Galloway Forest District

PENNINGHAME

Land Management Plan

Approval date:

Plan Reference No: FDP

Plan Approval Date: 01 March 2017

Plan Expiry Date: 28 February 2027

We manage Scotland's National Forest Estate to the United Kingdom Woodland Assurance Standard – the standard endorsed in the UK by the international Forest Stewardship Council® and the Programme for the Endorsement of Forest Certification. We are independently audited.

Our land management plans bring together key information, enable us to evaluate options and plan responsibly for the future. We welcome comments on these plans at any time.

The mark of responsible forestry

CSM 6 Appendix 1
FOREST ENTERPRISE – Application for Forest Design Plan Approvals
Forest Enterprise – Property

Forest District:	GALLOWAY FD
Woodland or property name:	PENNINGHAME
Nearest town, village or locality:	NEWTON STEWART
OS Grid reference:	NX 350700
Local Authority district/unitary Authority	DUMFRIES & GALLOWAY

1. I apply for Forest Design Plan approval*/~~amendment approval~~* for the property described above and in the enclosed Forest Design Plan.

2. I confirm that the scoping, carried out and documented in the Consultation Record attached, incorporated those stakeholders which the FC agreed must be included. Where it has not been possible to resolve specific issues associated with the plan to the satisfaction of consultees, this is highlighted in the Consultation Record.

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

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

Signed ……..... Signed .....
Forest District Manager Conservator

District **GALLOWAY FD**..... Conservancy .....

Date **……**..... **Date of Approval:** .....

Date approval ends: .....

*delete as appropriate

Penninghame Forest Design Plan 2016-26

EIA Determination form if required

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Summary of Proposals:

The main objective is sustainable timber production sympathetic to the significant demands of environmental quality, landscape and biodiversity.

1.0 Introduction:

1.1 Setting and context

Part of Galloway Forest District that is based in Newton Stewart, Penninghame is a moderate to large scale, fairly blocky plantation some 6.0km north west of Newton Stewart. The block, totalling some 3672.5ha, is particularly visible in near and mid distance view from the B7027 minor county road from Newton Stewart to Barrhill that bisects the plan area and the A712 Newton Stewart to Girvan road that runs along part of its eastern boundary. Other minor roads, the C3 and U59, also have significant frontages onto the plantation.

The block is predominantly surrounded by open hill and agricultural land but also bounds to the west with numerous smaller private sector woodlands and the FES Tannylaggie plantation.

An integral part of the Galloway Forest Park the block also lies within the larger Western Southern Uplands ESA.

This plan is a revised submission of an earlier plan approved in 2006.

1.2 History of plan

Initially three smaller plans that were first amalgamated in 2000 (Penninghame, Penninghame pond and Blackquarter) this larger scale plan area now better captures a distinct section of the R Bladnoch SAC / SSSI.

Apart from the initial Penninghame estate land purchase in 1950 and the sizeable Carseriggan (pt) purchase in 1969, the Penninghame block has been acquired piecemeal over many years (see table below).

Acquisition date	**Deed No**	**Title**	**Seller**
June 1950	11021	Penninghame estate	R & W Callander Ltd.
Mar 1960	11029	Glassoch farm (pt)	Mr J McInally and others
Nov 1963	11036	Challoch moss	Mr & Mrs J A White
Mar 1969	11049	Carseriggan (pt)	McNeill Estates
April 1970	11052	Glassoch(pt)	D S Gladstone
May 1970	11053	Glenvernoch	F & FE Harvey
Mar 1972	11059	Beoch farm (pt)	Executor of W McWhirter Malcolm

May 1972	11060	Blackquarter farm (pt)	T G Trotter and F H Ryman
May 1972	11061	Blackquarter croft	T G Trotter and F H Ryman
Aug 1974	11069	Urral farm	Caledonian Insurance Co
Dec 1974	11070	Urral and Kilquhockadale	Caledonian Insurance as Trust
Jan 1975	11071	Glenruther farm (pt)	J McKenna
Mar 1980	11089	Urral and Kilquhockadale exchange	R T Oxley and Co
March 1982	11096	Glenruther farm (pt)	Mrs McKenna

Afforestation of the block began during the early 1950s continuing through to the early 1960s with a further expansion in the 1970s as more areas were acquired. To the east of the block around the Castle Stewart loch and Glenrazie area, vestiges of the early 1950s conifer and broadleaf plantation planting can still be found but over the last 20yr period and specifically more recently as a result of *Phytopthora ramorum* infection of larch trees in the block large swathes of older plantation have been removed.

This moderate to large scale plan is relatively detached from other FES plantation and, with the R Bladnoch SAC / SSSI running through it, stands comfortably as a separate design plan unit for water quality and conservation considerations.

2.0 Analysis of previous plan

2.1 Analysis from previous plan

Objectives from the previous plan were as follows:

Objectives	Assessment of Objectives during plan period
Commercial softwood timber production in forest core. Diversify age structure and species composition of the block through restructuring to benefit habitat and visual diversity (particularly along public roads)	Clearfelling has continued in the older plantation to the east over the previous design plan period but has also expanded into the younger plantation to the west and delivered improved views from the B7027 road (sadly to an extent now compromised by extensive P ramorum felling).
Increase area of broadleaf and open space to enhance conservation	The creation of broadleaf and open space areas increased over the period of the previous plan. Now with more felling taking place due to the extensive P ramorum infestation, greater opportunities exist for further larger scale broadleaf habitat network creation.
Improve riparian zones particularly along significant watercourses as identified by Galloway Fisheries Trust Monitor and improve water quality as per Guidelines	Significant tracts of conifer plantation have already been removed, and will continue to be removed, along the R Bladnoch riparian corridor. A greater area of these important riparian zones now comprises open space and broadleaf planting.
Provide Recreation resource for local communities and visitors to area	Existing facilities have been maintained during the plan period. Now with the additional felling taking place to accommodate the extensive P ramorum infestation, opportunities exist to develop the recreation infrastructure further.
Maintain suitable habitat for Nightjar	After many years of absence Nightjar have been recorded in the block during the last two years. Our clearfell and extended fallow period for Hylobius management and the additional felling precipitated by P ramorum felling continues to provide potential habitats for the species.
Create moorland fringe on plantation margins to improve Black Grouse habitat	There has been little progress on this objective given that very few coupes on the northern edge of the block have been clearfelled. Clearfell in the next 10yr period will have a greater impact on moorland fringe creation.

Whilst these 2006 approved plan objectives have generally been met, they have over the interim period become slightly outdated. Key objectives for the plan (see table below) are now more directly related to the revised brief (see Appendix V).

Themes and objectives	**Priority**
Timber; Promote sustainable timber supply through revised felling plan, thinning based LISS (focus on eastern section of block centred on recreation areas and roadsides) and restocking plans (significantly compromised by P ramorum infection) Implement modest scale road building / road maintenance programme required to service proposed operations coupes Increase broadleaf woodland creation, native species for biodiversity and where possible faster growing commercial species (eg Sycamore and Aspen) Create a more diverse age structure for the forest.	high
Biodiversity; Enhance biodiversity of the site through the restoration of Ancient Woodland sites, the development of other relict BL woodland within block and the creation of linkages to other nearby ASNW sites and the habitat networks associated with the R Bladnoch valley Improve open space and edge habitats throughout plan area (esp. restock areas and aquatic zones)	high
Environmental Quality; Protect water, soil and air by adhering to UKWAS standards, agreed SSSI management plans and Forest and Water guidelines to maintain and improve water quality in the R Bladnoch (SAC) and R Cree catchments to improve feeding and spawning conditions for fish Contribute to Scotland's landscape through the management of views from the A712, the B7027 and other minor roads through the plan area (consider impact of P Ramorum within block and the future design of a Larch free forest) Expand block area managed under Low Impact Silviculture systems (focus on eastern section around Penninghame Pond and B7027 minor county road) Manage heritage features within block according to FES Archaeological guidelines Increase area of mature woodland and species diversity for habitat enhancement	high
Access & Health; Improve public enjoyment by providing a varied and enjoyable woodland experience through localised intensive management	medium

regimes, improved signage and facilities and a maintained road network	
Business Development; Maintain and develop Recreation facilities infrastructure within the block (trail network / fishing facilities (Spectacle Loch and Loch Eldrig) / Penninghame Pond development) within the overarching Biosphere buffer & Dark Skies park zones	medium
Climate change; Increase carbon sequestration on site through bog restoration work in deep peat areas and establishment of new broadleaf woodland rather than conifer plantation.	medium

3.0 Background Description

3.1 Physical site factors

3.1.1 Geology Soils and landform

Glaciation has deposited large quantities of coarse boulder till material over the area generally obscuring the underlying geology but most of the afforested area essentially comprises sedimentary greywackes and shales of the Ordivician period.

Much of the area is former moorland with Carseriggan, Garwhachie and Glenhapple moors the most significant. Now the area is essentially a low lying forested mix of gentle mineral slopes and drumlins interspersed with deep peats flows, wet flushes and various sized lochs. Shallow stony Brown earth soils (18%) are largely restricted to the dryer knolls with the area generally dominated by Molinia and Calluna bogs (60%) and Peaty gleys (20%). Scattered Podsols, Iron pans and skeletal soils make up the remaining 2% of the site. Glassoch Fell (140m) and Glenhapple Fell (137m) are the highest points and Penninghame pond (30m) the lowest in the area.

The dominance of these poorly draining soils, particularly to the north and west of the block, has generally resulted in a monoculture of shallow rooting spruce conifer with a high risk of windthrow.

The James Hutton Institute "Land Capability for Forestry" classification (previously Macaulay Institute) for the area is F5 (land with limited flexibility for growth and management of tree crops.

3.1.2 Water

There are several open water bodies within the block; Garwachie and Spectacle Lochs, Penninghame Pond, Loch–na-Tummock, Loch Swad and Loch Quie are the most significant. Built as a replacement for an earlier Irish pipe bridge, that was a substantial barrier to fish migration, there is a weir with fish pass at the outflow of Penninghame Pond.

The design plan also lies within two water catchments, principally in the R Bladnoch catchment but also partially in the R Cree. The Castle Stewart burn is the main watercourse running through the block for the R Cree catchment with the river Bladnoch and a number of its important tributaries such as the Beoch Burn, Glassoch Burn and Polbae Burn core for the R Bladnoch catchment. Both catchments are heavily forested and generally have issues with surface water acidification, over shading, risk of siltation, drainage and riparian management. Due to the high incidence of plantation and relatively modest areas of existing open space within the plan, surface water acidification is of particular concern within the R Bladnoch catchment. Along the 9km of the main river Bladnoch that lies within or is adjacent to the DP unit there are a variety of habitats present ranging from juvenile salmonids habitat through to adult holding water. Brown

trout, Eels, Pike and Perch are all currently found in this section of the river but Atlantic salmon is only found up to where the Beoch Burn enters the main rivercourse; above this point low pH is a constraining factor for successful spawning.
The R Bladnoch is designated SAC for Atlantic salmon and Salmon habitat. Within the designated area overall site management is a key environmental consideration. With regard to River Basin Management Plan considerations the R Bladnoch is currently classified as "moderate". Potential pressures on the watercourse are morphological alterations from forest operations, production of non-renewable electricity and diffuse source pollution. We therefore aim to comply with best practice and minimise sediment release from any forest operations with efforts made to create wider aquatic and riparian zones (up to 50m) to provide long term protection against disturbance from future forestry operations and loss of light from canopy closure.
FES has considered flood risk of peak flows at the exit of the site and also further downstream. There are no known issues and plan proposals to increase the area of open space, reduce the area of commercial conifer woodland restocked replacing it with additional broadleaf areas both commercial and for biodiversity with well designed and significant sized buffers will minimise any additional effect. It is appreciated that new planting with associated operations of draining and ploughing can give rise to a very slight increase in peak flow (up to 20% at site scale) however there are no new planting proposals in the plan. The significance of the potential increase in peak flow will reduce as more water joins from other tributaries and the peak flow is diluted. Clearly if whole water catchments were being proposed for planting this would require greater examination and consideration.
Details of all known private water supplies within the block are held in a District GIS layer (see constraints map).
All work undertaken will comply with the Forests and Water Guidelines (Fifth Edition) although in this sensitive acidified catchment riparian buffer zones should be significantly enhanced.

