

Callendar Wood Land Management Plan 2015-2025

Scottish Lowlands Forest District

Callendar Wood

Land Management Plan



Approval date: ***

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Version History

| Version | Date | Comments |
|---------|------------|---|
| 1.0 | 08/09/2015 | Initial draft |
| 1.1 | 30/09/2015 | Revised following district staff review |
| 1.2 | 09/12/2015 | Revised following public register comments |
| 1.3 | 11/12/2015 | Revised following Woodland Officer comments |

Summary of Proposals

This land management plan sets out a series of general management tasks, potential future projects and silvicultural prescriptions to be undertaken or explored by Scottish Lowlands Forest District in order to achieve the objectives set out within the management brief.

This plan sets out proposals to manage the current crop by way of alternatives to clearfell such as thinning in order to restructure the conifer element away from spruce whilst promoting existing softer conifers to retain their important site character whilst gradually, over many decades, replacing these with native broadleaves where they are found on sites of former ancient woodland. Select felling of sycamore aims to reduce the negative impact this species is having on other broadleaves preferred within the matrix.

The plan also proposes methodologies designed to diversify the age structure of the crop by managing the factors crucial to encourage and promote natural regeneration whilst also utilising enrichment planting to develop stands which, over time and with appropriate management, can be self-sustaining.

The silvicultural proposals set out in this plan will also benefit woodland biodiversity and the woodland's appeal both within the local and wider community and this plan also sets out proposals which build on these and aim to encourage further recreational appeal for visitors.

1.0 Introduction:

1.1 Setting and context

Callendar Wood is situated within the south eastern area of Falkirk, lying on a gentle northern slope providing a prominent green backdrop to the town. The National grid reference for the centre of the wood is NS 890 790. To the west, south and east the wood neighbours residential housing areas and to the south-east the wood marches with Woodend Farm, to the north-east with Callendar Business Park and to the north with Callendar Estate. The Estate with its park and stately house provides a popular recreation site for locals and visitors. The wood covers an area of 94.95 hectares. The western, southern and eastern boundary is marked by the old estate wall. The northern boundary is marked by a wire fence which runs from the Glen Brae lodge house to grid point NS 908 791 at the Laurieston end of the Wood. The area within the circular wall of the Forbes family mausoleum boundary and the mausoleum itself are still owned by Callendar Estate.

There are thirteen access points into the wood spread across the site with varying levels of formality and no formal car-parking facility although parking is available to Callendar Park (see **Map 1 – Location** and **Map 2 – Context**).

1.2 History of the site

Callendar Wood, the adjacent park and their locale have a rich and long history for which there are indications of human activity dating from the Iron-Age through to the present day. An in-depth evaluation of the site's history is revealed in the 'Historic Woodland Evaluation' report on the site from 2012, referenced in Appendix VII, and in the later section on 'Heritage' which provides further detail on how much of the woodland's history is still tangible today. With regards the woodland's management during its earliest recorded history, i.e. medieval period, much of what is understood to have occurred is only patchy, discerned from various historical accounts and maps etc. and is no longer evident in the wood today although it is thought that the site has been continuously wooded and exploited for its timber for as long as records exist.

Better understood is the woodland's more recent history from when it was purchased by the wealthy coppersmith, William Forbes in 1783 and subsequently by his descendants and now by the Forestry Commission after we purchased the wood in 1999. During the 18th Century the woodland's underlying geology was extensively mined for coal and its landscape was significantly altered by the creation of new features such as a large walled

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garden, new lodges, approaches and carriage circuits, together with the Mausoleum built in 1816 all part of the Forbes family's redesign of their estate grounds. In the mid-19th Century the woodland moved from having been documented as managed for oak-coppice to a more 'ornamental policy' mixed woodland significantly containing large areas of Scots pine. In the mid-20th Century there was also a move toward including more commercial conifer planting including spruces and larch much of which still remains today.

With regards Henry's Hill, Roy's Military map of c.1750 shows an open area in its location. Subsequent maps of 1781, 1818 and 1860 also show the area as open. It is therefore safe to assume that Henry's Hill has been free of tree cover for at least two hundred and fifty years. The quarry area is first pictured on the 1781 map and is featured in all subsequent maps.

2.0 Analysis of previous plan

2.1 Aims of previous plan and achievements

In lieu of the approval and implementation of this plan, Callendar Wood is covered by a FES Forest Design Plan which was approved on 15/06/2007 for the period of 10 years ending on 15/06/2017. The aims and achievements of the previous plan are listed in the following table.

Table 1 – Previous Plan Progress

| Objective | Proposed Management Actions | Progress to date 1 – Little/No progress 2 - Some progress 3 – Progress as per FDP |
|---|---|--|
| Restore areas of Plantation on Ancient Woodland Site (PAWS) and improve areas of native woodland. | <ul style="list-style-type: none"> ▪ The area will be managed through Alternative to Clearfell (ATC) achieved through small scale felling and thinning to create light and space for natural regeneration or planting. | 1 – No significant operations have taken place during the life of the previous plan. |
| Preserve features of archaeological and historical interest. | <ul style="list-style-type: none"> ▪ Boundary features will be maintained as habitats where possible. ▪ Carry out survey of Hill-Fort. ▪ Protect Boundary Wall, | 3 - 2010/11 Repairs made to Boundary wall. 3 – 2012 Survey Report produced. 3 - 2010/11 Repairs made to Boundary |

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| | | |
|--|--|--|
| | <p>Kennels, Marker Stones and Water House.</p> <ul style="list-style-type: none"> Manage designed landscape including the drainage system and earthen embankment. | <p>wall and kennels with the main structure repaired, the surrounding wall that was damaged also repaired and half of the railings were restored.</p> |
| <p>Improve the recreation value of the wood.</p> | <ul style="list-style-type: none"> Maintain the network of carriageways, footpaths rides and tracks which include 'All Ability' bridle and cycle routes. Maintain public access to the wood via the 9 formal and 3 informal access points. Thinning and windblow removal around access points to encourage public access. Control of Rhododendron. | <p>3 – 2010/11 Works done to improve roads, drains and thresholds as well as way-markers.</p> <p>3 – 2012/13 small scale thinnings around visitors zones around entrances and adjacent to paths carried out.</p> <p>2 – 2012/13 Tree safety work close to paths.</p> <p>3 – 2011/12 Remaining large bushes mulched. 2013 Follow up spraying of rhododendron, next intervention 2015.</p> |
| <p>Maintain external views from the wood and improve internal views.</p> | <ul style="list-style-type: none"> Open ground will be created as a dynamic feature of the wood through ATC practices. Henry's Hill will be maintained and improved as an area of open grassland by an agreed mowing regime. ATC practice will improve views and internal appearance. | <p>1 – As no operations have taken place no progress has been made on this objective although open areas were created as part of the Rhododendron clearance.</p> <p>3 – A mowing regime for Henry's hill has been adhered to each growing season.</p> <p>1 – As no operations have taken place little progress has been made on this objective although improvements have been made by identifying and managing visitor zones appropriately.</p> |

Table 2 – Summary of previously planned operations (2007-17)

| Planned thinning area (ha) | Actual thinning area (ha) | % |
|----------------------------|---------------------------|---|
| 94.95 | 0 | 0 |

2.2 How previous plan relates to today's objectives

The objectives of the previous plan still relate to today's objectives which can be found within **Appendix IV** this new plan aims to expand upon those objectives and detail a more comprehensive list of management actions in order to facilitate delivery of those objectives which is why a review of the previous plan was necessary.

3.0 Background information

3.1 Physical site factors

3.1.1 Geology Soils and landform

According to the British Geological Society the underlying geology of the site is predominantly Scottish Lower Coal Measures Formation; a repeating layering of sandstone, siltstone and mudstone that most commonly coarsens upwards. Coal seams are common and many exceed 0.3m in thickness. The site has 18 known mine entries which have been recorded and mapped with a further 24 entries reputed to be within the site. These mine entries have been either filled or capped and potentially could present a safety concern if any were to open up in the future. Overlying the bedrock, the superficial geology has been influenced by glaciation with the site being dominated by Devensian Till with small areas to the north east of Devensian Raised Marine Deposits and Glaciofluvial Ice Deposits. FC soils data characterise the soils as being brown surface water gley with a humose layer (7bh) which is similar to The James Hutton Institute characterisation which types them as predominantly non-calcareous gley (FC Category 7) with smaller areas of brown forest soil (FC Category 1) toward the north-east of the site (see **Map 3a – Soils**).

