Dumfries and Borders Forest District

Clauchrie

Forest Design Plan

Approval date: ***

Plan Reference No: ****

Plan Approval Date: *****

Plan Expiry Date: ******

FOREST ENTERPRISE - Application for Forest Design Plan Approvals in Scotland

Forest Enterprise - Property

Forest District:	Dumfries & Borders Forest District
Woodland or property name:	Clauchrie
Nearest town, village or locality:	Park
OS Grid reference:	NX91368865
Local Authority district/unitary Authority:	Dumfries and Galloway

Areas for approval	Conifer	Broadleaf
Clear felling	0	0
Restocking	6.15	4.41
Selective Fell	0	0
Natural Regeneration	0	0
New Planting	0	0

1. I apply for **Forest Design Plan** approval*/~~amendment approval~~* for the property described above and in the enclosed Forest Design Plan.
2. * I apply for an opinion under the terms of the **Environmental Impact Assessment (Forestry) (Scotland) Regulations 1999 for afforestation** as detailed in my application.
3. I confirm that the initial scoping of the plan was carried out with FC staff in 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 agreement has been reached with all of the stakeholders over the content of the design plan and that there are no outstanding issues to be addressed. Copies of consultee endorsements of the plan are attached.
7. I undertake to obtain any permissions necessary for the implementation of the approved Plan.

Signed ..... Forest District Manager

District Dumfries & Borders

Date 15th January 2016

Signed ..... pp Conservator

Conservancy South Scotland

Date of Approval 18/01/16.

Date approval ends: 18/01/26

UKWAS summary sheet

Description	Percentage of Forest block	Location of data
Restock main conifer species	27	Forester restock layer
Restock other conifers species	41	Forester restock layer
Open space	17	Forester restock layer
Native broadleaves	13	Forester restock layer
Managed for conservation/biodiversity NR, MI	14	Forester management layer
Long Term Retentions	2	Forester management layer
Natural reserve	1	Forester management layer

Support documents: Maps

1. Location Map
2. BGS Bedrock Map
3. FC Soil Classification Map
4. Landform Analysis Plan
5. Aspect Map
6. Slope Map
7. Climate Scores Map
8. DAMS Scores Map
9. Landscape Character Assessment Map
10. Species Composition Map
11. Age Class Map
12. Yield Class Map
13. Year of Mean Maximum Annual Increment Map
14. Thinning History Map
15. Analysis and Concept Map
16. Future Felling Coupes Map
17. Future Restock Map
18. Future Management map
19. Future Thinning Plan Map

Summary of Proposals

There are no clearfells planned within the next 10 years of this plan. However if a positive *Phytophthora ramorum* infection is found on site then sanitation felling of larch will occur. There will be thinning across various parts of the woodland, both standard thinnings and those that will be used to transform areas to LISS (Low Impact Silvicultural System). There is one area to be restocked within this period, after a recent felling in 2013/14 due to *P. ramorum*, as well as enrichment planting of broadleaves in some of the minimum intervention areas.
In terms of restructuring the woodland, species diversity will be achieved with a net increase in alternative conifers and a reduction in the area of Sitka spruce. There will also be a slight increase in the proportion of broadleaves on site. To achieve a more diverse age structure and ensure a more permanent landscape, areas will be managed under LISS in conjunction with those managed under clearfell systems.

Critical Success Factors

Main critical success factors for site are:

1. Monitor woodland for *Phytophthora ramorum* symptoms and react accordingly.

2. Obtaining resources and skills for the management of LISS areas.

3. Maintaining areas for productive timber to fulfil the objective of timber production.

4. Continue to diversify and restructure the woodland and tree species for landscape, biodiversity, stability and mitigation against climate change, pests and diseases.

5. Deer management needs to be maintained in order to successfully establish the next rotation of trees.

6. Continued riparian zone broadleaf recruitment and creation of permanent networks for wildlife habitat and biodiversity.

7. Restoration of areas of areas of ancient/long established woodland to native tree species.

1.0 Introduction:

1.1 Setting and context

- Clauchrie has an area of 235 hectares which is predominantly made up of 1st and 2nd rotation coniferous plantations planted between the 1950s and 2007. There are also areas of broadleaved woodland located predominantly on the western slopes of the site in the more sheltered valley area.

- This design plan is a revision of the plan created in 2002 and aims to identify an effective means of continuing to diversify the age structure of the forest as well as creating and working towards management objectives that relate to the Forestry Commissions Dumfries and Borders Forest District Strategic Plan.

1.2 History of the site

The area that Clauchrie encompasses has not always been as densely forested. Previously it was made up of small patches of woodland surrounded by open grassland, with areas of marsh on the upper slopes to the East and farmland to the West.

1.3 Planning Context

The management of the Forestry Commission Scotland's NFE (National Forest Estate) is guided by Scottish Forestry Strategy (SFS) 2006, which sets out seven key themes:

- **Climate change**
- **Timber**
- **Business development**
- **Community development**
- **Access & Health**
- **Environmental quality**
- **Biodiversity**

Relevant issues under the SFS and Dumfries and Borders Forest District Strategic Plan Key Themes are identified in the design brief in appendix I.

2.0 Analysis of previous plans

The first revision of the forest design plan for Clauchrie was created in 2002 and details the long term objectives for the forest as well as detailing the operations needed to diversify and restructure Clauchrie to create a multiple function forest. The woodland is currently composed of a mixture of first and second rotation crops.

The four objectives stated by the previous revision were to:

- Maintain the productivity level within Clauchrie
- Create a structurally balanced crop that is able to produce a sustainably supply of timber (not predicted to be met until end of second rotation)
- Restore areas of PAWS (Planted Ancient Woodland Site) native woodland. Create networks of stable habitats along stream sides and between broadleaf areas.
- Use a variety of species and shapes to soften the transition between the neighboring open land and the woodland.

Whilst there has been plenty of broadleaf planting/regeneration around watercourses, there has been relatively little progress made in restoring the PAWS to native woodland, with only some small areas next to the western boundaries now containing native broadleaved woodland. However, this objective is still mostly applicable and will be maintained into this revision except for an area which has been designated as Natural Reserve as with its diverse structure and species composition it fits in with plans to restore PAWS despite the presence of coniferous species.

The previous FDP revision suggested an increase in the net areas of broadleaves, larch, Scots pine, unmanaged open space and other conifers (not including SS) and a reduction in the area of Norway spruce. A reduction in the area of Norway spruce will not occur as this would conflict with the plan to use alternative conifer species on areas of the site with suitable conditions. As Sitka spruce was the main productive species, the previous FDP detailed that its net area should be maintained. However, as Clauchrie is suitable for growing alternative conifers, a 32% reduction in the percentage of Sitka spruce on site will occur, from 58% to 26%. The percentage of larch is also likely to decrease if there is a positive case of *P. ramorum* within the woodland which means that the restock plan approved for this plan revision will need to be altered with the threat of this disease being taken into consideration. The use of natural coupe shapes and a variety of species will remain incorporated as part of the design plan to minimise any impact on the landscape.

Diversifying the age structure of the forest was also a key part of the first revision of the Clauchrie design plan. At this point in time the restructuring should be entering its middle phase, with most of the forest area being open ground or in the establishment and early thicket stages with a very low percentage of the area between Thicket and over mature. Current data shows that the age classes found in the coupes in Clauchrie match these predictions. As such the objective of creating a structurally balanced and sustainable crop will be carried forward to this revision of the Clauchrie forest design plan.

Along with diversifying the age structure of the forest, the previous revision detailed that alternative conifer species where to be used if they;

- Produced a higher return, which was deemed not applicable for Clauchrie by the previous design plan.
- Enhanced the landscape.
- Or improved the conservation value of the site.

It is for the latter two reasons that introducing more alternative conifer species will be part of this new plan. It is policy for there to be a least 5% broadleaf species on site. Currently broadleaves make up 10% of the species composition which means that the 9% target of the previous revision has already been met.

During 2014 there coupe 24296 was felled a ramorum SPHN. Restocking is planned after 5 years and will be detailed as part of this plan.

3.0 Background information

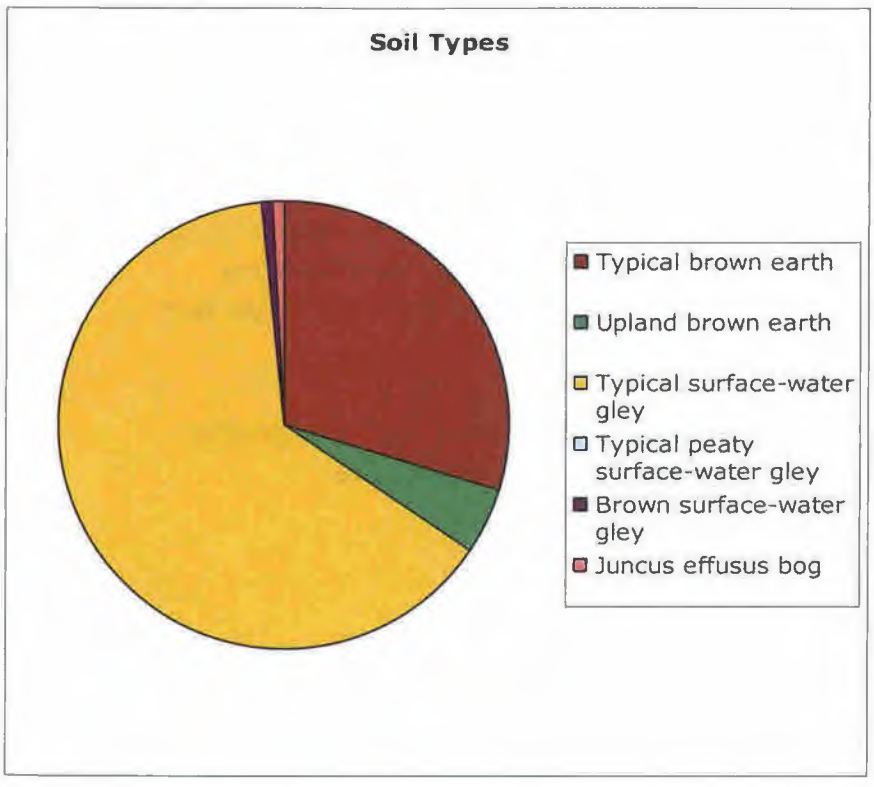
3.1 Physical site factors

3.1.1 Geology Soils and landform

Clauchrie lies over two different types of bedrock. The first and most dominant type is Wacke and Mudstone which lies under 93% of the forest. The second is just Wacke on its own, which covers a much smaller 7% at the very North of the forest. For further information on the distribution of these bedrocks refer to the BGS Bedrock map.