3.1.3 Climate

The south west of Scotland has a predominantly mild windy oceanic climate influenced by the Gulf Stream. Annual rainfall in the block is around 1200mm, compared to the district range of 1000 – 2000mm, and falls mainly during the winter months October to February.
Guidance on Climate Change suggests that the District can expect an increased frequency of extreme weather events with the climate remaining wet and mild. Whilst there may be little impact on this DP block with regard to primary species choice (mainly conifer) there may be future threats to wildlife habitats. The development and maintenance of Habitat networks will be important.

3.2 Biodiversity and environmental designations

Ring Moss, a peatland SSSI, borders the design plan to the south west. Although generally separated from the land management plan by the R Bladnoch to the east the SSSI may still retain hydrological links with plantation to the north of the bog area. Bog habitats (UKBAP priority) support numerous flora and fauna species and are generally in decline. Any conservation or restoration and expansion of bog habitat within the plan would therefore make a significant contribution to biodiversity. The creation of additional open ground and its associated tree removal on the FES estate adjacent to the SSSI could improve groundwater levels essential for mire and bog habitats. The process of bog restoration here has started with the premature felling of 28.0ha of conifer and associated drain blocking to the north of the Ring Moss SSSI.

Water quality is a significant environmental factor in the plan area with the River Bladnoch identified as being of conservation importance (Special Area of Conservation (SAC)) due to the migratory Atlantic salmon population it supports (reference appendix viii R Bladnoch Designated Site Management Plan).

Galloway Fisheries Trust (GFT) has played a key role in identifying watercourses important for breeding salmonids such as the Glassoch Burn and Beoch Burn with work already actioned to address the issues of forest encroachment onto watercourses in the plan. This work will benefit other aquatic species such as Brown trout and European Eel and will be further developed with the subsequent creation of aquatic and riparian zones improvements, generally in excess of basic guidelines identified in Forest and Water guidelines 5th edition.

There are significant areas of Native Woodland within the DP unit but no existing FES PAWS sites. The plan area includes Glenrazie Wood, a substantial site that appears in the NCC *Inventory of Long-established Woodland of semi natural origin* (class 1A) and in the more recent Scottish Natural Heritage directory as *Ancient Woodland* and smaller sites such as Moor Plantation and Glassoch Wood. The Glenrazie Wood site already has fragile links with other Ancient Semi Natural Wooded areas along the R Cree valley and is a high priority site for restoration to further develop these links.

The area is also a local hotspot for various mammals.

3.2.1 FCS Biodiversity Programme key species

Red Squirrel is present within the block at low densities but the area is not considered to be a "Red Squirrel Stronghold site". These areas are designated by the Scottish Government as sites where Red Squirrel can be assisted to survive through positive management practices. Despite our intention to restore significant areas of native woodland within the plan area our otherwise continued commitment to areas of retained mature conifer plantation with an increased proportion of Scots Pine, Norway Spruce and small seeded Broadleaf restock areas will ensure that the block remains relatively advantageous towards Red

squirrel. Grey Squirrels have periodically been trapped along the eastern edge of the block.
Penninghame FDP is not considered to be a core area for Black Grouse. However as this red listed UKBAP species has been recorded around 2km from the eastern boundary at Barclye in 2010 the plan presents a great opportunity to provide for the species through improving the condition of existing internal open space, particularly that adjacent to developing heather areas and open ground / farmland, and developing the habitat further through establishing additional stands of native broadleaf species such as Birch, Hawthorn, Willow and Rowan for winter browsing on sites likely to be favoured by the species.

3.2.2 Scottish Biodiversity List Species

Water bodies and existing riparian habitats are regularly used by Otters for breeding (holts have been discovered at Garwhachie and Spectacle Lochs and Penninghame Pond (Castle Stewart Loch)) and for movement between the R Cree and R Bladnoch systems. Otters have a large territorial range, consequently wide ranges of adjacent connecting land will also be used.
Water voles have also used the lochs in the past and while the habitat is still suitable for recolonisation, they are increasingly scarce.
Positive riparian zone improvements, often exceeding basic guidelines proposals, such as an increase in BL cover coupled with our aim to keep sections of stream banks permanently vegetated and persisting throughout subsequent rotations will increase both the availability and connectivity of suitable breeding and feeding habitat for both of these species. Galloway FD Environment staff now also prepare brash piles along water courses, specifically providing excellent cover for rearing, resting and breeding otters. The main benefits for FES is that providing these features greatly reduces the likelihood that otters will create resting places or breeding sites within commercial forest stands and the brash piles are also likely to be used by a wide range of animal species and provide valuable deadwood habitat.
Pine Martens favour similar forest habitats as Red Squirrels and have been regularly seen around the Glassoch and Bladnoch bridge areas.
Nightjar, a rare and declining species that favours heathlands, moorlands, and recently felled conifer plantation, has historically used the area. There are recent increased records for the plan area.

3.3 The existing forest

3.3.1 Age structure, species and yield class

Species / Yield class

Species diversity within the block is relatively good but has been compromised by the continuing loss of a significant area of the Larch component removed as a result of the *P ramorum* infection. Pure spruce and Sitka Spruce and Lodgepole Pine mixtures generally dominate the block accounting for around 56% of the

plan area. The remaining plantation area, around 13%, comprises a mix of minor conifer species (Scots Pine, Douglas Fir and Larch) and broadleaf that is generally located on the better site types to the east of the plan area. Species diversity should quickly improve during the period of the plan as restocking with non-spruce conifer alternatives to the larch and BL species impacts.
Around 70.0ha (38%) of the broadleaf within the block has been identified as Native Woodland under the Native Woodland Survey Scotland project. These areas will form focal points for further broadleaf expansion.
Surprisingly just over 30% of the plan area is currently classified as open space. Comprising a mix of open water bodies, open hill ground and a significant although transient area of felled plantation, the area of open ground slightly increases over the period of the plan eventually stabilising at around 30%.
Yield class across the block is extremely variable with spruce crops ranging from YC16 in the valley bottoms down to very poor crop on some of the ranker soils. There is scope for substituting some of the poorer crops with alternative conifer species better suited to the site such as Scots Pine or further conversion of the area to broadleaf woodland fringe or permanent open space.

Species in 2017	**Total area (ha)**	**Total area %**
Sitka spruce	1946.8	53.0
Norway spruce	36.7	1.0
Larch spp.	80.2	2.2
LP (Other Pine)	121.7	3.3
Scots Pine	141.5	3.9
Douglas Fir	13.9	0.4
Other conifers	18.3	0.5
Broadleaf	184.5	5.0
Open space (includes felled areas & open water)	1128.9	30.7
Total	***3672.5***	***100.0***

Age Structure

Over previous plan periods our felling programme, with a minimum of 7yr age gaps or a 2m height differential maintained between fell coupes (with longer gaps up to 10yr in Black Grouse areas), extended crop rotation lengths and the conversion of some second rotation crops from clearfell to Low Impact Silvicultural System (LISS) management, had improved the spatial appearance and structure of the block bequeathing a relatively diverse age class spread although still skewed in favour of pole stage and maturing high forest crops. (see table below).

Age of trees	**Growth stage**	**Percentage of class at given year**

		2017	2047
0 - 10	Establishment	11.1%	13.3%
11 - 20	Thicket	12.2%	20.2%
21 - 40	Pole stage	19.2%	26.3%
41 - 60	Maturing high forest	24.9%	7.9%
61 +	Old high forest	1.9%	2.7%
	Open space / felled areas	30.7%	29.5%
Total		**100.0%**	**100.0%**

The significant recent felling of, and as yet not restocked, *P ramorum* infected larch areas will transitionally compromise structural diversity to the east of the block with increased open space and establishment crop hopefully balanced in time by additional areas of LISS crop. Further block restructuring to the west however remains an important consideration with a planned mix of some coupes being restocked quickly with others with potential adjacency issues dealt with through delayed restocking.

3.3.2 Access

The block has a relatively extensive forest road network that is generally accessible for timber haulage. The main haulage exits are to the east onto the A714 Newton Stewart to Girvan "agreed route" but also to the west along the B7027 Knowe to Barrhill road categorised as a "consultation route" on the Dumfries and Galloway Timber Transport Group Agreed Routes Map west for Timber Haulage. A small section of the C3w, again a "consultation route" is also used by the western extremity of the plan area. Final access to the forest road network using minor county roads ill-suited to timber haulage is an issue for both this block and much of the surrounding private sector plantations. Partnership work through the Strategic Timber Transport Fund (STTF) has previously taken place to address the access issue by substantially increasing the length of forest road used to transport timber and therefore reduce the impact of FES and private sector timber haulage on the public road network.

Within the period of this land management plan new road construction to facilitate access to the remaining first rotation crops and maintenance and road upgrade of the existing forest road network is required to service the forecast timber volume programme. Around 95% of the planned roads programme for the block is scheduled for construction during the approval period for this plan (see table below).

Period of Proposed Construction	Proposed length of new forest road for construction
2017 to 2021	5550m
2022 to 2026	2700m

Beyond 2024	510m

A completed application for determination of Prior Approval or Alteration of a Private Way (Forestry) form will be provided to the FCS prior to road construction work being carried out.

There are several active quarries in the plan area providing substantial quantities of stone material for forest road upgrade and new construction to service the planned timber harvest.

Spectacle Loch quarry is the principal quarry in the centre of the block but Glassoch, Glenhapple, Penninghame black and Penninghame 64 quarries are also regularly used. The lesser quarries are all located deep within the block core and are relatively inconspicuous but, as a result of some recent P ramorum felling, the expanding Spectacle loch quarry is visible from the Knowe road. Mitigating landscape work is planned to improve the view aspect.

All quarries are identified in the suite of DP maps along with proposed / planned forest roads for the plan period and beyond. To avoid diffuse pollution arising from rainfall derived leaching, appropriate soakaways are in place.

3.3.3 LISS potential

Virtually all of the plan area has low to moderate DAMS scores (Detailed Aspect Method of Scoring) of 17 or less providing opportunities for the expansion of future LISS management. LISS is defined as "Use of silvicultural system whereby the forest canopy is maintained at one or more levels without clearfell of areas over 2.0ha". Opportunities for the expansion of LISS are limited to the better site types to the east and generally constrained to the west of the Glassoch Burn by poorer, boggy site types. Crucially second rotation crops to the east may potentially provide opportunities for future LISS expansion (see section 5.1.3).

3.4 Landscape and land use

3.4.1 Landscape character and value

Despite its size the block does not constitute a particularly dominant feature in the landscape. The eastern edge of the plan area starts within the Cree valley extending westwards up onto a relatively flat plateau landscape.

