Forestry Commission Scotland
Coimisean na Coilltearachd Alba

Planning

Cowal and Trossachs Forest District

Land Management Plan

Glen Lochy North

Cowal and Trossachs Forest District

GLEN LOCHY NORTH

Land Management Plan

Approval date:

Plan Reference No:

Plan Approval Date:

Plan Expiry Date:

CSM 6 Appendix 1b

FOREST ENTERPRISE - Application for Land Management Plan Approvals in Scotland

Forest Enterprise - Property

Forest District:	Cowal & Trossachs
Woodland or property name:	Glen Lochy North
Nearest town, village or locality:	Tyndrum
OS Grid reference:	NN324319
Local Authority district/unitary Authority:	Loch Lomond & The Trossachs National Park

Areas for approval

	Conifer	Broadleaf
Clear felling	50.9ha.	0ha
Selective felling		
Restocking	24.7ha	7.9ha.
New planting (complete appendix 4)		

1. I apply for Land Management Plan approval for the property described above and in the enclosed Land Management Plan.

2. I apply for an opinion under the terms of the Environmental Impact Assessment (Forestry) (Scotland) Regulations 1999 for roads, tracks and quarries as detailed in my application.

3. I confirm that the initial scoping of the plan was carried out with FC staff on 5th December 2014.

4. I confirm that the proposals contained in this plan comply with the UK Forestry Standard.

5. I confirm that the scoping, carried out and documented in the Consultation Record attached, incorporated those stakeholders which the FC agreed must be included.

6. I confirm that consultation and scoping has been carried out with all relevant stakeholders over the content of the of the land management plan. Consideration of all of the issues raised by stakeholders has been included in the process of plan preparation and the outcome recorded on the attached consultation record. I confirm that we have informed all stakeholders about the extent to which we have been able to address their concerns and, where it has not been possible to fully address their concerns, we have reminded them of the opportunity to make further comment during the public consultation process.

7. I undertake to obtain any permissions necessary for the implementation of the approved Plan.

Signed …… Signed……

Forest District Manager Conservator

District …Cowal & Trossachs FD Conservancy……

Date 4th July 2016 **Date of Approval**……

Date approval ends ……..

Environmental Impact Assessment

Scheme No 032/03/07

Determination Enquiry Form

Complete this form to find out if you need consent, from the Forestry Commission (under the EIA Regulations 1999), to carry out your proposed work.

Section 1

Please tick the box to indicate the type of work you are proposing to carry out. Give the area in hectares and where appropriate the percentage of conifers and broadleaves.

Proposed work:							
Afforestation	☐	ha	BL%	Con%	Forest roads	☒	1.25 ha
Deforestation	☐	ha	BL%	Con%	Forest quarry	☐	ha

Location and district: Cowal and Trossachs Forest District

Please attach map(s) showing the boundary of the proposed work and also give details of the operations.

Section 2

Property details

Property name: Glen Lochy North

Grid Ref: *(eg AB 123/789)* NN324319

Local authority: LLTNPA

Nearest town: Tyndrum

Section 3

Applicant's category: *(please put a cross in one box)*

PE	Personal occupier	☐	PU	Public ownership	☒
BU	Business occupier	☐	OT	Other	☐
VO	Voluntary organisation	☐	CT	Crofting tenant	☐

Section 4

Applicant's type: *(please put a cross in one box)*

LS	Lessee	☐	TE	Tenant	☐	OW	Owner ☒	TR	Trust ☐

Section 5

Your agent or woodland manager's details

Title (Mr, Mrs, Ms, etc): Initials: Surname:

Organisation:

Address:

Postcode:

Tel: Mobile:

Fax: E-mail:

Is this the address for correspondence? ☐ YES ☐ NO

Forestry Commission

Section 6

Applicant's details

Title (Mr, Mrs, Ms, etc): Mr Initials: J Surname: Hair

Organisation: Forestry Commission Scotland

Position (eg partner, director etc) Planning Manager

Address: Cowal and Trossachs Forest District

Aberfoyle

Stirlingshire Postcode: FK8 3UX

Tel: 0300 067 6600 Mobile:

Fax: E-mail: john.hair@forestry.gsi.gov.uk

Is this the address for correspondence? [X] YES [ ] NO

Section 7

Sensitive Areas: Give the area of the proposal that is covered by any of the following designations:

Sensitive Area as listed in "Schedule 2" of the 1999 EIA Regulations	Area (ha)
a. Sites of Special Scientific Interest (SSSI) or Proposed Sites of Special Scientific Interest (PSSSI)	0.00
b. SSSI's with a Nature Conservation Order (Section 29 of the Wildlife and Countryside Act 1981)	0.00
c. National Park (NP)	1.25
d. The Broads	0.00
e. World Heritage Site	0.00
f. Scheduled Ancient Monument (SAM)	0.00
g. Area of Outstanding Natural Beauty (AONB)	0.00
h. "Natura 2000" site - *(European network of special areas of conservation and special protection areas under the Wild Birds Directive)*	0.00

Forestry Commission

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Summary of Proposals

The Glen Lochy North Land Management Plan (LMP) draws on the key themes of the Scottish Forestry Strategy (SFS) (2006), Forest Enterprise Scotland's Strategic Directions and Cowal & Trossachs Forest District's Strategic Plan. It consists of a single block of woodland, approximately 200ha in size, immediately north of the village of Tyndrum in the county of Stirling.

The objectives of the new plan, which were developed following internal and external consultation, are summarised below and emphasise the importance of landscape. Though the area of productive woodland will be reduced, it will remain a key consideration.

1. Manage the forest for timber production. Clearfelling, before onset of windblow, and replanting will be the predominant management technique. Timber production will be concentrated above the wayleave which runs parallel with the A82 trunk road.

2. At restocking Sitka spruce will be the principal species of choice. ESC principles will be used to guide choice and diversify species structure where site conditions are favourable. Up to date guidance on the effects of climate change will be taken into account.

3. A diverse age structure will be developed in order to maintain resilience and provide visual diversity.

4. The forest block is visually important being viewed from the heavily used A82, West Highland Way and Tyndrum. Coupe structure and restocking will reflect this and aim to improve the visual appearance of the woodland.

