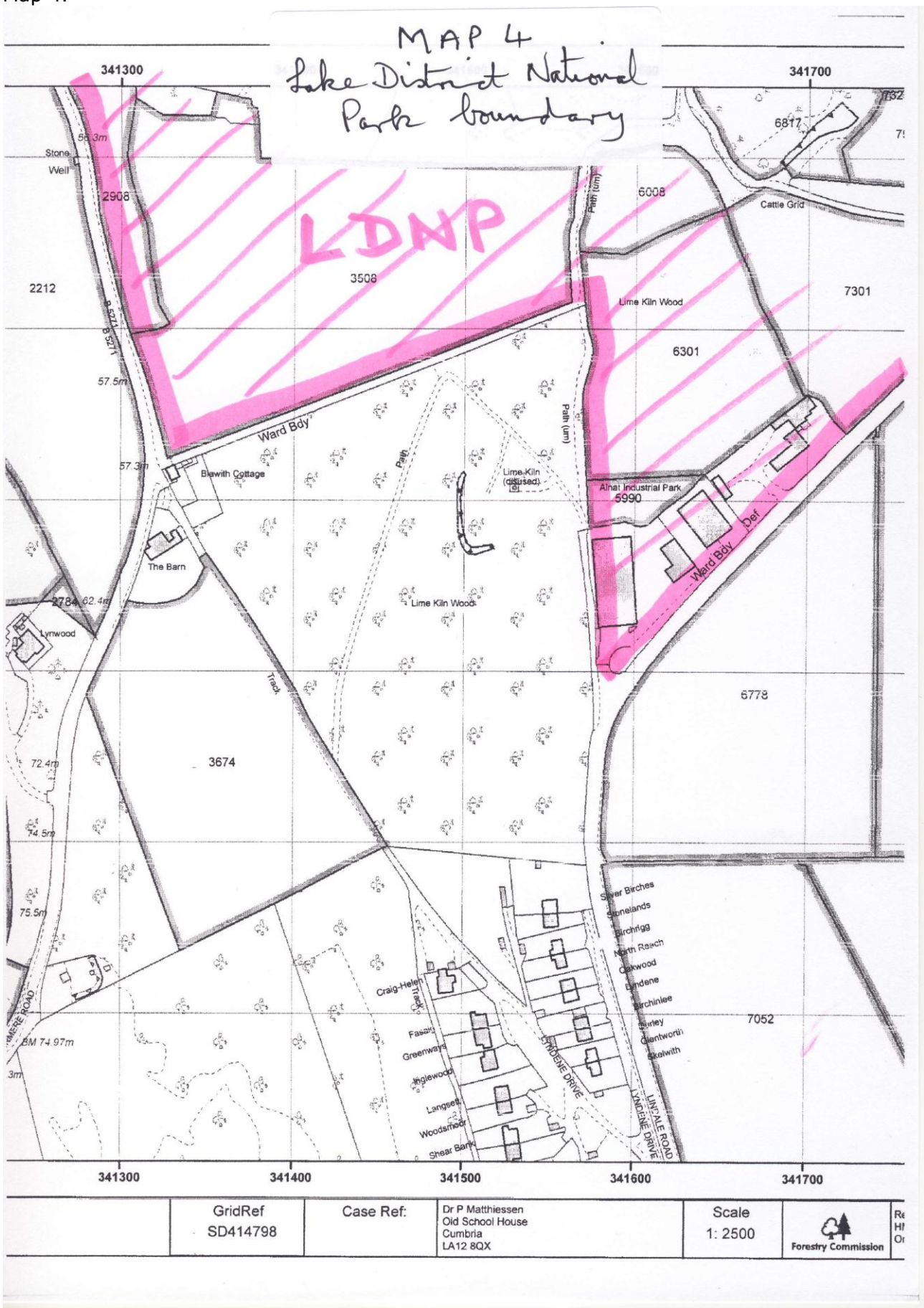
Map
2.


MAP 2
Limekiln Wood
detail
341300
341400
341500
341600
341700
Stone Well
2908
Cattle Grid
2212
3508
Lime Kiln Wood
7301
6301
Ward Bdy
Path (um)
Path
Blewith Cottage
Lime Kiln (disused)
Alnat Industrial Park
5990
Def
The Barn
Lime Kiln Wood
Lynwood
Track
6778
3674
Silver Birches
Stonelands
Birchrigg
North Reach
Oakwood
Lyndene
Birchinlee
Murley
Glentworth
Skelwith
7052
Craig-Helen
Track
Fasad
Greenways
Inglewood
Langsett
Woodsmoor
Shear Barn
LYNDENE DRIVE
LINTALE ROAD
BM 74.97m
GridRef
SD414798
Case Ref:
Dr P Matthiessen
Old School House
Cumbria
LA12 8QX
Scale
1: 2500
Forestry Commission

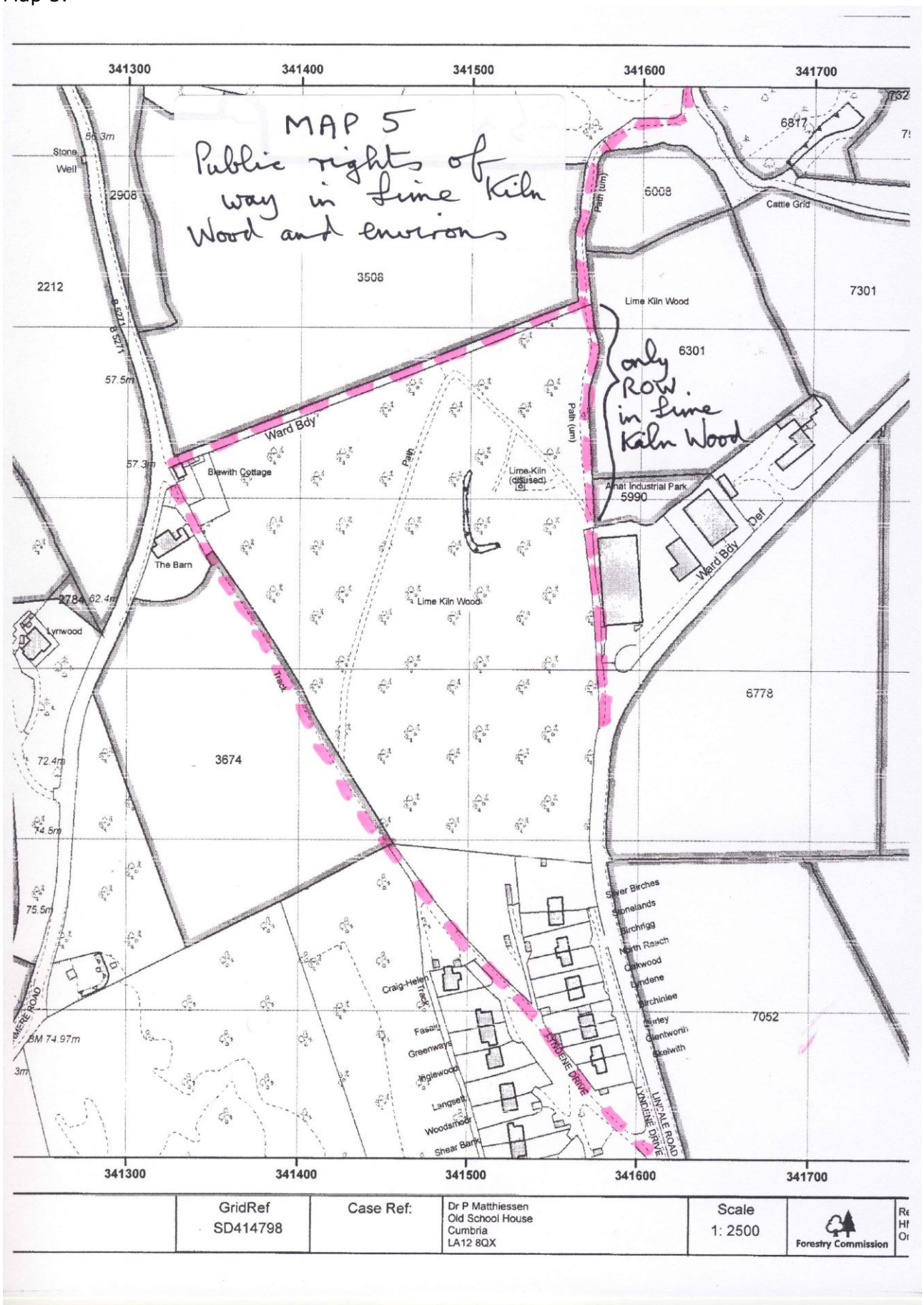
Map 3.


Lime Kiln Wood
Cumbria County Council
MAP 3
Extent of limestone pavement Order (pink)
WINDERMERE ROAD
B5271
B5271
Path
Path
Path
Blawith Cottage
Track
LYNDENE
Scale 1:2500

Map 4.


MAP 4
Lake District National Park boundary
LDNP
341300
341700
Stone Well
2908
6008
Cattle Grid
2212
3508
Lime Kiln Wood
7301
6301
57.5m
Ward Bdy
Path (um)
Blewith Cottage
Lime Kiln (disused)
Alnat Industrial Park
5990
Def
The Barn
Lime Kiln Woods
Lynwood
6778
3674
72.4m
74.5m
75.5m
Silver Birches
Stonelands
Birchrigg
North Reach
Oakwood
Lyndene
Birchinlee
Shirley
Glentworth
Skelwith
7052
Craig-Helen Track
Fasach
Greenwaye
Inglewood
Langsett
Woodsmoor
Shear Barn
LYNDENE DRIVE
LINDALE ROAD
BM 74.97m
341300
341400
341500
341600
341700
GridRef SD414798
Case Ref:
Dr P Matthiessen
Old School House
Cumbria
LA12 8QX
Scale 1: 2500
Forestry Commission

Map 5.