Based on the James Hutton Institute Land Capability for Forestry classification the majority of the site is classed as very good for supporting trees.

3.1.2 Climate

Callendar Wood falls within the **Warm, Moist** climatic zone with Accumulated Temperature (day-degrees above 5 °C, a measure of growing season length) varying between 1316 and 1411 (1200 representing the dividing point between Cool & Warm); (see **Map 3b – Climatic Conditions**).

3.1.3 Exposure (DAMS)

Detailed Aspect Method Scoring (DAMS) is a measure of windiness of a site using the angle to the horizon in the eight compass points, weighted towards the prevailing wind direction. Scores range from 0-24: The higher the score

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the greater the exposure, with scores below 13 regarded as sheltered and above 22 as too high for commercial forestry. **DAMS on the site scores from a sheltered 11 to a moderately exposed 14** (13-15 = moderately exposed, 16-17 = highly exposed), with scores generally increasing with elevation. The moderately exposed areas as one might expect are found toward the elevated south west of the site. (See **Map 3b – Climatic Conditions**).

3.1.4 Hydrology

Callendar Wood has no associated watercourses but does however have an extensive drainage ditch network. The wood was once the source of water for Falkirk and the network of channels and stone culverts may be connected to this historic function. Ditches in the western half of the wood drain to various points on Kemper Avenue where they enter a pipe that runs down the length of the street whilst ditches in the eastern half of the wood drain into Callendar Loch. The ditches are part of the historic landscape of Callendar Park. Most ditches are blocked to some extent by woody debris. The resultant blockages have caused some localised wetter areas. (See **Map 3c – Hydrology**).

3.2 The existing woodland

3.2.1 Age structure, species and yield class

Age Structure

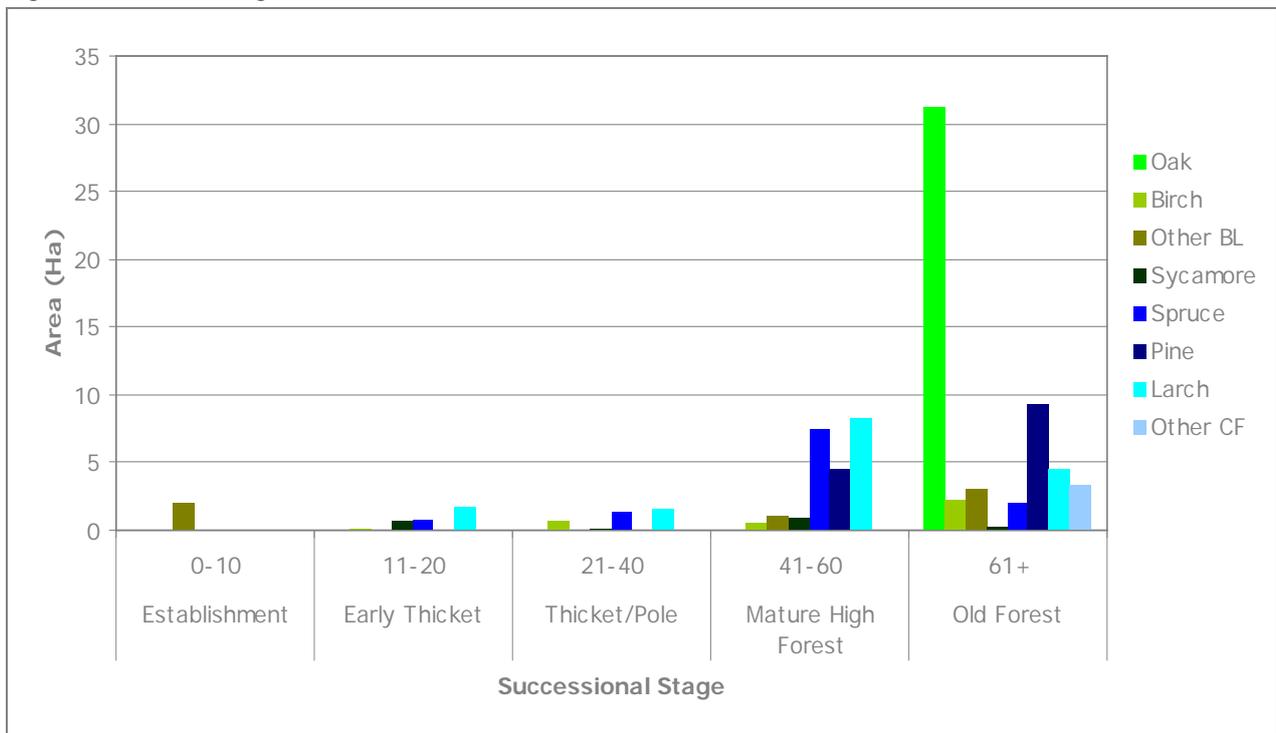
As figure 1 below highlights, the age structure of Callendar Wood is dominated by older trees as well as mature high forest. To achieve a more diverse woodland transforming the age balance to better represent trees of younger successional stages is a desired aim.

The woodland can be simplistically characterised in terms of age structure as shown in Figure 1 - Current Age Structure Breakdown but it is also useful to understand it as characterised as a number of stand types, those being:

- The oldest individual trees surviving (mainly the old stumps & trees identified on early boundary features)
- The old 'scroggy' oaks, 18th century or earlier, and certainly including pre-Forbes trees
- 19th century planted oaks along with nursing conifers
- Late 19th and early 20th century mixed planting
- Conifer planting from the 1940s
- Conifer planting from the 1960s and 70s
- Mixed young and fenced planting

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Figure 1 – Current Age Structure Breakdown



Species Structure

Figure 2 - Current Species Structure Breakdown and **Map 3d – Current Stock** helps one understand the proportions of the various species throughout the wood but further detail on the significance of these species and their spread is provided below.

Broadleaves

At present the woodland has a fairly even mix of broadleaves and conifers. Within the broadleaf mix, as figure 2 below indicates, there is a predominance of oak and birch

Native Woodland - Of the broadleaved area over half (approx. 32 ha) has been identified as native woodland by The Native Woodland Survey of Scotland (NWSS) carried out between 2006-2013 (see **Map 3e – NWSS**).

National Vegetation Classification - Overlapping much of the native woodland area and beyond into areas identified as nearly native are two National Vegetation Classification types of woodland: W10e (approx. 31 Ha) and W11a (approx. 6 Ha) both of limited occurrence in the Falkirk area. W10e represents Pendunculate oak/Bracken/Bramble woodland with a sub-community of sycamore & wood sorrel; W11a represents Sessile oak/Downy birch/Wood sorrel woodland with a sub-community of Broad Buckler Fern (see **Map 3f – NVC**).