Within the forest there are six different soil types. The proportions of these different soil types found in Clauchrie are displayed in Figure 1 below;

Figure 1; Clauchrie Soils Types



Soil Type	Area (ha)	%
Typical brown earth	70.2	30
Upland brown earth	10.9	5
Typical surface-water gley	150.5	64
Typical peaty surface-water gley	0.1	>1
Brown surface-water gley	1.7	>1
Juncus effusus bog	2.1	>1
Total	235.5	100

For spatial reference refer to the FC Soil Classifications Map.

Clauchrie carpets the west facing slope of Clauchrie Hill from its peak down to the burn in the valley below. The slope across the site varies from areas of reasonably flat land to steep banks especially along the western edge of the forest.
For further information please refer to the Slope map.

Aspect across the forest varies however west facing slopes are predominant. For Spatial reference please refer to the Aspect Map.

The geology, soils and landform have created sheltered areas on the western side of the site down into the river valley. These areas may have the potential for a variety of different species to be planted and scope for alternative silvicultural practices to be implemented within Clauchrie.

3.1.2 Water

The watercourses in Clauchrie drain into one of two different catchment areas.

The majority of the watercourses drain into the Back Burn which runs through the valley on the West side of the forest before feeding into the Clauchrie Burn. Only one watercourse at the north of the site drains into the catchment for Pennyland Burn.

Both of these burns feed into the Solway Firth which has a SSSI designation. There is also interest in Clauchrie Burn as a salmon spawning site.

Water Management

All operations within the forest will be carried out adhering to the forest and water guidelines, which will protect aquatic habitats within the forest and those further downstream. Improvements to drain layouts during restocking operations will be carried out to best practice.
Water acidity is not considered to be a problem in this particular area.

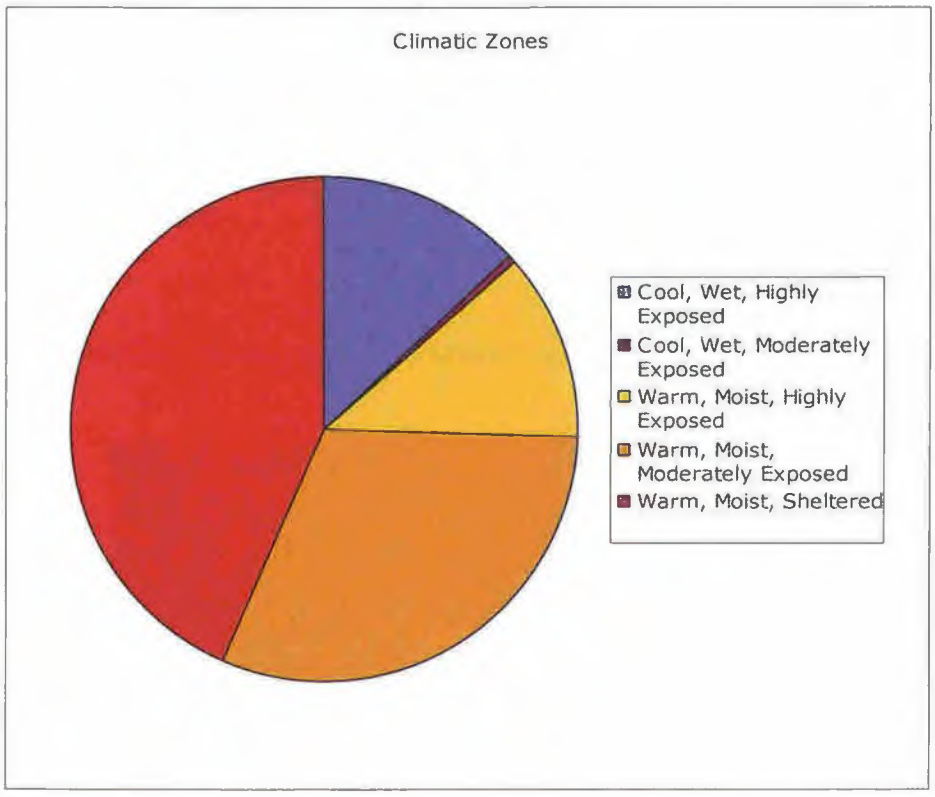
An increase in continuous cover forestry (CCF) will help moderate the fluctuations in the volume of water run-off created by clearfell operations.

3.1.3 Climate

Current climate

Current climatic conditions in Clauchrie vary from warm moist and sheltered at the valley bottoms to cool, wet and highly exposed on the hill top. Figure 2 illustrates the areas encompassed by these climatic zones.

Figure 2: Current Clauchrie Climate Zones

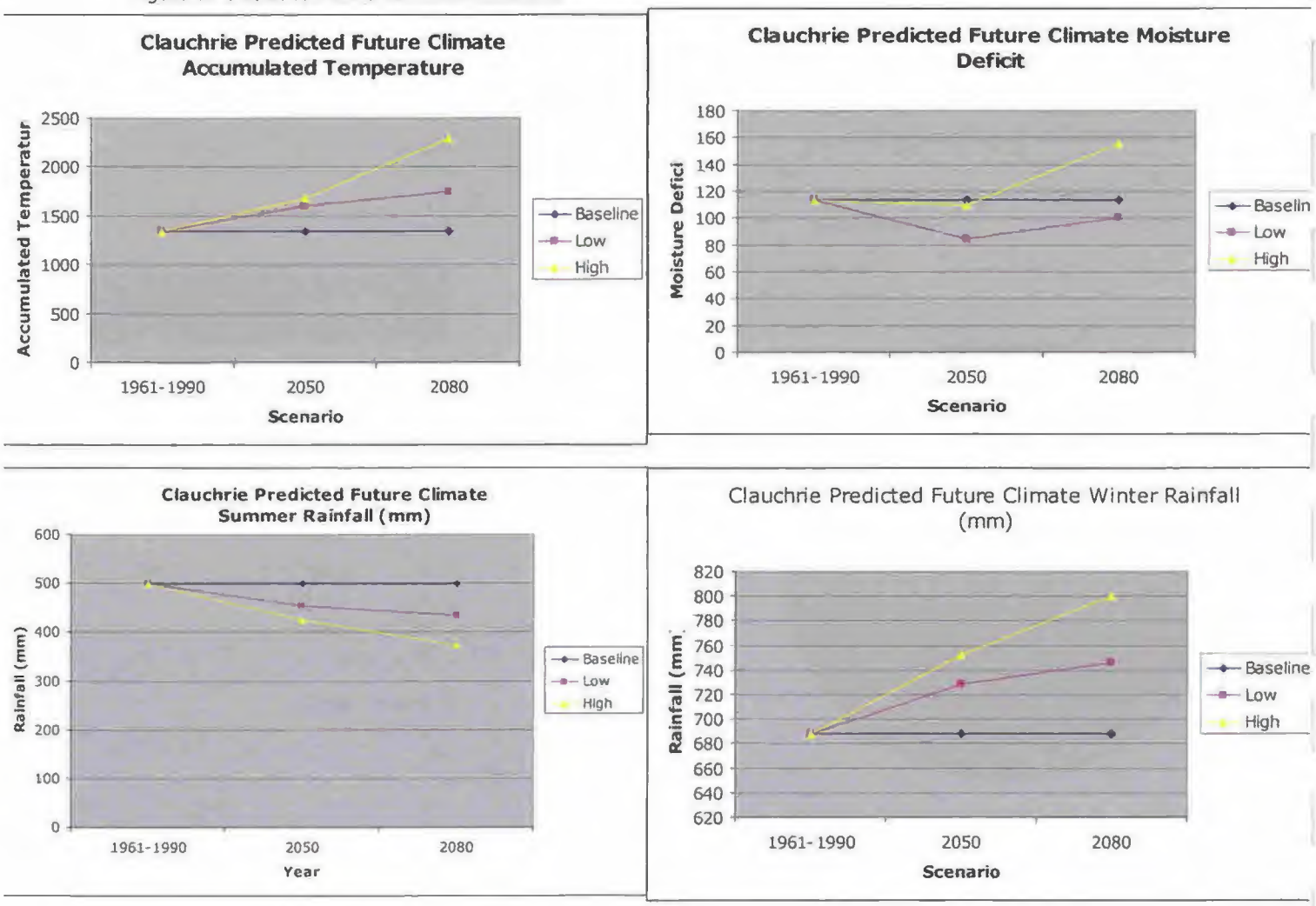


Climate Zone	Area (ha)	%
Cool, Wet, Highly Exposed	30.8	12
Cool, Wet, Moderately Exposed	0.9	1
Warm, Moist, Highly Exposed	28.4	12
Warm, Moist, Moderately Exposed	72.5	31
Warm, Moist, Sheltered	102.8	44
Total	235.5	100

Consideration of the climatic zones will need to be taken when deciding what species will be used to restock the forest. For further spatial information please refer to the Climate Scores Map.

Assessing exposure to wind using the Detailed Aspect Method of Scoring (DAMS) has given a varied range of results across the forest. These range from between 16 and 20 on the exposed hill tops down to less than 10 in the sheltered valley bottoms. Potentially about 180 ha of the forest is thinnable with DAMS scores of 16 or less but in reality the actual thinnable area will be less due to access, soils and slope constraints. For further information please refer to the DAMS scores map. To predict future climatic conditions, the ESC (Ecological Site Classification) tool has been used to calculate data for 2050 and 2080, low and high emissions scenarios. The findings of this study are illustrated in Figure 3;

Figure 3: Clauchrie Future Climate Predictions



These graphs suggest that;

- Summers will be drier and warmer which would suggest a longer growing season, However;
- Winters will be wetter

These predictions will enable us to take this data and incorporate it into the exploration of using broadleaves and alternative conifer species in future crop rotations and restructuring of forests.

- The moisture deficit (wetness) will initially be slightly drier.

Although it is predicted to be drier Sitka spruce is still a very suitable species in all future predictions.

There are no windiness predictions available in the data. Although it is assumed that storm events will be more common in the future.

ESC also lists species suitability for the site in the future and the following species are predicted to be suitable or very suitable for both the high and low emissions scenarios in 2050 and 2080 in consideration to the site soil types, precipitation levels and DAMS scores;

- Sitka spruce
- Norway spruce
- Douglas fir
- Western red cedar
- Noble fir
- Grand fir
- Scots pine
- Oak
- Silver and Downy birch
- Alder
- Aspen
- Rowan
- Willow (on the wetter soils and around watercourses)

Whilst it is not possible to plant larch presently due to *Phytophthora ramorum*, it should not be completely disregarded for the future. It is district policy to include larch in the restock plan beyond the initial 10 years. This will then be reviewed during the next revision of the design plan.