The 1998 Dumfries and Galloway landscape assessment categorises the area occupied by the Penninghame block mainly as type 17 "Plateau with forest" where "land cover is typified by extensive conifer plantation of even age, colour and texture as yet little modified by redesign", and where "forests show an exposed and remote character with a lack of elevation to create dark landscapes" but also to the south small areas of Type 12 "Drumlin Pasture in Moss and Moor Lowland" where typically prominent pasture drumlins are set in flatter moss and moorland, two distinct character types.

The main issues arising from the assessment of these two distinct landscape character types of contrasting landform and vegetation are

- adding diversity to the landscape in subsequent rotations
- loss of plateau moorland through overall forestry expansion and resultant impact on land use balance
- potential wind power development given the landscape sensitivity

The following key landscape specifics have therefore been addressed:
The gentle landform and large scale relief will allow for some large scale felling coupe design in the plan hinterlands however enhancing the limited topographical diversity through the greater use of interconnected patterns of open space and the restocking of alternative species with a greater future reliance on broadleaf and minor conifer species such as Scots Pine and restructuring the forest for spatial, age, species and wildlife diversity through smaller coupe size and Low Impact Silviculture should be progressed.

3.4.2 Visibility

Parts of the block are seen through a range of near and mid-distant views afforded by the county roads that intersect the plan area however with distant external views limited by the flat, rolling topography much of the remainder of the block is generally less visible.
Internal views tend to be restrictive from the forest road network however, with recent felling for P ramorum infection and planned increases in permanent open space, alternative views have dramatically opened up.

3.4.3 Neighbouring landuse

There are several residential properties in and around the plan area. The block is however predominantly surrounded by open hill and agricultural land to the north, east and south and by numerous smaller private sector woodlands and the FES Tannylaggie plantation to the west.

3.5 Social factors

3.5.1 Visitor Zone Recreation

Although only a relatively minor part of the core Recreation facility area for the district, the Penninghame plan area has significant potential for more targeted recreation and would generally benefit from a path network upgrade. The principal facilities are listed in the table below.

Facility	**Concept / Opportunity**	**Constraint**	**Plan Development**
Penninghame Pond car park and trails	Enhance trail and car park environs	Large scale felling for *P ramorum* (plant health)	Area lies within group shelterwood coupes where objective is of

		Windthrow	gradual conversion to broadleaf woodland
Spectacle lochs fishing	Enhance loch environs Reduce impact of future operations	Large scale felling of P ramorum infected larch (plant health)	Enhance immediate loch surrounds with additional BL woodland and open space
Southern Upland Way	Enhance internal and external views	Relatively short section of route that runs through coupes not due for clearfell within plan period	Enhance immediate long distance path surrounds with broadleaf woodland to reduce impact of future harvesting operations

The Penninghame pond car park and trails facility lies within a series of group shelterwood coupes where the main objective is a gradual conversion of the mature conifer to broadleaf woodland.
A short section of the Southern Upland Way long distance route (around 1.5km) cuts through the northern edge of the plan area between the minor county roads at Knowe and Glenruther Lodge.
Recreational demands around both of these facilities will impact greatly on our management choice with our standard regimes heavily modified to improve the internal and external views associated with them. Treatments will be developed for each site involving bespoke thinning regimes, mature tree retentions where possible and the creation of additional open space and species diversity.

3.5.2 Community

Apart from the local community of Knowe village, that has a fairly central position within the block, there are several residential properties (Glenrazie, Meikle Eldrig and Penninghame Home Farm) and various agricultural neighbour interests affecting the DP unit.
All local Community Councils, Cree Valley Community Council covers the area, are in receipt of the latest version of our local Strategic Plan.

3.5.3 Heritage

Following *FES Historic Environment Planning Guidance*, this Forest Design Plan describes and considers the conservation and management of the historic environment. The FDP includes details of all relevant scheduled monuments, listed buildings, designed landscapes and the most significant undesignated features.
Designated historic environment features are recorded in the Designated Historic Assets Register (maintained by the FCS Archaeologist). Scheduled monuments and listed buildings are managed within Monument Management Plans and Condition Surveys respectively. FCS also maintains a programme of detailed

measured survey of our most significant sites in order to enhance the national historic environment record and inform conservation management.
Whilst there are no Scheduled Monuments or Category A listed buildings present in the plan area, a raft of other archaeological heritage features, settlement remains and sheep pens are present and listed in Appendix III.
All significant features will be protected and managed following the *Forestry and Archaeology Guidelines* (2011), the FCS policy document *Scotland's Woodlands and the Historic Environment* (2008) and the supporting *FES Historic Environment Planning Guidelines* (available from the FCS Archaeologist).
Known heritage features are marked on workplans before the start of forestry operations. Machine operators are fully briefed on their responsibilities prior to all sites being worked. The known record is based on features recorded on the 1st edition OS Map (1850).
Felling coupes, access roads and fence lines will be surveyed prior to any work being undertaken to ensure that upstanding historic environment features can be marked and avoided. Historic environment features, including drystane dykes, coming to light during forest operations will be surveyed, recorded, mapped and monitored for inclusion in future versions of the Design Plan and to demonstrate Forestry Commission Scotland compliance with the UK Forestry Standard.
At planting and restocking historic features will be removed from ground disturbing operations with opportunities to enhance the setting of important sites considered on a case-by-case basis (such as the views to and from a significant designated site).
Any recent archaeological surveys that have been undertaken on behalf of FCS have been incorporated into the Forester GIS Heritage Module geodatabase - and any new archaeological surveys required (in unimproved upland areas for example, or areas within which the archaeological record is unusually rich) are undertaken to the standards laid out in *FES Historic Environment Planning Guidelines.* This will ensure that undiscovered historic environment features are mapped and recorded prior to forestry establishment and management operations - and will ensure the continued comprehensive protection of the known archaeological resource.

3.5.4 Forest Renewables and Utilities

At this time there are no renewable developments planned for the Penninghame LMP unit however the possibility remains that the area could be subject to future windfarm applications.

Forestry Commission Scotland (FCS) is working to develop the wind and hydropower potential of the land and forests that we manage for the Scottish Ministers. Our aim is to ensure that the potential of the National Forest Estate is developed and managed in ways that

- contribute to the Scottish Government's renewable energy target
- maximise financial returns from the National Forest Estate
- secure benefits for local communities and
- achieve a reasonable and sustainable balance with other FCS objectives

3.6 Statutory requirements and key external policies

The legal status of the land is purchased.

4.0 Analysis and Concept

4.1 Analysis of constraints and opportunities

The following table sets out the site factors that are deemed significant in influencing the long-term management of the forest block.

Factor	Opportunity	Constraint	Concept Development
Timber	Provide planned sustainable timber supply	Creation / enhance conservation habitats Recreation developments	LISS areas and smaller coupe size Maintain conifer restock programme whilst increasing area of BL in subsequent rotations Remove flow peaks from timber production
Biodiversity	Enhance Nightjar habitat	Low (but increasing) resident population Moderate levels of species diversity Lack of appropriate mature conifer crop	LISS and smaller coupe size in Nightjar areas Increase BL restock for additional species diversity Identify retention areas of mature conifer and extend rotation lengths throughout Identify localised boggy areas as open space
Biodiversity	Restore ASNW remnants and connect to other external ASNW habitat networks	Fragmented nature and poor quality of existing ASNW remnant Extended restructure period	Extend BL woodland / open space connectivity to riparian zones and internal / external open space Increase BL restock for additional species diversity
Biodiversity	Enhance connectivity aquatic areas to other habitat networks	Isolated nature of lochs Extended restructure period	Extend woodland fringe / open space connectivity to riparian zones and internal / external open space
Environmental Quality	Enhance views of block from A712 and minor county	Rapid period of landscape change due to *P ramorum*	Smaller coupe size LISS areas Greater species

	road	infection Moderate levels of species diversity	diversity
Environmental Quality	Develop Low Impact Silvicultural Systems on better site types	Site type constraints	Increase area under LISS
Environmental Quality	Enhance water quality within the R Bladnoch (SAC) and R Cree catchments	Conifer monoculture planted close to watercourses Moderate levels of species diversity Extended period of landscape change	Smaller coupe size LISS areas Riparian enhancement through increased open space / BL restock Increase species diversity (BL and minor conifer)
Access and Health	Enhance access and enable communities to enjoy woodlands	Moderate current formal recreation in block	Enhance formal recreation through potential trail / facilities development Provision of additional bespoke treatments within Recreation Visitor zones including increased open space and species diversity

4.2 Concept development

The concept forms the broad framework for the detailed design and is presented graphically in map 4: Analysis and Concept. A variety of themes, often overlapping, are outlined as follows:

Commercial confer zone / Core timber production

Large swathes of upland spruce and mixed conifer plantation within the design plan unit will continue to be managed as commercial crop to meet the district programme commitments. Better site types however will facilitate extending rotation lengths in some conifer crops (through additional LISS areas), will allow for increased species diversity including commercial broadleaf production and will create opportunities for smaller clearfell coupe sizes.

Highly visible roadside corridors

Parts of the block, from both the A712 and the B7027 minor county road, are highly visible and currently present a series of fairly attractive views. Long term aims are to further improve the views although this will be significantly constrained by the current Phytopthora ramorum infestation on Larch and the landscape impact caused by its resultant removal programme. However greater species diversity in the future, both broadleaf and minor conifer, and the development of Low Impact Silviculture Systems will contribute towards maintaining views.

Bladnoch riparian zone / floodplain

The R Bladnoch, designated SAC, runs west / east through much of the plan area. Water quality issues within the catchment and the creation of a major habitat network centred on the development of this riparian corridor are critical success factors in the plan. Opportunities will be taken to go beyond the basic proposals of the legal drivers and voluntary codes i.e. the UK Forestry Standard (UKFS) the Forest and Water Guidelines (FWG) and the UK Woodland Assurance Standard (UKWAS) to fully open up the riparian corridor.

Aquatic habitats

There are several lochs scattered throughout the block providing localised points of recreation and or biodiversity interest. Linking these areas to external and internal open space areas or including them within the R Bladnoch riparian corridor through the creation of permanent woodland fringe will add biodiversity value to the plan area.

Ancient Semi Natural Woodlands

There are significant areas of ASNW remnant within and adjacent to the design plan unit. Opportunities exist over time to restore our existing fragmented ASNW areas through conifer removal, the development of LISS and greater species diversity and to further enhance them through linkages to the larger more favourable external ASNW areas, particularly along the R Cree valley.

Nightjar area

Nightjars have historically used parts of this design plan area and appear to be returning as evidenced by sightings in 2015 and 2016. Suitable habitat creation

/ enhancement will be focussed around their previous core area, through increased species diversity (including broadleaf) in the second rotation and additional open space creation.

Designated sites

Ring Moss SSSI borders the site. Bog restoration operations and the creation of an open space buffer in FES woodland on the northern edge of the designated site will contribute towards the maintenance of its favourable status.

Recreation Core / Residentials

The design plan unit is considered to be a core recreation area for the district with several fishing loch facilities, a trails network centred on Castle Stewart Loch (Penninghame Ponds), other informal access and minor car parking as well as providing a section of the Southern Upland Way with its link to external long distance walking access. Area specific Visitor zone treatments will be developed for each of these sites involving bespoke thinning regimes, mature tree retentions where possible and the creation of additional open space and species diversity.

There are several residential properties within and on the edges of the design plan area. Improving visual and species diversity around these areas is an additional objective for the plan.

5.0 Land Management Proposals

5.1 Forest stand management

The Penninghame plan has been designed in accordance with sound silvicultural and environmental principles within the framework outlined by the UK Forestry Standard, the UK Woodland Assurance Standard and the Galloway FD Strategic Plan.