MAP 5
Public rights of way in Lime Kiln Wood and environs
only ROW in Lime Kiln Wood
341300
341400
341500
341600
341700
Stone Well
2908
3508
2212
Lime Kiln Wood
6301
7301
6817
6008
Cattle Grid
Path (um)
Ward Bdy
Blewith Cottage
Lime Kiln (disused)
Amat Industrial Park
5990
The Barn
Lime Kiln Wood
Lynwood
6778
3674
Track
Craig-Helen
Fasnid
Greenways
Inglewood
Langsett
Woodsmoor
Shear Barn
Sheer Birches
Stonelands
Birchrigg
North Reach
Oakwood
Lyndene
Birchinlee
Glentworth
Skelwith
LYNCRAE DRIVE
LINCALE ROAD
7052
BM 74.97m
GridRef SD414798
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Cumbria
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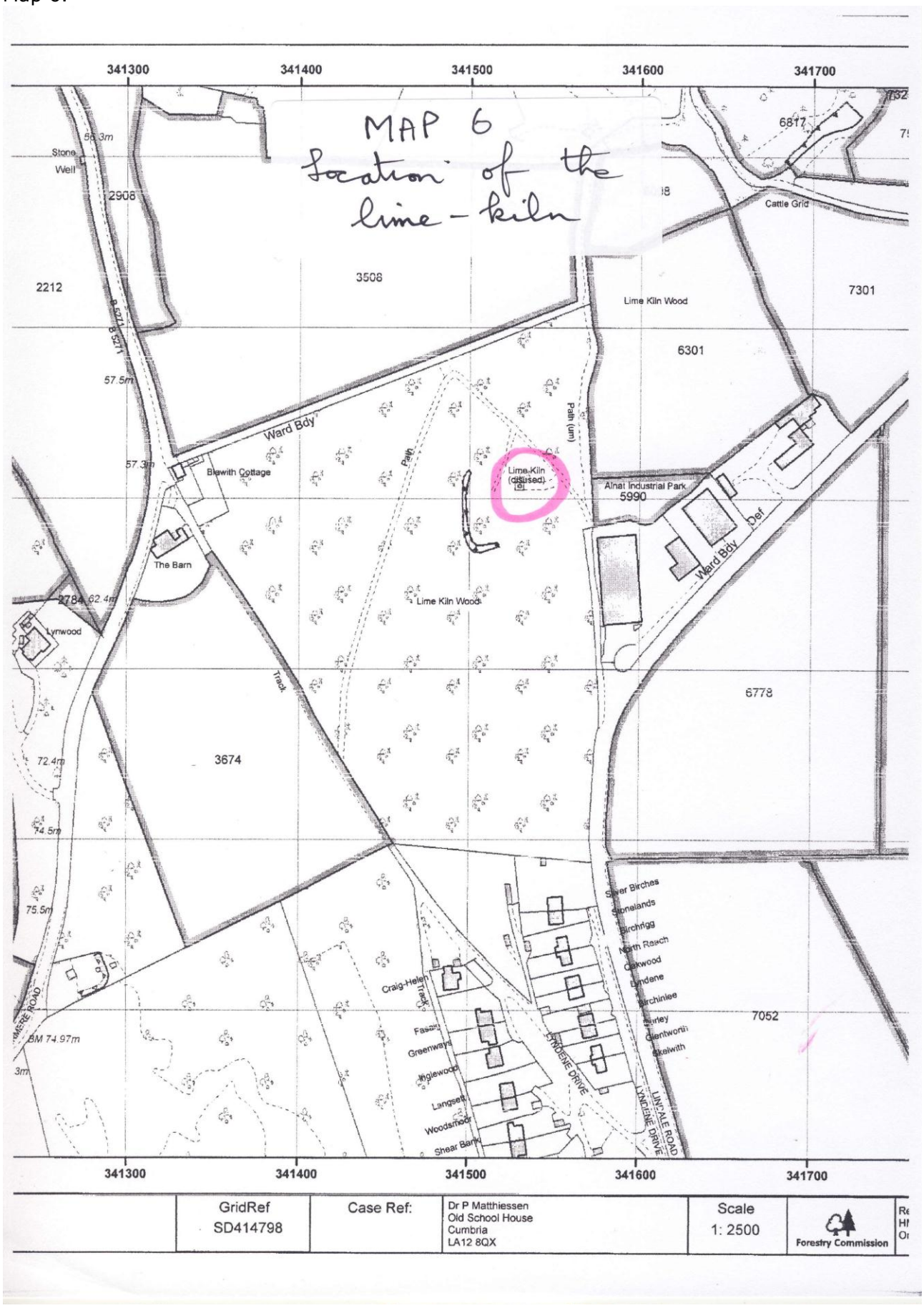
Scale 1: 2500
Forestry Commission

Map 6.


MAP 6
location of the
lime-kiln
341300
341400
341500
341600
341700
Stone Well
2908
2212
3508
6817
Cattle Grid
Lime Kiln Wood
7301
6301
B 5211
57.5m
Ward Bdy
Path
Path (um)
Blewith Cottage
Lime Kiln (disused)
Alnat Industrial Park
5990
Ward Bdy Def
The Barn
Lime Kiln Wood
Lynwood
Track
6778
3674
72.4m
74.5m
75.5m
Shear Birches
Stonelands
Birchrigg
North Reach
Oakwood
Lyndene
Birchinlee
Fairley
Glentworth
Kelwith
7052
Craig-Helen
Track
Fasnar
Greenways
Inglewood
Langsett
Woodsmoor
Shear Barn
BM 74.97m
STRIDENE DRIVE
LYNDENE DRIVE
LINCALE ROAD
GridRef
SD414798
Case Ref:
Dr P Matthiessen
Old School House
Cumbria
LA12 8QX
Scale
1: 2500
Forestry Commission

10 Thinning, felling and restocking proposals

Applicants seeking funding through the wood fuel initiative for harvesting machinery or wood fuel boilers must indicate the total volume that is to be thinned and felled during the period of this plan, **by completing Table A.**

This section **should not be completed** for any other applications.

All applicants **must** complete **Table B**. where harvesting work is to be undertaken.

10.1 Table A.

Species	Total estimated volume to be harvested during plan period (m^3)
Broadleaves	n/a
Conifers	n/a

10.2 Table B.

This section must be completed if you wish to gain felling licence approval from the Forestry Commission. The work detailed below should match the proposals set out in the plan.

For details on how to complete the table, please refer to EWGS 4 Woodland Regeneration Grant Guide (PDF 84kb).

Cpt/sub cpt	Area	Area to be worked	Type of felling	% of felled area comprising		Type of licence	Change in woodland type	Preferred claim year	Restock species %	Establishment by natural regeneration %	Standard proposals	Notes
				BL	CON							
All	5.1 ha	5.1 ha	T[1]	100	0	C	None	n/a	None			Thinning of undesirable species (esp. sycamore). Sycamore will only be completely eliminated where it is relatively scarce.
All	5.1 ha	5.1 ha	FC[2]	100	0	C	None	n/a	Same	100%		Coppice rotation
All	5.1 ha	5.1 ha	FIT[3]	100	0	C	None	n/a	None			Only felling standard trees if hazardous or damaging

[1] Thinning
[2] Fell Coppice
[3] Felling Individual Trees

Addition information if required

List of Appendices.

1. Cumbria Woodlands *Silver Birch* report (omitted from this version)

2 Tree and ground flora survey

3. Record of points made by Vanessa Champion, Ancient Tree Verifier, Woodland Trust during visit on 01/09/11 (omitted from this version)

4. Dunnewoods Tree Safety Report (omitted from this version)

Appendix 2.Tree and ground flora survey report.

A survey of trees and ground flora in Lime Kiln Wood, Lindale, spring/summer 2011

Peter Matthiessen, Chris Matthiessen, Richard Scott and Colin Barr

Background

The purpose of this survey was to provide basic data about the trees and ground flora of Lime Kiln Wood (LKW) in order to support a woodland management plan. No previous detailed surveys are known to exist, although a species list of trees and ground flora was recorded by Jane Lusardi in June 1999 in support of LKW's designation as a Cumbria County Wildlife Site (site ref. S-SD47-05). The species recorded by Lusardi are shown in Table 1.

Table 1. Trees and ground flora in Lime Kiln Wood recorded by Lusardi in June 1999.