By incorporating a mixture of these into the species composition of the woodland there is potential for the creation of a visually and structurally diverse woodland. However, species will be selected to match areas with appropriate site conditions as there are a variety of limiting factors including DAMS and Soil Moisture Regime (SMR) that will need to be taken into

account. Some of these species, such as Norway spruce and Douglas fir, are already growing successfully on the steeper, more sheltered slopes on the west of the site. This determines that matching species to site conditions will be a key detail in the restocking and restructuring of the site and in meeting the objectives of creating a sustainable and diverse woodland.

3.2 Biodiversity and environmental designations

3.2.1 National Designations

Whilst there are no known SSSIs/SACs designations within Clauchrie, both water catchments feed into the Solway Firth which is a SSSI. Clauchrie Burn also has a salmonid interest.

There are no Scheduled Ancient Monuments (SAMs) within Clauchrie.

3.2.2 Open Habitats

There are no areas of open habitat with conservation interest within Clauchrie. However there is an area of *Juncus effuses* bog as well as some open areas around watercourses with broadleaf regeneration that will not be planted.

3.2.3 Woodlands

Within Clauchrie there are areas of both ancient (of semi-natural origin) woodland and long-established (of plantation origin) woodland. These patches of woodland are fragmented and as such creating pathways between them through restoration is an important objective for the creation of permanent habitat networks. The distribution and location of these areas are shown on the Hazards and Constraints map.

3.2.4 Protected Species

There is little recorded data about the presence of protected species within Clauchrie but there is the potential for species such as badgers and bats to be present and is a good site for raptor species. The areas of open ground are home to a variety of different moth and butterfly species and the woodland is also a priority area for red squirrels.

3.2.5 Deer Populations

Clauchrie forms part of the Main Block and Auchencastle Deer Management Unit (DMU) 1. The only deer species currently known to be present in this forest is roe deer. Responsibility for the control of deer populations in this area lies with the wildlife rangers whose cull target is predicted to decrease the deer density from the current 7.6 deer per 100 hectares to 6.7 deer per hundred hectares in line with the Dumfries and Borders Forest District Deer Management Strategy. A wildlife ranger is currently in the process of working to achieve these targets and work was carried out in March 2014 to improve and maintain the site's culling potential.

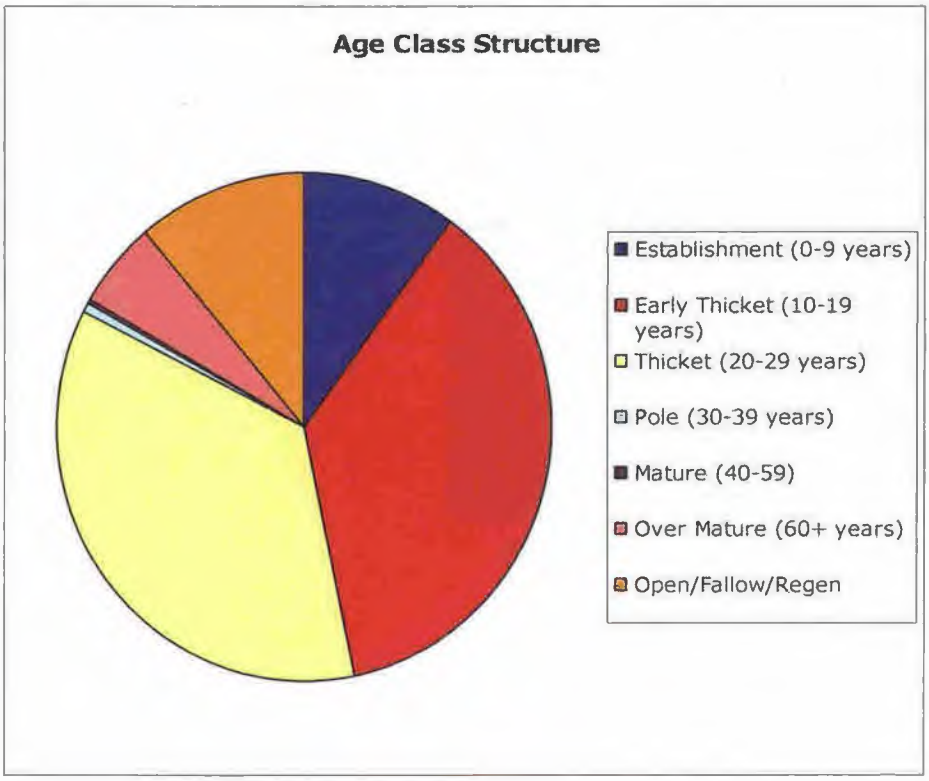
Deer Browsing on Norway spruce regeneration.

3.3 The existing forest:

3.3.1 Age structure, species, yield class and management types

The current age class of the forest is illustrated in Figure 4;

Figure 4: Clauchrie Age Class Structure

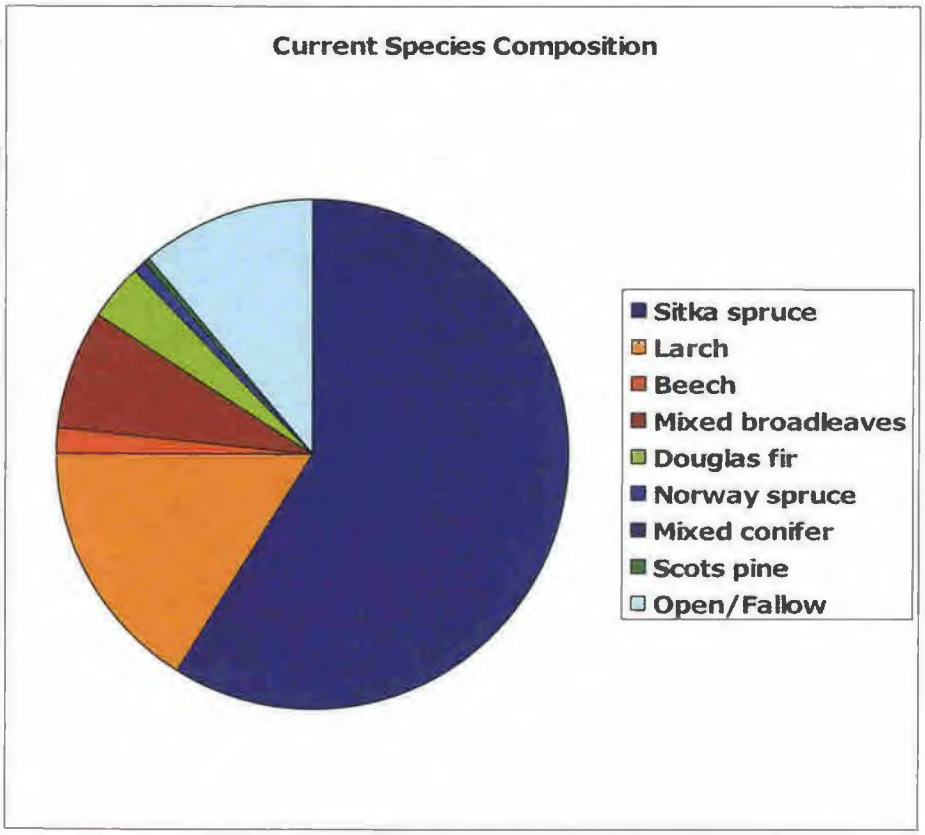


Age Class	Area	%
Establishment (0-9 years)	23.5	10
Early Thicket (10-19 years)	86.2	37
Thicket (20-29 years)	85	36
Pole (30-39 years)	1	>1
Mature (40-59)	1	>1
Over Mature (60+ years)	12.9	5
Open/Fallow/ Regenerated	25.9	11
Total Area	235.5	

These figures indicate that the majority of the trees in Clauchrie have not yet reached maturity and that the restructuring detailed in the previous design plan revision is underway within the forest block. The continuation of the restructuring of the forest will lead to a more diverse structure within the forest as a whole. See Current Age Class Structure for a spatial reference of the age classes within Clauchrie.

Figure 5 displays the current species composition of Clauchrie;

Figure 5: Clauchrie Current Species Composition

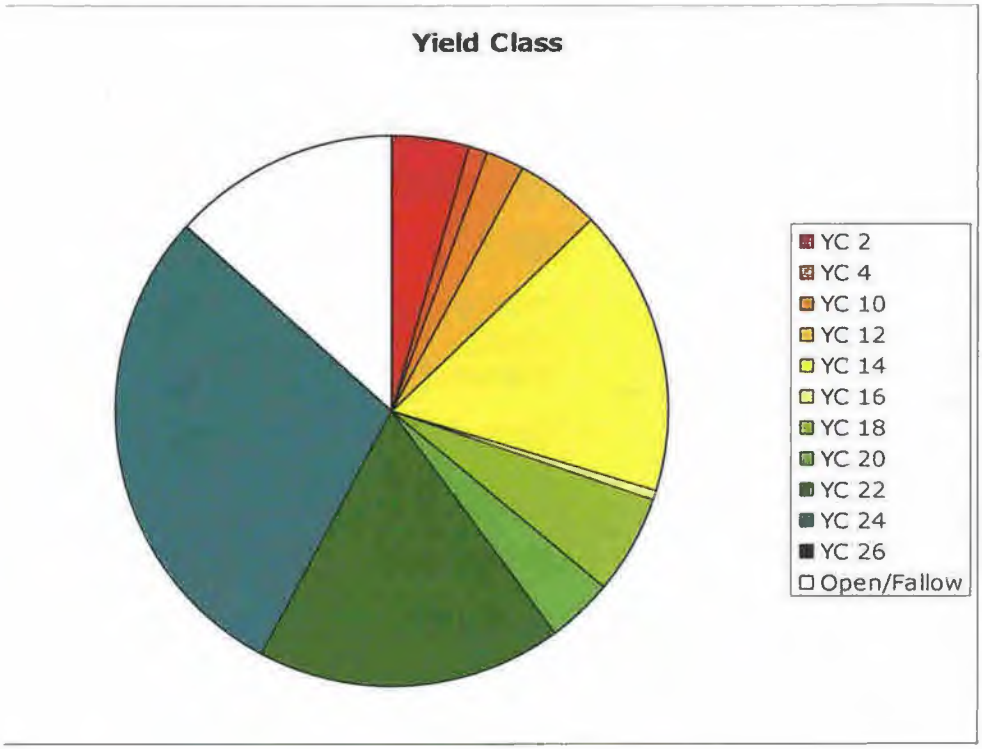


Species	Area (ha)	%
Sitka spruce	138.6	59
Larch	38.4	16
Beech	3.8	2
Mixed broadleaves	17.7	7
Douglas fir	8.5	3
Norway spruce	2	1
Mixed conifer	0.1	>1
Scots pine	0.4	>1
Open/Fallow	26.1	11
Total Area	235.5	100

The forest is currently dominated by Sitka spruce which occupies 59% of the landholding. It is envisaged in this plan that SS will be reduced and opportunities to diversify the conifer composition will be investigated in the areas where other species would be suitable.
The native broadleaf elements of the forest will also increase as planting of broadleaves is targeted along riparian corridors to create links and increase permanent habitat types. The Current Species Composition Map illustrates the distribution of the figures displayed above.

