Forestry Commission England

Yorkshire Forest District

Coatham and South Burdon Forest Plan

FDP 30

2015

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FOREST ENTERPRISE - Application for Forest Plan Approvals in England

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Coatham and South Burdon

279.1 Hectares

Period of Plan: 2015 - 2024

1. Background

Coatham and South Burdon are part of the network of Forestry Commission (FC) land in the north-west of the District. Coatham is situated 2.5 miles south-west of Stockton-On-Tees and South Burdon is a little over 2 miles east of Darlington, both forming part of the Cleveland beat.

The land at Coatham was acquired in 1997/1998 and South Burdon in 2001.

The woods consists of previously cropped agricultural fields sitting within a flat landscape, dominated by large fields growing arable crops and improved grassland in a rectilinear pattern. Tree cover is generally represented in maintained hedgerows with few copses or existing woodlands present. The large conurbations of Darlington to the west and Stockton-On-Tees to the east provide a stark contrast to the intensively farmed landscape.

2. Describing the Site

2.1 Geology and Soils

Underlying bedrock geology is predominantly sedimentary sandstone (Sherwood group) and conglomerate from the Triassic Period. Superficial geology is primarily Devensian till with alluvium and glaciolacustrine deposit running along and adjacent the length of Coatham Beck.

The soils at Coatham and South Burdon are uniform in their nature being of the typical surface water gley group, offering a medium nutrient regime and wet to very moist regime based on Forest Research Ecological Site Classification. Both sites were previously classed as Grade III on the MAFF Agricultural Land Classification.

2.2 Tree Species (Maps – 1a/1b)

Broadleaf is the dominant species group across both woods with 57% planted area at Coatham and 84% at South Burdon. Oak and ash are the main broadleaf species with a wide range of other, predominantly native species with the exception of Poplar.

Conifers account for 43% of the planted area at Coatham with Corsican pine (40%) by far the greatest proportion and 16% conifer at South Burdon. Japanese larch and Scots pine are minor components at Coatham as is Scots pine at South Burdon.

The main difference in planting pattern between the two woods is the significant areas of pure conifer planting at Coatham compared with the intimate mixture of broadleaf:conifer at South Burdon.

Open Ground forms a significant component at both sites with 36% of total area at Coatham and 57% at South Burdon.

The narrow age-range across both sites are shown on maps **2a/2b.**

2.3 Wind Damage

Windthrow hazard measurements indicate the whole of South Burdon and the majority of Coatham is windfirm at WHC 2. The hazard rating increases to 4 in the southern half of Coatham, although this should not be a limiting factor on the choice of silvicultural system by which these crops are managed.

In light of this, management options are relatively unrestricted across the majority of the property with regard to practising Continuous Cover Forestry and the potential to extend the rotation age of crops to cover a wide range of objectives.

2.4 Landscape

Coatham and South Burdon sit centrally within the Tees Lowlands National Character Area (NCA), bordered by Darlington to the west and Stockton-on-Tees and Middlesbrough to the east. This NCA forms a broad, low-lying plain framed to wide views to the south-east towards the North York Moors and Cleveland Hills and to the west there are distant views of the Pennines across the industrial fringes of Darlington. Power lines and energy infrastructure are conspicuous in the landscape and particularly so at Coatham. Green corridors and former railway lines (Stockton to Darlington line at South Burdon) provide links between urban areas and the surrounding countryside.

The elevation for both woods sits below 50 metres, supporting their low-lying nature within the landscape. Across this flat topography, the foreground and edge views dominate both of these establishing woodlands.

Internal views vary between the two where the faster growing stands of conifer and Poplar at Coatham foreshorten views and create a sense of enclosure within recently established woodland.

The areas of permanent open ground can sometimes create a 'corridor' effect with limited visual diversity.

This contrasts markedly with South Burdon where the slower to establish, broadleaf-dominant stands and significant areas of open space still offer longer views across the site and beyond as canopy closure has not yet been achieved.

2.5 People and Community (Maps – 3a/3b)

The car park at Coatham provides a popular starting point for walkers and young families alike to utilise the network of trails, rides and public rights of way that are utilised on a frequent basis throughout the year.

Visitor usage is less developed at South Burdon, although the former Stockton to Darlington railway line along which George Stevenson's and his 'Rocket' travelled, passes through the site and provides a pedestrian link with Middleton St George to the south-east and, via the footbridge crossing the A66,the market town of Darlington to the west. The land at South Burdon adjacent the eastern spur off the A66/B6279 roundabout, as yet remains undeveloped.

These are freehold woods where there is the potential to develop recreational use for people and businesses where these do not conflict with the plans aims and objectives.

2.6 Natural Heritage (Maps – 3a/3b)

Both woods are increasing their contribution to the local biodiversity value in contrast to their previous agricultural land use with its limited conservation value.

South Burdon

Open water and wetland habitats are developing a broad range of floristic diversity at both the old quarry site in the northern section of the wood and the recently created ponds south of South Burdon Farm. In conjunction with maintained areas of meadow and grass sward habitat, these sites are attracting a range of fauna, including increased numbers of owl species and Kestrel.

An important development to the site is the presence of Water vole, a semi-aquatic rodent whose population nationally has declined by 90-95% of its pre 1960's level.

Coatham

The riparian habitat along Coatham Beck continues to improve in condition as the adjacent areas of open ground allow existing trees, shrubs, deadwood habitat and ground flora to develop, without the impact associated from previous agricultural practices (See images 1 – 3). Otter are

known to travel along this habitat corridor. Although Coatham Beck is currently categorised as 'moderate' status under Water Framework Directive criteria there are opportunities to develop improvements for water quality and flood protection measures.

The wildflower meadow, north-east of the car park continues to support a significant population of Forester moth, a priority UK BAP species.

Following the creation of several freshwater ponds, a Great Crested Newt relocation project was initiated in 2012. This has proved a successful development with newts now being recorded across parts of the wood beyond their original sites of release.

2.7 Cultural Heritage (Maps 3a/3b)

There are no scheduled heritage features recorded at either site although unscheduled features were noted at the time of planting and allocated as open ground.

3. Describing the Project

3.1 Project Brief

- manage natural heritage sites in accordance with their requirements as per agreed management plans

- consider the selection of alternative main tree species that will contribute toward a greater range of species diversity to maintain or increase timber productivity and increase resilience to plant health and biosecurity threats

- increase the diversity of the age structure by use of appropriate silvicultural systems.

3.2 Objectives

- Maintain the land within our stewardship under UKWAS certification, to be measured by independent surveillance audits.

- Maintain the cultural and heritage value of these woods, to be measured by Non Government Organisations and FC systems accordingly.

- Encourage and support appropriate business activity in support of other objectives.

- Provide informal woodland based recreational opportunities for people and business.

- Improve the economic resilience of these woods from a more diverse range of site appropriate conifer and broadleaf species, to be measured by the Production Forecast and Sales Recording Package.

- Encourage communities to become involved across these woods, its management and direction though consultation in planning and participation in volunteering.

3.3 Constraints

- Coatham has a significant density of utilities running across the forest block which will impact on subsequent harvesting operations.

- Coatham is moving from a thicket-stage to pole-stage woodland in which crop management will start to impact on operational activity through silvicultural thinning.

- Corsican pine comprises over 30% (54 ha) of the productive high forest and is currently suffering from varying rates of infection by Dothistroma septosporum (needle blight). We will consider the scale and pace of removal to reduce the level of risk to the development and impact of the disease.