Table 1 and the accompanying Management map provides details of our coupe management proposals and Table 2 summarises the average annual felling and thinning volumes (m3ob) expected for the next 10years (plan period):

Table 1

Management Type	**Area (ha)**
Clearfell	2939.8
Group Shelterwood	440.1
Minimum Intervention	144.0
Natural Reserve	6.2
Long Term Retention	71.5
Other/Open land	70.9

Table 2

Fell period	**Thinning / LISS**	**Clearfell**	**Total**
2017-2021	3183	31431	34614
2022-2026	3909	42491	46400
2027-2031	2615	26106	28721
2032-2036	2516	42534	45050

The timber volume programme for this block has been significantly smoothed to provide a regular and sustainable supply of timber to the market.

5.1.1 Clear felling

While most of the plan area (around 80.0%) will be managed under a clearfell management type using conventional harvester and forwarder working, a significant area will be managed under alternative management types.

A number of coupes (30 coupes, around 25 % of the plan area) are scheduled for clearfell during the 10yr period of the plan and they contribute quite substantially to the district programme (see Appendix IV).

The following table confirms that, as per paragraph 3.4.2 in the UK Woodland Assurance Standard (second edition), no more than 25% of the plan area is due to be felled in any five year period within this plan approval period.

5yr Fell period	Area felled (ha)	Area felled as % of total plantation area
2017-2021	**345.6**	**9.4**
2018-2022	**187.3**	**5.1**
2019-2023	**222.7**	**6.1**
2020-2024	**234.5**	**6.4**
2021-2025	**296.7**	**8.1**
2022-2026	**426.4**	**11.6**
2023-2027	**494.7**	**13.5**
2024-2028	**580.3**	**15.8**
2025-2029	**436.5**	**11.9**
2026-2030	**356.0**	**9.7**

For landscape and biodiversity considerations efforts have been made

- to extend the felling period between coupes
- to reduce the overall size of the remaining clearfell coupes
- to increase the area of plantation under LISS specifically in the eastern section of the plan

It is also of course important to manage forestry activities in acid sensitive water catchments and this Land Management Plan area lies within a catchment that has been identified as being either "at risk" or "failing". Calculations have been prepared and are included at Appendix VI showing that proposed operations in this catchment satisfy both the felled area and closed canopy forest >15yrs needing to be less than 30% of the catchment in 15 years' time thresholds.
All proposed operations sites will be surveyed prior to work taking place to identify the presence of species such as Red Squirrel, Otter or Badger that may require specific management treatments i.e. locating dreys or avoiding breeding seasons.

5.1.2 Thinning

Thinning is currently confined to the area east of the Glassoch Burn where there is a relatively good forest roads infrastructure and better site types. Second rotation crops here offer the best potential to expand the overall thinnable area ultimately resulting in an increased area of the block moving from clearfell towards other less intensive management systems. Much of the thinning is currently scheduled for within the next 5yrs.
Carried out on a 7-10yr cycle in accordance with our local policy, crops will generally be thinned to realise amenity, biodiversity and landscape objectives with the benefits of improved timber quality mainly restricted to second rotation first thin crops.

5.1.3 LISS, Long-term Retention and Natural Reserve

A significant area of the Penninghame FDP area, some 440.0ha (12.0%), is currently managed under Low Impact Silvicultural Systems (LISS). As LISS can contribute to the protection and improvement of soil quality, water quality and biodiversity through reducing soil erosion and the creation of suspended solids in water, areas primarily in the east of the block where site types are better and areas adjacent to the main watercourses throughout the DP unit will be targeted for additional LISS development.

Group Shelterwood systems will be the preferred system and should, through regular crown thinning and occasional small-scale clearfells of <2ha (perhaps centred on windthrow), provide areas for either natural regeneration or targeted restock of small seeded native tree and shrub species and contribute towards greater spatial diversity.

Group Shelterwood generally encompasses:

- progressive thinning
- clearance of windthrow patches
- small-scale felling patches of 0.5ha up to 2.0ha to stimulate restructuring and promote regeneration of target tree species

If there is a management requirement for any coupe greater than 2.0ha to be felled then that prescription will be initially agreed with the FCS as per the Tolerance Table in Appendix II.

With the move towards LISS management and increased thinning it is inevitable that additional road spurs and a permanent network of coupe access racks will be required. These will be identified and recorded during future plan period operations.

Natural Reserves are predominantly wooded, permanently identified locations of high wildlife interest or potential that is solely managed for high conservation or biodiversity value. As there are sufficient selected Natural Reserves of higher biodiversity value throughout the district only a small area centred on Moor Plantation has been identified.

Minimum intervention has management with no systematic felling or restocking although operations such as fencing, control of exotics and pests, safety work and trail maintenance are permitted. In this plan around 4% of the plantation area, mainly broadleaf areas, provide the focus for Minimum Intervention management.

Under Long-term Retention (LTR) trees are retained for environmental benefit significantly beyond the age or size generally adopted. Only around 2% of the Penninghame plan, mainly areas of second rotation pine and broadleaf plantings adjacent to access roads or other retained areas, have been identified as LTR.

5.2 Future habitats and species

The accompanying Future Habitats and Species map provides detail of our proposed restock species and habitats for Penninghame FDP.

5.2.1 Bog habitat restoration (open space)

The UK Forestry Standard and the Scottish Government's policy on Control of Woodland Removal presume that sites will be restocked following clearfell. The UK Forestry Standard also requires managers to minimise soil disturbance, particularly on organic (peaty) soils with a general requirement to consider the potential impacts of soil disturbance when planning operations involving cultivation, harvesting, drainage and road construction. Since the FC Forests and Peatland Habitats Guidelines Note was published in 2000, the importance of trees in mitigating climate change has become more important with supplementary guidance produced in 2015 to support the original note. This additional guidance offers a decision making framework based on the likely carbon storage or release from different management options on deep peats. Three restocking options are now available

1. where the site is a priority for habitat restoration on ecological grounds, conventional restocking will not be required
2. where the site is not a priority for restoration and is likely to support tree growth of Yield Class 8 or above for Sitka spruce, conventional restocking should be undertaken
3. where the site is not a priority for restoration to open peatland and is unlikely to support tree growth of Yield Class 8 or above for Sitka spruce, the appropriate action will usually be to create peatland woodland edge.

Under the FES strategy for Lowland Raised bog and Intermediate bog on the National Forest Estate in Scotland 2012-2022, there are environmental and conservation considerations for areas within the plan where there will be a presumption against commercial restocking in the second rotation. FES bogs with existing canopy woodland have enormous potential to improve towards open bogs if successfully restored and accordingly represent significant conservation opportunities.

As a result of recommendation 5 from this strategy "Initiate further lowland raised bog and intermediate bog restoration work on other plantation sites which are ecologically suitable for restoration" and the decision framework from the FCS guidance the following table identifies an area prioritised for bog restoration according to its perceived habitat value.

Area	**Objective**	**Benefits / positive factors**	**Implementation**
Coupe 21026 (site adjacent to R Bladnoch SAC and Ring Moss SSSI and shows strong evidence of	• Restore to open peatland;	• Conserve existing moss land vegetation • Reduce risk of transpiration and lowering of water table by conifers to adjacent Ring Moss SSSI	• Clearfell coupe 21026 with no planned restock • Block drains by use of wet peat to speed up re-wetting of bog surface and restore water table

moss land vegetation)		• Reduce conifer effect upon SAC site R Bladnoch • meets UKWAS UKBAP priority habitats requirements	• Monitor occurrence of conifer regeneration at 5yr intervals and assess impact on resulting habitat • Remove regeneration where appropriate by tree pulling or cutting by chain saw

5.2.2 Woodland fringe / open hilltop

A feature of the design plan is to create areas of woodland fringe, a transitional zone between the plantation and open hilltops. Native woodland fringe is defined as 20-50% tree cover in a matrix of short vegetation. Always more than 50% (ideally 100%) of the tree species will be native. Regeneration will be closely monitored, assessed as to its suitability and if the density of woodland cover is unacceptably low then restocking would take place or if too dense the conifer regeneration removed as resources allow. Woodland fringe has the potential to provide additional habitat for Black Grouse and Nightjar.

Modification of the upper planting margins and highlighting crag areas through broadleaf planting and increased open space to better complement landform will take place.

Block	**Objective**	**Benefits**	**Implementation**
Penninghame	• Creation of woodland fringe (additional Black Grouse habitat)	• Enhance hill top habitat for variety of species • Increase area of potential heather moorland / open space • Increase BL area within forest district	• Identify areas for open space / broadleaf woodland creation to link lower lying R Bladnoch valley to higher elevation open ground, farmland and moorland sites

5.2.3 Riparian zones / aquatic zones (open space)

Still water areas in the plan such as Loch Swad, Loch-na-Tummock, Loch Quie and Garwachie and Spectacle lochs are important habitat oases for fish and wild fowl species. Not only will they require significant buffer zones to remove excessive shading by conifer crop but efforts will also be made to link them to larger habitat networks both major riparian zones and other external and internal open space.

All watercourses >0.5m wide associated with the block will be subject to improved riparian buffer zones comprising native BL planting and open space.

Those within the SAC area could be further extended by up to 50m, to assist in improving water quality, protecting soils and benefitting species that use that habitat.
At a more detailed level where we are looking to better promote other natural features such as rock crags and wet hollows areas, increased open space and species diversity will persist.

5.2.4 Wetlands zones (open space / woodland)

There are localised wetland features throughout the plan area, many associated with the R Bladnoch valley system. Many, such as the area to the south of Glassoch have already been identified in the plan as areas of permanent open space or low density broadleaf planting to complement local habitats, others will be identified by future operations during the plan period. These sites will as far as possible remain unstocked as a benefit to invertebrates and bird life although, if water quality is not diminished, some natural regeneration of native species will be accepted.

5.2.5 Quarries (open space)

The substantial and active Penninghame quarry (NX355700) is identified on the features map and will remain as permanent open space. Future quarrying, without major boundary expansion, may well be required to provide source material for forest road construction and maintenance in the area. Any significant quarry development proposals will be submitted to FCS for approval prior to work taking place (see Tolerance table Appendix II).

5.2.6 Deadwood / veteran trees

Although there is generally little in the way of established deadwood throughout the block, there are broadleaf areas such as the mature broadleaves in Moor plantation that do contain an element of standing deadwood. These areas and their associated woodland ground flora should be retained at time of conifer clearfell and will provide focal points for future BL expansion (see local District BL policy document) and in time as the broadleaf component of the block increases should provide additional sources of deadwood.
Dedicated areas for deadwood creation will also rely on identifying around 1% of the conifer plantation as Natural Reserve (from which no timber will be removed) as per our current District Deadwood Management policy (see Features map).
There are several trees Oak, Ash and Beech within the Penninghame block, identified on the ground and recorded, that potentially qualify as veteran trees (see Features map).

5.2.7 Woodland

In the conifer dominant commercial areas Sitka spruce will continue to be the main timber species however, where landscape considerations prevail or where site conditions are favourable DF, NS and SP will be preferred. Our current policy

not to restock with Larch (driven by current and potential future P ramorum infections) will in the long-term result in a loss of Larch forest previously beneficial for Black Grouse and Red Squirrel. This potential loss will be offset through additional planned restocking of DF, SP, NS and BL and should the restocking embargos be lifted in the future, the reinstatement of some Larch crops.