5. Mixed broadleaved and coniferous woodland (native and non-native) will be established on visually prominent sites facing Tyndrum and adjacent to the A82 trunk road. Where feasible such woodland will be managed productively.

6. A forest habitat network (FHN) will be established and managed for conservation and landscape interest.

7. The upper tree line will be reshaped and the possibility of extending this will be considered if site conditions allow.

8. There is limited biodiversity at present but opportunities will be taken to enhance and protect existing habitats.

9. There are no known features of archaeological interest however we will record and protect any new discoveries made during operations.

10. An appropriate deer management regime will be implemented to protect planted trees, encourage natural regeneration of native species and improve the condition of degraded open ground.

11. Forest and water guidelines will be followed during operations. Both public and private water supplies and riparian zones will be managed to maintain and improve water quality, increase biodiversity and mitigate against erosion and flooding.

1.0 Introduction:

1.1 Setting and context

The Glen Lochy North Land Management Plan area lies immediately north of the village of Tyndrum in the county of Stirling. The eastern and southern boundaries are the A82 and A85 trunk roads. Immediately to the west is woodland and open ground managed by West Argyll Forest District and the northern boundary is the county boundary with Highland. The block is entirely within Loch Lomond and the Trossachs National Park. (Figure 1.1). The setting is one of glens and mountains with grassy slopes rising steeply to high rounded summits. There are other woodlands on the slopes to the east of Tyndrum, the Cononish Glen and on both sides of Glen Lochy to the west. The A82 and A85 are key routes for both business and tourists to the Highlands and Islands and Tyndrum is an important and heavily used stopping point.

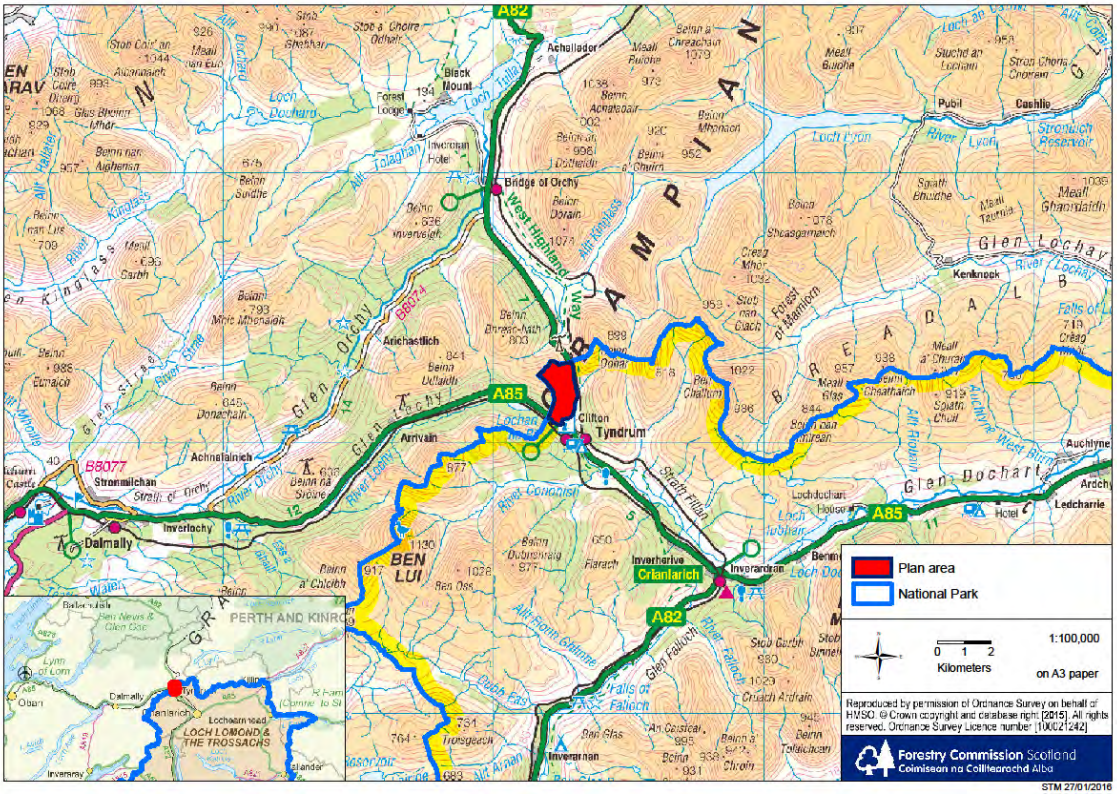

Figure 1.1 Glen Lochy North: location

1.2 History of the plan

The plan area is about 200ha and it was previously part of a much larger unit covering 1082ha at the eastern end of Glen Lochy, managed by Lorne Forest District. Following re-organisation of Forest Districts Glen Lochy North became the responsibility of Cowal and Trossachs Forest District because it is within Loch Lomond and The Trossachs National Park. Until the late 1960s the area had been open ground, all the planting taking place in 1968 and 1969. The main species was Sitka spruce with smaller areas of lodgepole pine and Japanese larch. About 150ha were planted, the upper, more exposed areas being left open. Only one coupe has been felled since that first planting and trees have not been re-established. This is the second plan for the area and continues a general aspiration to maintain production whilst improving the environmental and landscape features.

2.0 Analysis of previous plan

2.1 Aims of previous plan and achievements

The objectives of the previous plan are incorporated into the aims of the larger management unit from which it was split off. These were to focus on sustainable timber production whilst taking account of wildlife habitats, landscape, water resources and archaeology. Recreation was not given a high priority.

The previous plan envisaged a programme of phased felling covering a period of 30 years. The first coupe was to be felled in 2009. Coupes were to be designed to be sympathetic to the landscape. A new road was proposed to access the northern parts of the forest but there were no plans for formal recreation.

To date although about half of the proposed roadline has been felled, only a short section has been constructed. It is not yet possible to access the more northerly coupes and only one coupe has been felled, and this is not yet restocked. In general, however, the proposals could still be achieved through judicious re-phasing of the felling programme.

2.2 How previous plan relates to today's objectives

The broad objectives of the previous plan will be retained in the new land management plan. Sustainable timber production remains a key objective,

concentrating on Sitka spruce. Broadleaves and Scots pine will be used in landscape sensitive parts of the woodland and to enhance bio-diversity; these species will be treated as productive stands where feasible. The management of open ground will be taken into account and the shape and position of the upper tree line reviewed. The area designated as pine retention will also be reviewed.