3.4 Implementation

3.4.1 Conservation

Protect and, where appropriate, enhance all known sites of archaeological and ecological importance:

Archaeological sites

All sites, regardless of their designation, will receive the same level of care during the planning and execution of forest operations. The operational planning system will ensure they are recognised and the proper measures for their protection are in place before work begins. This planning system also ensures that, where possible, opportunities to enhance the condition of archaeological and historic interest are taken during routine forest work.

Ecological sites

All work sites are surveyed prior to any operations being carried out, both to audit the accuracy of information already held on record and to identify opportunities to further improve the ecological value of the woodlands. For Coatham and South Burdon this will include managing sites that acknowledge the presence protected species such as Great crested newt, Otter and Water vole in line with current guidance and best practice.

Opportunities to contribute toward Water Framework Directive improvements will be considered at Coatham where these improve the condition status of Coatham Beck. In addition, we will work with partners to consider how land management at Coatham can contribute toward the Lustrum Beck Flood Risk Management Partnership Scheme.

Long Term Retentions (LTR)

These are stable stands or clumps of trees that are important to retain for landscape or biodiversity reasons and will be retained beyond their economic rotation but still managed under

an appropriate silvicultural system i.e. thinning may still be carried out. The mature stand of mixed broadleaves at Moor Plantation, Coatham is designated LTR.

Invasive species

There are currently no invasive species across either site that impact across this plan.

3.4.2 Timber Harvesting

We will sustainably harvest timber both from thinnings and small group-felling, and where appropriate develop broadleaf stands to increase their contribution to timber production. These operations will be planned and controlled to ensure due regard for all other objectives of management. These operations will be limited to Coatham only as South Burdon will not achieve productive capacity during the approval period of this plan. We will look to carry out small-scale, low impact harvesting systems offered through a Direct Production tender to manage harvesting activity.

3.4.3 Landscape

Opportunities will arise during this plan period to increase species and structural diversity at Coatham as it moves into a productive phase where and thinning/group-felling activity can help to enhance views along paths, roads and rides making them appear more natural and interesting.

South Burdon will continue to move toward canopy closure and it is unlikely any felling activity will be carried out during this pan period. Future forest plans will present opportunities to increase species and structural diversity as and when this block reaches the age of first thinning.

3.5 Plan (Map 5)

The design concept map shows the key factors we need to address. These are taken forward and used to form the basis of a practical plan in the fell and restock maps.

3.6 Areas (Map 6 and 7)

3.6.1 Breakdown of felling areas within the period of the plan.

A map showing the location of felling sites can be found in the Forest Plan folder.

Thinning/Selective felling	Area - hectares	% of total area	Projected volume (m^3)
Continuous Cover (Coatham)	**60**	**30**	**3000**

3.6.2 Breakdown of constituent areas.

A Future Habitat and Species map showing the location and detail of the constituent areas can be found in the Forest Plan folder.

Habitat type (based on principal species established)	Area – hectares	% age of total area
Conifer	**61.1**	**22**
Broadleaf	**99.7**	**36**
Open space (i.e. meadow/grassland)	**118.3**	**42**

3.7 Methods / Forest Operations

3.7.1 Planning

Before any major forest operations are undertaken an "Operational Site Assessment" is completed. This document details the proposed work and outlines all known environmental, social and operational considerations. The "Operational Site Assessment" then becomes an important reference document during the planning phase, at the pre commencement meeting before scheduled works begin and for supervisory visits during the operation. The "Operational Site Assessment" is kept along with other documents relating to the operation in the main office.

For routine maintenance operations (e.g. fencing, ride mowing, survey work etc.) the Yorkshire District policy on timing of operations to minimise wildlife disturbance will be followed.

3.7.2 Standards

All operations within the forest will be carried out in accordance with the certification standard for the U.K. Woodland Assurance Standard and the U.K Forestry Standard 2011 i.e. Forests and biodiversity, Forests and climate change, Forests and historic environments, Forests and landscape, Forests and people, Forests and soils, Forests and Water.

3.7.3 Harvesting

See 3.4.2. Forestry Commission staff will monitor work through regular site visits to ensure all guidelines and contract conditions are adhered to.

Clearfell V's Continuous Cover Forestry

All plans are required to consider lower impact silvicultural systems (LISS) in windfirm conifer plantations as opposed to traditional clearfell systems. This decision is based upon the methodology provided in FC Information Note 40 – 'Transforming Even-aged Conifer Stands to Continuous Cover Management'.

See Appendix 3 – CCF Justification.

3.7.4 Haulage

As in our other woodland blocks we will continue discussions with the relevant Highways Authority to agree haulage routes and discuss annual tonnages.

All timber traffic will be managed in line with the Road Haulage of Round Timber Code of Practice, Fourth Edition (2012), which aims to improve the safety and environmental standards of the timber haulage industry.

During the lifetime of this plan, we anticipate infrastructure improvements will be required into Coatham to enable harvested timber to be transported from the site. As set out in 3.4.2, this will be small-scale and at a low level.

3.7.5 Restocking

Conifer

The areas of small group felling carried out as part of the CCF silvicultural systems will be replanted to diversify species and age structure and to continue to provide a sustainable timber resource, whilst mindful of the projected impacts of climate change. The FC Forest Research Agency, Ecological Site Classification system (ESC) will aid species choice and selection. A range of timber producing conifer species as set out in Appendix 3 and Appendix 4 'Species by soil type' will help inform restocking options.

Reference to Predominantly Mixed Conifer on the Future Habitat & Species Map will be used to describe those areas where a range of species will be planted.

As indicated at 3.7.1 Planning, the Operational Site Assessment will provide site-specific data on soils and other site factors that will help inform the correct choice of species on a site-by-site basis.

The continuous cover silviculture will be managed to encourage natural regeneration, although it is accepted that replanting will be required to maintain and further diversify the current range of species.

Broadleaf

As above for conifer, the areas of small group felling carried out as part of the CCF silvicultural systems will be replanted to diversify species and age structure and to continue to provide a sustainable timber resource, whilst mindful of the projected impacts of climate change.

There are no areas of Ancient Woodland Sites at either Coatham or South Burdon.

4. Monitoring

4.1 Clearfells

All clearfell areas are managed spatially using the Sub Compartment Database to ensure the boundaries and designs are accurately reproduced on the ground. Significant variances in the areas to be felled will require a formal amendment of the plan plus the agreement of and approval by Forest Services staff, as per CSM 6.

4.2 Restock

All restock areas where timber production is an objective will be planted/naturally regenerated and monitored to ensure that the number of established trees per hectare fully meets the requirements of OGB*4. This document has mandatory requirements on the monitoring of the crop in Year 5 to ensure the establishment of at least 2500 trees / ha.

4.3 Continuous Cover

Continuous cover areas will be monitored using the methods and procedures contained in OGB*7. Similar in scope to the methods employed for restock areas, where timber production is the aim we need to have at least 2000 saplings per hectare after 10 – 15 years, these should be evenly spread over 90% of the site.

4.4 Forest Plan

All forest plans are formally reviewed as part of a "5-year mid term review" and the plan's aims and objectives and its success at achieving those aims and objectives. This plan will be formally reviewed in 2019. This time period can be shortened if circumstances change significantly or if parts of the plan prove detrimental to the overall aims and objectives.