The forest has a range of yield classes that are displayed in Figure 6. For spatial information please see the Yield Classes Map.

Figure 6: Clauchrie Current Yield Classes



Yield Class	Area	%
YC 2	10.7	5
YC 4	2.2	>1
YC 10	5.7	2
YC 12	11.8	5
YC 14	39.4	17
YC 16	1.4	>1
YC 18	13.9	6
YC 20	9.6	4
YC 22	41.2	18
YC 24	68.1	28
YC 26	0.3	>1
Open/Fallow	31.3	13
Total	235.5	

Although yield class is a good indictor of tree growth generally it is also species specific. Some of the lower yield classes displayed are from slower growing species such as Scots Pine or Larch as well as the broadleaved species.

Figure 7 below illustrates the coupe management types within the forest.

Figure 7: Clauchrie Coupe Management Types

Coupe Management Type	Area (ha)	Comments
Clearfell	223.9	Including open stream sides, roads etc
Long Term Retention	1.1	Coupes left standing past optimum felling age
Open	10	Coupes classified as 100% open and felled coupes yet to be planted.
Natural Reserve	0	No intervention

Clearfell is by far the most common management practice, and will continue to be into the future. However, it is expected that there will be an increase in the other management types prescribed in this design plan in order to create a more permanent woodland with lower impacts on habitats and the landscape. These practices will be targeted on the more sheltered lower slopes of the site in the valley.

3.3.2 Access

Timber transport is heavily restricted for Clauchrie. There is only one access road into the forest (a C class road between Park and Auldgirth) which is a Consultation Route as it is not up to an Agreed Route standard. As such timing and tonnage allowed on the road will need to be agreed before operations requiring timber haulage are implemented.

The majority of the forest is well roaded with an ongoing upgrade and maintenance programme to make sure the forest roads are kept to specification.

Public access is encouraged in all of these areas whether on foot, horseback, or bicycle. The access is managed under the Scottish Outdoor Access Code (SOAC).

3.3.3 LISS potential

Within Clauchrie there is the potential to implement LISS/CCF systems in the more sheltered areas leading down into the valley bottoms on the west and southern edges of the site. These areas are displaying regeneration on various levels from sparse to dense. Areas that would benefit socially and environmentally will also be considered. These areas would also aid in the expansion and connection of areas of permanent habitat. The mature conifers will be maintained as long term retention to add structural diversity and will be gradually thinned whilst a new crop is regenerates underneath.

Dense larch regeneration on area of ground previously disturbed by quarry operations.

3.3.4 Current and potential markets

Given the expanse of land and conifer potential, a large proportion of the timber will be softwood for the large scale processing sawmills within 50 miles of the forest. This does not rule out hardwood and other diverse timber products, which are particularly relevant given the benefits species diversity can bring to other social and environmental management objectives. These opportunities will be considered and implemented as part of the plan.

3.4 Landscape and landuse

3.4.1 Landscape character and value

The Landscape Character Type map displays that Clauchrie is predominantly Upland Fringe with smaller areas of Foothills with Forest and Middle Dale (Valley).

Therefore, the key landscape features of Clauchrie are:

- High gently rolling pastures.
- Locally uneven topography including small valleys, ridges and hollows.
- Strong contrasts between wide open areas and small landscapes with more intimate landforms.

Some areas will also display features of the Middle Dale and Foothills with Forest:

- Complex topography
- Watercourses contained in steep bluffs with semi-natural hanging woodlands
- Dominated by extensive coniferous plantations

The guidance given by Landscape Design Guidance for forest and Woodlands in Dumfries and Galloway suggests:

- Restructuring the forest and designing felling coupes that reflect the landform and scale of the landscape.
- Use broadleaves/alternative conifers to highlight and reflect features of the landscape and soften forest edges to link with surrounding areas.
- Encourage regeneration of hedgerow trees.

3.4.2 Visibility

Clauchrie as a whole creates a relatively natural shape on the landscape but is only visible from the immediate neighbouring land and the public road between Park and the woodlands access. Individual coupes in the block could easily have a strong impact on Clauchries presence within the landscape. As such felling coupes need to be designed to match the medium scale of the woodland and opportunities should be taken to ensure Clauchrie remains an integrated part of the wider landscape.

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3.4.3 Neighbouring land use

Surrounding Clauchrie there are two major types of land use. The first, which lies predominantly along the West of the site is improved and unimproved grassland used for agriculture. The second type are areas of privately owned forests neighbouring our land to the South and East. The southern area is part of the Blackwood Estate managed by Smith Gore whilst the Eastern area is part of Auchencairn and managed by Tillhill. Where possible we will plan our felling coupe phasing, and restocking, to complement these forests and not compromise our own or adjacent crop stability.

3.5 Social factors

3.5.1 Recreation

Recreationally there are not many facilities in Clauchrie. However, there appears to be a significant usage of the forest roads and informal tracks/trails by members of the public for walking, running and dog walking. There is also a Core path that runs through the woodland that is regularly used by the public.

3.5.2 Community

There has been interest in Clauchrie from the local community, who are currently considering a lease option on Clauchrie under the National Forest Land Scheme (NFLS). The changes detailed in this plan over the next 10 years, will have little to no impact on the use of Clauchrie by the public or on any aspirations the local community may have for the woodland.

3.5.3 Heritage

There are no known heritage features within the boundaries of Clauchrie. There are a few stone dykes running across the site that are in various conditions which are to be left as they are as far as possible during operations.

3.6 Statutory requirements and key external policies

Other than the areas ASNW and LEPO mentioned previously there is no known statutory requirements and key external policies covering Clauchrie.

4.0 Analysis and Concept

4.1 Analysis

The Analysis and Concept maps shows show detailed considerations of the factors that influenced the development of design and long term vision of this forest.

4.2 Concepts of the plan

The design concept has been graphically presented in the site Analysis and Concept Map.
The thought process in developing the concept is set out below.

Factor	Opportunity	Constraint (limitation or restriction)	Concept Development
Adapting to climate change – a resilient forest and protecting the environment	There is the opportunity to restructure the forest using alternative management systems to create a more diverse and permanent area of woodland.	Increased risk of pests and diseases due to warmer weather. Increased risk of windblow. Hot summers may lead to drought crack. Extreme rain events may increase flooding.	Using data from climate change predictions (See section 3.1.1), select and plant species that are suitable for the site conditions. Use structural diversity and CCF to mitigate the effects of wind on the forest. Avoid larch in the first 10 years of the plan due to risk from Phytophthora ramorum. Increase and connect buffers/riparian zones around watercourses with areas of AW and LEPO to increases permanent habitat networks and improve water quality. Increase in use of alternative conifers to SS.
Mitigation for climate change	Store carbon in forest ecosystems and timber products	Highly productive timber producing trees may not be best species for environmental and social benefits.	Given that timber production is a key management objective, plant fast growing Sitka Spruce and other species, particularly those capable of producing timber for long term use in construction (carbon sequestration).

Timber Production	Large areas of land in good climate capable of producing large quantities of high value quality timber. Currently the majority of the less visible upper slopes of the site are planted with SS.	Soils limit tree growth. Wind limits rotation length. Heavily restricted consultation route for access and timber transport. Diversification of the woodland. Protection of watercourses.	The current 58% SS tree cover will be reduced in favour of other conifers, productive broadleaves and increased buffers/riparian zones. In the next rotation plan for approx. 30-40% of the tree cover as SS to produce timber.
Forest Structure	Many examples on the more sheltered areas of the site of natural regeneration. Potential for LISS/CCF systems to be implemented. Areas of timber production and broadleaf woodland will also be present.	Limitations on management systems and rotation lengths due to wind and soil types. Resources available for LISS management practices.	Create areas of LISS/CCF where site conditions allow for it. Maintain buffer zones on watercourses and increase native woodland by planting of broadleaves. Clearfell still a prominent management practice but the design of smaller felling coupes (that are still economically viable) that complement the wider landscape will reduce impact.
Neighbours and communities	Interest in managing Clauchrie forest from the local community.		Listen and engage with the local communities and members of the public who have any thoughts/aspirations regarding the woodland. Aspirations of the community will be incorporated where compatible with the wider management objectives.
Managing permanent habitats to support a range of species	Use of alternative silvicultural/management practices. Maintain riparian/buffer zones. Increase areas of native woodland planting.	Expansion is limited by timber production management objectives	Increase % of broadleaves from approx. 10% to 15%, linking with similar habitats both within the woodland and the surrounding area to create habitat networks and ameliorate the effects of habitat fragmenting.

Designing woodland for specific species	Raptors Butterflies and other insect species.	No knowledge of specific species currently present.	Retain habitat and perches for raptor species. Maintain open areas and verges next to roads for habitat.
Water and soils	Increase buffer zones to maintain water quality.	Limited funding for establishment of native woodland and constrained by the desired area of land to be used for producing timber grade conifers.	Focus the increase in of broadleaves along watercourse riparian zones that have lower stocking density by locating the area with the best conditions for the desired species and planting them in clusters rather than planting up the entire area. Try to link these areas up with the ASNW and LEPO sites across the woodland.
Landscape	Enhance landscape by thorough landscape analysis and implementing an appropriate woodland design.	Balance between other management objectives and landscape quality needs to be achieved.	Consider the impacts on the landscape when establishing felling coupe shapes and sizes. Design coupes that follow the landform.
Operational Access	Good, well maintained access to most of the woodland.	Heavily restricted access to the woodland itself.	Maintain current roads and make improvements if they are required. Consult and work with local council to determine restrictions and use of the timber haulage route.