The zones map illustrates the relative importance of the main objectives throughout the area, though there is a degree of overlap.

3.0 Background information

3.1 Physical site factors

3.1.1 Geology Soils and Landform

The Land Management Plan Area lies to the north of the Highland Boundary Fault and is underlain by older metamorphic rocks derived from sandstones. These rocks are hard, break down only slowly and are angled down in an easterly direction. There are thin and discontinuous superficial deposits of glacial or fluvio-glacial origin largely derived the solid geology. These deposits typically consist of poorly sorted sands and gravels and provide an uneven, hummocky topography on lower slopes. On steeper slopes and at higher elevations where the superficial deposits are less thick the underlying bedrock has more influence on topography; the bedrock is exposed in places. The glacial deposits are deeply incised by burns, in places, and there is evidence of occasional small slips associated with these. Elevation ranges from 250m at the junction of the A82/A85 to 653m at the summit of Beinn Bheag.

There is no detailed soil survey for this plan area but the James Hutton Institute 250000 map indicates the presence of peaty iron pan soils and peaty gleys with areas of deep peat and peaty shallow soils. Field observations confirm this general association with intergrade and iron pan soils more frequent at lower elevations, on steeper sections of the hummocky moraines. Although there are some better drained soils on steeper slopes, even here peaty gleys tend to dominate and these are often shallow to bedrock. At the highest elevations rankers and alpine soils become more frequent. On flatter sections of slopes and between hummocks small areas of deep peat occur. These soil types suggest water regimes towards the wetter end of the spectrum and poor to very poor soil nutrient regimes.

Table 3.1 summarises the nutrient and moisture regimes of the main soil types. The brown earths are likely to be towards the poorer end of the nutrient spectrum, only flushed surface water gleys are likely to be medium in terms of nutrient status. Apart from areas of true podzols, moisture availability is unlikely to be a limiting factor in the plan area.

Soil type	Soil moisture	Soil nutrient
Brown earth	Slightly dry to moist	Poor to medium
Upland brown earth	Fresh to moist	Poor
Intergrade	Moist	Poor to very poor
Iron pan soil	Very moist	Very poor
Surface water gley	Very moist to wet	Poor to medium
Peaty gley	Wet to very wet	Very poor to poor
Flushed peat	Very wet	Poor to medium
Unflushed peat	Very wet	Very poor

Table 3.1 Glen Lochy North: important soil properties

3.1.2 Water

The burns in the plan area drain into the River Fillan, which is part of the Tay River catchment. They are steep and often incised into the superficial glacial deposits. Sub-surface flow seems to be an important feature of the steeper slopes and surface water can appear in flatter areas. There is a private water supply at the western end of the forest block.

3.1.3 Climate

Using the measures of warmth and wetness defined in the Ecological Site Classification (ESC, see Forestry Commission Bulletin 124) the Glen Lochy North LMP area is categorized as cool and wet, conditions becoming more extreme at higher elevations. Average annual rainfall is about 2750mm, about 65% of this falling in the winter months. Most of the area is at least slightly exposed and above the present tree line it is highly exposed. The south western edge and northern boundary are more exposed than other parts of the block at similar elevations.

3.1.4 Future climate

Predicting the impact of future climate change presents one of the biggest challenges in forest planning. Analysis carried out by Forest Research indicates an overall increase in average temperatures with warmer summers and milder winters (Figure 3.1). There will be regional variation in the future rainfall pattern and distribution, with a predicted decrease in summer rainfall in the east but a predicted increase in the west of the country. This will lead to more frequent drought in the east but a reduction in moisture deficit in the west (Figure 3.1).