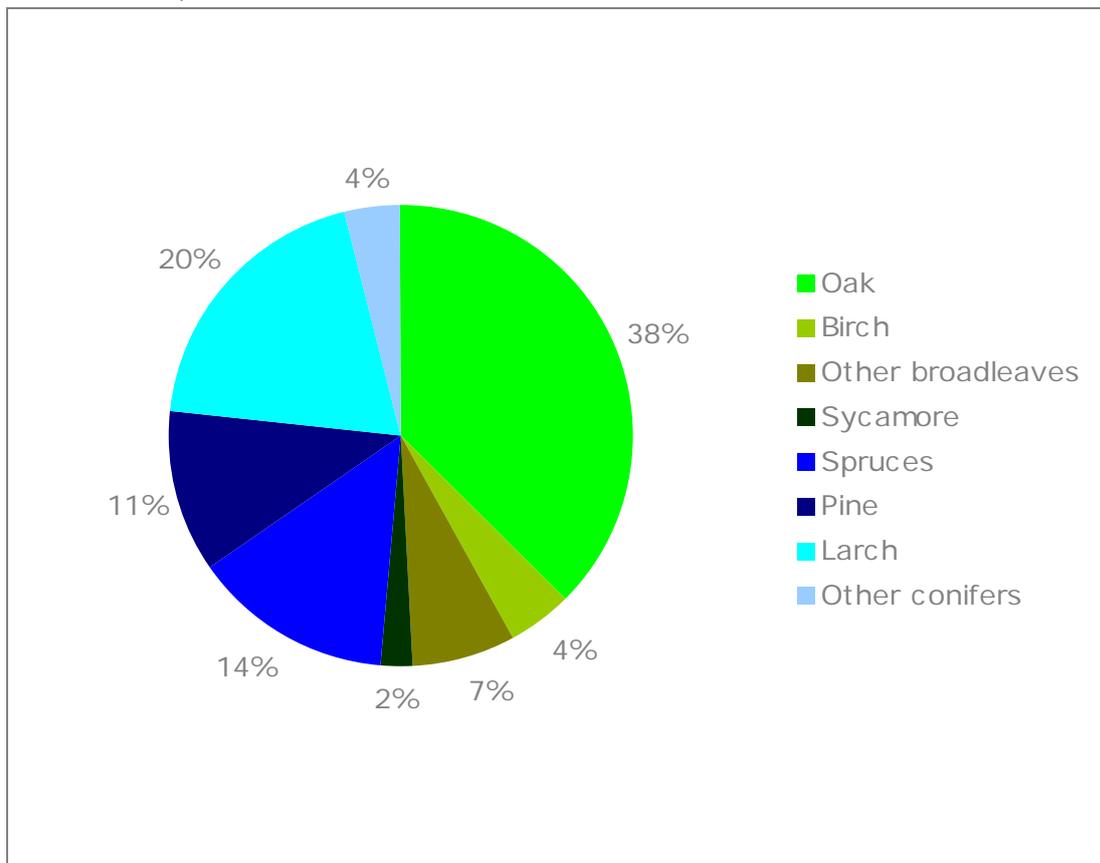
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Ornamental/Exotic Species - Being the remnant of the former estate house policy woodland there have been and remain to this day a significant number of ornamental species. Species such as Horse chestnut, Sweet chestnut, Red oak, Common lime, Silver fir, Portugal laurel, and Yew can be found mainly along carriageways and footpaths. With the exception of the Laurel and Yew these ornamentals are usually very large but all are an integral part of Callendar Wood's aesthetic within the larger designed landscape of the former Callendar Estate as a whole.

Conifers

The conifer element of the wood, much of which is situated in the heart of the site, consists predominantly of mixtures of spruce with either European larch and Scot's pine with a small area in mix with Douglas fir. There is also a significant area of mature European Larch mixed with Scot's pine to be found in the south east of the site and some Douglas fir, Western Red Cedar and Grand fir located close to the central trail leading into the site from Callendar Park.

Figure 2 – Current Species Structure Breakdown



Yield Class

Yield classes within the broadleaves are predominantly 2 – 4 but do reach up to 8 and within the conifers the majority of the crop is YC 10-12 however some spruces have reached YC 20 and above .

3.2.2 Ancient Woodland

The majority of the site (approx. 76 Ha) has been identified as Ancient Woodland of Semi-Natural origin (ASNW) with other significant areas, mostly on the periphery of the woods that have been identified as of Long Established Plantation Origin (LEPO) (approx. 10 Ha) (see **Map 3g – Ancient Woodland Map**).

3.2.3 Access

The wood has around 6 miles of carriageways, footpaths, rides and tracks (see **Map 5e - Visitor Zoning**). There are 13 public access points into the wood with varying levels of usage. The most heavily used accesses are generally from the north from Callendar Park or Kemper Avenue although there is also a great deal use from people accessing from Hallglen to the south often as a route north through to Falkirk. Vehicle access is restricted, realistically, to the most westerly entrance along Kemper Avenue. At this point the road is suitable for timber lorries as well as for access for vehicles transporting forestry machinery. The internal access network is limited for timber haulage with widths ideally not great enough to sustain timber traffic. The network of paths and carriageways can provide access for small vans and cars for forest and wildlife management tasks however some path widths again are not ideal even for such smaller vehicles.

3.2.4 LISS potential

Callendar Wood is suited to low impact systems as it is a relatively stable site with high amenity and recreational usage with restricted access to large harvesting machinery due to the heritage and environment constraints of the site. The nature of the crop is also suited to LISS in order to further diversify a relatively varied age and species structure.

3.2.5 Current and potential markets

Thinnings from within the conifers would provide the timber trade with green and red saw-logs as well as pallet wood and small round wood. Thinnings from within the broadleaves would provide for the firewood market and potentially for more niche local hardwood saw-millers. Access for timber transportation is limited due to the width of roads and high public usage.

3.2.6 Pathogens

3.2.6.1 Dothistroma Needle Blight (DNB)

DNB previously known as Red Band Needle Blight due to the colourful symptoms it shows on pine, causes premature needle defoliation, resulting in loss of yield and, in severe cases, tree death.

Recent surveys have shown outbreaks of DNB across Scottish Lowlands Forest District and as yet Callendar Wood remains unaffected. Scots pine constitutes approx. 11% of the species matrix within Callendar Wood and therefore poses a moderate risk to the crop in terms of the potential loss of biodiversity and visual character.

3.2.6.2 *Phytophthora ramorum* (*P. ramorum*)

P. ramorum is a fungus-like pathogen of plants that is causing extensive damage and mortality to trees and other plants in parts of the United Kingdom. Larch in particular is extremely vulnerable, and high infection and mortality levels are currently causing significant issues in Galloway Forest District.

At present only one case of *P. ramorum* has been found within Scottish Lowlands Forest District, in the highest risk zone, and whilst Callendar Wood falls within Zone 3 (Low risk of infection) in the FCS Action Plan for Larch in Scotland it remains important to monitor for the spread of this pathogen within the wood. Larch makes up around 20% of the tree cover within the Callendar and therefore such a loss of area would have a significant impact on the character and diversity found within the wood.

3.2.6.3 *Chalara fraxinea* (Ash Dieback)

Ash dieback is a serious disease of ash trees caused by a fungus, resulting in leaf loss, crown dieback and, potentially, tree death.

Ash accounts for only a very small proportion of the tree cover in Callendar Wood where, as yet, Chalara infection has not been detected but continued monitoring for the disease is very important.

3.3 Landscape and land use

3.3.1 Landscape character and value

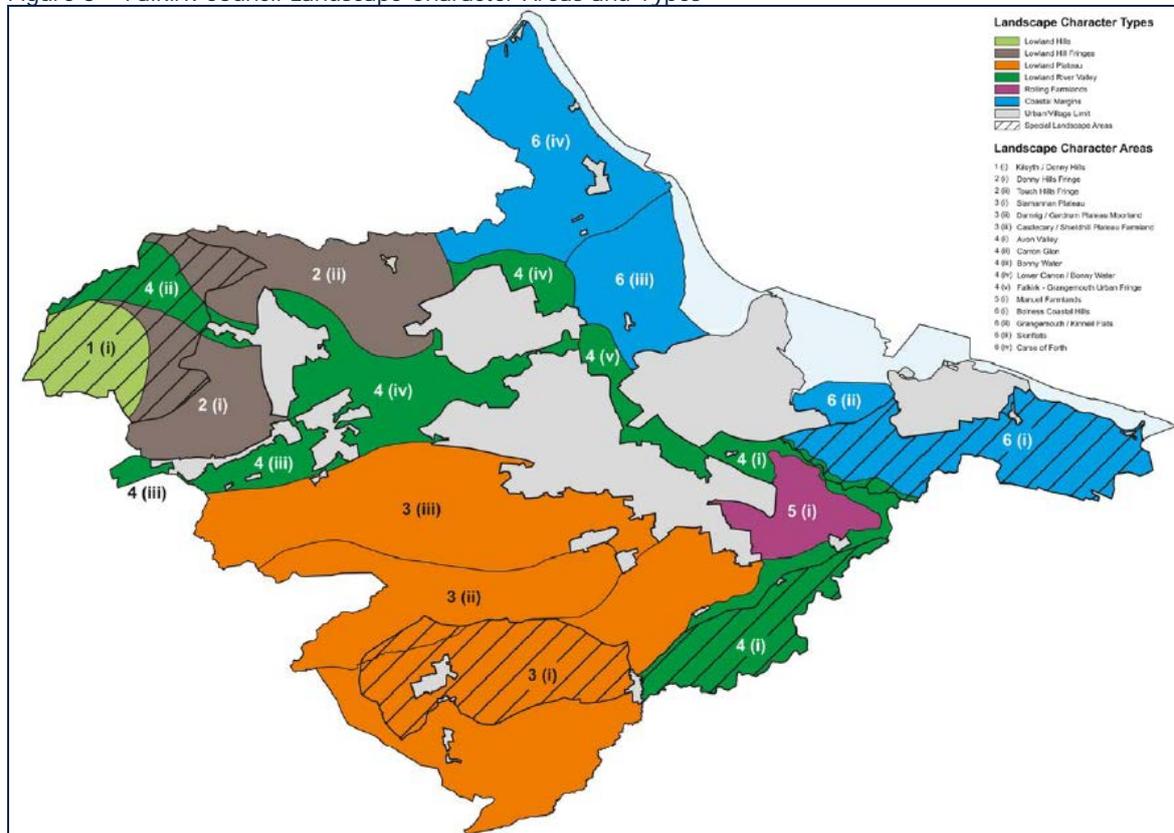
Callendar Wood sits within a very visually diverse rounded, irregular landscape due to the nature of its highly populated urban setting characterised by a complex matrix of roads, residential housing, schools, woodlands and agricultural enclosures. The woodlands are generally perceived on the small