Species	Common name
A) Trees	
Acer pseudoplatanus	Sycamore
Betula pubescens	Downy birch
Corylus avellana	Hazel
Crataegus monogyna	Hawthorn
Fagus sylvatica	Beech
Fraxinus excelsior	Ash
Ilex aquifolium	Holly
Pinus sylvestris	Scots pine
Prunus padus	Bird cherry
Prunus spinosa	Blackthorn
Quercus petraea	Sessile oak
Taxus baccata	Yew
Ulmus glabra	Wych elm
Viburnum opulus	Guelder-rose
B) Ground flora	
Allium ursinum	Ramsons
Arum maculatum	Cuckoo pint / Lords and Ladies
Athyrium filix-femina	Lady fern
Brachypodium sylvaticum	False-brome
Carex sylvatica	Wood sedge
Circaea lutetiana	Enchanter's nightshade
Cotoneaster horizontalis agg.	Cotoneaster
Ctenidium molluscum	Chalk comb-moss
Dactylis glomerata	Cock's foot
Dryopteris dilatata	Broad buckler-fern
Dryopteris filix-mas	Male-fern
Epilobium montanum	Broad-leaved willowherb
Fragaria vesca	Wild strawberry
Galium odoratum	Woodruff
Geum urbanum	Wood avens
Hedera helix helix	Common ivy

Species	Common name
Hyacinthoides non-scripta	Bluebell
Hypericum androsaemum	Tutsan
Lonicera periclymenum	Honeysuckle
Lysimachia nemorum	Yellow pimpernel
Melica uniflora	Wood melick
Mercurialis perennis	Dog's mercury
Phyllitis scolopendrium	Hart's-tongue
Poa trivialis	Rough meadow-grass
Polytrichum formosum	Bank haircap
Potentilla sterilis	Barren strawberry
Ribes rubrum	Red currant
Ribes uva-crispa	Gooseberry
Rubus fruticosus agg.	Bramble
Senecio jacobaea	Common ragwort
Stachys sylvatica	Hedge woundwort
Thuidium tamariscinum	Common tamarisk-moss
Veronica montana	Wood speedwell

Methods

Trees

LKW was divided into a grid of survey squares oriented to magnetic north using a measuring tape and compass, with a small numbered grid marker placed at 25 m intervals (Fig. 1). Positioning of the markers was probably accurate to +/- 5-10 m, which was deemed sufficient for the purposes of the survey. During spring and summer 2011, all the trees (>2 m high) in every second 25x25 m square (with the exception of any partial squares on the boundary) were identified and counted, and their diameters at chest height measured with callipers. Tree numbers were extrapolated to the wood as a whole on the basis of the relative areas of the squares surveyed and the total wood area.

Ground flora

Semi-quantitative sampling was carried out in LKW from April to June 2011. The 2011 survey was designed to describe the spatial patterns in LKW and to relate them to tree species distribution, linked to past management events. A $1m^2$ sample quadrat was taken to the NE of each 25m grid intersection, a total of 87 points (Annex 2). Species occurrence and other features such as leaf litter, bare soil/rock and roots were recorded. A snapshot photo was taken of each quadrat and GPS readings for each quadrat were also made (data not shown). A marker was inserted in the SW corner of each quadrat for future location. Cover percentage was estimated for each species and feature, the scores overlapping to give cover in excess of 100% in most cases. This survey will be repeated periodically to monitor the ground flora in relation to successional change and human intervention.

Results and Discussion

a) <u>Trees</u>

The tree canopy generally reaches a height of 10-15 m and is essentially continuous with no large breaks. Total numbers of surveyed trees (both standards and understory) are shown in Table 2, together with an extrapolation to the wood as a whole. It can be seen that 37% of the total wood area was subjected to the detailed count.

Table 2. Total tree numbers (> 2m high) in Lime Kiln Wood, ranked by abundance.

	Counted trees (in 31 blocks of 25x25 m = 19,375 m^2)	**Trees extrapolated to whole wood** (52,230 m^2)
Hazel *Corylus avellana*	604	1628
Sycamore *Acer pseudoplatanus*	528	1423
Ash *Fraxinus excelsior*	428	1154
Holly *Ilex aquifolium*	101	272
Hawthorn *Crataegus monogyna*	96	259
Sessile oak *Quercus petraea*	83	224
Beech *Fagus sylvatica*	76	205
Wych elm *Ulmus glabra*	47	127
Yew *Taxus baccata*	42	113
Wild cherry *Prunus avium**	40	108
Downy birch *Betula pubescens*	36	97
Larch *Larix europaeus*	26	70
Blackthorn *Prunus spinosa*	12	32
Rowan *Sorbus aucuparia*	10	27
Spindle *Euonymus europaeus*	6	16
Elder *Sambucus nigra*	2	5
Scots pine *Pinus sylvestris*	2	5
Horse chestnut *Aesculus hippocastanum*	1	3
European barberry *Berberis vulgaris*	1	3
Willow *Salix* sp.	1	3
European fly honeysuckle *Lonicera xylosteum*	1	3
Silver birch *Betula pendula*	1	3
Wild crab apple *Malus sylvestris*	1	3
TOTALS	**2145**	**5783**

* Some observers including Lusardi report that bird cherry (*Prunus padus*) is also present in the wood, but the large specimens appear to be *Prunus avium* based on the appearance of their bark.

As only just over a third of the total wood area was surveyed, it is to be expected that the extrapolated abundances are not entirely accurate, particularly those of the rarer species. Furthermore, it is known that at least two of the latter (field maple *Acer campestre* and Corsican pine *Pinus nigra*) were present, but not in the counted squares.

Presence/absence

The tree survey revealed the presence of several species not reported by Lusardi in 1999, including wild cherry, larch, rowan, spindle, elder, horse chestnut, European barberry, willow, European fly honeysuckle, wild crab apple and field maple. As Lusardi reported the presence of bird cherry but not wild cherry, and as we did not record any bird cherry, it is possible that Lusardi's report of the latter is incorrect. It should also be noted that, unlike Lusardi, we did not observe any guelder rose. Overall, the total tree species count therefore amounts to at least 25.

Despite the presence of various non-native species (*e.g*. sycamore, beech, horse chestnut, Corsican pine and larch), some of which were probably planted in the 19th or early 20th centuries, LKW is clearly an Ancient Semi-Natural Woodland (ASNW) which is fairly typical for the area and the limestone geology. Many trees (especially hazel and sycamore) show signs of having been coppiced in earlier times, but little if any felling or coppicing seems to have been carried out in the last 30-40 years. According to the National Vegetation Classification (FC, 2008; Annex 1), LKW essentially falls into group W12 (ash, sycamore, yew, whitebeam, hazel, hawthorn present, holly rare, as the key tree species), although some features of groups W8, W9 and W10 are present. More discussion on this aspect is given in the ground flora report below.

Size distribution

Size-frequency data for the more common trees are shown in Figs. 2a (standards) and 2b (understory). Among the standards, the 'ideal' frequency distribution is shown by sycamore, with large numbers of young trees available to provide a source of recruitment. Ash, wych elm, and cherry also show a reasonable size distribution, and the ground flora data (see below) show that the woodland floor is carpeted with seedling ash in many places. Beech recruitment appears strong (and many <2m saplings are present), but there are relatively few in the middle size categories. On the other hand, few if any young oaks are present, and recruitment of yew and downy birch appears relatively weak. Finally, the size-distribution of larch is unusual given that this species might be expected to have been planted. The presence of some juvenile (but no very young) larch suggests that some natural recruitment from earlier planted specimens may have occurred in the past.

Spatial distribution

The spatial distribution of the commoner tree species is shown in Fig. 3. While some species (hazel, wych elm, holly) are distributed fairly evenly across LKW, most are to some extent clumped into particular areas. It is particularly noticeable that oaks and yews tend to be concentrated in the central or southern half of the wood, while the hawthorn, ash, beech and cherry distributions tend towards the northern half. There is also a high concentration of sycamore in the north-western quadrant, although this species is present everywhere. It seems possible that sycamore may have been planted in this area for use as a coppice crop, although coppicing has not occurred for many decades.
Overall, despite the trends described above, the tree community in LKW is fairly homogeneous and there is little reason to consider dividing the wood into areas with radically different tree management strategies.

General observations and conclusions about tree diversity and abundance

1. The designation of Lime Kiln Wood as Ancient Semi-Natural Woodland appears correct, although a number of non-native tree species are present, and there are no extremely large specimens.

2. None of the trees would be considered of interest for inclusion in the Ancient Tree Inventory, although many appear to be growing from old coppice stools.

3. There are few signs of coppicing or felling during the last 30-40 years, but hazel and sycamore seem to have been intensively coppiced in earlier times.

4. The woodland most closely corresponds to National Vegetation Classification group W12.

5. The size-distribution of some species (oak, yew and downy birch) indicates poor recruitment potential, although the other common native species (ash, wych elm, cherry, hazel, holly, hawthorn, blackthorn and rowan) seem to be recruiting fairly well.

6. There are signs that ash seedlings (which are very common), and some other species, are being grazed by deer (roe). Small numbers of roe deer have been sighted in the wood on several occasions. However, grazing pressure appears relatively light compared with some woodlands in south Cumbria.

7. The tree canopy is continuous and generally dense, with little direct sunlight reaching the woodland floor.

8. Two non-native species (sycamore and beech) give some cause for concern as the former invasive species dominates some areas (esp. the north-western quadrant), while the latter is shading out species such as yew in some locations and its fallen leaves are preventing the growth of many species of ground flora.

9. A significant proportion of the sycamores are rotting at the base and some are hollowing out. The reason for this is unknown.

10. The spatial distribution of the tree community does not suggest the need to divide the wood into areas subject to radically different management regimes, although it is clear that the dominance of some species (e.g. sycamore) is greater in some areas than others.

Figure 1. Lime Kiln Wood sampling grid, 2011.