5.0 Forest Design Plan Proposals

5.1 Management types

5.1.1 Continuous Cover Forestry (CCF)/ Low Impact Silvicultural Systems (LISS)

Continuous cover and LISS are used in areas with good climatic conditions, soils and where the chance of windblow is relatively low. These systems will be used to achieve the objectives relating to access and biodiversity as well as helping to create a more permanent woodland habitat in the landscape. As such around a

quarter of the site (59 ha) will be managed under CCF/LISS which incorporates the western slopes of the site that flow down into the river valley. These areas are the most popular in terms of access with their mixtures of conifers and broadleaves, and also have suitable climatic conditions and reasonably low DAMS scores. Areas of productive broadleaves are also incorporated into this area for the production of wood-fuel/non-timber products. For further details on LISS area of Clauchrie see: **Clauchrie Low Impact Silvicultural Systems Plan**.

5.1.2 Clearfell

Given the good growing conditions on site, clear fell systems will be maintained for crops of Sitka spruce and alternative conifers on the upper slopes to fulfil the objective of timber production. However, the clearfell coupes will be small-medium in size and will be designed to have minimal impact on the landscape. There will be no clearfells planned within this 10 year period.

5.1.3 Long Term Retention

The areas of mature conifers at the entrance to the site and along the lower slopes will be maintained in this way to maintain structural diversity and wildlife habitat as well as providing a visually inviting area around the entrance to the woodland. This area will differ from the former in that it requires a further thinning intervention which is feasible due to the fact it is not situated on a steep slope.

5.1.4. Minimum Intervention

The areas in proximity to the watercourses running across site will be managed under minimum intervention to create buffers against the areas of productive forestry and operations so as to ensure good water quality. These areas will also act a network of permanent habitats to increase the connectivity across the woodland and neighbouring land. An area of minimum intervention will be maintained in proximity to the water-pipe that runs parallel to the main road to prevent any damage to utilities.

5.1.4. Natural Reserves

An area of natural reserve will be left on the steep gully though which the Back Burn runs. This will provide an area of permanent mature woodland for wildlife and add to the structural diversity of the site. The inaccessibility and steepness of the site also mean that any attempts to extract timber are hazardous both to operators and the environment. This area links in well with the long term PAWS restoration planned in the adjacent wooded areas as this gully is already converting into a more natural woodland habitat.

5.2 Future Habitats and Species

By implementing this design plan a mosaic of tree crops and habitats should form across Clauchrie. Within the 10 year period of this design plan revision an area of 6.6 ha will be restocked with Norway spruce and Scots pine as detailed in the **Future Restock Map**, whilst some of the areas to be managed as minimum intervention need some enrichment planting with broadleaves (these areas are again illustrated in the Future Restock Species Map).

Coupe Number	Felling Year	Planting Year	Fallow Period (years)*	Gross Area	Species	Net Area	Comments
24296	2014	2018	4	6.6	NS	4.6	NS Planted to productive densities
					SP	1.5	SP 1600/ha**
					Open	0.5	
24629		2016		2.5	MB	1.75	Birch, alder, willow, rowan 1600/ha**
24277		2016		1.4	MB	1.3	Birch, alder, rowan and oak 3000/ha
24593		2016		1.6	MB	0.9	Birch, rowan, willow, alder 1600/ha**
					Totals	10.55	

*Fallow period will be agreed using the tolerance table in appendix III

** Trees are to be planted at 1600spha to create wide spaced riparian woodland and feature trees.

However, if the woodland is affected by the presence of *Phytophthora ramorum* then sanitation felling will be carried out and after a fallow period of 4 years, these areas will be planted with species that are not susceptible to the infection such as Norway spruce and Western red cedar. A longer fallow period will be left when susceptible species such as Douglas fir are used for restocking. Details of these restock plans are illustrated in the Future Restock Species Map (Phytophthora Scenario). Any larch regeneration will be mapped and removed by clearing saw as part of these operations.

Areas of native woodland will be created in networks across the site, providing buffers to watercourses and link between areas of broadleaved woodland both on site and on neighbouring land. The majority of these areas will be managed under

minimum intervention or single tree selection systems so they will also provide more permanent habitats within the landscape.

Areas of mature conifer managed under LISS will provide structural diversity both internally and at a landscape level as well as improving biodiversity levels in the woodland by diversifying habitat types.

During restocking, the area of Sitka spruce monocultures will be reduced and replaced with alternative conifer species such as Norway spruce, Douglas fir, Western red cedar with small areas of Grand fir, Noble fir and Scots, which will increase diversity whilst still fulfilling the objective of timber production.
We will maximise the planting of Norway spruce up to where its growth is limited by wind. Sitka spruce will be planted in the areas where no other conifer species are deemed suitable. No larch will be planted within the next 10 years however there may be scope for its use after that, depending on the situation with *P. ramorum* in the future.

Douglas fir will be planted on the lower slopes of the site on areas with well drained soils, reasonably low exposure to wind and good climatic conditions. Western red cedar will be planted in the pockets and mixture where temperatures are suitable for its growth to add diversity and mitigate against the impacts of climate change.

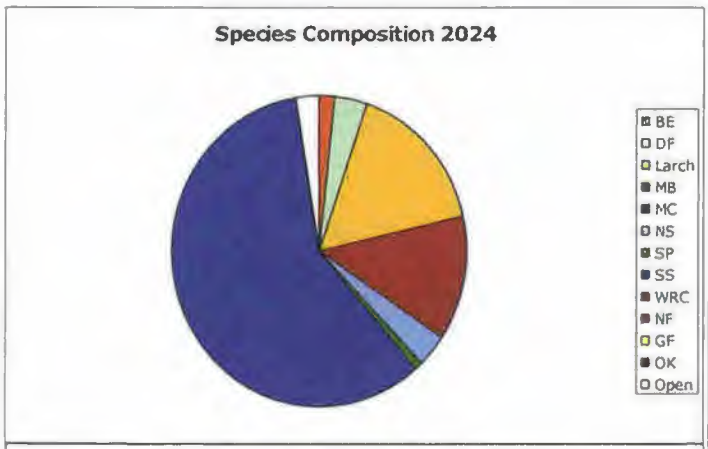
Grand fir and Noble fir are suitable for planting across the site (although GF is hindered by wind exposure and as such will be situated on the lower, more sheltered slopes of the site), however they do not produce construction grade timber and as such will be planted in small clusters to add amenity value and diversity to the internal and landscape structure of the woodland.

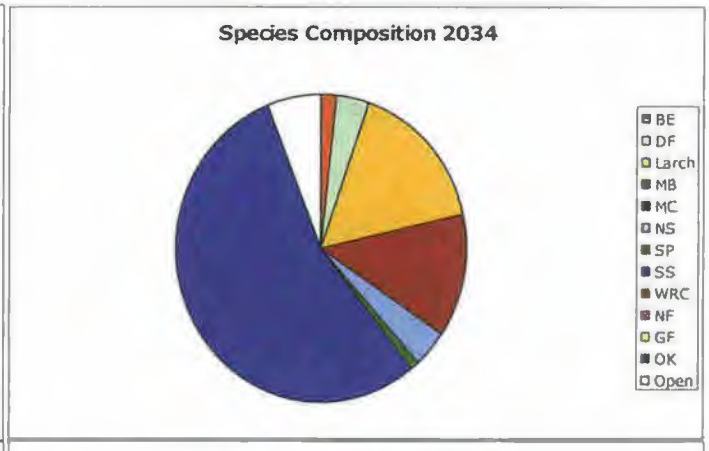
Scots pine also grows well across the site and produced timber of good quality however has a lower yield than the spruces and Douglas fir. As such, like GF and NF above, it will be planted in small clusters/mixtures to improve the aesthetics and structure of the site.

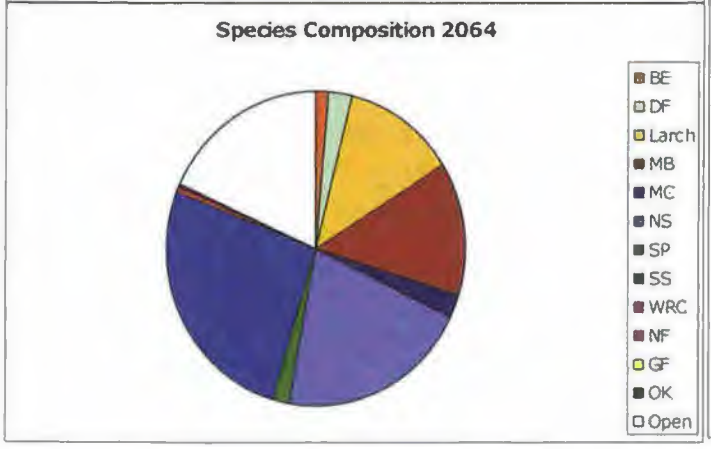
Broadleaved restock species will include rowan, hazel, alder, aspen, willow and birch as these species are already growing and regenerating well across the site and are indicated to be suitable or very suitable in the areas we wish to plant them by ESC (Ecological Site Classification) data. These broadleaves will provide areas of diverse native woodland and will also be planted in poorly stocked broadleaved areas to enrich them. These areas of will consist of 60-70% broadleaves and 30-40% open space. The only large seeded broadleaf that will be actively planted will be oak as part of the long term restoration of the areas of

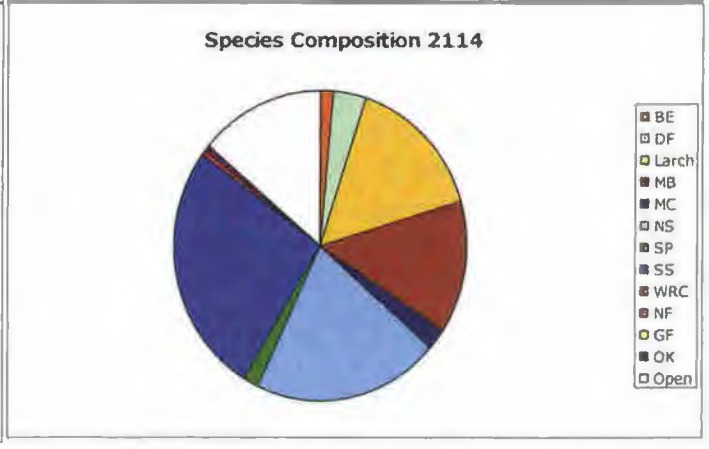
ASNW and LEPO as well as creating potential veteran trees for the future to improve structural diversity, habitat and bio-diversity.

	Species Composition (%)				
Species	**2014**	**2024**	**2034**	**2064**	**2114**
BE	2	2	2	1	1
DF	4	4	4	2	4
Larch	16	16	16	12	15
MB	10	13	13	14	14
MC	>1	0	0	2	2
NS	1	3	4	21	21
SP	>1	1	1	2	2
SS	59	59	55	26	26
WRC	0	0	0	1	1
NF	0	0	0	>1	>1
GF	0	0	0	>1	>1
OK	0	0	0	1	1
Open/Fallow	9	3	6	18	14
Totals	100	100	100	100	100









5.3 Restructuring

The high quantity of felling and restocking within the past 10 years within the areas suitable for LISS management means that there is the opportunity to manipulate and manage these stands from the offset. This means that the structural diversity achieved through LISS will be part of the overall restructuring of the woodland. The figures below predict the fluctuation of the proportion of each age classes over time, based on a 50-60 year rotation in the clearfell areas.