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scale from the south, east and west due to topography coupled with urban build up obstructing larger scale views from these directions. From the north however the wood is also perceived on the medium scale due to its slope-side situation setting it as a backdrop to the town lying on the flatter ground below.

Falkirk Council's recently published (July, 2015) Landscape Character Assessment and Landscape Designations: Supplementary Guidance 09, types the area within which Callendar Wood sits as Urban/Village Limit but unfortunately this guidance does not further characterise this particular area or provide further information on future forces for change, sensitivities or guidelines to conserve it (see Figure 3 below).

Figure 3 – Falkirk Council Landscape Character Areas and Types



3.3.2 Visibility

Situated to the south east of Falkirk and gently rising to the south toward the Slamannan plateau Callendar Wood is visible at various scales. The woods can be glimpsed from various points within the immediate vicinity of the town to the north at the small scale but can also be seen in the wider medium to larger context from various point more further afield such as the M9 motorway and across the Firth of Forth from Fife.

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3.3.3 Neighbouring land use

The neighbouring land use is predominantly urban residential with the communities of Hallglen to the south-west, Westquarter to the east, Laurieston to the north-east and Parkfoot & Woodlands to the north-west. Other surrounding land-use includes the recreational Callendar Park to the north and Woodend Farm to the south-east whose fields are regularly used to graze horses.

3.4 Biodiversity and Heritage

3.4.1 Biodiversity

Falkirk Council's Local Biodiversity Action Plan (LBAP) has within it four specific areas which influence management at Callendar Wood; the Woodland Action Plan, the Urban Action Plan, the Farmland and Grassland Action Plan and the Education, Awareness Raising and Participation Action Plan. Each plan, other than the latter, identifies priority habitats and species in need of conservation and outlines methods the LBAP Group intend to pursue in order to achieve this goal. The priority habitats and species relevant to Callendar Wood are listed below.

3.4.1.1 Priority Habitats

Drawing on the LBAP, two broad UK habitats are identified as being relevant to Callendar Wood; **Broadleaved, Mixed & Yew woodland** and **Neutral Grassland**. Within these broad definitions specific priority woodland and grassland habitats are specified. Also identified within the LBAP are urban habitats of priority to the local biodiversity group.

Amongst the broader woodland habitat the UK priority habitats which are relevant to Callendar include **Lowland mixed deciduous woodland, Upland mixed ashwood & Upland birchwoods** as identified by the NWSS (see **Map 3j – NWSS Dominant Habitat**).

Amongst the broader Neutral Grassland habitat the priority habitat relevant to Callendar is **Lowland Meadows** found on Henry's hill where amongst the neutral grassland wildflower meadow species have been added from seed to an area on the northern slope of the hill.

Further to the UK priority habitats above the LBAP identifies priority urban habitats relating to Callendar Wood which include **Urban Greenspace** and **Urban Wildlife Corridors**.

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3.4.1.2 Priority Species

The LBAP identifies the following species which will have varying relevance to Callendar Wood.

Woodland species

Mammals: Badger (*Meles meles*), Brown long-eared bat (*Plecotus auritus*), Soprano Pipistrelle bat (*Pipistrellus pygmaeus*).

Birds: Bullfinch (*Pyrrhula pyrrhula*), Cuckoo (*Cuculus canorus*), Green woodpecker (*Picus viridis*), Lesser redpoll (*Acanthis cabaret*), Song thrush (*Turdus philomelos*), Spotted flycatcher (*Muscicapa striata*), Tree pipit (*Anthus trivialis*), Wood warbler (*Phylloscopus sibilatrix*), Woodcock (*Scolopax rusticola*).

Invertebrates: Small pearl-bordered fritillary (*Boloria selene*).

Flowering Plants: Bluebell (*Hyacinthoides non-scripta*), Wych elm (*Ulmus glabra*).

Ferns and Lower Plants: Hay-scented buckler fern (*Dryopteris aemula*), Liverwort (*Plagiochilia spinulosa*).

Grassland species

Flowering Plants: Ox-eye daisy (*Leucanthemum vulgare*)

3.4.1.3 Invasive Non-Native Species

As a remnant of its former estate policy heritage the woodland contains ***Rhododendron ponticum*** which would have been planted as an ornamental when originally planted however has since had unintended consequences. This species is an aggressive coloniser that reduces the biodiversity value of a site; it obstructs the regeneration of woodlands and once established is difficult and costly to eradicate. As bushes mature and occupation of an invaded site increases, physical access can be reduced by the sheer density and size of the plants present, and the cost of some management operations can increase if the bushes require treatment first. Mature bushes also act as a prolific seed source for invasion of adjacent areas, and are a continued source of new plant material into areas successfully cleared.

With its proximity to residential areas and some incidents of the fly-tipping of gardening/landscaping residue a small area of woodland has seen the advance of **Japanese knotweed** (*Fallopia japonica*) and **Himalayan balsam** (*Impatiens glandulifera*). These species are a threat to native flora and habitats as they are aggressive and form dense stands that exclude other plants. If these species were left unchecked they could pose a risk of colonising substantial areas to the detriment of native flora and fauna.

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The wood is inhabited by **Grey squirrels** (*Sciurus carolinensis*) which in high numbers are extremely destructive in woodlands, stripping bark from the main stem and branches of trees over late spring and summer. Oak, Scots pine and Norway spruce are species within the wood which are particularly vulnerable to stem breakage caused by bark stripping.

3.4.2 Heritage

Callendar Wood has a rich history and as such retains many features and clues pertaining to it. The remainder of this subsection as well as **Map 3k – Heritage Features** describe and locate these features.

3.4.2.1 Designed landscape

The woodland is part of the wider designed landscape of Callendar Park listed in Historic Environment Scotland's Inventory of Gardens & Designed Landscapes in Scotland. This designation has been afforded to the site due to its importance in terms of its silvicultural value, its high artistic and historic value and its outstanding architectural value.

In relation to its **silvicultural value** this is in part down to the number of specimen trees and shrubs across the site which can be categorised as either large and/or old trees; ornamental/exotic trees or ornamental shrubs.

Large and/or Old trees

There are a number of trees that have reached large size and which form visually impressive landscape features. Notable trees are: the extremely large European larch along the northern boundary; Douglas fir at the Shrubbery Road entrance; the large Sitka spruce at the east end of the newly created all abilities path; the old Beech trees on the Loch Road esker embankment and the scattering of large Sweet chestnut.

Ornamental/Exotic trees

In common with many other policy woodlands, Callendar has its share of ornamental and exotic tree species. These species include; Noble fir, Grand fir, Strawberry tree, Copper beech, Western hemlock and Red oak. These are generally found at the sides of former carriageways. The most common carriageway species are Common lime and Yew.