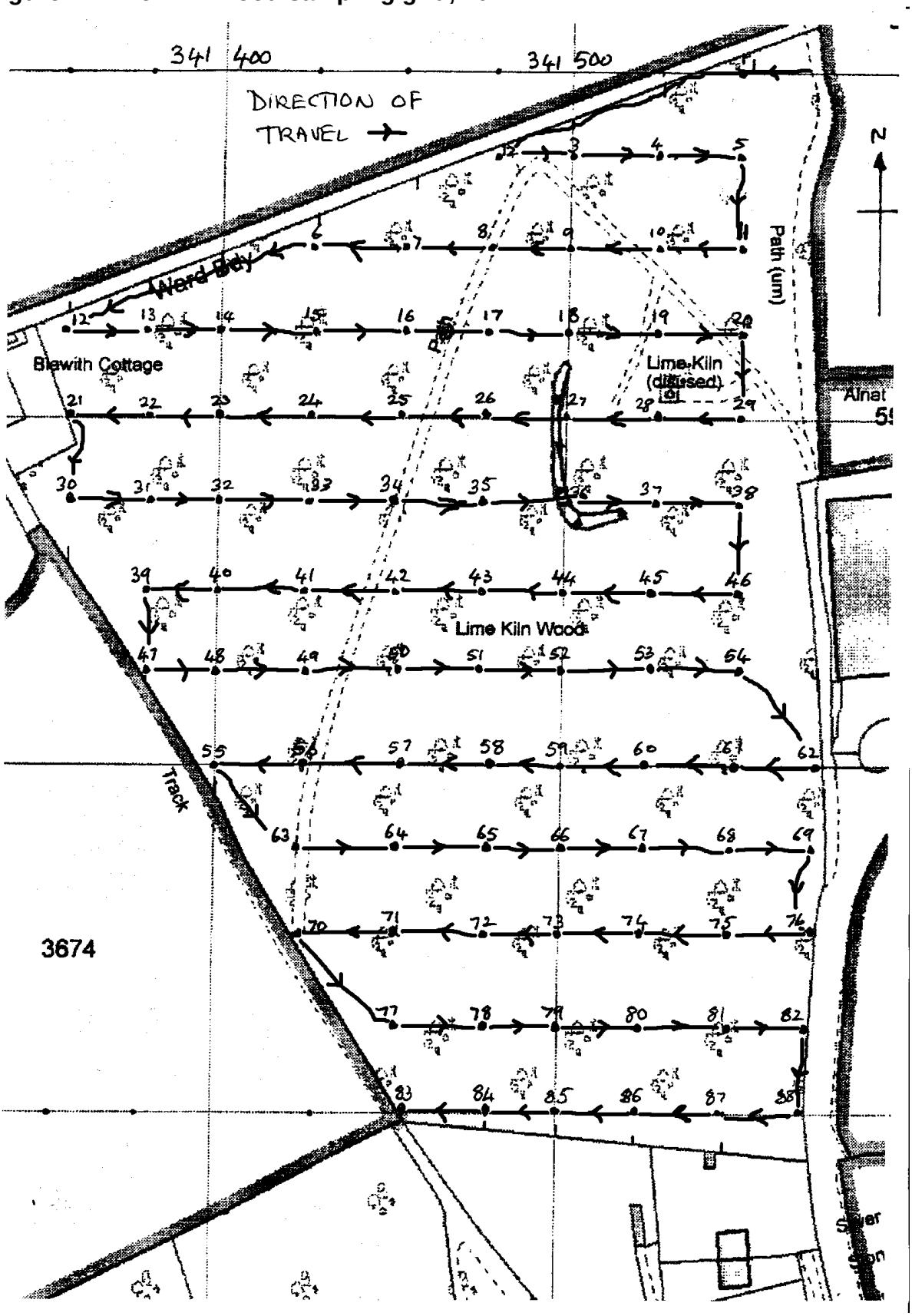


Figure 2a. Size-frequency distribution of trees: Standards. Size is diameter at breast height (dbh) in cm. Vertical scale is % of all records.

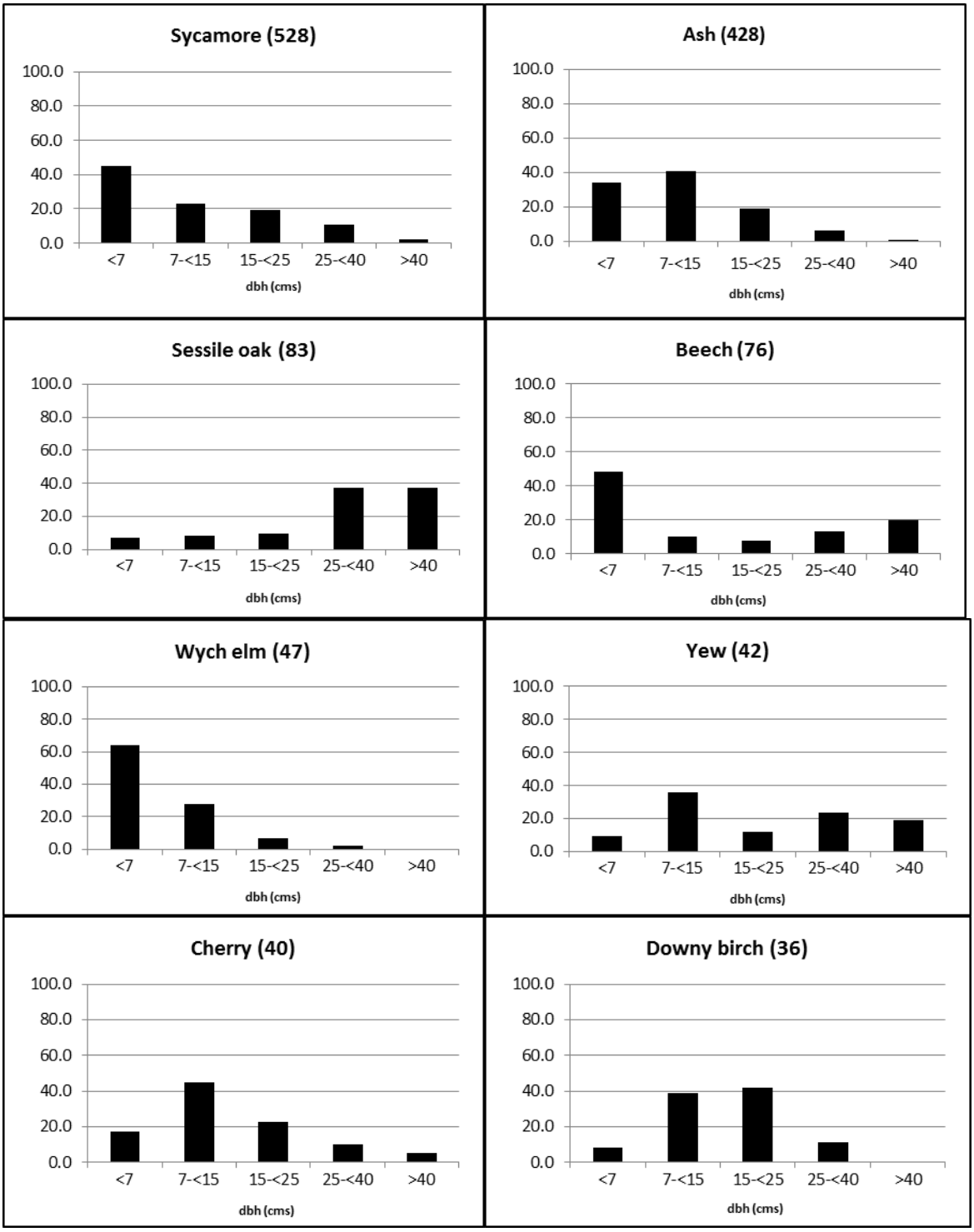


Figure 2a. Size-frequency distribution of trees: Standards (continued). Size is diameter at breast height (dbh) in cm. Vertical scale is % of all records.

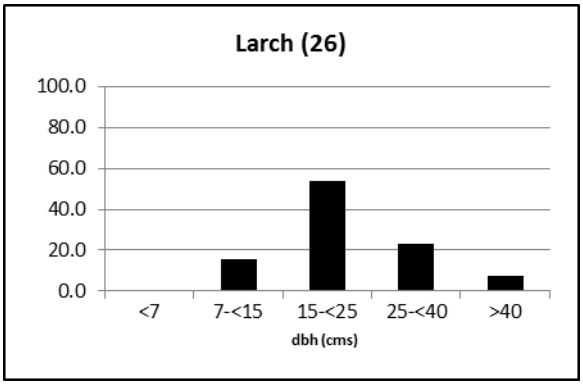


Figure 2b. Size-frequency distribution of trees: Understory. Size is diameter at breast height (dbh) in cm. Vertical scale is % of all records.