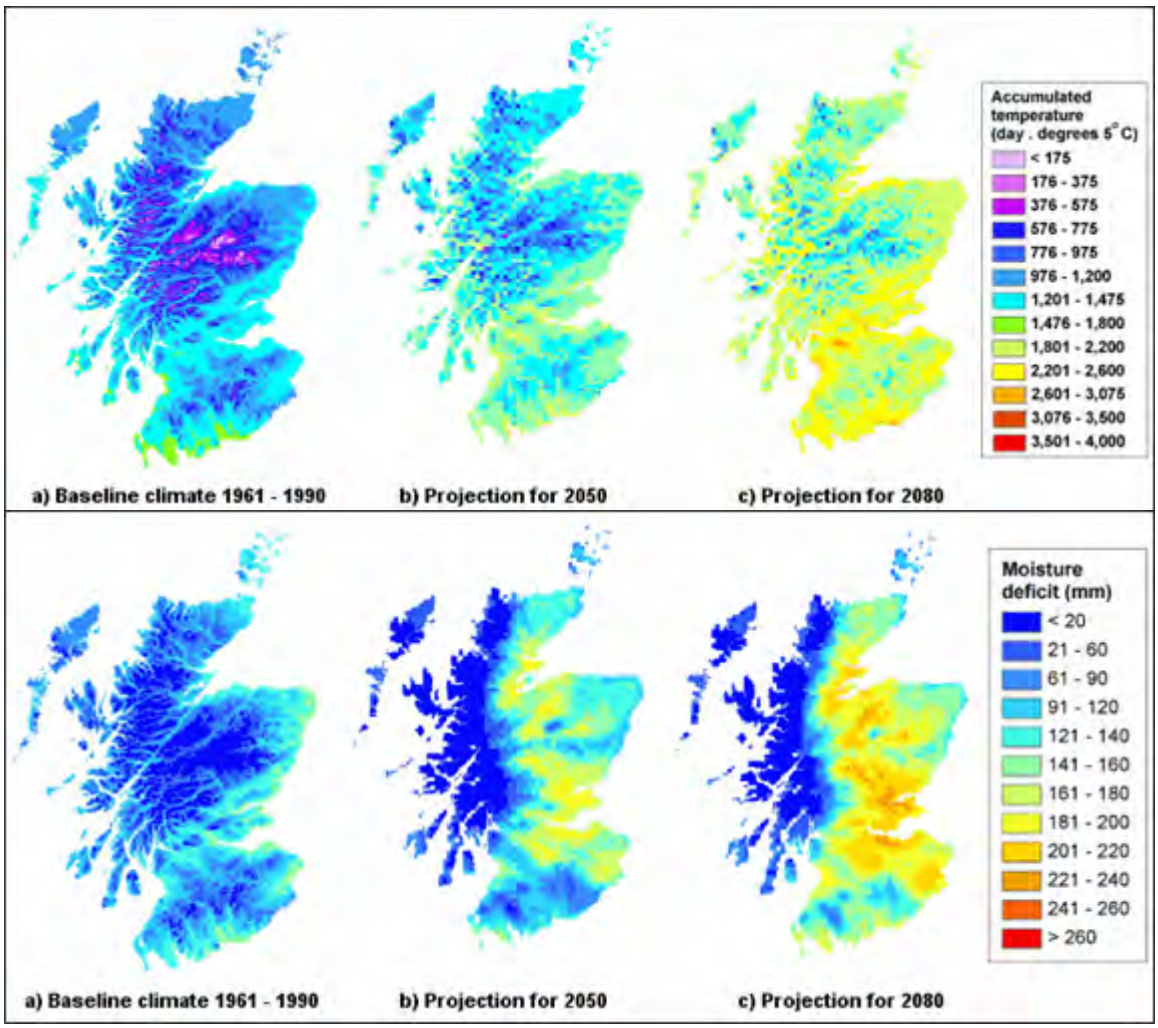

Figure 3.1 Predicted future warmth (top) and moisture deficit (bottom) – high emissions scenario

There is less confidence in predicting changes in other climatic parameters such as windiness and extreme winter cold or summer heat. However, there is a general belief that the number of frost days will decrease and that the incidence and severity of extreme events (e.g. gales and heavy rain) will increase.

Data for the Tyndrum area suggest an increase in accumulated temperature of about 25% by 2050, compared to baseline 1960 – 1990 data. However, for high emission scenarios the increase could be by as much as 85% by 2080. A slight decrease in annual precipitation is indicated; a 20% decrease in summer rainfall is compensated for by a predicted rise of about 10% in winter precipitation. Moisture deficit is predicted to fall by up to 30%. Potentially there could be an increase in growth rate in all tree species and a wider range of species become suitable, where exposure is not the limiting factor.

3.2 Biodiversity and environmental designations

There is limited bio-diversity in the LMP area. Of the total area of 201ha about 95ha are currently open ground, 65ha of which are overgrazed and degraded hill ground above 450m elevation. A further 15ha is felled ground awaiting restocking. There are small areas of wet/marshy ground but these are of currently poor quality as habitats. The woodland areas, are dominated by Sitka spruce, the only other species of note being Lodgepole pine and Japanese larch. There are no ancient woodland sites and no environmental designations.

Squirrels are known to be present but there is little for them to feed on. Golden eagles are likely to range over the open ground but do not nest in the immediate area. There are no other bird or mammal species of conservation concern. Red deer occur in the block. The burns are part of the upper catchment of the feed Tay River system, which is an important salmon fishery.

3.3 The existing forest

3.3.1 Species, age structure and yield class

Table 3.2 shows the species distribution for the plan area. Sitka spruce is the dominant species making up just over 40% of the plan area and over 80% of the woodland area. Larch and Lodgepole pine each account for just under 10% of the wooded area. The area of open ground in table 3.2 includes the felled areas awaiting restocking noted in section 3.2.

Species	Area ha	Area %
Sitka spruce	86.8	43.2
Larch	10.5	5.2
Lodgepole pine	8.9	4.4
Open	94.9	47.2
Total	**201.1**	**100**

Table 3.2 Species diversity, Glen Lochy North, 2015

All the trees are in the 41-61 age class having been planted in either 1968 or 1969.

Yield class, (productivity) is measured as maximum mean annual volume increment ($m^3yr^{-1}ha^{-1}$) and is only moderate in Glen Lochy North. For Sitka spruce yield classes of 16 – 20 might be achieved on better sites, at lower elevations, but growth at higher elevations is much reduced. At all elevations there are frequent areas of very slow growing trees (check) due to waterlogging. Japanese larch grows moderately well at lower elevations but there are groups of severely stunted trees at the upper tree line. Lodgepole pine has generally performed poorly.

3.3.2 Access

Currently there is only one road access into the woodland and this through the property managed by West Argyll Forest District onto the A85. The forest road extends only 350m into the plan area though this will be extended north for a further 1800m. There is a single ATV track, which can be accessed through a gate by the A82 which climbs steeply through the woods, ending soon after it reaches the open hill ground.

3.3.3 Potential for continuous cover forestry

Climate and soil conditions mean there is limited potential for continuous cover forestry. There is scope for establishing permanent native woodland for landscape, environment and amenity.

3.3.4 Current and potential markets

Although timber prices fluctuate, there is continued demand for softwood timber of all dimensions and it is expected that there will continue to be a ready market for spruce. Future markets for hardwood and other conifer species are uncertain but expectations are that these will develop over time; in particular the demand for biomass for the woodfuel market is expected to grow.

3.4 Landscape and landuse

3.4.1 Visibility, landscape character and value

Glen Lochy North is on the northern boundary of Loch Lomond and The Trossachs National Park, occupying a prominent position above the A82 at Tyndrum. The woodlands are visible from Tyndrum, major road and rail routes and the popular West Highland Way. The general character of the high hills and steep sided glens is described by Scottish Natural Heritage in a Landscape Character Assessment report for Loch Lomond and The Trossachs National Park (LLTNP).

3.4.2 Neighbouring land use

There are other large blocks of commercial forestry adjacent to the plan area; the open hill ground is largely used for rough grazing. There is deer stalking on nearby estates. Tyndrum is an important stopping point for tourists.

3.5 Social factors

3.5.1 Recreation

There are no formal recreation facilities in the plan area. It is however, an important interactive zone viewed from the A82, West Highland Way and the popular tourist destination of Tyndrum.

3.5.2 Community

Although there is no direct interest in the Glen Lochy North block Strathfillan Community Development Trust (SCDT) are seeking to renew an expired agreement to manage an area of FES land immediately to the west of the village of Tyndrum. The Development Trust already own an area of land near Dalrigh, which was previously part of the National Forest Estate, and this proposal demonstrates the communities' continuing interest in the management of local woodlands. It is possible that opportunities for involvement in management of Glen Lochy North may arise in the future.