Ornamental shrubs

Numerous non-native and specimen shrubs have been planted within the wood including rhododendron (*Rhododendron ponticum*), Portugal laurel (*Prunus lusitanica*), Holly (*Ilex aquifolium* "Silver Queen"), and Golden Irish Yew (*Taxus baccata* "Fastigiata Aurea"). Rhododendron was planted alongside most

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of the carriage drives and perhaps in some woodland areas as game cover. Over the years the rhododendron spread throughout a significant proportion of the wood. Thick, impenetrable rhododendron scrub covered approx. 1/3rd the woodland area when Callendar Wood came under the management of Forest Enterprise in 1999. The rhododendron was entirely made up of *R. ponticum* with the exception of two bushes at the west end of Earls Tree road, which have been retained. These differ from *R. ponticum* in the colour of the flowers and shaped of the leaves. Portugal laurel, which are confined to a few specimens alongside the west part of the All Abilities path, have grown wildly and are of large size with some overgrown limbs. There are two specimen Holly bushes in three different locations but they are not particularly noticeable within the landscape. There is one Golden Irish Yew beside the Farm Road.

In terms of the **artistic, historic and architectural** value of the site these are evident within the landscaped **Carriageways & Avenues** and **Vistas** as well as within architectural features such as the Category 'C' Listed **Policy Wall, Kennels** and **Wellhead**, the **Water House** and the Category 'A' Listed **Mausoleum** although this last feature is not actually within the management area owned by FCS but have been retained by Callendar Estate.

3.4.2.3 Other Archaeology

As well as the features mentioned which make up the designed landscape of the former Callendar Estate there are several other features within the wood of historic interest.

Iron-age hill fort: The fort occupies the east end of a ridge 110m above sea level and the ground falls sharply away into the valley of the Glen Burn to the south, and only slightly less steeply into the Forth Valley to the north. The fort is distinguished by a large perimeter ditch forming an oval-shaped enclosure 149m W/E by 77m N/S. Part of the rampart is still standing at the SE corner. No excavation has taken place on the site and so it remains undated.

Marker Stones: The wood is reputed to contain 39 marker stones marked 'Coal Pit', 'Pipe', 'Air-Cock' and relating to the Ordnance Survey. 21 of these have been found to date, of which the most important are those that mark old mine workings. These stones are inscribed with a date and whether the coal pit was filled in or capped. If any mine workings were ever to open up they could present some danger to public safety, especially those that have been capped. The sites of old shafts have been mapped and visitors are not encouraged unknowingly into their vicinity. The greatest danger would be to any heavy machinery working in the vicinity of a shaft. The two "Air-cock" stones are connected to one of the two water supplies from the well. Their

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supply went to Falkirk steeple via the Kemper avenue gate whereas the “Pipe” stones are associated with the other well supply line, and mark the route of a pipeline from there towards to Callendar house via a series of water tanks (one within Callendar Wood the rest on the Callendar Park side). The line of the pipe from the well to the house is still clear from the marker stones and where it crosses a large drain.

Drainage system: Callendar Wood has an extensive drainage network which is made up of recent forestry and amenity drains, older forestry drainage, natural drainage, older ditches which relate to the early earthen bank system, historic coal mining drainage and water supply channels. Most of the drainage system is captured on **Map 3c – Hydrology**.

Earthen embankment at Southern boundary: The remains of a linear embankment which runs along the southern edge of the wood. One length runs from the Farm Road to the east High Road/Barrel Well Road junction. The second length runs from NS 891 787 to the edge of Henrys Hill. The embankment has still not been explained conclusively but it is possibly the original boundary embankment.

Plague pit: Locals of the site have previously reported that a Plague Pit is reputed to be located at the southern boundary near Farm road.

3.5 Utilities

Map 3i – Utilities shows the extent of the various utility infrastructures detailed throughout the site.

3.6 Community & Recreation

3.6.1 Community

Callendar Wood is surrounded by several suburban communities of Falkirk such as Hallglen, Westquarter and Parkfoot amongst others. The people of these communities make use of the wood in a variety of ways including walking, dog exercising, cycling and as a short-cut for through access between urban areas. There are several local nurseries as well as primary and secondary schools nearby most of which are regular users of the woods running self-organised educational outings for the children. Many visitors to the wood do not differentiate between either the management or the borders of Callendar Park and the wood and see the two as one contiguous site and as such infer issues in the park as FCS’s responsibility and vice versa for Falkirk Community Trust. There has been issues in the past with antisocial behaviour within the walls of the mausoleum, located in the heart of the woodland and is

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managed by Callendar Estate, such as fire raising and substance abuse which has imparted a negative reputation on the wood which is often difficult to alter. Of the visitors to Callendar Park a relatively low proportion go on to visit the woods the reasons for which may be varied but are probably linked to the woods historic link to Callendar Estate and the restricted access visitors would have had in the past.

3.6.2 Recreation

Callendar Wood is used for many purposes by a wide variety of groups. As mentioned above the predominating activities are walking, dog exercising and cycling but other activities include: orienteering, cross country running, military fitness training and horse riding. The woodland has approximately just less than 9 miles of carriageways, footpaths, bridalways and rides. In 2014 a short section of path through Callendar Wood was incorporated into the John Muir Way, a 134 mile trail which runs through the central belt between Helensburgh and Dunbar. It remains to be seen how much this new trail will affect visitor numbers to the wood which are estimated at approx. 170,000 each year making it the most visited site managed by FCS within Scottish Lowlands Forest District.

4.0 Analysis and Concept

Using survey work and research, a broad range of factors were acknowledged and considered to recognise the site's key features (see **Map 4a – Survey & Key Features**) which, informed by the objectives set out in the management plan brief (see **Appendix IV**) were used to identify the opportunities and constraints (see **Map 4b – Opportunities & Constraints**) which exist within the management plan area and from there develop an initial concept (see **Table B4 Analysis and Initial Concept Development** below). This initial concept was then distilled further to produce a concept map (see **Map 4c - Concept**) which summarises the main aspirations and intentions for the management plan. This management concept formed the main basis for the public consultations held in February 2015.

5.0 Management Plan Proposals

The proposals detailed below describe the rational and methodologies to be employed in order to achieve the objectives set out in **Appendix IV**. Much of what is proposed for Callendar Wood will be dependent on various factors such as the availability of suitable funding, consultation with neighbours/community etc. Such proposals constitute possible future projects for FES to be delivered in partnership/agreement with others. **Appendix II – Management Table**

highlights which aspects of the management of the site fall under our 'general management functions' and which might constitute a 'potential future project'. The associated **Maps 5f-g** indicate where on the ground various tasks listed in **Appendix II** would be focused.

5.1 Woodland Management

The proposals for this site have been produced based on sound silvicultural and environmental principles and follow the requirements, guidelines and recommendations set out within the UK Forestry Standard, the UK Woodland Assurance Scheme, FC Bulletin 124 Ecological Site Classification for Forestry and FC Bulletin 62 Silviculture of Broadleaved Woodland, FC Bulletin 115 Alternative Silvicultural Systems and the current FC edition of Forest and Water Guidelines.

As the woodland functions primarily to provide general amenity and biodiversity value and is of mixed species; it is the intention to manage the woodland sensitively to those aspects. That being said managing the woodland with a view to developing its value as a timber crop need not conflict with the overriding aspiration for the site in providing community benefit.

With this in mind the intention for the woods is to balance appropriate management of the various visitor zones throughout the sites whilst creating the conditions which will encourage the healthy growth and regeneration of a mix of species and strata in perpetuity. Achieving this balance will require coordination of both the Forest Management (FM) team and the CRT team. The FM team will concentrate on silvicultural thinnings primarily within the passive and interactive management zones whilst CRT will focus on aesthetic interventions to improve the visual appreciation of the sites for the visitor by way of light thinning, crown lifting and coppicing within the welcome and interactive management zones (see **Maps 5a - Management & 5e – Visitor Zoning**). The remainder of this subsection outline both the short term aims of the thinning proposals and the longer term silvicultural aims.

Long-Term Silvicultural Aims

Conifer – To gradually, over many decades, reduce the proportion of conifer within the wood utilising low impact silvicultural systems in order to eventually restore the woodland to its original ancient state as a woodland dominated by native broadleaved tree species. This will be achieved whilst remaining sensitive to the woodlands more recent 'policy' character which conifers contribute to significantly. Natural regeneration (NR) and/or conifer

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enrichment will be managed to promote good growth and form to eventually produce quality saw-logs along with secondary log products.