*Operational Guidance Booklet

5. Determination of Impact Significance and Mitigation

5.1 Ancient and Native Woodland

Threats to our ancient and native woodlands can be immediate and absolute (e.g. loss to infrastructure or development) or slower and more subtle (e.g. shading from conifer species or invasive species such as Rhododendron). There are also more widespread environmental changes, such as diffuse pollution and climate change, which may threaten in the long term. (www.forestry.gov.uk/keepersoftime)

Major threats to ancient and native woodland are:

- Climate change and fragmentation
- Excessive browsing and grazing by deer & livestock
- Inadequate or inappropriate management
- Invasive and problem species
- Diffuse pollution
- Loss

Through this plan, we will continue to apply local and national policy and best practice guidance for the management and development of our native woodlands.

5.2 Other Objectives

Contribute towards targets for locally occurring priority habitats and species identified in the Tees Valley Biodiversity Action Plan. This includes measures which reduce habitat fragmentation: for example, through the creation, extension and restoration of priority habitats, and maintaining a network of wildlife corridors in urban and rural areas.
(Stockton-on-Tees, Green Infrastructure Strategy. November 2011))

We will continue to apply local and national policy and best practice guidance to the management of riparian corridors across Coatham and South Burdon Forest. This will improve and enhance the habitat network within the woodlands and benefit protected species.

Continuing development of both species and structural diversity will benefit habitats for priority woodland bird species throughout the woodland.

Appendix 2 – Priority woodland bird species

Bird Species [1]	Forest location		Habitat enhancement
	South Burdon	Coatham	
Lesser spotted woodpecker	Y		Restructure closed canopy woodland through thinning and sequential felling, create and maintain open structure woodland/wooded heath, ride enhancement and glade creation.
Willow tit	Y		Thinning of closed canopy stands to improve shrub layer structure, enhance rides and woodland edge, create and maintain successional woodland (birch)/scrub habitat and standing deadwood
Marsh tit	Y	Y	
Grasshopper warbler		Y	
Spotted flycatcher	Y		

[1] Source – RSPB targeting maps, Bird conservation targeting project 2010, Woodland assemblage, North East.

Appendix 3 – CCF justification (Coatham only)

Site Factor	Suitability Score	Comment
WHC: range 1to 4	1	Tree stability is not a site-limiting factor except for the wetter surface water gley soil types across the southern half of the block.
Soil fertility: Medium	2	Predominantly Very Poor with isolated areas of Medium fertility which support a wider range of competing vegetation.
Species suitability: P.oak SP,CP, Larch Ash	1 – Optimal 2 – Suitable 3 – Marginal/ Unsuitable	Corsican pine is considered unsuitable due to *Dothistroma* needle blight. Larch is considered unsuitable due to *Phytophthora ramorum*. Ash is considered unsuitable due to *Chalara.*

With a combined score ranging from 4 to 6, initial analysis indicates significant areas of Coatham achieve a moderate suitability score for transformation to CCF. Further analysis of stand structure is considered to help inform whether transformation should be considered.

- Stand form – Form is average and of a reasonable quality.
- Thinning history – To date no thinning has been carried out. Early thinning interventions will enhance crop stability across the site.
- There is strong evidence that ash regeneration is currently developing across the site. However, ESC indicates this as unsuitable for long-term timber production due to Moisture Deficit as the limiting factor at 2050 Hi scenario and potential impacts of *Chalara* restricts the planting of this species. Natural regeneration will be accepted where this contributes to overall objectives but will be reviewed if disease and performance issues arise.

On the basis of the above information, we will consider CCF Group system to develop stand structure where enrichment planting with suitable species will be used aiming for a simple stand structure. See ESC output.

Table of Management

	Stand Type		
	Mixed Broadleaf	Mixed/Pure Conifer	Poplar
Management Prescription	Management table thinning favouring oak and cherry to develop high quality timber trees. Accept broadleaf regeneration and consider enrichment planting with suitable alternative species i.e. aspen and small-leaved lime.	Heavier than management table thinning to mitigate against *Dothistroma*. Gradually reduce canopy through thinning and small group felling. Carry out enrichment planting with suitable alternative species i.e. Macedonian pine, Serbian and Oriental spruce, Coast redwood.	Management table thinning plus small group-felling to develop gaps for natural regeneration and enrichment planting with suitable alternative species i.e. Cider gum and hornbeam. Develop deadwood habitat on poorer formed specimens.

The Forest Research ESC table below supports the range of target species considered for natural regeneration and those where enrichment planting will increase species diversity.

Key

Very Suitable

Suitable

Marginal

Unsuitable

[Coatham NZ395160] Future Climate Analysis - 5km Area Projection UKCIP02

Species	Baseline			2050 Lo			2050 Hi			2080 Lo			2080 H
	Lim Factor	Suitability	YC	Lim Factor	Suitability	YC	Lim Factor	Suitability	YC	Lim Factor	Suitability	YC	Lim Factor	Suitab
Corsican pine	SMR		4	SMR		4	SMR		4	SMR		4	SMR	
Lodgepole pine	DAMS		16	DAMS		16	DAMS		16	DAMS		16	AT5	
Macedonian pine	DAMS		14	DAMS		14	DAMS		14	DAMS		14	AT5	
Maritime pine	SMR		4	SMR		4	SMR		4	SMR		4	SMR	
Monterey/Radiata pine	SMR		6	SMR		10	SMR		10	SMR		10	SMR	

Scots pine	SMR		10	SMR		10	SMR		10	SMR		10	SMR
Weymouth pine	SMR		0	SMR		0	SMR		0	SMR		0	SMR
Norway spruce	MD		12	MD		10	MD		6	MD		8	MD
Oriental spruce	SMR		14	SMR		14	SMR		14	SMR		14	SMR
Serbian spruce	DAMS		18	DAMS		18	DAMS		18	DAMS		18	DAMS
Sitka spruce	MD		16	MD		12	MD		8	MD		10	MD
Douglas fir	SMR		0	SMR		0	SMR		0	SMR		0	SMR
Hybrid larch	SMR		12	MD		10	MD		2	MD		4	MD
Japanese larch	MD		10	MD		8	MD		2	MD		4	MD
European larch	SMR		4	SMR		4	SMR		4	SMR		4	MD
Western red cedar	DAMS		18	DAMS		18	DAMS		18	DAMS		18	MD
Japanese red cedar	DAMS		16	MD		10	MD		4	MD		6	MD
European silver fir	SMR		14	MD		12	MD		8	MD		8	MD
Grand fir	SMR		18	SMR		18	MD		14	MD		16	MD
Noble Fir	MD		6	MD		0	MD		0	MD		0	MD
Nordmann fir	SMR		14	SMR		14	SMR		14	SMR		14	MD
Pacific fir	SMR		14	SMR		14	SMR		14	SMR		14	SMR
Leyland cypress	SMR		14	SMR		14	SMR		14	SMR		14	MD
Western hemlock	SMR		16	SMR		16	SMR		16	SMR		16	SMR
Giant redwood	SMR		0	SMR		0	SMR		0	SMR		0	SMR
Coast redwood	SMR		18	SMR		20	SMR		20	SMR		20	SMR
Lawson's cypress	DAMS		18	MD		18	MD		14	MD		16	MD