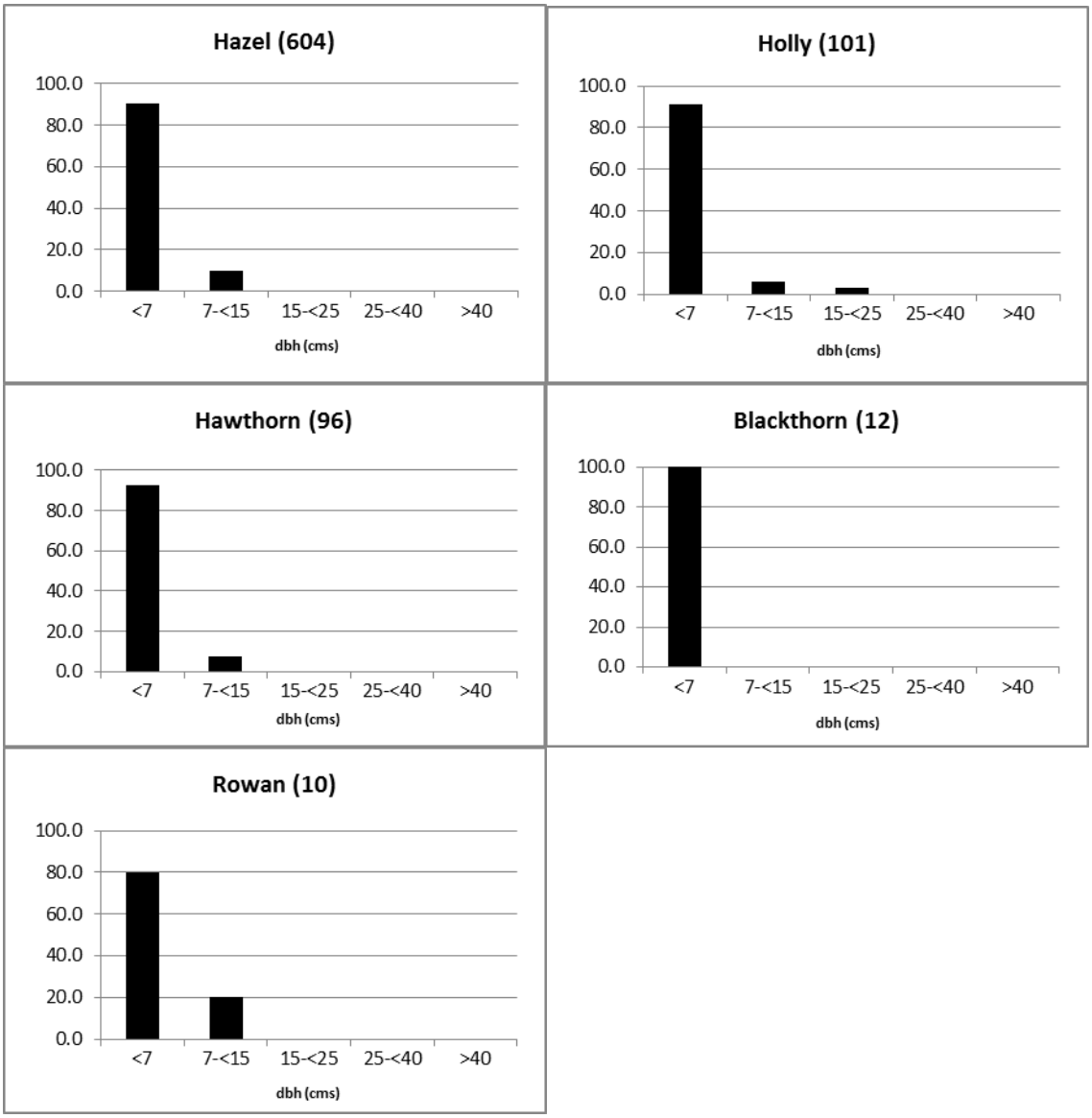
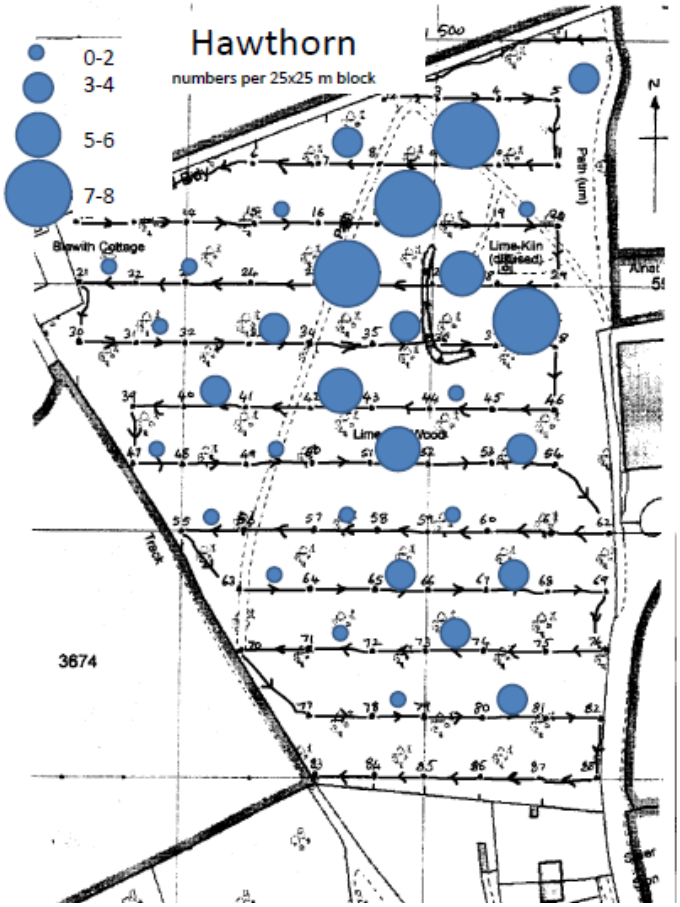
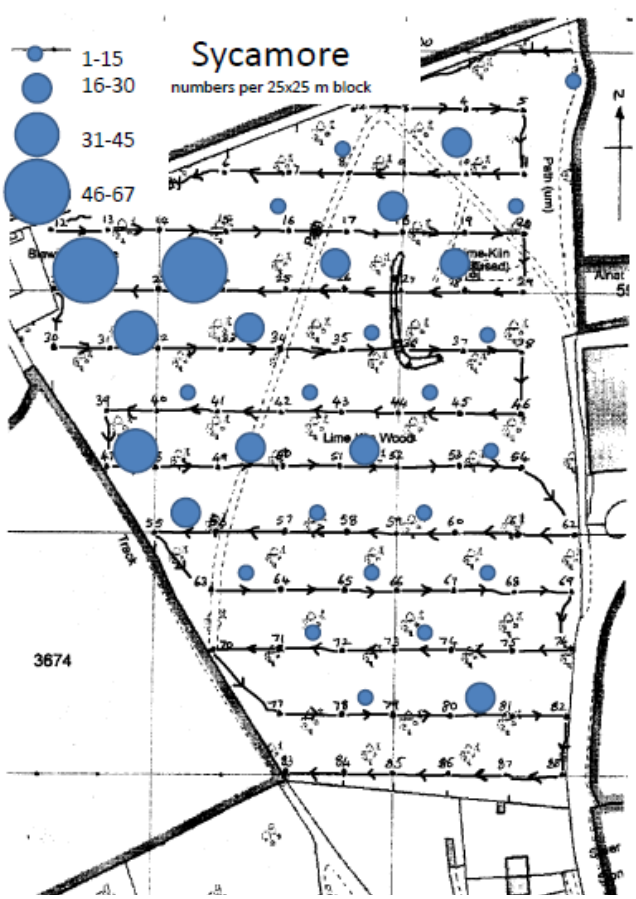
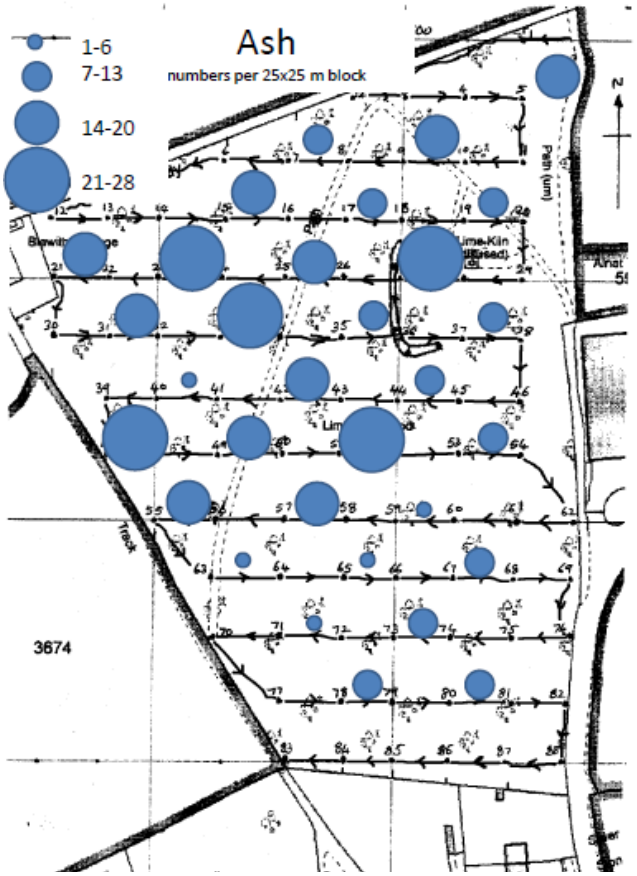


Figure 3. Geographical distribution of the commoner tree species in Lime Kiln Wood. Circles of different sizes represent numbers of individuals per 25x25 m square.