3.5.3 Heritage

There are no known archaeological features in the plan area.

3.6 Statutory requirements and key external policies

The key policy documents influencing the LMP are the UK Woodland Assurance Standard, the UK Forestry Standard (3rd Edition), the Scottish Forestry Strategy, the LLTNP Partnership Plan 2012-2017 and the LLTNP Landscape Character Assessment.

4.0 Analysis and Concept

The analysis and concept map summarises the main issues and aspirations for the LMP area.

4.1 Analysis

- Even aged commercial conifers are dominated by Sitka spruce, increasingly at risk of wind damage and with limited ecological and visual diversity.
- The dense monoculture woodland is visually prominent and overlooks Tyndrum, a major tourist gateway to the Highlands and Islands. There are important road and rail junctions and the West Highland Way attracts around 30,000 walkers annually.
- Relatively straight woodland edges, parallel lines of infrastructure and steep straight burns could lead to “chequerboard” effect without careful coupe design.
- Climatic and soil conditions restrict species suitability, even in a changing climate.
- Stands of larch are in visually prominent positions, often growing poorly, windblown and potentially at risk to Phytophthora ramorum disease.
- The woodland is in the upper reaches of the Tay Catchment, which has an important salmon fishery and is used for water abstraction.
- Much of the block has slopes between 5^0 and 20^0 adjacent to the A82 with occasional evidence of minor erosion.

4.2 Concepts of the plan

The main objectives of the plan will be to maintain an element of timber production whilst diversifying species and age structure and improving ecological and visual diversity.

- Establish a coupe structure that will progressively increase the age and species diversity whilst minimising the risk of future wind damage.
- Restock the southern part of the area early in the plan period with a mixture of broadleaves and conifers at productive and non-productive spacing. Explore options for restocking and diversification of species along the eastern edge visible from the West Highland Way.
- Design coupes to avoid straight lines with perpendicular intersections of man-made and natural features, where feasible. Lower and scallop upper tree line and forest edges to provide organic shapes which are sympathetic to natural features. At restocking incorporate buffer zones to further break up pattern of dense conifers.
- Use decision support tools and knowledge of site conditions to guide species choice, using a range of native and non-native species according to site conditions. Establish effective deer control where “soft” species are planted.
- Plan coupes to allow early removal of larch. At restocking use suitable alternative species to larch.
- Follow Forest and Water Guidelines during all operations.
- As part of the planning process carry out a Slope Stability and Risk (STAR) assessment.

5.0 Land Management Plan Proposals

5.1 Management

Management will be guided by the key objectives of the plan. Broad objectives are illustrated in the management zones map though it should be stressed that there can be overlap between zones. The main technique will be clearfelling aiming to complete felling of the first rotation crops within the next 20 – 25 years.

Coupes for which approval to fell is being sought are shown in the management map and are listed in table 5.3. Approximately 10.4ha of coupe 51007 were felled in 2010.

All harvesting operations will be carried out in accordance with the UK Forestry Standard Guidelines, Forests and Water (5th edition).

The coupes have been designed to remove wind damaged stands and those with Japanese larch as early as possible. Most of the latter is in a strip between the powerlines and the A82 trunk road and therefore the proposal is to remove all of this within the period of the plan. The actual, and even aged, nature of the forest means there is increasing risk of further wind damage to standing trees. To help minimise risk a balance has been sought between coupe size, shape and time of felling. Second phase coupes have been timed to allow new planting to become established before they are felled. However, these coupes may be brought forward if windblow or Phytophthora ramorum disease becomes problematic. They will thus be treated as extensions to phase 1 coupes. Attempts have also been made to avoid straight edges where this is practically feasible. Despite the steep nature of the hillsides much of the block can be accessed by harvester/forwarder. Final choice of harvesting method will be determined at work planning stage and take into account both cost of felling and landscape considerations.

5.2 Future habitats and species

The future habitats map shows the restocking proposals of the plan. Further detail is given in Table 5.3. Timber objectives will be met by continuing to use Sitka spruce but opportunities will also be taken to increase the percentage of other productive conifers and broadleaved species, the latter two concentrated in coupes 51007 and 51010. The upper tree line will be lowered in places to provide a more irregular boundary with the open hill ground. Similarly the northern boundary has been reshaped and will be planted with broadleaved species to soften the edge. Both here and, on the

western boundary, the pattern will complement neighbours' plans. Buffers along larger burns and between individual restock coupes will provide an opportunity for the extension of open space or native woodland. The aspiration for the largely non-productive ground between the forest road and A82 is for a mix of native woodland and open space. The preferred method of tree establishment will be natural regeneration but the available seed source is limited; planting will therefore be considered as an option. Work will, in part, be determined by available resources and more detailed assessment of options will take place following clearfelling. It is expected that there will be Sitka spruce natural regeneration in some of the buffers between restock coupes and this will be managed within certain limits. An adaptive approach to management will be taken in these circumstances and the amount of Sitka, or other species, that is accepted will be determined on a site by site basis (see section 5.7).

5.3 Restructuring

The felling programme begins the process of restructuring the forest. Coupe size is relatively large for the size of the woodland but given the current structure there seems little alternative to the relatively short time scale for completion of first rotation felling. Indeed, if windblow becomes a problem, earlier completion might become necessary. Adjacency issues have been avoided as far as possible and future stability will be achieved by replanting Sitka spruce in discrete stands with wide buffers between them. The tree line will also be lowered and further diversity achieved by using a limited number of alternative species to Sitka spruce.

5.4 Future management

Table 5.1 indicates net felling area and volume figures for the plan area. These values are approximate and coupes will be surveyed to provide more precise figures prior to felling.

Phase	Area (ha)	Volume (m^3)
1	36.4	15350
2	14.5	8100
	50.9	23450

Table 5.1 Proposed felling

Table 5.2 summarises the establishment proposals for the plan area. The figures include approximately 10.4ha of previously felled ground that has not yet been restocked, accounting for the difference between area felled and restocked.