Downy birch	MD		8	MD		6	MD		6	MD		4	MD
Silver birch	SMR		8	SMR		8	SMR		8	SMR		8	SMR
Big leaf maple	SMR		14	SMR		14	SMR		14	SMR		14	MD
Norway maple	SMR		8	SMR		8	SMR		8	SMR		8	MD
Sycamore	SMR		10	SMR		10	SMR		10	SMR		10	MD
Beech	SMR		4	SMR		4	SMR		4	SMR		4	SMR
Roble beech	SMR		4	SMR		4	SMR		4	SMR		4	SMR
Ash	SNR		8	MD		6	MD		2	MD		4	MD
Pedunculate oak	DAMS		8	DAMS		8	MD		6	MD		8	MD
Red oak	SMR		4	SMR		4	SMR		4	SMR		4	SMR
Sessile oak	SMR		2	SMR		2	SMR		2	SMR		2	SMR
Aspen	DAMS		14	DAMS		14	MD		12	MD		12	MD
Black poplar	SNR		8	SNR		8	SNR		8	SNR		8	SNR
Rauli beech	SMR		0	SMR		0	SMR		0	SMR		0	SMR
Common alder	SNR		8	SNR		8	SNR		8	SNR		8	SNR
Red alder	CT		12	MD		10	MD		8	MD		8	MD
Grey alder	AT5		12	MD		12	MD		10	MD		10	MD
Italian alder	CT		10	CT		10	CT		10	CT		10	CT
Shining gum	SMR		22	SMR		22	SMR		22	SMR		22	SMR
Cider gum	SMR		28	SMR		28	SMR		28	SMR		28	MD
Rowan	SMR		4	SMR		4	SMR		4	SMR		4	SMR
True service tree	SMR		0	SMR		0	SMR		0	SMR		0	SMR

Wild service tree	SMR		2	SMR		2	SMR		2	SMR		2	SMR
Black walnut	SMR		0	SMR		0	SMR		0	SMR		0	SMR
Common walnut	SMR		0	SMR		0	SMR		0	SMR		0	SMR
Hornbeam	SMR		6	SMR		8	SMR		8	SMR		8	SMR
Small-leaved lime	SMR		8	SMR		8	SMR		8	SMR		8	MD
Wych elm	SNR		6	SNR		6	MD		6	SNR		6	MD
Wild cherry	SMR		8	SMR		8	SMR		8	SMR		8	MD
Sweet chestnut	SMR		0	SMR		0	SMR		0	SMR		0	SMR

Site type		Species													
Upland sites	Lowland sites	**SP**	**LP**	Mac P	**DF**	ESF	GF	WH	WRC	Ley/Law C	Coast R	Giant R	**SS**	**NS**	Oriental S
Gley						***y***		***y***	***y***	y			**Y**	**Y**	***y***
Iron pan/podzol		**Y**	***y***	***y***	**y**	***y***	***y***				***y***	***y***		y	***y***
BE/intergrade		**Y**		***y***	**Y**	***y***	***y***	***y***	***y***	y	***y***	***y***	***y***	**Y**	***y***
Calcareous				***y***		***y***			***y***	y					***y***
	Gley					***y***		***y***	***y***	y	***y***	***y***	**Y**	**Y**	***y***
	Podzol	**Y**	***y***	***y***	**y**	***y***	***y***	***y***	***y***	y		***y***		y	***y***
	BE/intergrade	**Y**		***y***	**Y**	***y***	***y***		***y***	y	***y***	***y***	***y***	**Y**	***y***

BOLD CAPITAL/INFILL	**Cat A Major species** - currently widely used with no supply problems and should continue to play an important role
Bold lower case italics	**Cat B Minor species** - Species that either currently play a minor role but have demonstrated their suitability being part of a species range to diversify our forests. Climate change may increase or reduce their use
Normal lower case	**Cat C Secondary species**- Species with little information on forest performance but possible choice based on Arboreta. Use on small-scale experimental basis for now but may increase if favourable results

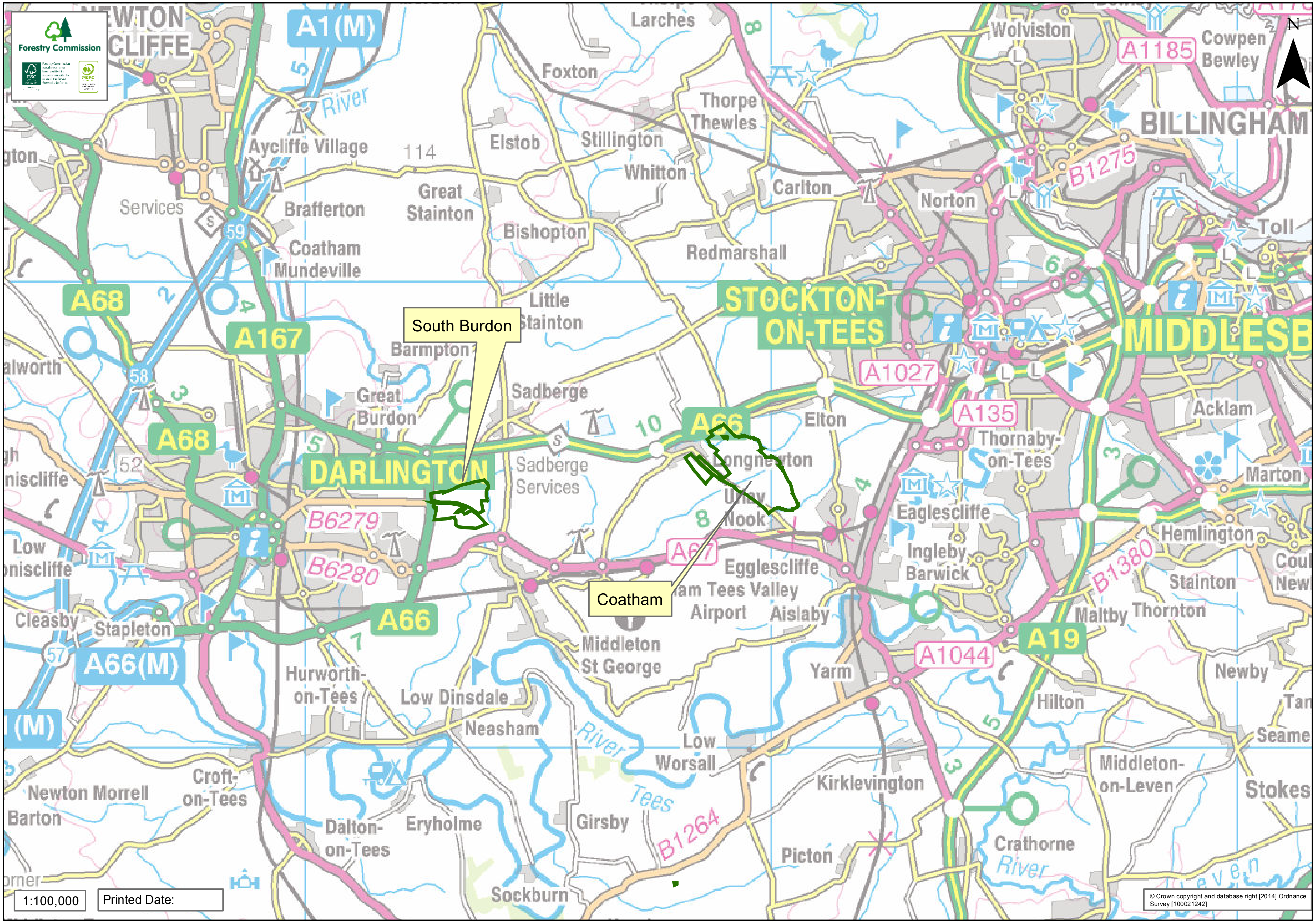
soucre data http://www.forestry.gov.uk/fr/treespecies

source data http://www.forestry.gov.uk/forestry/infd-8mad67

Refer to cell comments for specific species notes

No planting where >1m peat depth

Pacific coast associated forest cover - consider in mixtures as part of underplanting for CCF					
DF	GF	WH	Law C	Coast R	*ESF*