The following table presents the details of our proposed species restock:

Species	**Area (ha) in 2027**	**Total Area %**	**Area (ha) in 2047**	**Total Area %**
Sitka spruce	1656.5	45.1	1510.0	41.1
Norway spruce	47.9	1.3	64.7	1.8
Larch spp.	45.8	1.2	43.4	1.2
LP (other pine)	117.1	3.2	116.3	3.2
Scots Pine	175.6	4.8	224.0	6.1
Douglas Fir	43.5	1.2	97.2	2.6
Other Conifers	17.4	0.5	22.4	0.6
Broadleaf	300.3	8.2	509.5	13.9
Open Space	1268.4	34.5	1085.0	29.5
Total	3672.5	100.0	3672.5	100.0

The table reflects, mainly at the expense of the existing Sitka Spruce and infected Larch crops, a significant expansion of Scots Pine woodland, modest increases in DF and NS and small increases in the other minor conifer species for added species diversity. There is also a marked increase in the proposed area of mainly native, small seeded broadleaf, tree cover that will both enhance the landscape and provide improved woodland habitat to protect soils and improve water quality.

Target stocking density for non-commercial broadleaf will be a minimum of 1600stems per hectare (2.5m spacing) with restocking taking place should the figure not be reached. Where there is potential for commercial broadleaf (mainly Sycamore, Oak, Aspen and Birch) then a minimum stocking density of 3500stems per hectare (1.7m spacing) will apply.

The overall area of permanent open space remains fairly constant focussed on the riparian zones and their linkages into internal and adjacent hilltop areas some of which may eventually develop into native woodland fringe.

Post clearfelling there will be no conifer restocking within at least 20m (and on occasion up to 50m) of main watercourses with the riparian zones also benefitting from small areas of additional broadleaf planting. Significant natural regeneration of conifers within these riparian zones will be managed as resources allow avoiding the loss of proposed buffer zone.

Where species selection differs markedly from the design plan proposals, detailed restock plans will be submitted to FCS for approval prior to work taking place (see Appendix II Tolerance table).

5.3 Restructuring

Despite significant recent clearfelling to remove P ramorum infected Larch block restructuring remains a significant objective. Our planned clearfell throughout the plan area, but particularly to the west where the infection was less pronounced, coupled with extended age class differences and increased areas of open space will continue to gradually change / improve the spatial appearance and structure of the block. Additional areas of broadleaf and the Long-term Retention of conifer species such as Scots Pine will provide landscape benefits as well as a greater diversity of habitat for conservation for the block.

5.4 PAWS restoration

There are no existing FES PAWS sites within the DP unit but Glenrazie Wood and Moor Plantations are areas of broadleaf LEPO woodland (Long Established of Plantation Origin). Whilst it is District policy to restore PAWS sites, significant opportunities still remain for habitat network creation by linking these broadleaf woodland areas to the external blocks of adjacent Ancient Semi Natural woodland both internally up the Glassoch Burn (Glassoch Wood), externally along the public road network and up the nearby R Cree valley (Wood of Cree, Camer Woods and Glenhapple Wood) and to other LEPO areas to the south west such as Turnieminnoch Wood and Stony Park Plantations along the Black Burn. Small scattered areas of broadleaf also exist along the C3w Glassoch to Three Lochs county road and the B7027 Knowe to Newton Stewart road that can be retained and significantly enhanced through planned BL restock to flesh out this skeletal linkage.

5.5 Deer management

Current deer management in the Penninghame block is carried out by FES Wildlife Rangers with assistance from contract rangers as required.
Both Roe deer and significant numbers of Red deer inhabit the plan area and over the next 5yrs significant resources will be deployed in an effort to reduce the overall background population. This action will be vital to ensure that Forest Enterprise Scotland's National Deer Management Strategic objectives are met.
New ATV tracks will be implemented along restocked coupes adjacent to open hill areas or along the larger riparian zones. Careful consideration will be given to their absolute need and location. Though none are currently planned, where required, they will be constructed to one of two designated standards.

- Tracks along riparian zones will involve minimal ground disturbance work.
- Those not following riparian zones will involve removing topsoil and levelling the surface with a drain on the top side and will be a maximum of 2m wide.

No trees will be planted within 5m of the track centre.

Temporary quad bike tracks will also be formed with minimum ground disturbance. They will generally follow old unplanted rides, with levelling to

negotiate side slopes and be spaced at approximately 400m intervals. There will be no unplanted margin around these temporary tracks and they will subsequently be subsumed into the plantation as tree canopy closes. Forests and Water guidelines (Fifth edition) will be adhered to during their construction and crossing points will be piped.
Deer glades, typically up to 1.0ha in size, are not shown on the suite of design plan maps. Precise locations will be identified and inserted at time of restocking when Ranger staff has had the opportunity to fully assess site conditions post clear fell.

5.6 Pathogens, Diseases and Invasive Non native species

Dothistroma Needle Blight (DNB) has been identified on Corsican, Lodgepole and Scots Pine crops in the district, although at present is only causing mortality in CP. Within the design plan small areas of CP have already been removed but for now, given the impact on structural and species diversity of the Phytopthora infection, Scots Pine will remain an important element of planned restock. DNB surveys may in the future become more intensive and its wider presence in the block cannot be ruled out.
Hylobius, the Pine weevil, can cause extensive damage to young conifer crop and is found both in this plan area and throughout the district. As part of the districts chemical minimisation strategy the *Hylobius* Management Support System (HMSS), incorporating the use of billet traps, was previously used to measure *Hylobius* numbers on clearfell sites. Based on several years of monitoring data the district has moved to a standard 3year fallow period. This standard fallow period between felling and re-stocking conforms to our revised tolerance table (Appendix II Tolerance Table).
With the *Phytopthora ramorum* infection confirmed on Larch within the block and throughout the district, most of mainland Galloway now lies in the *P. ramorum* Management Zone where we will continue to fell infected stands as and when we are able but no longer bound by the requirements of Statutory Plant Health Notices (SPHN). The Penninghame block has been particularly affected with large areas of mature and pole stage larch recently removed. Where in previous plans the species was a significant component in our planned restock, in this plan it is likely that the species will become a far less prominent component of the local woodland with other minor conifer (not Sitka spruce) and broadleaf woodland contributing more towards the species diversity of the block.
Invasive non-native species (INNS) impact the geology of an area directly and are recognised as a significant risk to water environments. There are no records of Japanese Knotweed, Giant Hogweed and Himalayan Balsam in the block however there are significant areas of Rhododendron ponticum. Treated in the past, the species will continue to be treated as per the District's Invasive Species Policy until eradicated.

5.7 Waste on site (including felling waste)

Generally there are no plans to carry out chipping, mulching or spreading of forest waste over the plan area for ecological site improvement however some felling to waste may take place in response to potential infections of P ramorum of immature larch crops and clearance of conifer regeneration as part of the peat restoration project adjacent to Ring Moss SSSI.
Detailed plans will be submitted to FCS for approval prior to any work taking place.

5.8 Sites requiring Habitats Regulations Appraisal

There are two sites bordering the plan area that have Special Area of Conservation (SAC) status under the EC Directive 92/94/EEC on the conservation of Natural Habitats and of Wild Flora and Fauna (the habitats directive) meaning that the provisions of Revised Circular 6/95 apply. The circular sets out the UK Government's obligations under the Habitats Directive that: "The regulations require that where an authority concludes that a development proposal unconnected with the nature conservation management of a Natura 2000 site is likely to have a significant effect on that site, it must undertake an appropriate assessment of the implications for the conservation interests for which the area has been designated."
The relevant site is the River Bladnoch (see appendix VII)

5.9 Tolerances

Tolerance thresholds for design plan amendments are as per our Tolerance Table (based on CSM6 Appendix 3 and subsequent to local agreement with FCS South Scotland staff) and the *P ramorum* working tolerance table for Larch found in Appendix II

5.10 Critical Success Factors

- Development of the R Bladnoch riparian corridor
- Peatland restoration adjacent to Ring Moss
- Persistence and enhancement of ASNW features
- Construction of proposed new roads

5.11 Amendments

To be logged on amendment form

Appendix I: Forest Design Plan Consultation Record

Statutory Consultee	Date contacted	Date response received	Issue raised	Forest District Response
Galloway Fisheries Trust: Jamie Ribbens	19 December 2013	03.February 2014	• Identified following issues: overshading , siltation risk, riparian management and drainage of R Cree catchment with specific recommendations for Castle Stewart burn and Penninghame Pond • Identified identical issues along with acidification for the R Bladnoch catchment again with specific recommendations for the Beoch and Glassoch Burns • Issue over inflows of still waters such as Garwachie Lochs, Loch-na-tummock, Loch Swad and Loch Quie	• Noted in DP text (sections 3.1 & 5.2.2)
SNH Newton Stewart office: Stuart Graham	19 December 2013	16 January 2014	• Supportive comments generally on improved access, increased species and habitat diversity, enhanced management of Ring Moss SSSI interface to plantation, use of LISS, restructuring and landscape	• Noted in DP text (section 3.2)

			integration of plantation and the enhancement of aquatic and riparian zones throughout the block • Data on protected species provided	
Historic Scotland: John Malcolm	19 December 2013	07 January 2014	• No designated features – no comment other than referred to Regional Archaeologist	• Noted in DP text (section 3.5.3)
SEPA: John Gorman; Newton Stewart office	19 December 2013	06 January 2014	• Identified following issues: acidification of R Bladnoch catchment • need for a holistic approach for riparian management to benefit environmental improvement (increases in riparian zone width) • drainage management and pollution protection • conifer regeneration control	• Noted in DP text (sections 3.1 & 5.2)
RSPB Crossmichael: Julia Gallagher	19 December 2013	06 January 2014	• Proposed habitat enhancements for Nightjar and other species noted • Potential beneficial affect of BL around Ring Moss SSSI noted	• Noted in DP text (sections 3.2 & 5.2)
Rosemary Green;IUCN Otter Specialist Group	19 December 2013	02 January 2014	• Various notes on mammal records for area	• Noted in DP text (section 3.2)
FCS South Scotland Conservancy: Dumfries office	19 December 2013	No comment received	•	•
Scottish Woodlands : Alastair	19 December	No comment	•	•

Menarry	2013	received		
Saving Scotland's Red Squirrels: Heinz Traut	19 December 2013	No comment received	•	•
Dumfries & Galloway Regional Council: Andrew Maxwell	19 December 2013	No comment received	•	•
Dumfries & Galloway Regional Council: Tom Whitty	19 December 2013	No comment received	•	•
Cree Valley Community Council : Morag MacIlwraith			•	•
Scottish Wildlife Trust: Maggie Keane	19 December 2013	No comment received	•	•
Visit Scotland: Paula McDonald	19 December 2013	No comment received	•	•
Neighbour; Jack Orchel	19 December 2013	No comment received	•	•
Neighbour; Philip Skinner	19 December 2013	No comment received	•	•

Appendix II: Tolerance Tables

1) Adjacency issues will normally be dealt with through delayed felling i.e. a coupe will not be felled until all surrounding crops are at least 2m tall

2) Where this cannot be achieved then adjacency issues may be dealt with through delayed restocking i.e. a coupe will not be restocked until all surrounding crops are at least 2m tall. Where this approach is adopted an assessment must be made and recorded, at the time of the decision being taken, to ensure that the wider forest and habitat structure is not being significantly compromised. Such evidence should be presented at the 5yr review.