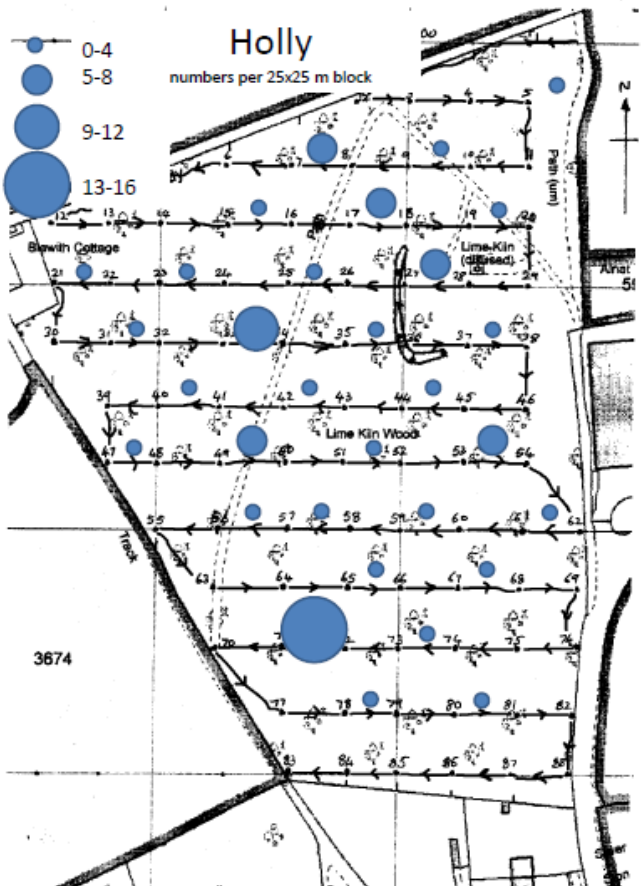
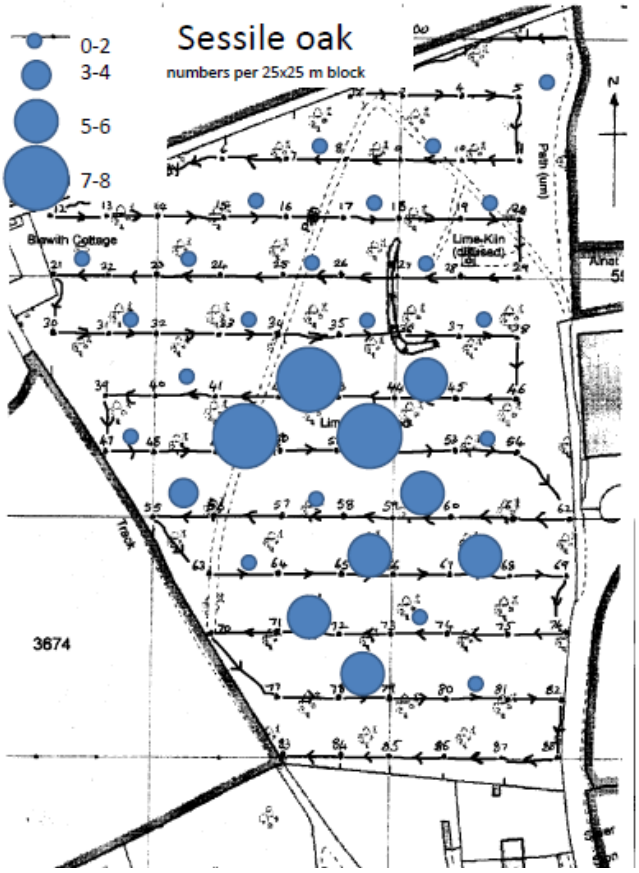
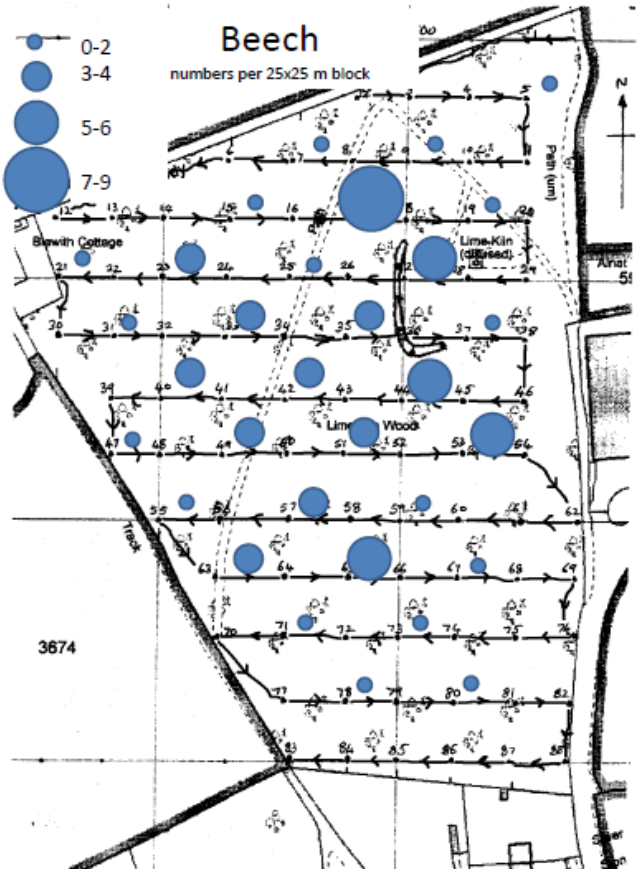
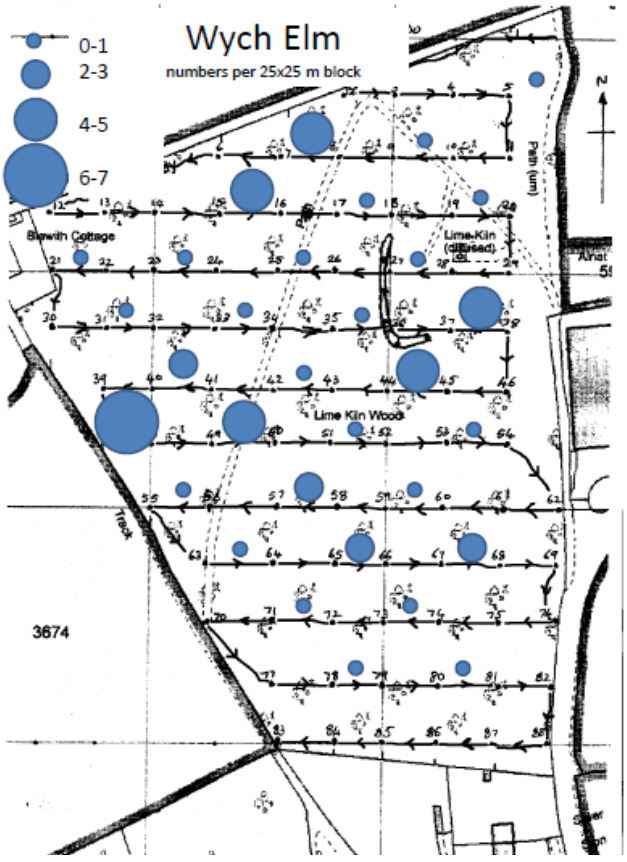


Figure 3 (continued). Geographical distribution of the commoner tree species in Lime Kiln Wood. Circles of different sizes represent numbers of individuals per 25x25 m square.







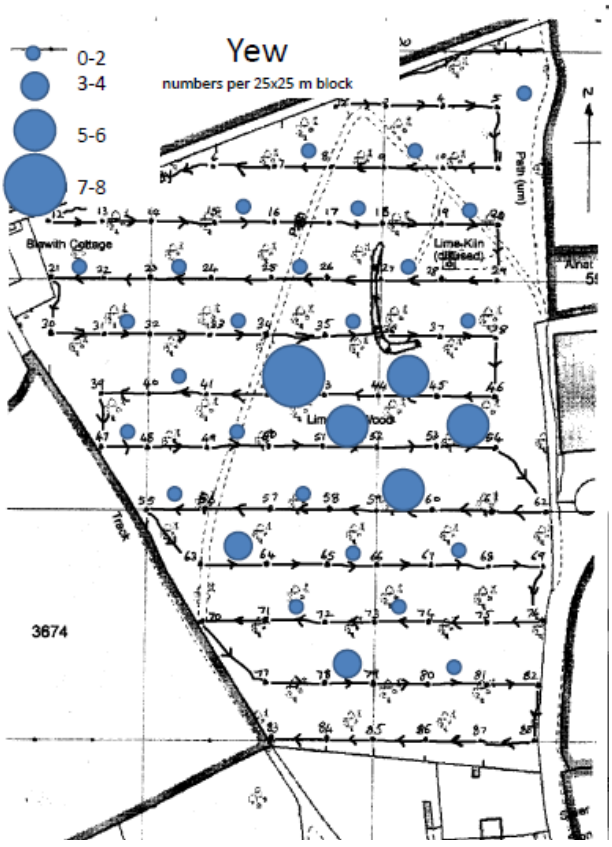
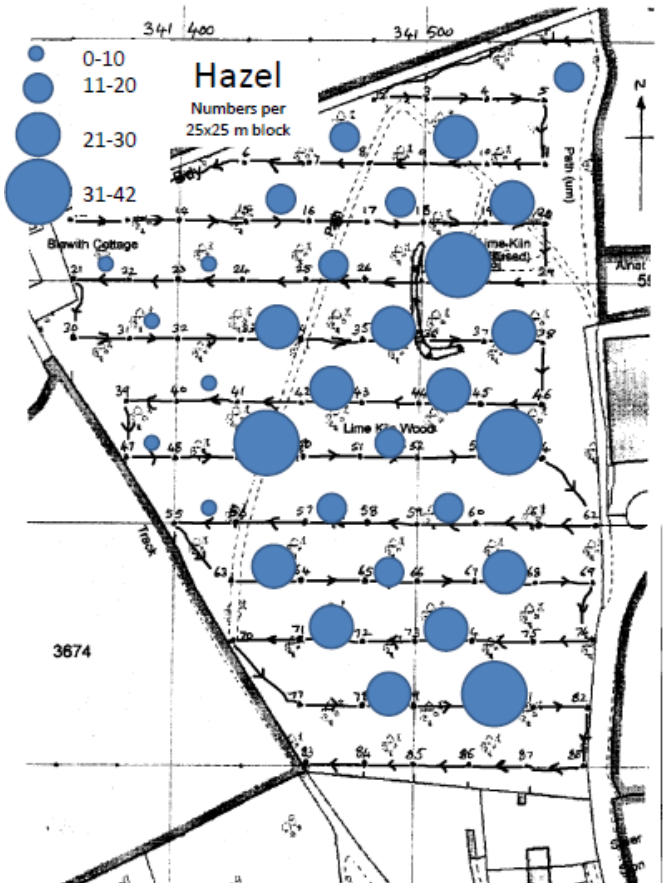


Figure 3 (continued). Geographical distribution of the commoner tree species in Lime Kiln Wood. Circles of different sizes represent numbers of individuals per 25x25 m square.



b) Ground flora

Previous survey species list

The species occurrence survey of Lime Kiln Wood (LKW) carried out in 1999 by Jane Lusardi for Cumbria County Council (Table 1) included all the tree, shrub, pteridophyte and bryophyte species found. Ms Lusardi's list contains several species not found in the Lime Kiln Wood Trust (LKWT) 2011 survey reported below, but we believe there are many more bryophyte species than she listed. Fungi were not covered in either survey, an important omission which will be addressed at a later date. Other taxa such as invertebrate animals will be linked to the biodiversity of the ground flora and, as the management of the wood aims to enhance species diversity, it is important that reliable quantitative baseline data are gathered for LKWT to assess the degree of success.