Broadleaves – To encourage and promote the growth, regeneration and spread of existing native species throughout the wood along with other site suitable native species aiming to achieve a woodland diverse in species, structure, character, texture and biodiversity. NR and/or native broadleaf enrichment will be managed to promote good growth and form with clean boles with a view to producing timber suitable for a wider range of niche markets such as those for butts and beams rather than solely for the firewood market.

5.1.1 PAWS Restoration

It is the intention of Scottish Lowlands Forest District to restore the area of former ASNW back to native broadleaf species however due to the large number of visitors to the wood and their appreciation of conifers as part of the woodland mix and former 'policy' character we propose to make the transition to native broadleaves at a variable pace over several decades, perhaps over several rotations in order to affect the desired change at a pace acceptable to those who visit and use the wood. **Map 3h – PAWS Restoration** shows the area of woodland intended for restoration.

How this will be achieved is detailed in the following subsection.

5.1.2 Low Impact Silvicultural Systems (LISS)

In order to implement both the gradual transition from plantation conifer to native broadleaf woodland as well as managing the existing broadleaf stands LISS will be employed (see **Map 5a – Management**). Although for most of the stands where thinning will be employed the ideal window of opportunity to thin for the benefit of stand stability or to promote an increase in girth of the primary species may have passed, thinning will still be an important tool to achieve the desired restructuring of the crop.

5.1.2.1 Silvicultural Systems

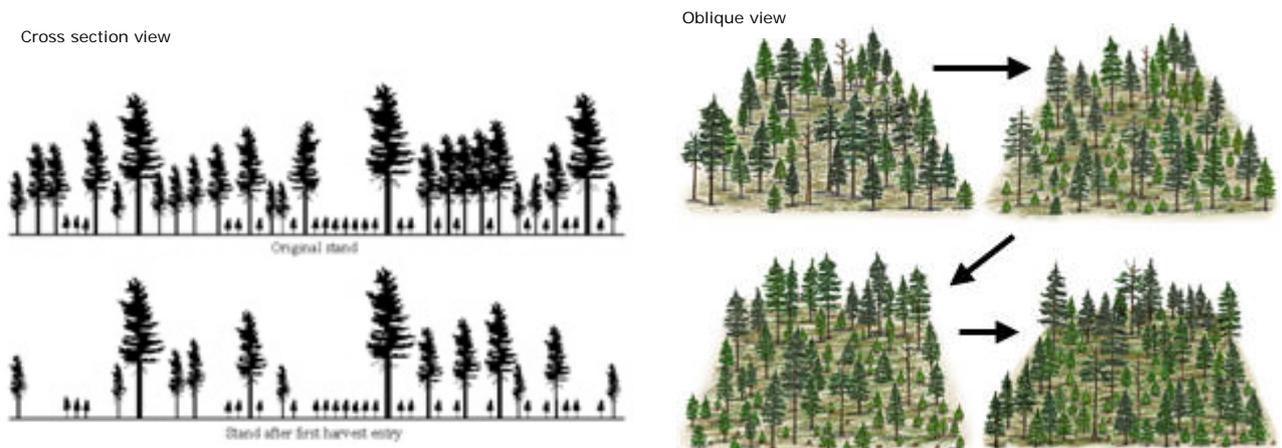
In order to achieve the long-term silvicultural objectives the following low impact systems will be used within the wood (see **Map 5b – Silvicultural Systems**).

Single Tree Selection System

This system of silviculture will be practical for the short term management of the areas of the woodland which are currently primarily mature oak. As much of the oak is mature or old woodland with existing large canopy gaps this

system will simply involve widening these existing gaps or clearing them of unwanted secondary competition to enable the creation of manageable plots for planted enrichment supplemented by any NR (see **Figure 4 – Illustrations of the Single Tree Selection system**). Management of these created oak plots are further described in the 'Future Habitats & Species' section.

Figure 4 – Illustrations of the Single Tree Selection system



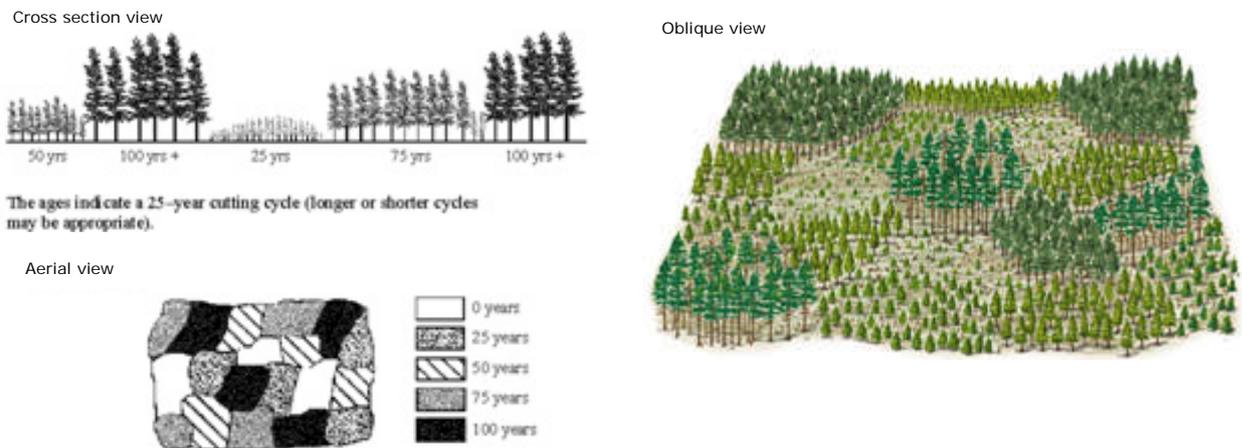
Group Selection System

This system of silviculture will be practical for the management of the areas of the woodland which are currently primarily spruce or larch mixtures as well as the younger intimate mixtures of broadleaves (see **Figure 5 – Illustrations of the Group Selection system**).

Restoring the conifers to native broadleaves is our long term objective however the rate at which this will be progressed will be dependent on various factors. Species will be a consideration, spruce trees are generally not as appreciated as some of the less heavily branched and lighter coloured conifers such as Scots pine, European larch and other softer species. With this in mind thinnings within mixtures including spruce will generally favour the other species removing small groups of competitors and encouraging the favoured trees potential chances to naturally regenerate. In such areas if the desired NR is not prevalent at such times as it would be expected then enrichment planting will be necessary using native broadleaves or perhaps alternative soft conifers where that character is particularly important.

This system will also be used in areas of existing mixed broadleaves with non-regenerating groups being restocked with site appropriate native broadleaves at a productive density of at least 5100 stems/Ha.

Figure 5 – Illustrations of the Group Selection system



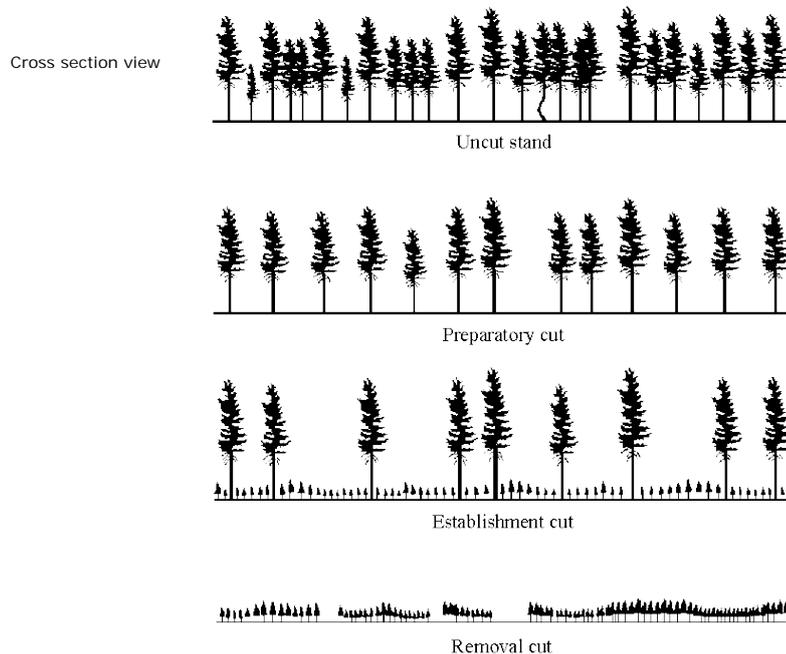
Uniform Shelterwood System

This system of silviculture will be practical for the management of the areas of the woodland which are currently primarily Scots pine in mixture. (see **Figure 6 – Illustrations of a Uniform Shelterwood system**).