3) Tolerance table

	Maps required (Y/N)	Adjustment to felling period	Adjustment to felling coupe boundaries	Timing of restocking	Change to restocking species	Change to roadlines	Designed open space * **	W/blow Clearance ***
FC Approval not normally required	N	Fell date can be moved within 5yr period where separation or other constraints are met.	Up to 10% of coupe area	At year 3 after felling. Restocking within 2yrs +/- of year 3.	Change within species group e.g. evergreen conifers or broadleaves		Increase by up to 5% of coupe area	Up to 0.5ha of coupe area
Approval by exchange of letters and map	Y		Up to 15% of coupe area			Additional felling of trees not agreed in plan. Departures of >60m in either direction from centre line of road.	Increase by up to 10% of coupe area Any reduction in open space of coupe area	Between 0.5ha to 2.0ha of coupe area
Approval by formal plan amendment may be required	Y	Felling delayed into second or later 5yr period. Advance felling into current or 2nd 5yr period.	In excess of 15% of coupe area	If timing of restocking is outwith the period detailed above.	Change from specified native species. Change between species groups.	As above depending on sensitivity.	In excess of 10% of coupe area Colonisation of open space agreed as critical.	In excess of 5.0ha of coupe area

Notes

* No more than 1.0ha, without consultation with FCS, where location is defined as "sensitive" within the Environmental Impact Assessment (Forestry) 1999 Regulations (EIA

** Tolerance subject to an overriding maximum 20% open space
*** Where windblow occurs, FCS should be informed of extent prior to clearance and consulted on where clearance of any standing trees is required

Within the text of the Forest Design Plan it must clearly state how the plan will address the issue of adjacency with a statement to the effect that:

- **EITHER Any adjacency issues will be dealt with through delay restocking, i.e. a coupe will not be restocked until all surrounding crops are at least 2m tall**
- **OR Any adjacency issues will be dealt with through delay felling, i.e. a coupe will not be felled until all surrounding crops are at least 2m tall.**

TABLE OF WORKING TOLERANCES SPECIFIC TO LARCH WITH THE INFECTED ZONE

	Adjustment to felling period *	**Adjustment to felling coupe boundaries**	**Timing of restocking**	**Changes to Species**	**Changes to road lines**
FC Approval normally not required	Fell date for all larch can be moved and also directly associated other species	Larch areas can be treated as approved coupes. Other conifers directly associated with larch being felled, may also be removed up to an equivalent of 20% of the area occupied by the larch or 5 ha, whichever is greater	To be undertaken within the overall plan approval period	Replacement as per the agreed restock plan, but where this is not specified or is larch this may be replaced with either another diverse conifer (not SS) or Broadleaves.	
Approval normally by exchange of letters and map. **In some circumstances Approval by formal plan amendment may be required**		Removal of areas of other species in excess of the limits identified above.	Restocking proposals outwith the plan approval period	Restocking proposals for other species which do not meet the tolerances identified above.	New roadlines or tracks directly necessary to allow the extraction of Larch material

Appendix III: Ground Truthed Heritage sites

SITE	PHOTO	GRID	LAST VISIT	COMMENT
R Bladnoch building	No	NX296710	02.02.15	Not located; site within P1977 conifer. **Maintain in area of open space**
R Bladnoch structure	No	NX299706	02.02.15	Not located; site within P1977 conifer. **Maintain in area of open space.**
Carseriggan craig	No	NX314698	-	Not located; field system on edge of open area. **Maintain in area of open space.**
Beoch Burn farmstead	No	NX318725	-	Area recently felled / restocked. Possible farmstead, dyked enclosures and hay ree. **Maintain in area of open space.**
Beoch Burn sheep ree	No	NX317723	-	Area recently felled / restocked. Possible sheep ree. **Maintain in area of open space.**
Knowe structure	Yes	NX318713	02.02.15	Linear compartmented structure within recently felled area. **Maintain in area of open space.**
Old House Hill Carseriggan	Yes	NX328678	19.03.14	Carseriggan farmstead ruins; Previously in deer glade (around 6 large associated mature Ash / Oak trees - veteran Ash), now adjacent to new forest road access that separates the trees. **Maintain in area of open space.**
Sheep pen	Yes	NX328683	02.02.15	Sheep pen group (square); in area of permanent open space within 20m of forest road / walls in fair condition with small section at ground level. **Maintain in area of open space.**
Enclosures	No	NX333692	-	Not visible. **Maintain as area of open space.**

Cairn	No	NX336709	-	Not located; feature associated with area of open space. **Maintain in area of open space.**
Eldrig Mills ruins	No	NX336668	-	Low level ruins in poor condition, both mill and water lade visible on aerial photography. **Maintain in area of open space.**
Hay Ree	No	NX338676	-	Not located; site associated with area of open space. **Maintain in area of open space.**
Glassoch Fell Cairn	No	NX340711	-	Not located; feature within area of open space. **Maintain in area of open space.**
Garmill field system	No	NX348706	-	Not located; within recently felled area (2014) adjacent to cairn in open area. **Maintain in area of open space.**
Cairn	No	NX347707	-	Not located; feature possibly associated with Garmill field system. **Maintain in area of open space.**
Garwachie Moor farmstead & field system	No	NX345695	-	Ruins not located; site under P1989 conifer crop. **Maintain in area of open space.**
Garwachie Loch; Hay Ree	No	NX350681	-	Not located; coupe recently felled and restocked / no obvious sign of feature / possible association with drumlin type rocky ground. **No further action.**
Sheep pen	No	NX358678	-	Not located; site within area of mature conifer. **Maintain in area of mixed woodland.**
Moat Plantation (Motte)	Yes	NX357674	02.02.15	Natural mound around 40m in diameter with ditch / earth wall and mature Beech trees around base (considered as possible motte). Site generally open but with conifer and BL regeneration present. **Maintain in area of open space / open BL woodland.**
Glenvogie	Yes	NX357676	02.02.15	Ruined farmstead within area of mature plantation with adjacent *R ponticum*. **Remove *R ponticum* and maintain in area of mixed woodland.**

Blackquarter farmstead	No	NX360651	-	Not located; ruinous site disturbed by forestry within area of P1977 conifer. **Maintain in area of open space.**
Lower Blackquarter farmstead	No	NX361648	-	Not located; relatively well preserved farmstead within P1977 conifer. **Maintain in area of mixed woodland.**
Barskeoch	No	NX361647	-	Not located; site within P1977 conifer. **Maintain in area of mixed woodland.**
Water tank	No	NX368680	02.02.15	Large concrete water tank; part of the extensive water collection system for Penninghame estate. **Maintain in area of open space.**
Bomb range marker *(associated with target triangle)	No	NX360661	02.02.15	Concrete arrow (20m) pointing south. Direction arrow for WWII bombing range lying within field around 1km from target. **Maintain in area of open space.**
Bomb range marker *(associated with concrete arrow)	No	NX358651	-	Not located; target triangle from WWII bombing range. Triangle lies 5m from forest ride edge. **Maintain in area of open space.**
Fleckedland farmstead	No	NX366666	-	Not located; farmstead ruins associated with open space post clearfell. **Maintain in area of open space.**
Blackquarter, structure	No	NX357660	-	Not located; circular feature, possibly sheepfold within conifer P1976 plantation. **Maintain in area of open space.**
Blackquarter Moss building	No	NX361671	02.02.15	Unroofed building attached to field wall. **Maintain in area of open space.**

Appendix IV: Coupe details for clearfell and establishment

Clearfell

Coupe	SS	NS	Larch	SP	LP	Other con.	BL	Open space	Total
21001	30.4	-	2.3	-	-	-	-	4.4	37.1
21004	46.4	-	-	-	-	-	-	9.1	55.5
21008	26.0	-	-	3.2	-	-	-	8.0	37.2
21013	39.6	-	-	3.6	-	-	-	2.6	45.8
21019	16.3	-	2.7	-	-	-	-	0.7	19.7
21020	11.9	-	-	-	-	-	-	9.5	21.4
21021	7.3	-	-	-	-	-	-	2.4	9.7
21027	33.0	-	2.9	-	-	-	-	1.7	37.6
21038	16.6	-	-	0.7	-	-	-	1.6	18.9
21040	24.5	-	5.5	1.0	-	1.5	-	0.4	32.9
21046	16.0	-	-	-	-	-	-	1.1	17.1
21052	39.2	0.7	3.4	2.8	-	5.0	-	10.4	61.5
21055	43.2	-	-	2.4	-	-	-	3.3	48.9
21059	29.2	-	3.5	0.2	-	-	-	8.5	41.4
21064	50.3	-	2.2	-	-	-	-	10.8	63.3
21071	24.5	-	-	-	-	-	-	1.9	26.4

21073	35.6	-	-	-	12.6	-	-	-	48.2
21083	19.4	-	-	-	-	-	-	3.8	23.2
21084	34.7	1.1	2.3	-	0.7	-	-	3.0	41.8
21106	34.8	-	-	-	-	-	-	2.0	36.8
21111	10.2	-	-	-	13.2	-	-	13.2	36.6
21127	7.0	0.7	1.5	-	3.0	-	-	4.0	16.2
21151	26.8	1.6	0.8	-	1.1	-	-	3.2	33.5
21152	15.7	-	-	0.6	-	-	-	1.0	17.3
21155	25.7	1.8	0.2	-	-	-	-	3.1	30.8
21159	23.4	1.0	-	1.0	-	-	0.5	2.2	28.1
21161	16.8	-	-	-	-	2.2	-	3.0	22.0
21165	26.8	-	1.5	0.6	0.7	-	-	2.0	31.6
total	**731.3**	**6.9**	**28.8**	**16.1**	**31.3**	**8.7**	**0.5**	**116.9**	**940.5**

Restock

Coupe	SS	NS	Larch	SP	LP	Other con.	BL	Open space	Total
21001	9.4	-	-	3.4	9.3	-	4.3	10.7	37.1
21004	44.5	-	-	-	-	-	1.0	10.0	55.5
21008	27.4	-	-	2.2	-	-	2.2	5.4	37.2
21013	37.8	-	-	3.4	-	-	-	4.6	45.8
21019	17.1	-	-	-	-	-		2.6	19.7

21020	19.1	-	-	-	-	-	2.3	-	21.4
21021	5.7	-	-	0.3	-	-	1.2	2.5	9.7
21027	16.3	-	-	-	16.3	-	1.2	3.8	37.6
21038	13.2	-	-	1.2	-	-	1.6	2.9	18.9
21040	18.7	1.4	-	6.8	-	-	1.0	5.0	32.9
21046	-	-	-	-	-	-	10.5	6.6	17.1
21052	21.3	-	-	11.8	-	5.0	6.6	16.8	61.5
21055	35.6	-	-	4.7	-	-	-	8.6	48.9
21059	30.0	-	-	0.9	-	-	6.2	4.3	41.4
21064	45.4	-	-	5.1	-	-	9.4	3.4	63.3
21071	10.8	-	-	-	-	-	14.6	1.0	26.4
21073	34.5	-	-	-	-	-	8.7	5.0	48.2
21083	17.5	1.7	-	-	-	-	0.3	3.7	23.2
21084	16.1	-	-	-	-	-	7.7	18.0	41.8
21106	31.9	-	-	-	-	-	1.2	3.7	36.8
21111	9.0	-	-	-	9.0	-	14.3	4.3	36.6
21127	-	0.6	-	-	-	-	13.1	2.5	16.2
21151	5.2	3.8	-	-	-	5.6	16.2	2.7	33.5
21152	15.0	-	-	-	-	-	-	2.3	17.3
21155	18.3	3.5	-	-	-	-	6.4	2.6	30.8
21159	0.8	-	-	5.7	-	18.9	-	2.7	28.1