	Mixed broadleaves	Mixed conifer	Open	Totals
Phase 1	7.3	16.7	22.8	46.8
Phase 2	0.6	7.9	6.0	14.5
Totals	7.9	24.6	28.8	61.3

Table 5.2 Proposed establishment

Where production is the key objective conifers will be planted at densities of about 2700 stems per hectare and broadleaves in the region of 3500.

Target densities for native woodland regeneration will vary depending on site objectives. Regeneration will be monitored and future management reviewed depending on the results of this. Re-establishment should be achieved within ten years of felling.

5.5 Species tables

Table 5.3 and Figure 5.1 indicate the change in relative species composition between 2017 and 2047. The figures are expressed as a percentage of the forested area, and do not include permanent and temporary open space. By 2047 all the first rotation stands will have been felled and restocked and the figures shown are an indication of the long term balance between the different species. The figures indicate a marked reduction in the percentage of Sitka spruce. This is largely due to the lowering of the tree line and creation of wider buffers beside burns and between coupes. The loss of Japanese larch and Lodgepole pine is compensated by planting mixed conifers and broadleaves.

5.6 Age structure

Table 5.4 and Figure 5.2 show the change in relative age structure between 2017 and 2047. The extreme even aged nature of the woodlands in 2017 is clearly evident. Because the single coupe that has been felled has not yet been restocked or naturally regenerated the cover of younger trees is negligible. By 2047 all first rotation stands will have been felled and restocked and there is a better age structure developing. There may be options to retain some stands for a longer period, which would further improve age-class distribution. Further diversification can be achieved in the next series of rotations and older age classes will become better represented.

Species	2017	2027	2037	2047
Sitka spruce	81.8	75.8	68.8	64.3
Japanese larch	9.8	2.4	0.0	0.0
Lodgepole pine	8.4	3.6	0.4	0.0
Mixed conifer	0.0	4.1	8.0	8.7
Mixed broadleaves	0.0	10.0	15.3	17.6
Scots pine	0.0	4.1	7.5	9.4
	100.0	100.0	100.0	100.0

Table 5.3 Change in species diversity over time in Glen Lochy North (percent planted area)

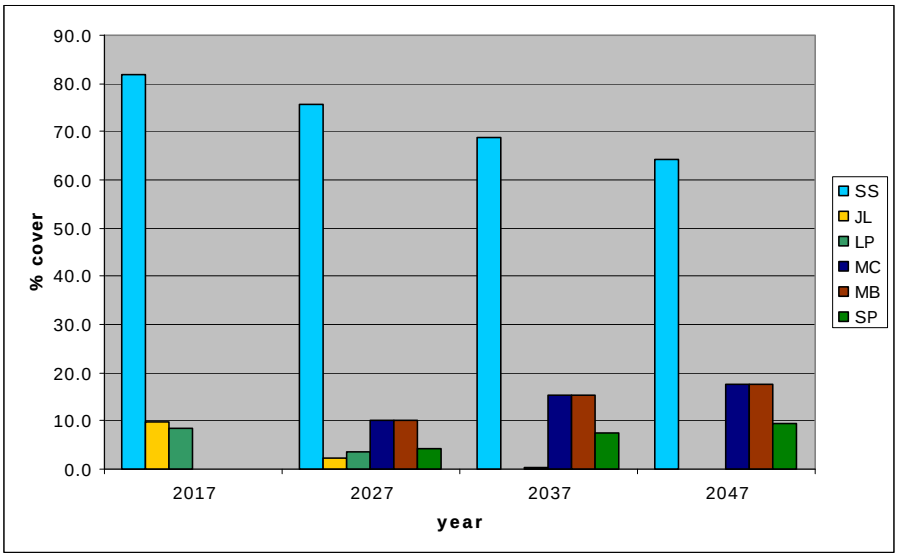

Figure 5.1 Change in species diversity over time in Glen Lochy North (percent planted area)

Age Class	2005	2015	2025	2035
0-10	0.0	35.9	48.7	20.6
11-20	0.0	0.0	35.6	41.0
21-40	0.0	0.0	0.0	38.4
41-60	100.0	64.1	0.0	0.0
60+	0.0	0.0	15.7	0.0
	100.0	100.0	100.0	100.0

Table 5.4 Age structure in Glen Lochy North (percent of forested area)

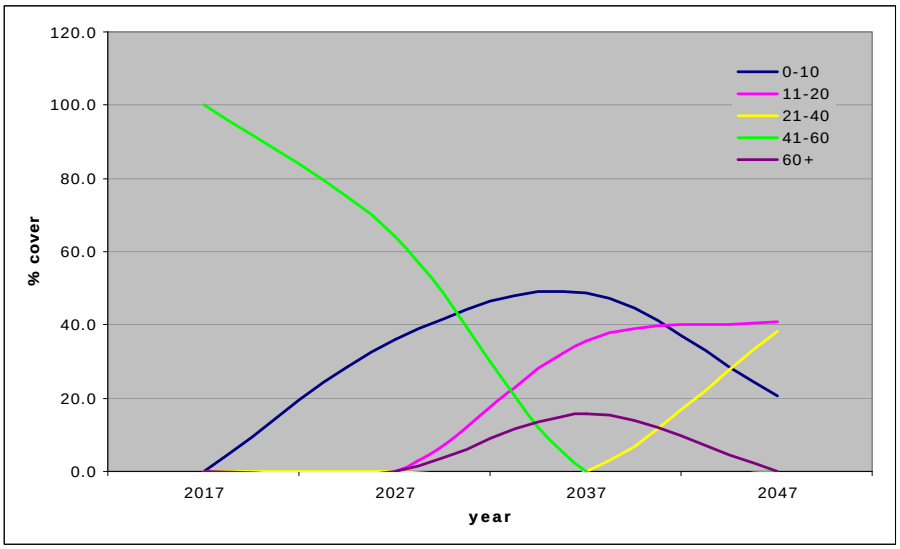

Figure 5.2 Age structure in Glen Lochy North (percent forested area)

5.7 Management of open land

	2017	2027	2037	2047
Forest	52.7	42.3	35.8	33.3
Open	47.3	57.7	64.2	66.7

Table 5.5 Relative area of open ground and forest (%).