Classification

From the FC dendrogram (Annex 1), the best fit for LKW is NVC W12, which has ash, sycamore, yew, whitebeam, hazel, hawthorn present, with holly rare, as the key tree species. The 'fairly rich' ground flora of W12, on free draining calcareous soils in the north, is 'dominated by dog's mercury and/or ivy'. These statements are broadly true. However, within the 5 ha wood there is marked spatial diversity, reflecting the different tree species forming the canopy in different parts of the wood, the result of management, both clearance and planting.

Results of 2011 survey

The species frequency data have been tabulated (Annex 3). Species and features for which there were most records, eg ash seedlings and leaf litter, were entered on an Excel worksheet and abundance colour-coded for visual effect (see Annex 4 for an example relating to ash seedlings). Some vascular plant species present in LKW and recorded in the 1999 Lusardi survey were missed by our sampling regime, but we were able to add to the species list (up to 7 additional species) and to ask questions about the accuracy of some of the previous records, particularly bryophytes. Furthermore, several additional ground flora species noted casually by LKWT during spring 2011 were also not recorded by either formal survey. These included *Alchemilla* sp., wood anemone (*Anemone nemorosa*), cow parsley (*Anthriscus sylvestris*), cuckoo flower (*Cardamine pratensis*), pignut (*Conopodium majus*), crosswort (*Cruciata ciliata*), snowdrop (*Galanthus nivalis*), herb robert (*Geranium robertianum*), Welsh poppy (*Meconopsis cambrica*), wood sorrel (*Oxalis acetosella*), herb paris (*Paris quadrifolia*), primrose (*Primula vulgaris*), meadow buttercup (*Ranunculus acris*), goldilocks (*Ranunculus auricomus*), lesser celandine (*Ranunculus ficaria*), dandelion (*Taraxacum officinale*), germander speedwell (*Veronica chamaedrys*), and bush vetch (*Vicia sepium*).

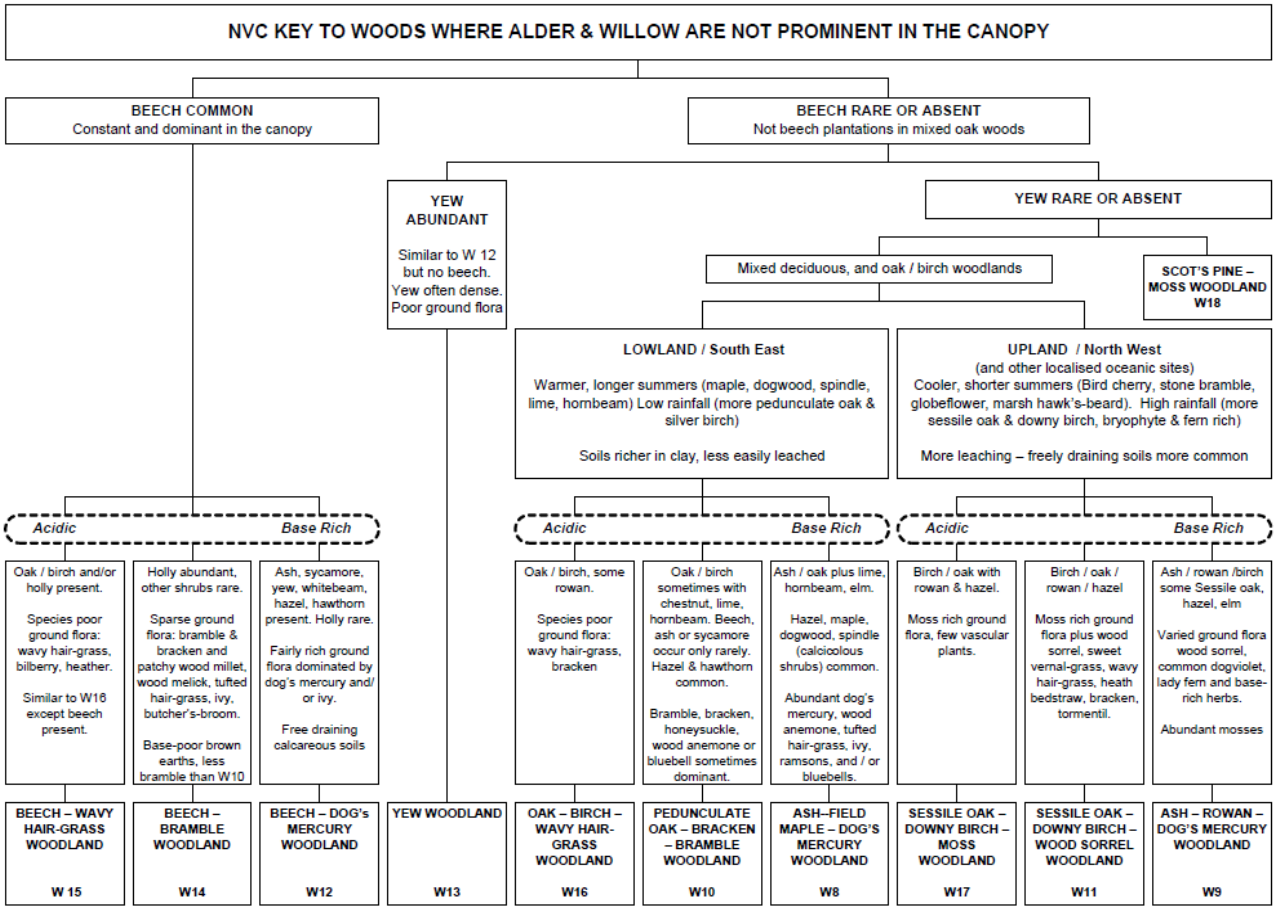
The total number of tree and ground flora species in Lime Kiln Wood therefore amounts to at least 75.

Spatial patterns

There are several distinct vegetation zones in LKW, closely linked to tree species locally dominating the canopy. A striking feature of LKW is the virtual absence of living plants under yew and beech canopy, but elsewhere there are dense stands of dog's mercury, ramsons or bluebell in opened up areas, often dominated by just one of those species. The NW corner has a very open canopy with spindly young trees and the stumps of recently felled sycamore trees. The result is a continuous spring carpet of ramsons and

bluebells. The Southern margin of the wood has very depauperate ground flora, under a canopy dominated by yew and beech trees.

Annex 1. Dendrogram for NVC woodland classification



Richard Boles

Page 4 of 4

Forestry Commission England

ewgs

The scheme is supported with European Union and Defra funding

English Woodland Grant Scheme

Operations Note 4 1st June 2008

National Vegetation Classification (NVC)

Annex 2. Approximate geographic array of sample plots in Lime Kiln Wood

								1	
					2	3	4	5	
			6	7	8	9	10	11	
12	13	14	15	16	17	18	19	20	
21	22	23	24	25	26	27	28	29	
30	31	32	33	34	35	36	37	38	
	39	40	41	42	43	44	45	46	
	47	48	49	50	51	52	53	54	
		55	56	57	58	59	60	61	
			63	64	65	66	67	68	69
			70	71	72	73	74	75	
				77	78	79	80	81	
					84	85	86	87	

Annex 3. Ground Flora survey data (% coverage)

	Quadrat numbers																	
SPECIES	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**19**
Hedera helix - Ivy	30	10	30	15	1		20	5	10		1					1		10
Mercurialis perennis - Dogs mercury		40			80				5			85						
Hyacynthoides non-scripta - Bluebell		10	15	35	10	65		10	5		90		30	5	40	10		30
Geum urbanum - Wood avens			5	10				1								30		5
Viola canina - Dogs violet		1														1		
Allium ursinum - Wild garlic														90				
Circaea lutetiana - Enchanters nightshade																5		
Stachys sylvatica - Woundwort																10		
Dryopteris filix-mas - Male fern						5		35							10			
Ilex aquifolium - Holly									5	5						25		
Rosa canina - Dog rose			1															
Prunus padus - Bird cherry			1															
Rubus fruticosus - Bramble				1				10	1		5				5	10		
Lonicera periclymenum - Honeysuckle				5			5	5							10		1	
Corylus avellana - Hazel sapling			1												10			
Fraxinus excelsior - Ash sapling	1		5	5	1		5	15	1	30			5	1	1	5	5	10
Acer pseudoplatanus - Sycamore sapling	1										1							
Fagus sylvatica - Beech sapling								5						1	1			
Quercus petraea - Sessile oak sapling																	20	
Moss - *Hypnum*?	50	20	15	5	5		15	15	10	1	5	5	25	5	5	5	10	15
Larch cones																		
Pine cone																		1
Leaf litter	5	15	10	5	5		50	15	65	55	1	10	20	5	5	15	60	15
Dead wood litter		1	5	5			5	1	10	10	1	1	10	1	25		10	10
Live tree root				5	5								10		5	5	10	1
Limestone	5		5														1	
Bare soil	15	5	5	5			1		1	5	1	5		1		1	5	5