Generally the areas of mature Scots pine and European larch will be managed as uniform shelterwoods and encouraged to naturally regenerate in order to retain the conifer character within the woodland however if future NR of these areas is unsuccessful they should be enriched with native broadleaves along with a proportion of alternative conifers which will be encouraged to grow into specimen trees.

Where NR is successful then this will be managed appropriately as a commercial crop with any necessary re-spacing and timely thinnings being carried out. Such crops will eventually be managed using an irregular shelterwood system where gaps are created to either allow further NR or have native broadleaves planted as part of the process of restoration to native broadleaf.

Figure 6 – Illustration of a Uniform Shelterwood system



5.1.2.2 LISS Thinning Intentions

In order to complement the approaches of the silvicultural systems proposed the thinning regime(s) applied will aim to achieve the following general intentions:

Conifer – To identify the desired species of trees and better stems and remove some of their surrounding competitors in order to promote; stand health, stability, future regenerative potential as well as enhancing biodiversity and improving views through the wood.

Broadleaves – To identify future seed trees of desired climax species such as native oaks and remove competing secondary species such as sycamore whilst creating the space to encourage the ideal light and seedbed conditions to promote enrichment and NR of a healthy & vigorous understory of desired species.

5.1.2.3 LISS Thinning prescriptions

Map 5c – LISS Thinnings (Indicative) provides detail on thinning regimes that could be applied; these include systematic methods such as rack and matrix as well as selective methods such as crown and low thinning. A small area of conifers (1.6 Ha) will be selectively felled to be restocked for the most part with native broadleaves in order to link the broadleaves to the north and south of this area.

Thinning interventions will be careful not to overly destabilise stands, in particular conifer, however due to previous neglect this remains a potential risk. If windthrow should occur, creating natural canopy gaps, these should be inspected to determine if desirable NR is likely and if not, appropriate species should be planted in these gaps.

5.2 Future habitats and species

5.2.1 Woodland habitat

The management systems detailed previously as well as the prescriptions in the following section outline how the current crops will eventually be replaced using NR and enrichment will maintain or improve the condition of the priority woodland habitats of **Lowland mixed deciduous woodland**, **Upland mixed ashwood** and **Upland birchwoods**.

5.2.1.1 Prescriptions

Mature Scots pine/European larch mixed stands – As indicated previously these stands will be managed as uniform shelterwood. The present conditions of these stands means that it is not expected that the species or age mix will be altered significantly within the life of this plan. To expand on this using coupe 3 as an example; here the light levels are good yet competing ground vegetation means the seedbed conditions are currently not suitable for pine or larch NR. Under-planting with birch and/or other suitable native broadleaves as an understorey will work to inhibit the competing ground vegetation. When the seedbed eventually becomes suitable, removal of the understorey timed with a good pine mast year and a final thinning of the pine should encourage dense pine/larch regeneration. If, despite these actions, pine/larch NR should not be forthcoming then future plans will set out how these stands should be restocked. Under-planting with native broadleaves in blocky mixture would seem appropriate.

Spruce & Larch mixed stands – As with the previous instance it is not expected that the species or age mix will significantly alter within the life of this plan although the process of reducing the spruce component will have begun. Thinning interventions will allow additional light to the forest floor and some NR might be expected however it will only be when the stands have reached a suitable age and are stable enough that gaps will be created to encourage larch/pine NR. If despite these actions appropriate NR should not be forthcoming then future plans will set out how these stands should be restocked. Native broadleaves in blocky mixture or as pure crops in gaps would seem appropriate.

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Existing Predominantly Oak Stands - Within the areas of mature and or old native oak species woodland a series of several enrichment/regeneration plots will be set up. The aim of these plots will be to enable intensive management of relatively small areas to establish any naturally occurring native regeneration or planted enrichment. These roughly circular management plots will typically be around 2 tree lengths in diameter (approx. 30m-40m wide) in order to create areas of sufficient size to allow enough light to promote oak growth as well as being of a size practical enough to facilitate the management of competing ground vegetation such as bracken and bramble.

Within the management plots oak will be planted in groups surrounded by a matrix of native shade tolerant species such as hazel and Wych elm which will promote vigorous oak growth and improved form whilst inhibiting epicormic growth of the oak as well competing ground vegetation.

Plots may be variously protected in order to establish the most effective method for future use elsewhere through the site; potential methods may include deer fencing to physically exclude roe deer; stock fencing to deter roe deer; tree guard tubes to be evaluated against plot(s) with no protection.

Where establishment is successful, the relevant protection methodology will be employed elsewhere across the wood in a series of timed relocations which will help to diversify the age structure of crops within the woodland.

NR/enrichment will aim to establish stocking at densities of at least 5100 stems/Ha.

Table 3 - Indicative Silvicultural Management Timetable to Manage Enrichment/Natural Regeneration below outlines an indicative silvicultural management timetable appropriate for managing the establishing oak plots although within the life of this plan only the initial stage interventions are relevant.

Table 3 Indicative Silvicultural Management Timetable to Manage Enrichment/Natural Regeneration

| Stage | H ₁₀₀ [m] * | Interventions |
|---------------|---------------------------|---|
| Establishment | | Utilise any Natural Regeneration (NR) from the existing stand (predominantly Oak (OK) NR). Supplement this with enrichment planting of oak. Plant oak in groups (0.5m – 1.0m spacing); the number of groups corresponding to the number of final crop trees. Groups of OK should be surrounded by a single line of shade casting species that |

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| | | |
|--------------------|---------|---|
| | | <p>do not outgrow OK (such as Wych elm (WEM) or Hazel (HAZ)) in order to ensure straight growth of the outer trees within the group. The space within the matrix may be left to fill with NR or be planted with a shorter-term native broadleaved species.</p> <p>Protection against browsing and fraying. Employ a LISS single tree selection system creating a suitable number of gaps ~30m wide as a patchwork over time leading to an irregular structure. The gaps will allow more light to the forest floor allowing the enrichment/NR to get away.</p> |
| Young stand | <2 | <p>Establishment of access lines if necessary. Differentiation and species selection are mainly regulated through interventions in the overstorey (light level management). Clear up felling damage to allow quick restocking. Shaping the leaders (OK forks) if necessary.</p> |
| Thicket stage | 8 – 10 | <p>Selective removal of wolves and other trees of undesirable quality. Careful promotion of up to 200 FC tree candidates/ha. Crown pressure must be maintained to ensure self-pruning and differentiation (remove no more than 500 trees/ha). First stage of pruning in stands of low density – cut branches before they exceed 2–3 cm in diameter. Remove max. 50% of the live crown.</p> |
| Pole stage | 12 - 14 | <p>Continue selective removal of undesirable trees if necessary. Carefully promote FC tree candidates. Maintain canopy pressure for on-going self-pruning and differentiation process (remove no more than 500 trees/ha). Continue pruning in stands of low density.</p> |
| Small timber stage | 16 – 18 | <p>Start thinning (stage 2) when the majority of FC tree candidates have reached the desired length of clean bole. Establish extraction line network. Select and permanently mark 50–80 FC trees/ha and thin to release their crowns from competitive neighbours (crown thinning). Retain sub-dominant and suppressed trees to develop a diverse stand structure. Finish pruning in stands of low density. <u>Under-planting.</u></p> |
| Timber stage | >20 | <p>Monitor the development of FC trees and continue thinning to keep them free from crown competition. Live crown length should be 60–70 % of tree height. Signs of lower crowns struggling for light indicate the need for another thinning. Maintain and develop the understorey in order to suppress epicormic growth in OK, and to control ground vegetation. In later stages great care must be</p> |

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| | | |
|---|--|---|
| | | taken to prevent understorey trees from growing into the crowns of OK FC trees, particularly when BE is involved. |
| Final harvesting and regeneration stage | | Start final harvesting when FC trees reach target dbh. The understorey, which should have created favourable conditions for OK NR, is harvested immediately before the OK. Ideally both operations are timed with a mast year in OK (fell OK after seed dispersal). Covering the fallen acorns with a thin layer of top soil and litter may considerably improve the success rates for NR. Small scale clearfelling (0.5–1.0 ha) and fast shelterwood methods are most suited to the light demand of OK NR. |

** H100 represents the mean height of the 100 trees with the largest DBH within one hectare.*

5.2.2 Open Land

The management of Henry’s Hill neutral grassland with an area of sown wildflower meadow will continue to be based around a regime of timed cuts. After mowing the cuttings will be lifted and removed (see **Appendix II & Map 5g**).