Forestry Commission
South Burdon
Coatham
N
NEWTON
AYCLIFFE
A1(M)
River
Aycliffe Village
114
Larches
Foxton
Thorpe
Thewles
Wolviston
A1185
Cowpen
Bewley
BILLINGHAM
Elstob
Stillington
Whitton
Carlton
Norton
B1275
Services
Brafferton
Great
Stainton
Bishopton
Redmarshall
Toll
Coatham
Mundeville
A68
A167
Little
Stainton
STOCKTON-
ON-TEES
MIDDLESB
Barmpton
alworth
Sadberge
A1027
Great
Burdon
A66
Elton
A135
Acklam
A68
10
Thornaby-
on-Tees
52
niscliffe
DARLINGTON
Sadberge
Services
Longnewton
Marton
Urlay
Nook
Eaglescliffe
B6279
Hemlington
Low
niscliffe
B6280
A67
Egglescliffe
Ingleby
Barwick
B1380
Stainton
am Tees Valley
Airport
Aislaby
Cleasby
Stapleton
A66
Maltby
Thornton
Middleton
St George
A19
A66(M)
A1044
Hurworth-
on-Tees
Low Dinsdale
Yarm
Newby
Hilton
Neasham
River
Low
Worsall
Seame
Croft-
on-Tees
Middleton-
on-Leven
Newton Morrell
Kirklevington
Stokes
Barton
Tees
Dalton-
on-Tees
Eryholme
Girsby
B1264
Crathorne
River
Picton
Leven
Sockburn
1:100,000
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Coatham & South Burdon Forest Plan
Forestry Commission
Coatham - Species
OPEN 36%
AR 0%
SLI 1%
MB 2%
BI 2%
WCH 3%
PO 5%
AH 10%
OK 13%
SP 0%
MC 1%
JL 2%
CP 25%
AR
SLI
MB
BI
WCH