	Age Structure (%)		
Age Class	**2024**	**2034**	**2064**
Establishment (0-9 years)	19	1	19
Early Thicket (10-19 Years)	9	20	25
Thicket (20-29 Years)	32	9	16
Pole (30-39 Years)	31	32	4
Mature (40 - 59 Years)	1	28	14
Over Mature (60 Years Plus)	6	5	5
Open/Fallow	3	6	18
Totals	100	100	100

5.4 Operational Access

In terms of operational accessibility, most of the site is easily accessible using the current road infrastructure. There are no planned roads for this period

5.5 Thinning plans

The Thinning Plan Map illustrates the plans laid out in this section. The areas of Sitka spruce will be thinned in two groups with the young stands of larch and Douglas fir making up a third group for standard thinning. The plans for thinning the low impact silvicultural systems are further detailed in Appendix IV: LISS management plan.

Coupes	Thinning Prescription	Operation Year	Area	Estimated Volume
Thin group 1	Thinning complete	2013/14	76.6	5362m3
Thin group 2	First thin (rack and light matrix thin)	2016	65.6	4585m3
Irregular Shelterwood (BE – 24129)	Mark final crop trees, remove nearest competitors	2016	3.8	190m3
Irregular Shelterwood (BE – 24014)	Mark final crop trees, put in racks avoiding these.	2016	1.7	85m3
Single tree selection	Cut racks	2018	10.9	763m3
Thin group 1	2nd thin	2019	76.6	3830m3
Long Term retention	Marked light crown thin	2020	7.8	390m3
Thin group 2	2nd thin	2021	65.5	3275m3
Thin group 3	First thin (rack and light matrix)	2024	23.2	1624m3

5.6 Deer Management

Due to high browsing pressure in this area, deer management will be a necessity in the successful establishment of the forest, both through planting and natural regeneration. Deer management as such will continue in this woodland and will increase/decrease in response to changes in pressure/population size.
Broadleaved species will be planted with stakes and tubes as protecting against browsing pressure.

5.7 Management of open land

Open land in the forest can be grouped into three broad categories;

1. Important Open Habitats
   There is an area of open habitat on site as mentioned previously. This will be left unplanted for the purpose of structural and habitat diversity. Any conifer regeneration will be removed.
2. Open ground as a percentage of riparian zones and broadleaved woodland
   In riparian zones and some areas of broadleaved woodland there will be up to 80% open space in places to allow ground flora to develop and create a habitat network that links across the site at to neighbouring land. If conifer regeneration accounts for 15% or more of the species composition then it will require to be removed.
3. Open ground along roads and at hill tops.
   Due to the presence of many insect (especially butterfly) species and to reduce the damage to roads by trees areas of open ground will be left as verges between the infrastructure and crop.

5.8 Public Access

Public access in Clauchrie will continue to be encouraged informally under the Scottish outdoor access code. Access facilities will be maintained at their current level but rides will be left between restock coupes to allow informal access to other areas of the woodland. The gates and way markers for the Core path have been recently updated by the local council.

5.9 Heritage Features

There are no known heritage features on site. However, there are numerous stone dykes running across parts of the woodland and efforts will be made to keep damage from operations to a minimum.

5.10 Critical success factors

Main critical success factors for plan development are:

1. Monitor woodland for *Phytophthora ramorum* symptoms and react accordingly.

2. Obtaining resources and skills for the management of LISS areas.

3. Maintaining areas for productive timber to fulfil the objective of timber production.

4. Continue to diversify and restructure the woodland and tree species for landscape, biodiversity, stability and mitigation against climate change, pests and diseases.

5. Deer management needs to be maintained in order to successfully establish the next rotation of trees.

6. Continued riparian zone broadleaf recruitment and creation of permanent networks for wildlife habitat and biodiversity.

7. Restoration of areas of areas of ancient/long established woodland to native tree species.

Appendix I Design Plan Brief

1. Background and key information

- Clauchrie has an area of 235 hectares which is predominantly made up of 1st and 2nd rotation coniferous plantations planted between the 1950s and 2007. There are also areas of broadleaved woodland located predominantly on the western slopes of the site in the more sheltered valley area.

- This design plan is a revision of the plan created in 2002 and aims to identify an effective means of continuing to diversify the age structure of the forest as well as creating and working towards management objectives that relate to the Forestry Commissions Dumfries and Borders District Plan.

- There is some variety in the species composition of this site however Sitka spruce is the most prevalent and covers the majority of the area. The previous FDP revision suggested an increase in the net areas of broadleaves, larch, Scots pine, unmanaged open space and other conifers (not including SS) and a reduction in the area of Norway spruce. As Sitka spruce was the main productive species, the previous FDP detailed that its net area should be maintained. However within this revision the area of SS will be reduced given how much potential the site has to grow alternative conifer species and as such comply with the sites primary objectives. No larch will be planted within the first 10 years of the plan due to the *Phytophthora ramorum* infection.

- Diversifying the age structure of the forest was a key part of the first revision of the Clauchrie design plan. At this point in time the restructuring should be entering its middle phase, with most of the forest area being open ground or in the establishment and early thicket stages with a very low percentage of the area between thicket and over mature. Current data shows that the age classes found in the coupes in Clauchrie match these predictions. However the felling plan for Clauchrie indicates a lot of premature felling of crops, some as young as 33 years old and as such a new felling plan will need to be drawn up.

- The main access point for the site is from a minor road (that runs down from Park to the A76 at Auldgirth) onto the forest road network of the site. There is also access by foot from the north of the site on a core path that runs down the length of the woodland along one of the forest roads.

- Clauchrie in its entirety is a red squirrel priority site. However, the Nith Valley is not one of their strongholds and as such limitations will not be placed on planting

large seeded broadleaves or maintaining those currently growing on site. Within the woodland there are fragmented areas of ASNO and LEPO. There is the potential to create habitat networks along riparian zones and this will be investigated during the course of this design plan along with the consideration of the long term restoration of areas of ancient woodland. There are no archaeological features recorded in Clauchrie, however the property adjacent to the access road of the forest is a listed building and there are a few stone dykes running through the plantation.

- The main soil types within Clauchrie are surface-water gleys and brown earths with a small area of Juncus effusus bog which will be left as open habitat for biodiversity and wildlife.

- The wind categories that Clauchrie falls into are strongly correlated to the altitude of the forest. At the top of the hill there are high DAMS scores ranging between 16 and 20 which become lower as the elevation decreases down towards the boundaries of the site with DAMS scores of 10-14.

- The climate of the site varies from warm, moist and sheltered at the bottom of the slopes to cool, wet and highly exposed at the higher altitudes at the north end of the site. ESC climate change predictions for both low and high emissions in 2050 and 2080 indicate drier summers and wetter winters.

- Other than a water pipeline which runs parallel to the main road in an area of broadleaved woodland that will be managed under minimum intervention, there are no utilities within the site boundary. However there is a powerline which runs along the northern boundary of the small outlying area of Clauchrie.

- Most of the watercourses on site feed into the Back burn that runs through the valley along the western side of the site and on into Clauchrie burn. Clauchrie burn feeds directly into the River Nith which flows into the Solway which has a SSSI designation. The rest of the watercourses drain into the Pennyland Burn on the East of the site.

- Clauchrie burn is also part of a network of watercourses that are important for salmon spawning

- There are no formal recreational facilities other than a core path that runs through the forest however the forest is used by members of the public and the local communities for activities such as walking and biking.

- There is an interest in Clauchrie from local community groups and councils.

2. Key Drivers for design and draft management objectives

Draft Primary Management Objectives

Timber

Clauchrie is a relatively small forest block however it is still of importance in helping to maintain the Districts Net area of productive forest. Sitka spruce is growing well on site with high yield classes and good stocking density. However alternative conifer species such as Norway spruce, Western red cedar, Noble fir, Scots pine and Douglas fir could also add the overall productivity of the forest, as well as contributing to biodiversity, and as such the area of SS will be reduced and the area of alternative conifer species will be increased. There is also scope for areas of productive broadleaves to be managed/ created with the intention of providing woodfuel/non-timber products for local sale.

Climate change

Plantation forestry has the ability to lock up carbon dioxide in both its stands and in its products which aids in the mitigation of climate change. However it is also important to increase the resistance of our forests to the impacts of climate change. Creating woodlands with a wider variety of species and age structures will not only achieve this but will also increase the resilience of the forest against pests and diseases.

Community Development

The community has shown an interest in the woodland. During the development of this plan FCS will liaise with any community interest groups to help them achieve their aspirations where compatible with other management objectives.

Biodiversity

The levels of biodiversity in Clauchrie will be heightened by increasing the variety of tree species with a wider range of broadleaves and alternative conifer species as well as restructuring the woodland to give a more diverse range of age classes. The use of LISS/CCF/LTR will allow for less impact on the landscape and the creation of new NW and riparian zones will create networks between existing permanent habitats. Plans will be drawn for the long term restoration of areas designated as Ancient (of Semi Natural Origin) Woodland (ASNO). However a solution to the conflict between planting large seeded native species and red squirrel conservation will need to be drawn.

Draft Secondary Management Objectives

Environment

With the matrix of watercourses on site that feed into the sensitive catchment of the Solway Firth and burns with Salmonid interest, good water quality is of the upmost importance. The steep slopes and wet soils are also influential in terms of run-off from the site which is where alternative silvicutural systems may be of benefit. Therefore to protect water and soil quality all plans will follow best practices laid out by relevant guidelines such as Forestry and Water Guidelines.

Business Development

The management of the woodland for timber and non-timber products creates business development locally. In Clauchrie the main objective is to create opportunities for employment and working contracts within the forest industry and production of firewood/biomass.

Access and Health

The few recreation and informal access facilities in Clauchrie will be managed to be welcoming to public users. Management around the core path that runs through the site will be considered with the objectives of creating views and diversity around the core path. It is intended to allow recreational activity to remain at a low informal level.