5.2.3 Water

Operations on the site will adhere to the guidance in the latest version of the Forest and Water Guidelines e.g. existing drains should be realigned where appropriate to ensure that water is discharged slowly into buffer areas.

5.3 Biodiversity & Heritage

5.3.1 LBAP Priority Habitat & Species

The various LBAP woodland and open priority habitats as well as the various priority species they support will continue to be conserved and developed as per the management detailed in the previous section.

5.3.2 Specimen Trees

To ensure the long-term presence of a similar number of large, veteran and ornamental trees it will be prudent to select existing large, healthy, well-formed and stable semi-mature individual trees as replacement large specimens. Space should be cleared around newly selected specimens them to give them room to mature. Suitable older specimens should be selected for retention into old age as veterans. Young ornamental and exotic trees will be identified and either left to grow in situ or transplanted to more suitable sites for growth or visibility within the landscape. Species that will not regenerate naturally will be replaced by other means (see **Appendix II**).

5.3.3 Invasive Non-Native Species

Rhododendron ponticum - An eradication programme of *Rhododendron ponticum* is in place within affected sites across the district in accordance with the Rhododendron Strategy on the National Forest Estate in Scotland. A programme of control has already been implemented in Callendar Wood where *Rhododendron* has been previously been mechanically mulched, manually cut and had the foliage chemically sprayed. This is being followed up with on-going foliar spraying to remove it from the wood and collaboration with neighbours to tackle bushes in close proximity which if unattended will likely provide the seed to reinvade the site.

Japanese knotweed (*Fallopia japonica*) - An eradication programme of Japanese knotweed is in place within affected sites across the district in accordance with the District Invasive Non-Native Species Plan 2014-2019. Control is initially through stem injection of glyphosate and then a follow up foliar spray or stem inject the next year. The next stage will be to re-cover the affected areas with appropriate species to prevent re-establishment. It is planned to rake and burn the remaining material after the follow up spray and to reseed or plant the ground.

Himalayan balsam (*Impatiens glandulifera*) – Hand pulling of the principal affected area would not be fully effective so foliar chemical spraying of glyphosate will be employed between the months of May – Aug. Any other individual stems scattered elsewhere will be hand pulled and removed from site.

Grey squirrel (*Sciurus carolinensis*) – As Callendar Wood is not within a Red squirrel (*Sciurus vulgaris*) stronghold they are not deemed a threat to this species here and therefore this is not a driver for controlling them. Furthermore the woodland is not being managed primarily as a commercial plantation so likewise this also is not a driver to introduce Grey squirrel control (see **Appendix II**).

5.3.4 Deadwood

It is the aim to utilise natural processes retaining dead, windblown or snapped stems or those created during previous operations. Deadwood can be trees or limbs in the early stage of decomposition, e.g. veterans or dying individual trees. These should be retained wherever possible to create an even mix of standing, fallen or stacked deadwood.

It is the district policy to contribute around 20m³/ha of deadwood averaged across the whole woodland area in each forest block. This aspiration is

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dependent on the site type and long term objectives. At Callendar Wood the vast majority of the area the deadwood potential has been estimated as medium with a small proportion as high therefore the following SLFD policy approach should be adopted:

- Retain veterans, standing & fallen dead stems, windblow and some stumps.
- Consider felling non-native trees (and leaving in situ).

These approaches should be weighed against the health and safety implications in regard to priority visitor zoning areas detailed within the FC Practice Guide Managing Deadwood in Forests & Woodlands and appropriate steps should be taken to balance the approach above with public safety.

5.3.5 Wildlife Management

Callendar Wood has a healthy resident population of peri-urban roe deer which, from thermal imaging counts, is estimated at over 20 deer per 100ha post summer population. For the size of the wood this is an unsustainably high level of deer for the site which is evidently suffering from the effects of over browsing although improvements in regeneration is being seen since active deer management has taken place. The districts Wildlife Management team culls an average of 13 deer every year to keep the deer population at a sustainable level for the benefit of the deer and the wider woodland. Further details on our deer management can be found within the Scottish Lowlands Forest District Deer Management Strategy (in conjunction with the Deer Overview Map).

5.3.6 Heritage

The forest district will continue to conserve features of the designed landscape of the former estate such as the historic carriageways, the stone boundary wall, the water house and the kennels as well as other features of historic significance such as mine marker stones, the historic drainage system and the iron-age hill fort. The district will also continue to work with Callendar Estate to assist with the maintenance of the Forbes family Mausoleum and wall. **Appendix II** and **Maps 5f-g** outlines various maintenance tasks that FES will continue to carry out through the life of the plan as well as several potential aspiration projects such as restoring a view to the Mausoleum from Callendar House.

The district will also ensure the long-term presence of a similar number of ornamental/exotic "specimen" trees to enhance aesthetic interest within wood

and will also aim to retain avenue trees and plan to replace these as the trees senesce.

5.4 Community & Recreation

FES district staff will liaise with the local community to promote and encourage use of the wood and Community Rangers will continue to seek opportunities to develop new and forge existing links with schools, community and user groups to increase awareness and enjoyment of the wood.

5.4.1 Community

Appendix II & Maps 5f-g list the continued maintenance schedule FES will carry out over the life of the plan as well as potential projects in the wood to be explored with the aims of providing a benefit to the wood and in turn a long-term benefit to the community e.g. a community area.

5.4.2 Recreation

Appendix II and **Maps 5f-g** list various maintenance tasks that FES will continue to carry out through the life of the plan as well as several potential aspiration projects e.g. natural play areas. Further information on maintenance of the recreation of the site is detailed within the Callendar Wood Site Maintenance Plan.

5.5 Access

5.5.1 Visitor

The existing access provision for visitors to the wood in terms of their geographic spread and the linkages they provide are sufficient to meet present demand. There are no significant surrounding future developments identified within the local development plan which would require this to be revisited in the near future but if this were to change visitor access would be looked at accordingly. In terms of accessibility and orientation throughout the site, there are no plans to add to the already extensive network of paths but improvements have already been made to various sections of path to upgrade the surface making them more suitable for all abilities. In addition new way-marker posts for the re-named Yew Trail and High Road paths have been installed to provide defined routes for visitors to experience. The district aims to keep making improvements to the paths and signage in and around the wood. **Appendix II** and **Map 5f** detail some general maintenance and potential projects which would improve visitor access to the site.

5.5.2 Management

In terms of management access the tracks within the wood are generally unsuitable for modern timber traffic. Only the short section between the Kemper Avenue entrance and the Kennels would accommodate a timber lorry but even this doesn't have a turning area. The surfaced tracks can accommodate light vehicular travel e.g. FC Vans and small machinery but in general for any larger machinery it would be preferable for this to travel along existing racks within the wood. For operational access having only one main timber haulage access is limiting both in terms of stacking space and excessive extraction distances. Widening the existing Woodend farm track access leading from New Hallglen Rd., relocating the FC gate and creating a new stacking/turning area just within the wood would provide a valuable alternative which would minimise travel within the wood and therefore potential ground disturbance. **Appendix II** and **Map 5f** detail some general maintenance and potential projects which would improve management access to the site.

5.6 Critical Success Factors

The success of this plan will be based on whether the objectives set out in the Management Plan Brief (see **Appendix IV**) are achieved. The table which forms **Appendix V** details how each objective will be appraised, where and when each objective will be monitored; by who and where it will be recorded. This will enable an evaluation of success as part of the mid and end of plan reviews.