Table 5.5 summarises the relative distribution of open ground to forest in 10 year intervals between 2017 and 2047. The figures include transient open space where felled coupes have not been restocked, and areas designated “successional” that might partly fill with natural regeneration. In addition natural regeneration will be accepted in designated open areas, as long as canopy cover does not exceed 20%. Some of the open space will be taken up by the roadline and a buffer zone around this will be kept clear of dense tree growth. Permanent wayleaves make up a moderate percentage of the area and these will be managed in association with the relevant utility company. Open land is also incorporated into most of the restocking coupes though this is not identified specifically in the plan. Some areas may be kept permanently open for either landscape or bio-diversity reasons but apart from priority habitats the amount and location of open areas are likely to vary.

5.8 Deer management

Successful establishment of broadleaves and softer conifers will require deer control in order to keep browsing to a minimum. Both shooting and fencing are options though there are problems with the former adjacent to the A82. Fencing is the preferred option but there is short term uncertainty over the availability of resources. If resources are limited then options will be reviewed and may include delayed planting. An added benefit of deer control will be the improvement of open ground habitats.

5.9 Access

The planned road extension is shown on the roads map. This has already been the subject of an EIA determination request. An EIA is not required for this extension.

A number of ramps will be required to enable harvesting machinery to access felling coupes. The precise location of these will be determined during operational planning but the expectation is that there will be one ramp for approximately 100m of coupe/road interface. Ramps will be approximately 3m wide and generally less than 20m long; they will not be treated as permanent features. In addition about 5250m of ATV tracks will be required to facilitate silvicultural operations and deer management on coupes to be restocked. These tracks will be approximately 2m wide and there will be a minimum amount of disturbance when they are being constructed. They will not be treated as permanent features and will be allowed to grass over once restocking is complete. Indicative positions of the tracks are shown in the roads and quarries map. Final position will be within ± 100m of the indicated positions and the nominal area amounts to 1.05ha. An EIA determination form for tracks is to be found at the front of this document. A written request can be found in appendix V and a summary in Appendix VI.

The roads and tracks map indicates access points and haulage routes in and out of the woodlands, with approximate volumes. Timber will be brought to the A85 via the forest road running through West Argyll Forest District to a point approximately 2 miles into Argyll and Bute Council area.

Appendix I: Land Management Plan Consultation Record

Consultee	Date contacted	Date response received	Issue raised	Forest District Response
Forestry Commission Scotland	16/03/15			
Loch Lomond and The Trossachs National Park	November 2014	Attended brief meeting 05/12/14	Noted importance of WHW and A82 and visual impact of woodlands. Also importance of BL/riparian linkages Would like to see consideration of low density woodland expansion at upper edge of current treeline and noted importance of habitat linkages. This could benefit species such as Black grouse. Can net loss of SS be minimised? Diversification on the "nose" could include non-native species and should incorporate open space. Consider introducing Caledonian pine with potential links to refugia to north and south.	Felling and restocking coupes will be designed to improve visual appearance of the woods. Habitat will be an important element of the new plan. Production will be an important objective and the amount of SS will be balanced with other objectives. Restocking on the nose will be a mix of productive and non-productive woodland and open space. Caledonian pine will be among the species considered at restocking.
SEPA	16/03/15	19/03/15	Ensure that the UK Forest Standard and related Guidelines are being adhered to.	FES will follow all relevant guidelines.
SSE	16/03/15	no response		
RSPB	16/03/15	20/03/15	No comments to make.	
Strathfillan Community Council	11/02/15	17/03/15	No particular issues raised and no objections were raised to the felling of woodland north of Tyndrum at the March meeting of the Strathfillan	

			Community Council	
Mountaineering Council of Scotland	16/03/15	26/03/15	Noted that the woodlands act as a backdrop to Tyndrum when approached from the south. Would like to see a more diverse species mix, with an increased proportion of Scots pine and native broadleaves. Also a softening of the upper and northern edges of the forest. Would like to see improved access through the forest to the open hill ground above.	FES will examine at opportunities to diversify species and for redesign of edges to improve visual diversity. FES will consider options for improved access.
Scottish Water	16/03/15	24/03/15	There are water abstraction points in the Tay system, the nearest of which is at Killin 27km downstream from the woodlands. Follow Forest and Water Guidelines and report any incidents that occur during operations. The presence of Scottish Water Assets was not indicated but FES are asked to confirm presence from SW Asset Providers. List of precautions provided.	FES will follow Forest and Water Guidelines. Incidents will be reported. FES will consult with Scottish Water at operation stage if assets are known to be present. Precautions will also be followed.
Tay District Salmon Fisheries Board	16/03/15	No response received		
Friends of Loch Lomond and the Trossachs	16/03/15	No response received.		
West of Scotland Archaeological Service	16/03/15	No response received		
West Argyll forest	16/03/15	18/09/15	No major issues regarding design at	FES will continue to liaise with

District			boundary.	West Argyll Forest District with design and operations.
Transport Scotland	16/03/15	no response received		
SNH	16/03/15	no response received		
CONFOR	16/03/15	no response received		

Appendix II. Scoping Record

Glen Lochy North Land Management Plan
Record of scoping exercise carried out by email in February 2015

A number of stakeholders were contacted by email in March 2015 and the responses received are summarised in Appendix I.

Strathfillan Community Council were also contacted by telephone in February 2015.

The Loch Lomond and the Trossachs National Park were invited to attend the internal consultation meeting held on 5th December 2014.

In addition a telephone conversation was held with Mr Phil Thompson who was working on a cyclepath project for the Loch Lomond and Trossachs Countryside Trust.

Correspondence was also received referring to strategic deer management issues in the wider area.

Mr Miller Harris, who manages Auch and Invergaunan estates to the north of the LMP area, requested draft plans of the LMP area. He confirmed that restocking proposals were in line with those of the neighbouring estate.

NB: All forests managed by FCS are certified under the UK Woodland Assurance Scheme (UKWAS), which requires forests to be managed sustainably. The UKWAS is part of the Forest Stewardship Council (FSC) scheme, which allows timber sourced from certified forests to carry the FSC label. Callander FDP will incorporate the various requirements of UKWAS within its proposals.

Appendix III. Land Management Plan Brief

The Glen Lochy North Land Management Plan (LMP) draws on the key themes of the Scottish Forestry Strategy (SFS) (2006), Forest Enterprise Scotland's Strategic Directions and Cowal & Trossachs Forest District's Strategic Plan.