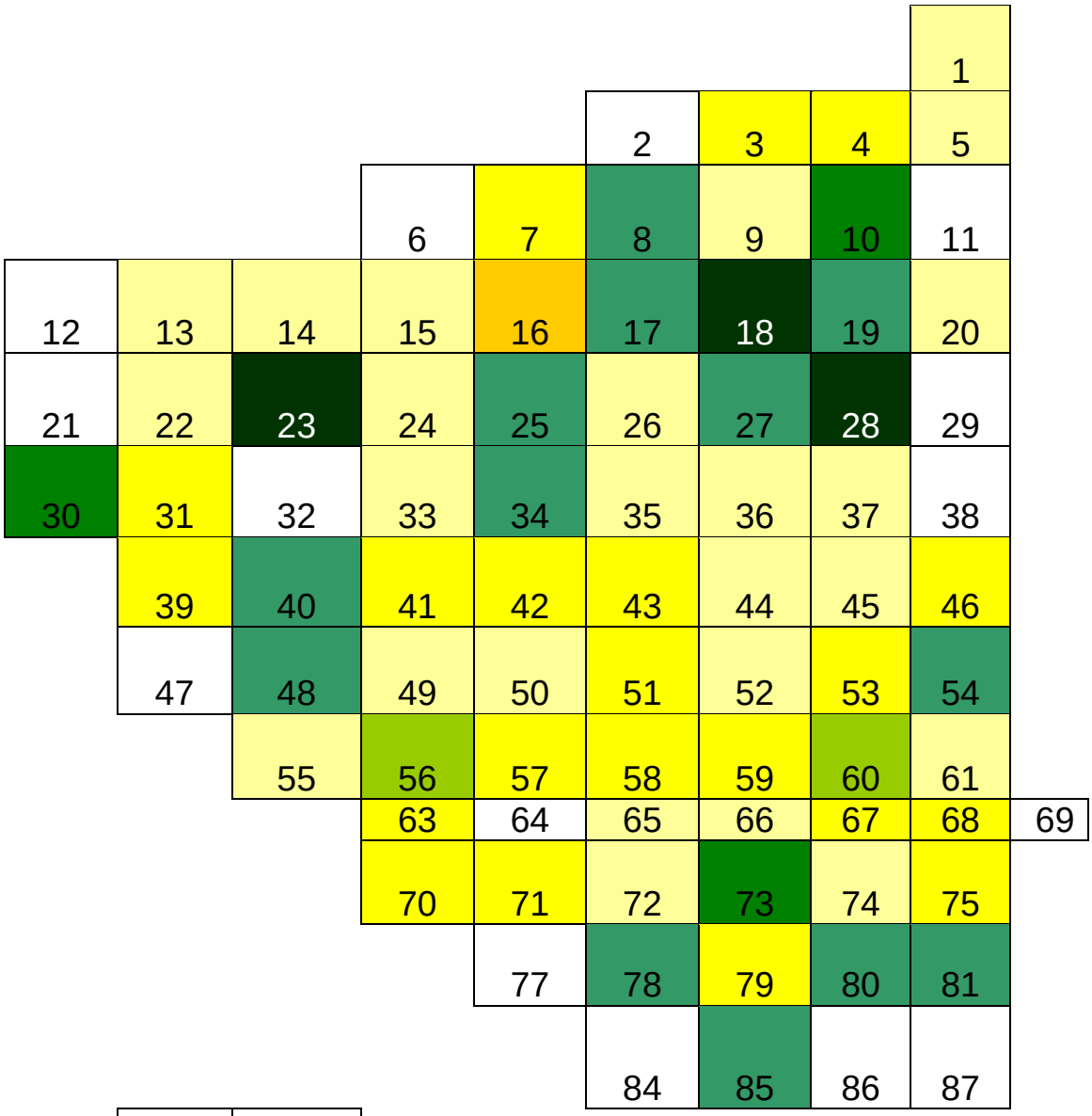
	Quadrat numbers																		
SPECIES	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**39**	**40**
Hedera helix - Ivy								5	5								1		
Mercurialis perennis - Dogs mercury										1									
Hyacynthoides non-scripta - Bluebell	90		75	5		20											60		
Geum urbanum - Wood avens																			
Viola canina - Dogs violet									1										
Allium ursinum - Wild garlic		100																	
Circaea lutetiana - Enchanters nightshade															5				
Melica uniflora - Wood melick (grass)								20											
Arum maculatum - Cuckoo Pint						1	5	5											
Dryopteris filix-mas - Male fern														1				15	
Ribes rubrum - Red currant					10														
Ilex aquifolium - Holly											5								5
Prunus padus - Bird cherry										1		1						1	
Rubus fruticosus - Bramble					5			20	15				5		15	5	25		
Fraxinus excelsior - Ash sapling	10			5	5	5	5	5	5	1	1		5	5	1	5	5	5	10
Fagus sylvatica - Beech sapling	5						15									10	5		
Moss - *Hypnum*?	1		1	50	1	15	1	15	65	25	5		1	20	1	1	1	5	20
Larch cones							10	1											
Pine cone							1												
Leaf litter	5		25	40	85	65	65	15	15	15	95	95	90	65	60	95	15	80	60
Dead wood litter	1	5	1	5	1	10	5	1	5	40	5	5	10	5	15	5	1	5	10
Live tree root			5	5		5		15		10				5					
Limestone								1	1	5	1		1	1		1		1	
Bare soil			5	5	10	5		5	5	5	5	1	5	5	20	1	1	1	15

	Quadrat numbers																	
SPECIES	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**
Hedera helix - Ivy							5							5	5			
Mercurialis perennis - Dogs mercury																		
Hyacynthoides non-scripta - Bluebell														1				
Geum urbanum - Wood avens												1				5		
Viola canina - Dogs violet																		
Allium ursinum - Wild garlic																		
Circaea lutetiana - Enchanters nightshade																30		
Arum maculatum - Cuckoo Pint		1																1
Fragaria vesca - strawberry																		5
Dryopteris filix-mas - Male fern		20	5		1													
Dicranum moss													10					
Sambucus nigra - Elder																		
Ilex aquifolium - Holly			5						5						10			
Rosa canina - Dog rose																		
Prunus padus - Bird cherry																		
Rubus fruticosus - Bramble	1	1						5			5			10	5	25		5
Lonicera periclymenum - Honeysuckle	65							10										
Fraxinus excelsior - Ash sapling	5	5	5	1	1	5		20	1	1	5	1	5	20	1	10	5	5
Acer pseudoplatanus - Sycamore sapling			1															
Fagus sylvatica - Beech sapling	10									5								1
Quercus petraea - Sessile oak sapling									15									
Crataegus monogyna - Hawthorn seedling										1								
Cushion moss										1		5						
Moss - *Hypnum*?	5	1	5	55			5	20	1		20	25	15		15		20	25
Thuidium? Moss							5											1
Tortula? Moss							5											
Polytrichum Moss			60															
Larch cones																		
Pine cone																		
Leaf litter	30	95	30	40	95	90	80	40	75	95	75	50	65	80	60	45	60	40
Dead wood litter	1	1	5	10	5	5	5	10	5	5	5	5	10	5	10		10	10
Live tree root			10						5						1		5	
Limestone							1		5	1	1	5	1		5		1	10

	Quadrat numbers												
SPECIES	**59**	**60**	**61**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
Hedera helix - Ivy	15		1		5								
Mercurialis perennis - Dogs mercury										60			
Hyacynthoides non-scripta - Bluebell	1			1									
Geum urbanum - Wood avens							25						
Phyllitis scolopendrium - Harts tongue fern	1												
Dryopteris filix-mas - Male fern					5								
Sambucus nigra - Elder										10			
Ilex aquifolium - Holly					1	10							15
Prunus padus - Bird cherry				5							1		
Rubus fruticosus - Bramble	5				1	10		5	10	30		1	5
Lonicera periclymenum - Honeysuckle	10				5	25			15				
Corylus avellana - Hazel sapling											5		
Fraxinus excelsior - Ash sapling	5	5	1	5		1	1	5	5		5	5	1
Fagus sylvatica - Beech sapling									25				
Quercus petraea - Sessile oak sapling	1												
Quercus petraea - large tree													10
Crataegus monogyna - Hawthorn seedling						1							
Cushion moss		10		1									
Hypnum cupressiforme? Moss	35	10	5		10	15	25		15		5	5	55
Leaf litter	35	15	90	95	75	35	20	95	40	5	80	95	35
Dead wood litter	10	10	5	5	20	10	5	1	5		20	5	5
Live tree root		15	5					5				1	5
Limestone	1	10		1			1			1		1	
Bare soil	1	25					25			10			1

	Quadrat numbers											
SPECIES	**73**	**74**	**75**	**77**	**78**	**79**	**80**	**81**	**84**	**85**	**86**	**87**
Hedera helix - Ivy		5	5					1				
Mercurialis perennis - Dogs mercury								15				
Melica uniflora - Wood melick (grass)	5	5										
Fragaria vesca - strawberry		1										
Phyllitis scolopendrium - Harts tongue fern											1	
Ilex aquifolium - Holly								5		15		
Prunus padus - Bird cherry							1		1			
Rubus fruticosus - Bramble	15	1					1	15	5			
Lonicera periclymenum - Honeysuckle	10	1					5	10				
Corylus avellana - Hazel sapling												
Fraxinus excelsior - Ash sapling	25	1	5		10	5	15	20	10	10	5	5
Acer pseudoplatanus - Sycamore sapling												
Fagus sylvatica - Beech sapling	1					1			1			
Taxus baccata - large Yew tree				35								
Crataegus monogyna - Hawthorn tree												30
Cushion moss										10		
Moss - *Hypnum*?	5	10	1	25	10	10	20	1	1	5	5	20
Leaf litter	25	60	90	20	80	90	50	20	90	25	95	35
Dead wood litter	10	20	10	5	1	10	10	10		15	1	20
Live tree root		1		20	1		1		5			5
Limestone		1	1	1	5	1	1		1	5	1	1
Bare soil	5	5	5	5			1			15		

Annex 4. Ash sapling abundance scores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86
87
% Ash
saplings
>30
21-30
11 to 20
6 to 10
5
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References

FC (2008). *National Vegetation Classification (NVC).* English Woodland Grant Scheme, Operations Note No. 4. Forestry Commission.