PO
AH
OK
SP
MC
JL
CP
OPEN
3011 15Ha
3012 48Ha
3013 44Ha
3014 23Ha
3015 40Ha
3016 15Ha
13Ha
a OK/AH/BI/~ 2000/2000/2000/~
f MB/CP 2000/2000
c PO/- 2000/-
e XWL 2000
b Open
h PO 2002
d AH/CP 2000/2000
g OK/AH/WCH/~ 2001/2001/2001/~
e OK 00
f OK/AH/WCH/~ 2001/2001/2001/~
i OK/AH/WCH/~ 2001/2001/2001/~
c CP/- 2001/-
b OK/AH/WCH/~ 2002/2002/2002/~
d CP 2002
a Open
c Open
d MB/AH/OK 2002/2002/2002
e MB 50
a OK/AH/SLI/~ 2002/2002/2002/~
i CP 2002
d Open
b CP 2002
j CP/JL 2002/2002
h JL/CP 2001/2001
g OK/AH 2001/2001
c CP 2001
f PO 2001
b OK/AH/WCH/~ 2001/2001/2001/~
k BI 50
c CP/JL 99/2000
h JL/CP 99/99
b PO 99
i OK/AH 2000/99
h Open
g CP/JL 2000/2000
l Open Water
a Open
j Open Water
e Open
d OK 99
k AH 99
e CP 99
f Car Pk/Picnic
g CP/JL 2000/2000
i CP/AH/OK 99/99/99
b CP 99
e CP 99
f OK/AH/WCH 2001/2001/2001
c CP 99
d CP 2001
a Open
a CP/- 2001/-
b Open
c CP/AH/OK 2001/2001/2001
Longnewton
Map 1a - Coatham Tree Species
Open
Mixed Broadleaves
Corsican Pine
Japanese Larch
0 125 250 500 750 1,000 Meters
1:10,000
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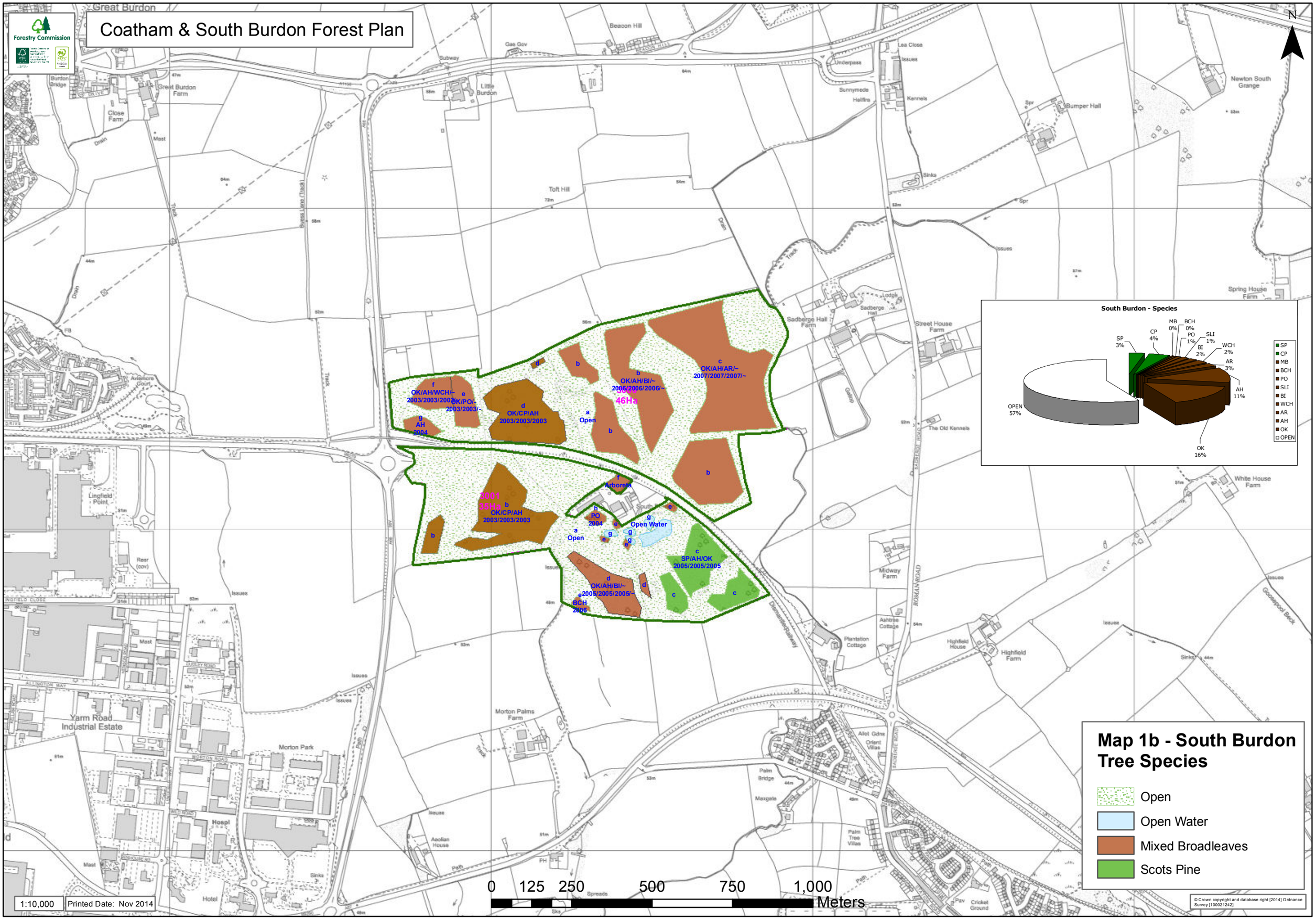
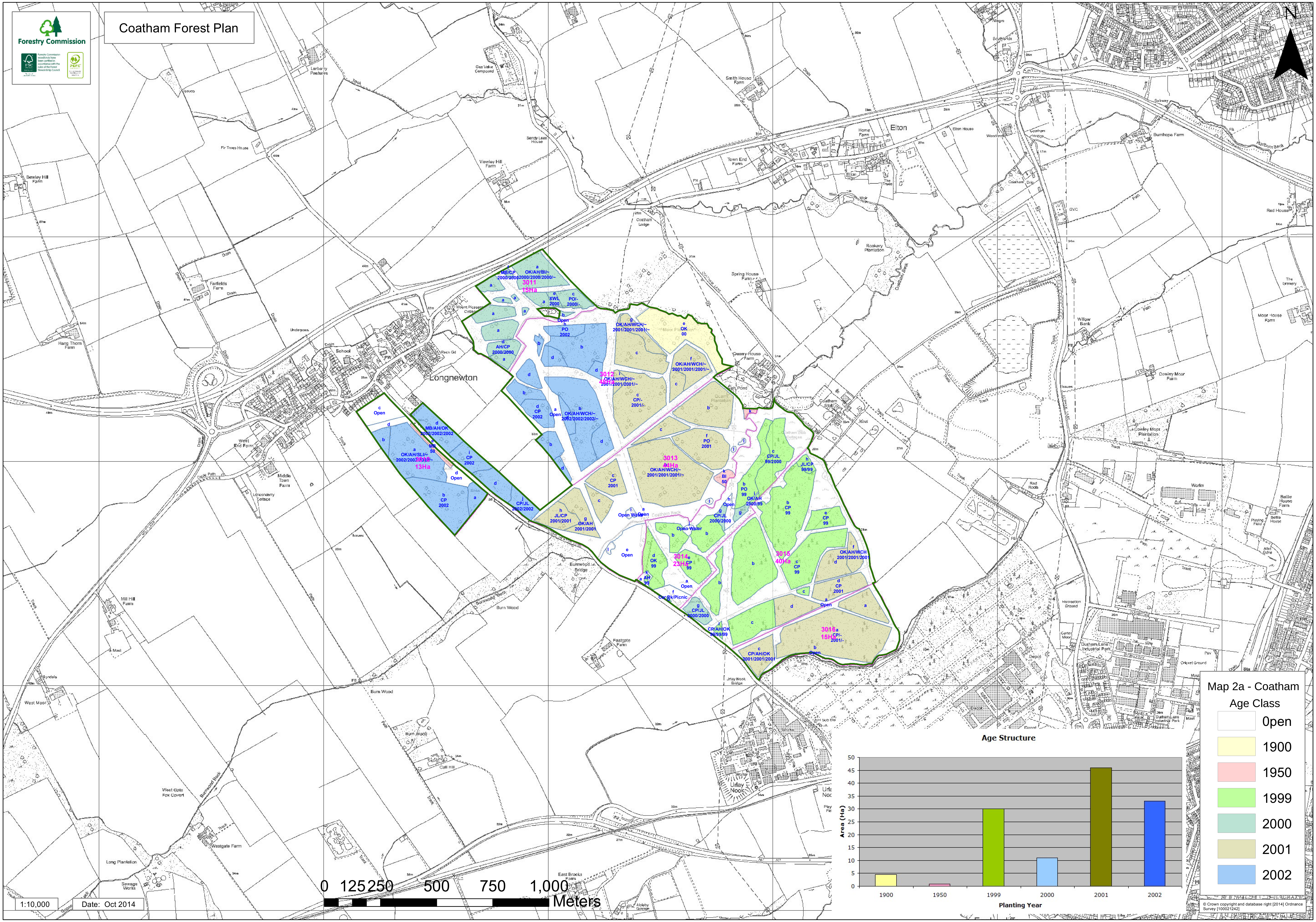
Coatham & South Burdon Forest Plan