3. Potential tree species and structure.

Tree Species	Current Forest Species %	Potential future Forest %	Reason for proposed change
Other Conifer	20	Around 35%	Alternatives to Spruce will bring multiple benefits to the forest. Tree species of Scots Pine and Fir must be included in the plan. These must only be included where they are deemed suitable in terms of ESC and future climate predictions. These species will be focussed on the best site conditions surrounding the watercourses in the sheltered areas of the forest except for Scots pine which prefers the free draining poorer soils. The diversity of these tree species will help strengthen the biodiversity of the habitat networks and increase the resistance of the forest as a whole to climatic changes whilst at the same time, delivering timber objectives.
Norway Spruce	1	Around 15%	Very useful species to deliver timber, biodiversity and forest resilience to climate change. This species has the potential to grow well on a large majority of the site, however, its growth potential will be limited in places by soil moisture and wind and should avoid exposed sites of DAMS >17. Establishing NS will be an important factor in increasing diversity in what is currently a SS dominated forest.
Sitka Spruce	58	Around 25%	Maintain a lower percentage of SS than currently for timber and carbon sequestration as part of climate change objectives. This species will be chosen only when there is no alternative species that will deliver the timber management objectives on these sites where the climate and the soils are more challenging
Broadleaves	10	Around 15%	Focus of broadleaves is in the riparian areas to strengthen the riparian networks, link permanent habitats and comply with the UKFS. Landscape ecology is important and robust links and networks to neighbouring land will be designed. Species will include Birch, Rowan, Willow, Alder, Aspen and Hawthorn. Around 50% of the broadleaf areas will be designated as productive broadleaves. These stands will be on the most sheltered and well drained sites within the forest
Open	11	Around 10%	Main areas of open space are in and around the riparian zones. This will strengthen the habitat networks through providing light and access for birds and animals. This area will be made up of open space around roads, paths, watercourses and within the broadleaved areas.

4. Glossary

AWS – Ancient Woodland Site
LTR – Long Term Retention
CCF – Continuous Cover Forestry
LISS – Low Impact Silvicultural Systems
UKFS – UK Forest Standard
FCS – Forestry Commission Scotland
AC – Alternative Conifers (alternative to Sitka spruce)
ASNO – Ancient of Semi-natural Origin
MB – Mixed Native Broadleaves
PB – Productive Broadleaves
ESC – Ecological Site Classification
NW – Native Woodland
LEPO – Long Established of Plantation Origin

5. Links to Strategic Plan and Criteria for Land Use and Tree Species

This section highlights the context of Clauchrie with the Dumfries and Borders Forest District Strategic Plan 2009-2013
http://www.forestry.gov.uk/pdf/Dumfries&BordersIPDF.pdf/$FILE/Dumfries&BordersIPDF.pdf

Listed in the left column are issues from this strategic plan which are relevant to Clauchrie. The middle column identifies appropriate land use, structure and species proportions to deliver the management objectives. The right column gives specific links to Clauchrie and the strategic plan.

Description from the Dumfries and Borders Forest District Strategic Plan	Potential Species/ Land use	Comment explaining where Clauchrie links against the key theme.
Key theme: climate change		
Renewable energy		
D&B 1.02 Help facilitate the woodfuel/biomass market growth and emerging woodfuel enterprises through making volume available on the open market which could be of interest to woodfuel purchasers. Continue to respond to enquires for local small scale firewood sales where resources allow.	Broadleaved biomass/wood fuel	Areas of MB and beech with the potential to be managed as productive woodland.
Adapting to climate change		
D&B 1.05 Use the Forest Research ecological site classification system to make sure that resilient species are planted on suitable sites to provide insurance for the future. This will be followed through in forest plans and detailed site plans, supported by local guidance on species selection and native trees and shrubs.	Mix of species suitable for the site and a more varied structure	High soil moisture content of site is main limiting factor according to ESC predictions. Conifer species selected are firs, pines, NS and WRC for CCF/LTR/LISS. Broadleaved species such as alder, aspen, rowan, poplar and birch (especially at higher elevations) with the potential for willow on the

		wetter areas. Areas of SS will remain on the upper site for productivity as according to ESC it will remain a 'suitable' species for the future.
D&B 1.07 Identify opportunities in existing forests and potential acquisitions for developing and expanding robust forest and open ground habitat networks.	Maintain and restore the areas of ASNO and riparian zones	Create a habitat network of riparian zones with MB and open space to link permanent habitats as well as maintaining and connecting the areas of ASNO/LEPO along the lower slopes of the site by Clauchrie Burn and on neighbouring lands.
Flood and catchment management		
D&B 1.11 Work with the Scottish Environmental Protection Agency and others to implement the relevant aspects of the river basin management plan and the area catchment management plans, including actions that will help to reduce the impact of flooding.	Maintain and expand areas of NW and riparian zones surrounding watercourses	Creation of riparian zones of NW to create buffers against operations and improve water quality into the catchment which is important for the spawning of Salmonid species.
Carbon sequestration		
D&B 1.14 Consider climate change implications in any decision to remove woodland and look at options to mitigate the loss e.g. by offset planting, in support of national policy	Implement LISS/CCF management in areas to reduce large areas of clearfell	The lower more sheltered and steeper slopes of the site lend themselves to alternative silvicultural practices and would create a more permanent landscape around the productive conifers
Key theme: Timber		
Timber supply		
D&B 2.01 Maximise potential in areas identified for productive timber species through best practice and the use of	Up to 25% Sitka spruce 50% other conifer inc. NS, DF, SP etc. 15% MB	Upper areas of the site will be maintained for productive timber with crops of both SS and

improved stock, wherever possible.	10% open space	alternative conifer species. Lower slopes will also house alternative conifers where suitable (to give an element of continuity through the woodland) and broadleaves, expanding the current areas of permanent habitats on the lower slopes
D&B 2.03 Maintain our compliance with the UK Woodland Assurance Standard to allow our customers to gain certification for their products, e.g. through the Forest Stewardship Council		Ensure compliance
Timber quality		
D&B 2.04 Distribution of species and selection of correct provenance will follow sound silvicultural practice to provide a quality growing stock at the correct density	Alternative conifer species on steep and more sheltered areas but covering no more than 20% of the total land area of the site. NW on the more sheltered west edges of the site. Sitka Spruce (improved or VPSS) areas >YC14 SS for construction timber industry.	Use improved stock in restocking SS where appropriate. These areas will be mapped in FDP. More palatable species means an increase in the quantity and costs of mammal control. Areas felled due to *P. ramorum* infection are not to be replanted with susceptible species.
D&B 2.05 Review the thinning programme based on a presumption to thin all suitable areas. This is expected to increase the volume of timber derived from thinning.	Diversifying structure and species of woodland	Clauchrie currently has stands of Sitka spruce of an age for first thins that would benefit from management to increase timber yield. However impacts from *Phytophthora ramorum*

		may lead to stands being prematurely felled rather than thinned and as such will alter the distribution of timber yield across the period of this plan.
D&B 2.06 Proactively manage natural regeneration areas to meet the objectives for the site	MC and MB Aim to implement lower impact/alternative silvicultural systems using regeneration where appropriate.	Where possible use regeneration as a means of restock for the areas of LISS/CCF on the more sheltered parts of the site. This will reduce the visual impacts of operations on the landscape and create a more permanent woodland cover.
Timber transport		
D&B 2.09 Adhere to agreed route maps for timber transport and the code of practice for road haulage of round timber.		Haulage along a consultation route. Only one main access point. Adhere to and use approved haulage routes out-with the forest area.
Hardwood timber		
D&B 2.11 Identify areas suitable for growing productive quality broadleaves and establish a local trial area to inform future targets and suitable species.	Beech and Oak	Areas with potential for management of productive hardwoods in the more sheltered areas down in the river valley on the west of the site.
Key theme: Business development		
Skills		
D&B 3.02 Promote continuous improvements to the safety culture in the sector, by exhibiting best practice on the national forest estate.		Enforce all safety procedures and best practices within the woodland
Tourism (see also under recreation)		

D&B 3.07 Continue to consider the landscape value of woodlands to tourism during revision of forest plans including opportunities for managing areas under low impact silvicultural systems.	Mixed woodland managed using alternative silvicultural systems.	Conversion to CCF/LISS management along the lower slopes of Clauchrie will create a more permanent buffer of habitat against the productive timbers on the higher altitude slopes. This would also provide links between riparian networks and permanent areas of ASNO/LEPO
Rural development		
D&B 3.16 Seek to continually raise the profile of forestry with local decision-makers and work in partnership with others to increase the benefits to the local economy derived from the forests.	Mixed well managed woodland	Aim for around 35% alternative conifer species to support the local timber industry in the long term.
D&B 3.17 Remain open to new business ideas based on the use of forest services and products that match our wider social and environmental standards and consider positively proposals that will assist growth or development of local businesses.	Mixed well managed woodland	
Key theme: community development		
Woodlands in and around towns		
D&B 4.04 Identify ways of increasing contact with all communities adjacent to forests to provide regular information on local forest operations and other activities.		High community interest, consultation and contact with the local community essential throughout the revision of the design plan. Design plan put on website so it may be easily viewed by members of the public.

D&B 4.05 Engage with and support communities currently, or wishing to become, active in the management of their local forest e.g. woodlands in the Forestry Commission Scotland woodlands in and around towns initiative.		Consult and maintain contact with local community to get input and opinions on proposed revision of design plan and ascertain if and how they would like to be involved with their local woodland management
D&B 4.06 Maintain and increase the opportunities to engage with communities of interest in the forest		Maintain contact through email/public consultation about the progression of the revision of the design plan and the operations entailed with the restructuring of woodland
Community ownership		
D&B 4.07 Receive positively all community approaches on purchase and process applications that fit the criteria published in the National Forest Land Scheme as quickly as possible.		Purchase or lease of woodland is still being considered by community.
Learning		
D&B 4.11 Review volunteer programme and identify ways to increase the level, range and scope of volunteering activity in the forest.		Local community very interested in the forest and this may act as a solution that enables their involvement without having to raise funds to purchase or lease Clauchrie
Key theme: access and health		
Recreation		
D&B 5.03 Consistently implement best practice in sustainable design and management and in safety on all our recreation sites.	Manage broadleaves and alternative conifers near the areas used for recreation.	
Making access easier		