21161	9.0	-	-	8.7	-	-	3.3	1.0	22.0
21165	23.6	-	-	-	-	-	2.7	5.3	31.6
total	**533.2**	**11.0**	**-**	**54.2**	**34.6**	**29.5**	**136.0**	**142.0**	**940.5**

Notes on coupe work schedule

21001	**Coupe adjacent to R Bladnoch; additional open space and BL restock for habitat network creation and visual and species diversity**
21004	**SS matrix with open space focussed around coupe boundary and forest road**
21008	**SS matrix with open space, BL and SP restock targeted to Damloch Strand watercourse and forest roads**
21013	**R Bladnoch forms north boundary; additional open space and SP restock for habitat network creation and visual and species diversity**
21019	**SS matrix with open space focussed around coupe boundary**
21020	**SS matrix with BL restock targeted towards adjacent ASNW**
21021	**SS matrix with open space, BL and SP restock targeted to external ASNW, minor county road and Damloch Strand**
21027	**SS/LP matrix with open ground / BL to forest road boundary, R Bladnoch corridor and Ring Moss peatland restoration site to south**
21038	**Beoch Burn runs along western boundary; additional open space, BL and SP restock for riparian habitat network creation and visual and species diversity**
21040	**SS matrix with SP, NS, BL and open space targeted to Glassoch Burn, coupe boundaries and open ground at Beoch**
21046	**BL and open ground to block plantation boundary, Black Burn and open hill interface**
21052	**Coupe straddles Glassoch Burn and suffers area of dead larch (P ramorum damage); open space, SP, other minor conifer and BL restock targeted to coupe edges, county road at Beoch and riparian zone for habitat network creation and visual and species diversity**
21053	**SS matrix with SP, BL and open space targeted to Glassoch Burn, coupe**

	boundaries and open ground and county road at Beoch
21055	**Coupe contains Loch Quie; open space and SP restock targeted to coupe edges and aquatic zone for habitat network creation and additional visual and species diversity**
21059	**Glassoch Burn runs along western boundary; additional open space, BL and SP restock for visual and species diversity along riparian habitat network, existing open ground and external ASNW to south**
21064	**SS matrix with open space and BL targeted to external / internal native woodland and open ground**
21071	**SS/BL matrix adjacent to open habitat to north**
21073	**SS matrix with BL and open space targeted to Castle Stewart Burn riparian habitat network and to open hill ground on northern boundary**
21083	**Coupe adjacent to Castle Stewart Burn; additional open space, NS and BL restock targeted to riparian zone for habitat network creation and visual and additional species diversity**
21084	**Significant area of open space targeted on Castle Stewart Burn riparian zone, Loch Swad and coupe boundary edge out onto open hill ground**
21106	**SS matrix with BL and open space targeted to coupe boundaries**
21111	**SS/LP matrix to south with BL and open space targeted on Garwachie Loch, Spectacle Lochs and Loch-na-Tummock (part felled)**
21127	**BL and open space targeted on area surrounds of Garwachie and Spectacle Lochs and Loch-na-Tummock (part felled)**
21151	**BL and open space targeted on area surrounds of Loch Eldrig with NS and SS to east**
21152	**SS matrix with open space to coupe edges**
21155	**SS matrix with BL and open space targeted to coupe boundaries and Loch Eldrig to west**
21159	**DF matrix with SS and SP for additional species diversity**
21161	**Coupe adjacent to R Bladnoch and minor county road at Glassoch bridge; additional open space, SP and BL restock centred on riparian zone for habitat network creation and visual and species diversity**
21165	**SS matrix with significant open space / BL component to R Bladnoch boundary**

	to east

Appendix V. Penninghame Design Plan Brief

A BRIEF FOR PENNINGHAME FDP

Main management objectives focus on Timber, Biodiversity (Nightjar?), Environmental Quality (R Bladnoch SAC water quality and minor heritage features) and Access interest (Recreation facilities) in this medium size DP unit.

The block lies some 6km northwest of Newton Stewart, Dumfries & Galloway.

Key National Themes from Scottish Forestry Strategy	Local District Strategic Plan Objectives	Prescription
Timber	• GAL 2.01 Increase timber production in this medium size block • GAL 2.02 Develop species choice for productive forest • GAL 2.07 Increase overall BL resource within block; establish commercial BL area where possible	• *Meet* production forecast commitment through revised felling plan and thinning based LISS (focus on eastern section of block centred on recreation areas and roadsides) • Use Ecological Site Classification based restock to *Optimise* commercial conifer potential • *Increase* area of BL, native species for biodiversity and where possible faster growing commercial species (Sycamore and Aspen) • *Implement* modest scale road building / road maintenance programme required to service proposed operations coupes
Biodiversity	• GAL 7.02 Improve status and condition / restore Ancient Woodland sites • GAL 7.03 Establish new Broadleaf Woodland • Other species and habitats	• Historical Nightjar area; *Improve* open space and edge habitats throughout plan area (esp. restock areas), open up boggy areas of poor tree growth and establish linkages between relict moorland areas to north • *Establish* new native BL woodland within and establish habitat networks along the R Bladnoch valley with neighbouring landowner where appropriate • *Restore* Ancient Woodland site (Glenrazie Wood & Fiddle Wood), develop other relict BL woodland within block and create linkages to other nearby ASNW sites (Glassoch, Glenhapple Woods and Moor Plantation) • *Manage* the range of aquatic habitats in Penninghame Pond, Spectacle Lochs, Loch Eldrig and Loch Swad through habitat enhancement

Environmental Quality	• GAL 6.01 Protect water, soil and air quality • GAL 6.03 Landscape • GAL 6.04 Maintain heritage features	• *Manage* watercourses within DP unit in keeping with UKWAS standards and Forest and Water guidelines to maintain and improve water quality within R Bladnoch (SAC) and R Cree catchments to improve feeding and spawning conditions for fish • *Increase* area of mature woodland and species diversity for habitat enhancement and *Enhance* views into block from A712 and B7027 minor county roads for landscape benefits(consider impact of *P Ramorum* within block and the future design of a Larch free forest) • *Expand area covered by and develop* Low Impact Silviculture sytems in block (focus on eastern section around Penninghame Pond and B7027 minor county road) • *Manage* heritage features according to FES Archaeological guidelines
Access and Health	• GAL 5.01 Maintain trail networks • GAL 5.03 Make access easier and enhance recreation	• *Retain and enhance* existing pedestrian and cycle trail networks, *develop* core recreation facilities within plan area to *provide* a varied and enjoyable woodland experience for visitors, local communities and internal residents (Glenrazie, Meikle Eldrig and Penninghame Home Farm) • *Maintain* FES signage to woodland for easy access • *Identify intensive management regimes* for Visitor Zone areas
Business development	• GAL 3.02 Deliver plans / outcomes of GFP tourism strategy	• *Contribute* towards district Recreation facilities infrastructure through trail network, fishing facilities (Spectacle Loch and Loch Eldrig) and Penninghame Pond development all within the Biosphere buffer & Dark Skies park zones

Penninghame Forest Design Plan 2016-26

ACHIEVED BY PLAN

HEALTHY

Y Committed to high quality silviculture and increasingly using alternatives to clearfell (LISS): significant area of LISS in place with potential for further expansion(eastern section of block)

Y Committed to dealing with invasive plants that threaten habitats and biodiversity: active *R.ponticum* control ongoing within block

Y/N Help the estate to adapt to climate change and become more resilient to pressure: ongoing proactive control of *P ramorum* and an operational Deer management plan for block in place

PRODUCTIVE

Y Supply three million cubic metre of sustainable softwood: design plan will contribute significantly to the overall programme for the district

Y Manage at least one quarter of our expanding broadleaf woodlands to produce quality hardwood and fuelwood: plan has potential to contribute towards this figure with increased BL restocking in the eastern sections of the plan area that may be of a productive nature

Y/N Work with partners to find new ways to harness our natural and cultural heritage and develop the estate's potential for tourism: limited opportunities however Pennfield project work has previously developed all abilities access

Y/N Support Scottish Governments woodland expansion programme: block presents limited opportunities for additional woodland expansion

Y/N Plan to increase the agricultural use of the estate where this is consistent with environmental objectives: block presents limited opportunities for agricultural land use expansion

TREASURED

Y Recognise the value of the Estate as a place for research and development of best practice: block has potential for further LISS development

Y/N Committed to more unique special places across the estate and delivering benefits to a more diverse range of Scotland's people: ASNW restoration will deliver additional habitat diversity

Y/N Continue to use the Estate as a place for volunteering and gaining employment skills: limited current scope however block has previously been used by volunteers (Pennfield project)

ACCESSIBLE

Y Invest available resources into high quality facilities that encourage and help visitors experience and enjoy the outdoor experience: block presents significant opportunities for development of fishing, walking trail and car parking facilities

Y Use estate for health benefits and outdoor learning: block is regularly used by local people for all abilities exercise including dog walking and horse riding

CARED FOR

Y Restore 85%of areas on ASNW to native species: ongoing thinning, LISS areas and planned native woodland restocking will contribute towards district restoration targets

Y Increase BL tree cover from 8% woodland cover to 20%: block will significantly contribute towards district's BL tree cover expansion targets through additional restock / natural regeneration

Y Identify particularly vulnerable species for which the NFE is important and take specific conservation action (Black Grouse / Red Squirrel): not a priority area for either of these species however forest operations within plan area should potentially benefit historic transient Nightjar population

Y Safeguard archaeological sites through planning and management and recognise special places and features with local cultural meaning: there are no SAM sites within the block however the local heritage features will be managed accordingly

Y/N Committed to maintaining best open habitats in good ecological condition: block presents limited opportunities for open habitat management nevertheless open habitat in the form of peatland restoration has taken place

GOOD VALUE

Y/N Seek a range of income sources to underpin the cost of managing the Estate and look for ways to achieve best value in delivery of public benefits: block presents limited opportunities for income from sources other than timber

Appendix VI: Assessment of felling and restock proposals within catchments at risk and failing

Penninghame 221 catchment at risk / failing catchment

The total area of this water catchment centred on Loch Ochiltree and R Bladnoch is 3557.5ha. Catchment comprises 1829.3ha* of FES land and 1728.2ha of additional private sector plantation to the north other open agricultural ground. See below for base catchment area detail as at 19 November 2015.

Open ground area (FES land)	620.9ha
Plantation area (FES land)	1208.4ha
Total catchment area (FES land)	1829.3ha*
20% of catchment (FES land)	365.8ha
30% of catchment (FES land)	548.7ha

The felled area within the catchment in any 3 year period needs to be less than 20% of the catchment. The table below based on the planned coupe felling programme confirms that this is the case.

5yr Fell period	Currently proposed felled areas (ha)	Proposed fell area as % of catchment area
2016-18	**170.2**	9.3%
2017-19	**187.3**	10.2%
2018-20	**80.0**	4.4%
2019-21	**80.0**	4.4%
2020-22	**0.0**	0.0%

2021-23	**38.2**	2.1%
2022-24	**202.6**	11.1%
2023-25	**235.5**	12.9%
2024-26	**235.1**	12.9%
2025-27	**163.6**	8.9%

The area of closed canopy conifer forest (age > 15years) needs to be less than 30% of catchment in 15 years' time i.e. 548.7ha. The table below confirms that, for the FES element of the catchment, this is the case.
In the table the proposed fell area for the next 15yrs within the catchment is subtracted from the current plantation area in the catchment to give a notional area of 522.5ha of plantation within the catchment over 15yrs age (assumes that felled areas will be restocked within 2-3yrs of felling subject to planned restock and Hylobius Management Support System).