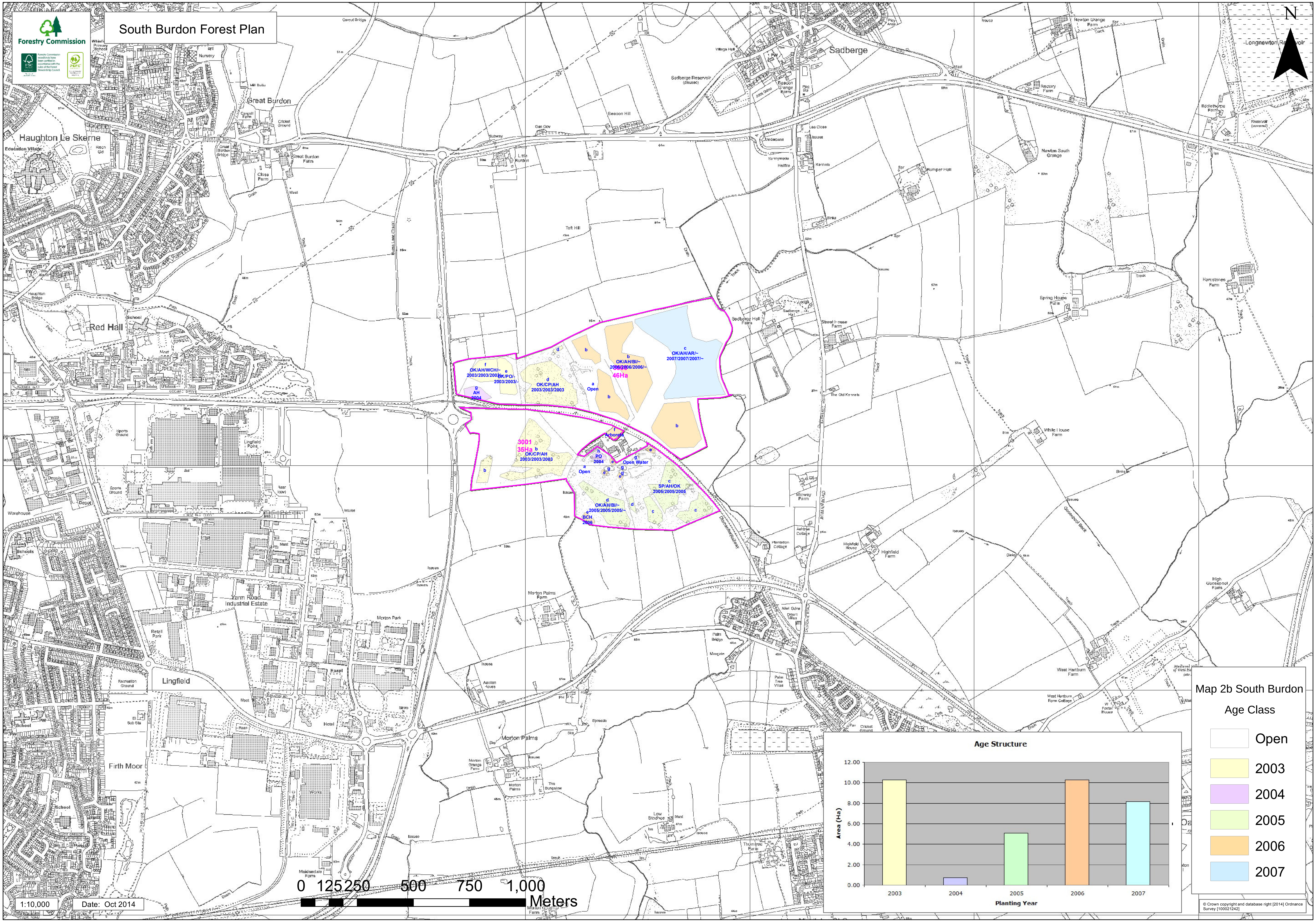
Forestry Commission



Map 1b - South Burdon Tree Species

- Open
- Open Water
- Mixed Broadleaves
- Scots Pine


Coatham Forest Plan
Forestry Commission
Map 2a - Coatham
Age Class
0pen
1900
1950
1999
2000
2001
2002
Age Structure
Area (Ha)
Planting Year
1900
1950
1999
2000
2001
2002
0 125 250 500 750 1,000
Meters
1:10,000
Date: Oct 2014
© Crown copyright and database right [2014] Ordnance Survey [100021242]
N
3011
15Ha
3012
48Ha
3013
44Ha
3014
23Ha
3015
40Ha
3016
15Ha
3010
13Ha
Longnewton
Elton
Coatham Lodge
Quarry House Farm
Spring House Farm
Smith House Farm
Town End Farm
Rookery Plantation
Cowley Moor Farm
Cowley Moor Plantation
Willow Bank
Moor House Farm
Burnhope Farm
Red House
Durham Lane Industrial Park
Recreation Ground
Urlay Nook
Urlay Nook Bridge
Burnwood Bridge
Burn Wood
Eastgate Farm
East Brocks Farm
West Gate Fox Covert
Westgate Farm
Long Plantation
Sewage Works
West Moor
Mill Hill Farm
Middle Town Farm
West End Farm
Fairfields Farm
Hang Thorn Farm
Bewley Hill Farm
Fir Trees House
Larberry Pastures
Viewley Hill Farm
Sandy Leas House
Gas Valve Compound
Open Water
Car Pk/Picnic
OK/AH/WCH/~
2001/2001/2001/~
OK/AH/BI/~
2000/2000/2000/~
MB/AH/OK
2002/2002/2002
OK/AH/SLI/~
CP/JL
2002/2002
CP/AH/OK
2001/2001/2001
CP/AH/OK
99/99/99


Forestry Commission
South Burdon Forest Plan
1:10,000
Date: Oct 2014
0 125 250 500 750 1,000
Meters
N
f
OK/AH/WCH/~
2003/2003/2003/~
e
OK/PO/-
2003/2003/-
g
AH
2004
d
OK/CP/AH
2003/2003/2003
a
Open
b
OK/AH/BI/~
2006/2006/2006/~
3000
46Ha
c
OK/AH/AR/~
2007/2007/2007/~
3001
35Ha
b
OK/CP/AH
2003/2003/2003
f
Arboreta
h
PO
2004
g
Open Water
c
SP/AH/OK
2005/2005/2005
d
OK/AH/BI/~
2005/2005/2005/~
e
BCH
2006
Map 2b South Burdon
Age Class
Open
2003
2004
2005
2006
2007
Age Structure
Area (Ha)
12.00
10.00
8.00
6.00
4.00
2.00
0.00
2003
2004
2005
2006
2007
Planting Year
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Coatham & South Burdon Forest Plan

Forestry Commission

Map 3a - Management Information Map - Coatham

- Management Area

EA detailed river network

- Secondary River
- Tertiary River

Utilities

- Communications Mast
- Powerline Overhead
- Gas Pipeline

Heritage & Conservation

- Heritage Feature
- Conservation Site
- Car Park

Access

- Public Right of Way
- FC Trail

1:10,000

Printed Date: Nov 2014

0 125 250 500 750 1,000 Meters

Coatham & South Burdon Forest Plan

Forestry Commission

N

Map 3b - Management Information Map - South Burdon

- Management Area

EA detailed river network

- Secondary River
- Tertiary River

Utilities

- Powerline Overhead
- Gas Pipeline

Heritage & Conservation

- Heritage Features Impact Zone
- Conservation Site Polygon

Access

- Public Rights Of Way

0 125 250 500 750 1,000 Meters

1:10,000

Printed Date: Nov 2014

Forestry Commission

Coatham & South Burdon Forest Plan

N

Map 4 - Current Felling - Coatham & South Burdon

Unallocated

Fell 2057 - 2062

1:20,000

Printed Date: Nov 2014

0 250 500 1,000 1,500 2,000 Meters

Coatham Forest Plan
Yorkshire Forest District
Analysis and Concept

Forestry Commission

WFD condition status for Coatham Beck is currently 'moderate'.

* Continuous cover systems will reduce the impact of felling activity and sediment delivery adjacent to watercourses.
* Sensitive group-felling and thinning adjacent watercourses and ponds will contribute toward developing habitat for flora and fauna alike.

Utility wayleaves create long, geometric corridors

* Small-scale group felling and thinning will improve internal landscape by softening hard edges and reduce the 'tunnel effect' along forest rides.
* Increased structural and species diversity will create more diverse edge habitat for flora and fauna alike.

Sustainable timber production remains a priority objective

* Develop continuous cover systems to allow natural regeneration and enrichment planting with alternative species to become established.
* Alternative species such as Macedonian pine, Oriental spruce, Coast redwood, small-leaved lime, aspen and cider gum will be considered where conditions are suitable.

Legend Map 5 - Design Concept

EA river status.
- Moderate

EA detailed river network
- Secondary River
- Tertiary River

Utilities
- Powerline Overhead
- Gas Pipeline

Woodland resource
- Productive mixed conifer
- Productive mixed broadleaf
- Coatham long term retention
- Open (grassland, meadows, forest rides)

1:5,000

Coatham & South Burdon Forest Plan

Forestry Commission

Proposed Harvesting Map

This map shows how we intend to manage tree felling in Coatham in order to meet the multiple objectives of management there.

Continuous Cover

In a continuous cover system change is managed more slowly using a combination of heavier thinnings and small group fellings (normally no greater than 0.25Ha). The purpose of the thinning / felling operations is to produce timber and to allow enough light to reach the forest floor for replanting / regeneration to take place. The majority of the site has tree cover at all times and at one or more levels.

Table of Management

	Stand Type		
	Mixed Broadleaf	Mixed/Pure Conifer	Poplar
Management Prescription	Management table thinning favouring oak and cherry to develop high quality timber trees. Accept broadleaf regeneration and consider enrichment planting with suitable alternative species i.e. aspen and small-leaved lime.	Heavier than management table thinning to mitigate against *Dothistroma*. Gradually reduce canopy through thinning and small group felling. Carry out enrichment planting with suitable alternative species i.e. Macedonian pine, Serbian and Oriental spruce, Coast redwood.	Management table thinning plus small group-felling to develop gaps for natural regeneration and enrichment planting with suitable alternative species i.e. Cider gum and hornbeam. Develop deadwood habitat on poorer formed specimens.

Map 6 - Proposed Felling

- Open, etc
- Continuous Cover

1:20,000

Printed Date: Nov 2014

0 250 500 1,000 1,500 2,000 Meters

Forestry Commission

Coatham & South Burdon Forest Plan

This map shows the main species groups that are to used when restocking areas that have been selectively felled or enrichment planting. This map shows the main species that are to be used when restocking felled areas. Because of the constraints of map scale unplanted areas are not shown unless they are greater than 0.5ha in size, this means that unplanted corridors left alongside roads and rides are not represented on this map.