D&B 5.09 Work with local access officers and the access forum to identify appropriate routes on the national forest estate that will form part of the core path network.	Use of alternative conifers and broadleaves to create a mixed woodland both in species and in structure around areas of access and recreation.	
D&B 5.12 Continue to make the thresholds of all suitable forests more welcoming through signing, easier access and management of entrances	Mixed well managed woodland containing mix of tree species and shrubs.	
Key theme: environmental quality		
Soil, water and air quality		
D&B 6.01 (see also D&B 1.11) Work with the Scottish Environmental Protection Agency and the fisheries boards to plan and implement local actions in the river basin management plans and area catchment management plans to contribute to the achievement of good ecological and chemical status for the region's water bodies by 2015, and in the protection of the Tweed special area of conservation.	Additional NW buffers to protect water – Additional NW where ancient woodland expansion possible.	
D&B 6.03 Consult key stakeholders, particularly the Scottish Environmental Protection Agency to identify site and downstream issues on sensitive sites to inform the development of detailed operational site plans.	Riparian zones of NW around watercourses.	
Landscapes		
D&B 6.06 Continue to include landscape characteristics and sensitivity as a major consideration in long-term forest planning. Resolve issues and make balanced decisions on the rate and scale of change taking into	Mixed species with a more diverse structure. Areas of LISS/CCF/LTR create areas of permanent habitat. Smaller felling coupes to reduce landscape impact	Areas of more permanent habitat surrounding the recreationally used areas. Buffer created around the productive areas at higher altitudes. Smaller felling coupes

account other issues such as economics and biodiversity value.	of harvesting operations.	considered especially in the more visible areas.
Cultural		
D&B 6.08 Record known unscheduled monuments in the Forestry Commission Scotland geographic information system and agree management plans for schedules monuments with Historic Scotland.	Open land appropriate to heritage.	
Key theme: biodiversity		
Species and habitats		
D&B 7.02 Continue to develop the area of native woodland and assess the potential for its expansion within the district.	Broadleaved woodland	Maintain and expand the areas of NW along the western edge of the site and around watercourses.
D&B 7.03 Survey all open ground habitats in the district as each forest design plan is revised to identify priority habitats and opportunities for expansion and for moorland fringe development in balance with our other objectives.	Open	Retain and protect any priority open habitats as appropriate.
D&B 7.04 Continue to take account of the need to protect and enhance the prospects for our priority species in future forest structure and management practices.	Alternative conifers and small-seeded broadleaves.	Clauchrie is a red squirrel priority area, species favoured by reds over greys planted but Oak will be planted and Beech maintained as there is a lack of potential future veteran trees. Maintain a diverse structure including mature stands and open areas for raptors.
Landscapes and ecosystems		
D&B 7.05 Diversify planted woodlands through restructuring and the use of an appropriate range of silvicultural systems including an increase in	LTR/CCF/LISS where feasible. Maintain and extend NW to create networks of permanent habitat.	Minimum intervention/natural reserve on more sheltered free draining slopes on the west of the

natural reserves, long-term retentions and the volume of deadwood in the forest area.		site. NW network links between AWS and creation of riparian zones.
D&B 7.06 Collaborate with neighbouring landowners, South Scotland Conservancy and Scottish Natural Heritage to create functioning landscape-scale habitat networks.	Planting of NW and management of riparian zones.	Currently small blocks of permanent habitats within Clauchrie and the surrounding area are not linked but there is the potential to do so by creating riparian networks.
D&B 7.07 Work with local deer management groups to manage deer population over their range, recognising the interests of all parties.	Mixed conifers	Increase in palatable species within the woodland structure means that careful consideration needs to be taken in the establishment of these species and the subsequent deer control that will most likely be needed.

Glossary – See Section 4.

Appendix II Forest Design Plan Consultation Record

Consultee	Date contacted	Date response received	Issue raised	Forest District Response
Michael Steele	23/06/14 (Date of Meeting)		Query about progress and plans for the design for Clauchrie	Held meeting to discuss our ideas for the forest and the consultees opinions/aspirations in regards to the site. Suggested holding a drop in session for the community but it was thought no one would attend. However it is standard practice to hold a drop-in session and so one was organised for the 14/08/14 (see below).
http://scotland.forestry.gov.uk/supporting/communication-consultation/forest-design-plan-consultations/clauchrie	This website was published and has been available since 26/06/14.	Ongoing	This web page has the location map, the design brief and the analysis and concept map.	
Anton Watson	27/06/14	27/06/14	Query as to whether deer management was being carried out on site.	Informed consultee that ongoing deer management was being carried out as part

				of the Dumfries and Borders forest district deer management strategy.
Jonathan Hudson	27/06/14	21/07/14	Happy with proposals and offered comments for advice only. Comments support increase in diversity of species and age structure as well as approving the introduction of LISS. Support the creation of riparian buffer-zones with low density broadleaves planted on them. Highlighted the potential presence of otters (adjacent land), red squirrels, bats and badgers within Clauchrie and commented that measures should be taken to ensure no loss of habitat or disturbance.	Noted
Richard Masters	27/06/14	1/07/14	Asked to be kept up-to-date with anything that impact the core path that runs through Clauchrie.	Assured that he would be informed of any issues or possible impacts surrounding the core path.
Graeme Alison	27/06/14	No response		
Adrian Pringle	27/06/14	No response		
Peter Norman	27/06/14	7/07/14	In general was happy with decisions. Had noted that the verges were attracting vast quantities of butterflies and other wildlife species and wished to ensure their	Assured that it was standard practice to leave a verge between the crop and roadside when planting. Also

			retention. Offered insight on the issue regarding the red squirrels, ancient woodland and planting/maintaining large-seeded native woodland tree species on site. He suggested we focus on maintaining the current mature broadleaves we have on site (inc. the beech) and then plant small-seeded native tree species. He also suggested retaining mature conifers in these areas for structural diversity.	explained that areas with a low density of broadleaves on them will be maintained for this reason as well. Thanked him for his insight and explained that after discussion with A. Gale we have decided to rework that part of the brief before including it in the porposal.
Jane Brann	27/06/14	27/06/14	Contacted due to the link for website not working not working Confirmed that there were no archaeological features within Clauchrie and supplied us with a 1850 OS map with the original woodland area.	Gave an alternative link for the webpage – this one worked. Expressed thanks for the map.
Julia Gallagher	27/06/14	21/07/14	Welcome the objective looking into the long-term restoration of the ancient woodland sites. Support the increase in diversity and area of broadleaves with the suggestion of planting small-seeded broadleaves to alleviate the conflict	Noted

			between red squirrels and native large-seeded broadleaved species (this will also be beneficial black grouse habitat). Commented on the presence of Black grouse lek on adjacent land as well as breeding raptors in the area. Recommended creation of habitat for black grouse and any operations near raptor nesting sites to take place out-with the breeding season.	Spoke with T.L and this will not be impacted on by any plans detailed in the design proposal.
David McNay	27/06/14	No response		
John Malcolm	27/06/14	No response		
Karen Ramoo	27/06/14	No response		
Alisdair Hendry	27/06/14	No response		
Jim Henderson	27/06/14	8/07/14	Agreed with the decisions for maintaining water quality but commented that neighbouring forest operations had caused issues due to the soil types and topography within the valley. Commented that care should be taken and that they would be happy to comment or advise on any forest operations that are planned to be carried out.	Thanked Jim for highlighting previous issues with forest operations within the area. All operations will be carried out to UKFS Forest and Water Guidelines. Explained that most of the current watercourses on site are already buffered with areas of open/broadleaved areas broadleaved woodland.
Michael Steele	27/06/14	No response		
Penelope Coles	27/06/14	21/07/14	Happy to see an increase in species	Thanked for comments.

			diversity and efforts to improve bio-diversity and habitats.	
Fiona Gauld		30/06/14	Asked to be kept up-to-date with the developments of the design plan.	Assured that she would be informed of any updates and that her e-mail address would be added to our list of contacts.
Hui Li	Contacted us instead of David McNay.	9/07/14	Contacted us from SEPA  Email from SEPA_Received_9_7_	Noted.
Mike Steele	25/07/14	25/07/14	Contacted us to enquire about a felling on neighbouring area of forestry and whether it was being felled due to phytophthora ramorum or not.	Informed Mike that this was not our land and checked aerial photograph to see if species being felled could be determined. Coupe looked to be mature spruce but couldn't give a definite answer. Correspondence with Alan Gale and Lenka Zaoralova to try and determine a definite answer. Lenka confirmed this was not a P.ramorum felling, MS informed via e-mail.

Neighbour (Clauchrie House)		31/07/14	Enquiry about Clauchrie.	Met and discussed our objectives and proposals for Clauchrie. Asked if they had any comments: • Would like to see the mature conifer kept for red squirrels and raptors. • More Scots pine (native conifer and red squirrel habitat). • Planting of Oak.
Leaflet Drop	6-7/08/2014			Posted 70 leaflets and 5 posters in the area around Clauchrie.  T:\Dumfries & Borders T Drive April
Public Drop-in Session	14/08/2014 (prior to council meeting below)		Queries about creating paths for a circular walk. Harvesting and timber haulage.	Explained that there is a lack of funding for facilities however gaps would be left between crops when restocked so space would be available for informal paths to form. Explained that due to the size

				of Clauchrie there would not be an excessive amount of traffic due to haulage.
			Presence of Cinnabar moths within Clauchrie highlighted.	Checked this with Tony to see if any action neede to be taken and plans do not need to be adjusted. Conveyed that there were to be no major changes within the woodland and that very few operations would be occurring within the next ten years.
			General interest in the plans for the wood.	Plans were to slowly restructure the area with smaller coupe sizes and a more diverse range of species and age classes to mitigate against the impacts of climate change and pests and diseases.
Closeburn Community Council	14/08/14	Community Meeting to discuss plans suggested by Mike Steele at previous meeting (see		Presented our initial ideas and final proposals to the community council. No negative feedback was given. Interest in the situation with larch at the moment, which we assured

		above)		was being monitored within Clauchrie given previous felling due to the infection.
Consultation Poster	19/08/14			Sign at Clauchrie giving details of community consultation event removed.
Webpage	28/08/2014		Asked for contact details to be changed from K. Tedd to A. Gale.	

Appendix III: Tolerance table

	Adjustment to felling period*	Adjustment to felling coupe boundaries	Timing of Restocking	Change to Species	Change to road lines	Windthrow response
FC Approval not normally required	Fell date can be moved within a 5 year period. Where separation or other constraints are met	1.0ha or 10% of coupe area – whichever is less	2 planting seasons after felling. Restocking within 2 years +/- of year 2 . For Shelterwood area stocking assessment by year 4 and beat up in 5th growing season	Change within species groups e.g. evergreen conifers or broadleaves. Underplanting of CCF areas with species indicated on the FDP.		Up to 0.5ha
Approval by exchange of letters and maps		1.0ha to 5ha or 10% of coupe area- whichever is less			Additional felling of trees not agreed in plan. Departures of >60m in either direction from centre line of road	
Approval by formal plan amendment may be required	Advance felling into current or 2nd 5 year period	>5ha or 10% of coupe area	If timing of restocking is out with the period detailed above	Change from specified native species. Change between species groups	As above depending on sensitivity	>5ha