The objectives of the new plan, which were developed following internal and external consultation, are summarised below and emphasise the importance of landscape. Though the area of productive woodland will be reduced it will remain a key consideration.

1. Manage the forest for timber production. Clearfelling, before onset of windblow, and replanting will be the predominant management technique. Timber production will be concentrated above the way leave which runs parallel with the A82 trunk road.
2. At restocking Sitka spruce will be the principal species of choice. ESC principles will be used to guide choice and diversify species structure where site conditions are favourable. Up to date guidance on the effects of climate change will be taken into account.

3. A diverse age structure will be developed in order to maintain resilience and provide visual diversity.

4. The forest block is visually important being viewed from the heavily used A82, West Highland Way and Tyndrum. Coupe structure and restocking will reflect this and aim to improve the visual appearance of the woodland.

5. Mixed broadleaved and coniferous woodland (native and non-native) will be established on visually prominent sites facing Tyndrum and adjacent to the A82 trunk road. Where feasible such woodland will be managed productively.

6. A forest habitat network (FHN) will be established and managed for conservation and landscape interest.

7. The upper tree line will be reshaped and the possibility of extending this will be considered if site conditions allow.

8. There is limited biodiversity at present but opportunities will be taken to enhance and protect existing habitats.

9. There are no known features of archaeological interest however we will record and protect any new discoveries made during operations.

10. An appropriate deer management regime will be implemented to protect planted stock, encourage natural regeneration of native species and improve the condition of degraded open ground.

11. Forest and water guidelines will be followed during operations. Both public and private water supplies water supplies and riparian zones managed to maintain and improve water quality, increase biodiversity and mitigate against erosion and flooding.

Appendix IV: Tolerance Table.

	Adjustment to felling coupe boundaries	Timing of restocking	Change to species (including boundaries)	Windthrow response	Changes to road lines
FC Approval not normally required	Up to 1ha or 10% of coupe - whichever is less	For productive species, up to 3 planting seasons after felling Up to 10 planting seasons for natural regeneration	Change within species group i.e. diverse conifers; broadleaves; Sitka spruce. Non native conifers in native woodland areas and designated open space up to 400 stems/ha. <20% increase in area of Sitka spruce	Up to 2ha as a single unit with >50%windblow	
Approval by exchange of letters and map	1ha to 5ha or 20% of coupe - whichever is less	For productive species, 3 – 5 years after felling	>20% increase in area of Sitka spruce	2ha to 20ha as a single unit with >50% windblow	Additional felling of trees not agreed in plan Departures of >60m in either direction from centre line of road
Approval by formal plan amendment	> 5ha or 10% of coupe	For productive species, over 5 planting seasons after felling	Change from specified native species Change between species groups	>20ha as a single unit	As above, depending on sensitivity

Appendix V. EIA Determination request

Glen Lochy North LMP –roads, tracks and ramps

This is a request for an EIA determination for works covering construction of roads, tracks and ramps in Glen Lochy North LMP area. The request covers proposals for the full ten year period of the plan which will offer some flexibility with the work programme without the necessity of having to re-submit a determination. Any work to be carried out in the second half of the plan period will be preceded by a new EIA determination request.

Approximately 1800m of new road will be constructed during the plan period. This road has already been the subject of an EIA determination request which is reprinted below. The outcome of the request was that an EIA would not be required.

Approximately 5250m of ATV tracks will be required to access coupes to facilitate silvicultural and deer management operations. In addition up to 20 ramps will be required to allow harvester/forwarder access into coupes that are to be felled during the plan period.

Tracks will be constructed in line with the principles described in the SNH guidance on Constructed Tracks in the Scottish Uplands. Construction will also conform to the Forests and Water Guidelines (Fifth Edition). During construction ground disturbance will be kept to a minimum. ATV tracks will not be treated as permanent features; once operations are complete tracks will be allowed to grass over and the running surface and side batters will be left in a condition that will promote vegetation regeneration. Tracks will be constructed with a top-side drain and will have regular drainage cut-offs to prevent erosion of the trackside drain. No water from the trackside drains will discharge directly into any watercourse.

Indicative positions of the tracks are shown on the roads and tracks map and final positions will be within ± 100m of these. The actual line will be planned to minimise landscape impact and ground disturbance, reflecting existing topography, avoiding steep gradients where possible and avoiding sensitive habitats. ATV tracks will be approximately 2m wide and the nominal area amounts to 1.05ha.

Ramps will be approximately 3m wide and up to about 20m long. The nominal area is approximately 0.2ha. They will not be treated as permanent features and will be removed following operations. The final number and location of the ramps will be determined at the time of operations but we believe one ramp per 100m of road/coupe interface will be sufficient.

An EIA determination request form is to be found at the front of this document and a summary of proposed works in Appendix VI. A revised EIA determination will be sought if any specific sensitive issues are encountered before construction.

1	Landscape	There are no major landscape issues with either tracks or ramps.
2	Watercourses	All work will conform to the 5th edition of the UK Forestry Standard Guidelines “Forests and Water”.
3	Archaeology	No major issues.
4	Biodiversity	Work carried out will be sensitive to permanent and temporary features of conservation value (e.g. spawning frogs and toads in roadside drains).
5	Access	There are no major access issues.
6	Recreation	No major issues.
7	Material	ATV tracks will use material from on site. Material suitable for forwarder and ramps will be sourced from local quarries.

Appendix VI. EIA Determination summary - forest tracks

Coupe	Length (m)	Area (ha.)	Purpose	Landscape	Water quality	Archaeology	Biodiversity	Access	Recreation	Material
51002	1184	0.24	crop establishment	visible from West Highland Way	standard protection measures	no known issues	no significant issues	from forest road	n/a	to be found on site
51004	812	0.16	crop establishment	visible from West Highland Way	standard protection measures	no known issues	no significant issues	from forest road	n/a	to be found on site
51006	715	0.14	crop establishment	visible from West Highland Way	standard protection measures	no known issues	no significant issues	from forest road	n/a	to be found on site
51007	2526	0.51	crop establishment	visible from West Highland Way	standard protection measures	no known issues	no significant issues	from forest road and existing track	n/a	to be found on site