Broadleaf areas and the broadleaf component in the continuous cover areas have no specific species detail as we are relying on natural regeneration in these areas. Enrichment planting may be used where there is insufficient regeneration or where we want to further diversify the range of species present.

Predominantly mixed conifer areas will be regenerated primarily by planting with appropriate species dependant on the underlying site conditions such as soil and topography. Climate change projections indicate species showing drought tolerance and disease resistance characteristics such as Macedonian pine, Coast redwood, Serbian and Oriental spruce will be considered.

Native broadleaf areas will be restocked primarily by natural regeneration using site-native species such as oak, birch, alder and willow. Ash will be accepted where this continues to contribute to overall objectives, however, this will be reviewed if potential disease issues (*Chalara*) arise. Future species diversification within areas of Poplar has identified Cider gum, hornbeam, aspen and small-leaved lime as being suitable for planting.

Map 7 - Proposed Future Habitat and Restock Map

- Open etc
- Predominantly Mixed Broadleaf
- Predominantly Mixed Conifer

N

1:20,000

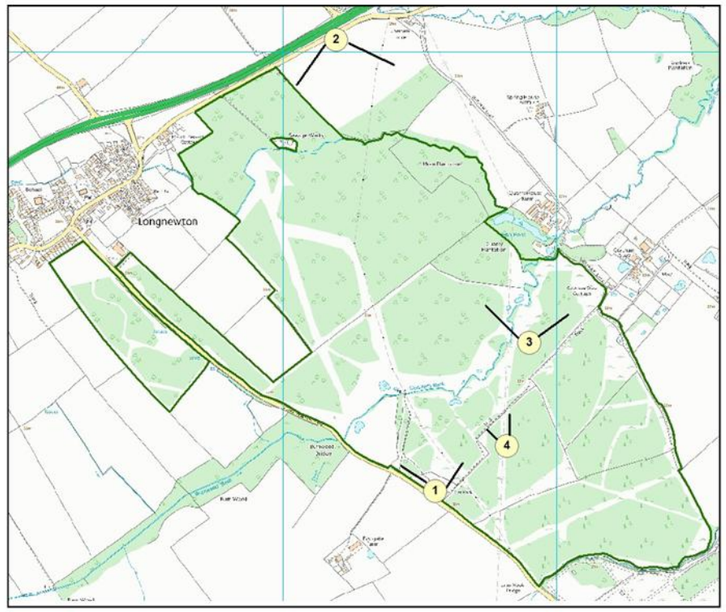
Printed Date: Nov 2014

0 250 500 1,000 1,500 2,000 Meters

Forestry Commission England

Forestry Commission woodlands have been certified in accordance with the rules of the Forest Stewardship Council.

Coatham Forest Plan—Photographic Locations



View 1 from Coatham Car Park – The car park at Coatham provides a hub from which visitors access the woodland site. Increasing visual diversity is experienced by visitors through the developing woodland habitats:

Conifer woodland – Areas of Pine provide a colourful winter contrast to the deciduous larch, mixed broadleaved and Poplar stands.

Mixed broadleaved woodland – The range of native species provide a variety of leaf shape, size and colour during summer and autumn months alike.

Poplar woodland – These highly productive, quick-growing stands provide height and structural diversity over a short period of time and soon create a wooded environment within the landscape.

View 2 from the A66 – To the left, Moor Plantation retains its prominence within the landscape with the developing stand of Poplar to the centre starting to contribute toward a more wooded appearance. Future management of Poplar stands by thinning, selective felling and introducing other species will further enhance their visual diversity and contribution to the landscape.

The slower-growing conifer and mixed broadleaved stands are only just becoming noticeable from distant views across a flat landscape.

Forestry Commission England

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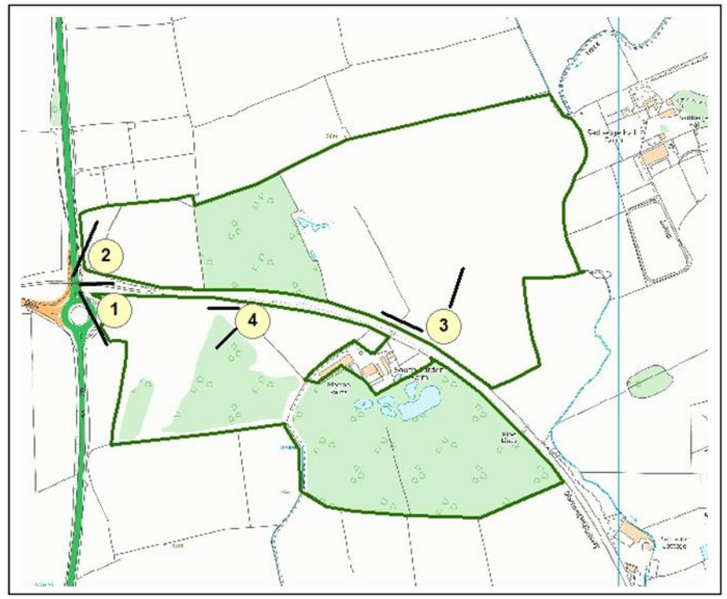
South Burdon Forest Plan
Photographic Locations



Views 1 and 2 from A66 entrance – The footbridge across the A66 (Stockton to Darlington Greenway, part of National Cycle Network), and parking at the roundabout, provides the main point of pedestrian access to the site. From here, visitors gain their first experience of the developing woodland, where open space forms a significant component of the forest structure. Mature hedgerows and mature trees and shrubs along the Greenway provide added structural diversity to this site.

View 3 from compartment 3014 across to Moor Plantation – Developing species and structural diversity is evident here, with the full range of both recently planted and older growth woodland habitats providing a positive contribution to the wooded landscape.

View 4 – Gas and electricity utility wayleaves create significant areas of open ground to be maintained within the wood. These can create hard edges and detract visually from the developing woodland. Opportunities will arise through future management operations (thinning/small group felling) to create more varied edges that are more structurally diverse and will enhance their visual appearance.

View 5 – Woodland trails through stands of Poplar create a more enclosed and intimate experience when compared to the open structure elsewhere across the property. Care will need to be taken to ensure future management maintains this varied woodland experience.

Forestry Commission
England

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South Burdon Forest Plan
Photographic Locations

View 3 across Compartment 3000 – The trees at South Burdon, in contrast to Coatham, have yet to achieve full canopy closure and are still at an early stage of development. Conversion from an intensively farmed landscape to a wooded habitat will take longer where slower growing tree species are prevalent. Footpaths and informal trails have varied edges and by linking with open spaces create a variety of visual experiences.

View 4 looking west toward Darlington – The visual link with the urban environment and infrastructure is still evident across parts of the site. This will soften with time as developing trees and shrubs enhance structural diversity.

Image 1

Old, split willow tree with developing deadwood creating niche habitat adjacent Coatham Beck.

Fallen limb creates a large woody debris dam within the watercourse which temporarily slows the flow of water downstream during periods of peak rainfall.

Image 2.

The land adjacent Coatham Beck provides a diverse semi-natural habitat of maturing broadleaved trees, woody shrubs and herb-rich ground flora. This habitat offers linear migration corridors for invertebrates, birds and mammals (UK Forestry Standard Guidelines - Forests and Water).

Image 3.

Large-diameter fallen deadwood and small-diameter standing deadwood provide a range of developing deadwood resource that contributes toward the increasing biodiversity value of woodland alongside watercourses - a high value woodland type.