Current plantation area within catchment	1208.4ha
Proposed felled area between 2016 -2030 (15yrs)	685.9ha
Notional plantation area in 15yrs time > 15yrs age	**522.5ha**

Appendix VII: Habitats Regulations Appraisals

R Bladnoch SAC

Qualifying Interests	
Common Name	**Scientific Name**
Atlantic Salmon	Salmo salar

The **conservation objectives** for the **R Bladnoch SAC** are to avoid deterioration of the habitats or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and significantly contributes to achieving favourable conservation status for the qualifying species ensuring that the following are maintained in the long term

- distribution of the species within the site
- distribution and extent of habitats supporting the species
- structure, function and supporting processes of habitats.
- no significant disturbance of typical species of the habitat.

The **potential impacts** and **controls of impacts** of operations associated with Penninghame land management plan on the R Bladnoch Natura site are as follows;

Potential Impact.	**Control of Impact**
Commercial forestry coupes adjoin the SAC. Future forestry operations (felling and extraction of timber and restocking operations) have the potential to impact on the water quality of the SAC and its tributaries that in turn impact on the habitat that supports the qualifying species. Additionally forest encroachment and tree canopy capture and deposition of acidic atmospheric pollutants contribute to water course acidification.	• There will be no forest operations or traffic within the SAC area. • All trees in coupes adjacent to the SAC will be felled away from the SAC area and brash concentrated in trackways off the SAC site. • Creation of a permanent broadleaf and open space riparian buffer along all watercourses in the plan area between the SAC and the commercial forest (ideally wider than those specified in Forests and Water guidelines) • Close adherence to Forest & Water Guidelines (pre-felling workplan process identifies appropriate safeguards prior to operations start)

Appendix VIII: R Bladnoch SAC Designated Site Management Plan

Galloway Forest District

Designated Sites Management Plan.

River Bladnoch SAC

Start Date of Plan; July 2016
End Date of Plan; June 2021

Relevant Forest Enterprise Land Management Plans;
Kilgallioch (19)
Tannylaggie (20)
Penninghame (21)
Knock of Luce Group (32)

Management Aims & Objectives for the designated site;
To avoid deterioration of the habitats of the qualifying species (Atlantic salmon) or significant disturbance to the qualifying species (Atlantic salmon,) thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features and to ensure for the qualifying species that the following are maintained in the long term;

- Population of the species, including range of genetic types, as a viable component of the site.
- Distribution of the species within site.
- Distribution and extent of habitats supporting the species.
- Structure, function and supporting processes of habitats supporting the species.
- No significant disturbance to the species.

Section 1 Designated Sites covered by this appendix (or LMP's)

Designated Site Name	Site code	Site Type	Total Area of designated site (ha)	Area within LMPs (ha)	% on NFE *	Annex containing SNH site documentation
River Bladnoch	8355	SAC	272.6	34.4 ha	12 %	See below for list of appendices.

Refer to the map in the appendices which highlights the location of the above designated sites in relation to the LMP boundary and the NFE management area.

For further detail on the designation refer to the SNH documentation in the appendices attached which refer to the entire designated site area.

Section 2 Features on the NFE and condition

Only features that exist on the NFE within the above LMP's are listed in the table below.

Site Type	Feature description	Feature code	SCM Condition (Date assessed)	Condition on NFE	Management Classification (if relevant)
SAC	Atlantic salmon (Salmo samar)	Fish	5/09/2011	Unfavourable Recovering	Favourable

Plan update and review.
This plan will be formally reviewed every 5 years but will be updated as required during the intervening period to reflect any major changes to the proposed management.

Section 3 Pressures and proposed actions

Site Type	Feature description	Feature pressures.	Proposed action	Timescale	Location Map highlighting work & other key limiting factors
SAC	Atlantic salmon	Agricultural Operations.	There are no agricultural activities taking place on the National Forest Estate (NFE.)	N/A	N/A
SAC	Atlantic salmon	Forestry Operations.	All work will be carried out following best practice set out in the UK Forest Standard and associated guidelines, especially Forest and Water guidelines V5. By complying with best practice we aim to minimise sediment release from any forest operations with efforts made to create wider aquatic and riparian zones (up to 50m on the wider watercourses) to provide long term protection against disturbance from future forestry operations and loss of light from canopy closure. See below in section 5 for detailed breakdown of operations.	Ongoing	See below.
SAC	Atlantic salmon	Water Quality.	The main sensitivities appear to be sediment and ph. All work will be carried out following best practice set out in the UK Forest Standard and associated guidelines, especially Forest and Water guidelines V5. The original Conifer monoculture planted close to watercourses will	Ongoing	See below.

			be considerably reduced during the plan period and levels of tree species diversity increased. The riparian area will be considerably enhanced through increased open space (including bog restoration) and broadleaved restock. See below in section 5 for detailed breakdown of operations.		

Section 4 Operations within the LMP that could impact on the designated features on the NFE

Operation Type	Detailed description of operation and method	Mitigation measures to be applied	Timing	Map reference & other relevant comments
The majority of forestry operations are adjacent to the SAC rather than within it, i.e. on banks on either side of the river except for the following;				
Research.	Work in collaboration with the Galloway Fisheries Trust (GFT) and SEPA to facilitate ongoing research into water quality, (temperature and ph data loggers) liming trials, electro-fishing and egg survival.	As per approval requirements stipulated by SEPA and approved by SNH.	Throughout plan period.	Reports to be supplied to SEPA and SNH by GFT.
Stocking of Salmon.	The Galloway Fisheries Trust operates a small hatchery off the NFE and they occasionally undertake supplementary stocking as part of ongoing research. This stocking sometimes takes access across the	GFT adhere to best practice following Marine Scotland guidelines and obtain the required Marine Scotland licence after consultation and agreement with Colin	If undertaken, stocking takes place in February.	Stocking only occurs in acidified and recovering sections of the upper Tarff and Bladnoch and only when there is an estimated surplus of eggs available.

	NFE.	Bean of SNH.		
Control of Invasive Non Native Species (INNS)	The only INNS known to be in the area are mink and mink rafts have been deployed in the past to survey and control this species.	To date very few Mink have been recorded, this is thought to be related to the good numbers of Otter present on the Bladnoch.	Ongoing	Particularly slow moving sections of water associated with populations of Water Voles are targeted for Mink surveys.

Section 5 Operations within the LMP or aspects of the National Forest Estate within the LMP that could impact on designated sites adjacent to the National Forest Estate

Operation Type	Detailed description of operation and method	Mitigation measures to be applied	Timing	Map reference & other relevant comments
Felling and extraction of timber.	Felling by harvester, extraction by forwarder and haulage by timber wagon.	No felling, extraction or haulage to occur in the designated site. All trees will be felled away from the SAC and debris cleared from the banks of the Bladnoch. All work will accord to the Forest & Water Guidelines version 5.	As per LMP colour coding on felling plans.	First two felling phases (red and orange.)
Restocking of previously felled areas.	Ground preparation (mounding) of previously felled areas and replanting with trees.	No mounding or re-planting to take place within the designated site. Wherever possible, planting will be kept back in excess of the distances stated in Forest & Water Guidelines version 5 and the banks of the river kept open. Planting of native riparian woodland will take place following Forest Habitat Network principles to create	As per restock plan on restock maps.	As per restock plans.

		dappled shading where this is deemed to be beneficial to the SAC. Advice from GFT and SNH will be sought through reviews and revisions of the LMPs especially in relation to emerging research on rising water temperatures and any requirement for additional shading on slow moving, peaty (darker) sections of the river. Where funds allow, any regenerating conifers will also be cleared from the riparian corridor.		
Restoration of Blanket Bog	Previously planted areas of deep peat will be surveyed and considered for deforestation and forest to bog restoration. Where funds allow, these areas will be restored to active bog through drain	Flat wet sites with good remnant bog vegetation will be favoured, especially those within the Bladnoch catchment where ph vales are low, e.g. Tannylaggie Flow. Consultation with GFT, SEPA and SNH will take place as part of the site selection and bog restoration process.	As per LMP colour coding on felling plans. Felling is being brought forward in some locations (premature felling) to facilitate bog restoration, (e.g. Ringmoss) and to facilitate an	First two felling phases (red and orange.)

	blocking to raise the water table.		improvement to water quality (e.g. Polbae Burn.)	
Otters	The presumption is that Otter are present on all watercourses within Galloway Forest District, including Designated sites.	Otters are always looked for as part of initial site assessment during the FES workplan process prior to any work commencing. A full Otter survey has been carried out of the NFE managed sections of the Bladnoch which has located the main couches and holts. These have been mapped and will be protected. Wherever possible, conditions are improved for Otter by the creation of artificial Holts on clearfell sites adjacent to water courses using logs and brash material.	Throughout the plan period.	As per workplan process.
Deer control.	Culling as per Forest District Deer control policies. This involves the use of quad bikes to extract culled animals adjacent to	Quad bikes to use hard and rocky routes to avoid soil erosion and damage. No quad tracks to be constructed within designated site.	Throughout the plan period as per best practice.	Deer are controlled in all areas.

	the designated site.			

Section 6 Appropriate Assessment/s undertaken on work contained within the LMPs

Not required for this SAC as the work being undertaking is required for the management of the SAC.

Section 7 Approvals, agreements & signatures

I confirm that the above management plan which covers the section of SAC River Bladnoch within Land Management Plans Kilgallioch (19) Tannylaggie (20) Penninghame (21) and Knock of Luce Group (32) contain the necessary detail, content and mitigation measures to comply with the statutory requirements contained within the Nature Conservation (Scotland) Act 2004 and in particular in relation to Part 2, Chapter 1, Section 14 (1) (e), which covers consents via an agreed management plan.

SNH Signature …… Date ……

SNH Name ……

SNH Job Title ……

Address……

Email ……

Contact telephone number ……

FCS has a corporate requirement under UKWAS (3rd edition) and under the FCS Framework Document for FES (2010) to manage all designated sites in accordance with plans approved by the statutory authority, I therefore sign below to approve the contents of this plan in relation to the designated sites River Bladnoch SAC that fall within its boundary on the NFE.

SNH Signature …… Date ……

SNH Name ……

Appendices relevant to this Management Plan;

Appendix 1; SAC. Qualifying Interests.
Appendix 2; SAC Conservation Objectives.
Appendix 3; SAC (SNH) Map.

Appendix 4; JNCC Natura Data Form.
Appendix 5; SAC & FCS Maps (north and South) showing SAC boundary and Land Management Plan areas (shown as "Blocks" on the maps.)

Document review table.

Version	Amendment	By	Date
1	First draft	Andrew Jarrott	04/07/16
2	Second Draft to incorporate comments suggested by Jamie Ribbens, GFT during discussion on the 7th July 16.	Andrew Jarrott	08/07/16

Appendix IX: The UK Forestry Standard, Forestry Commission Guidelines and the UK Woodland Assurance Scheme (UKWAS)

All of the operations in Penninghame plantation will be carried out in accordance with the UK Forestry Standard and its supporting publications. In particular the following documents are relevant:

- Forests and Water Guidelines (5th edition pending)
- Forest and Nature Conservation Guidelines
- Forest and Archaeology Guidelines
- Forest and Soil Guidelines
- Forest Practice Guide - Forest Design Planning
- Galloway FD Deadwood Management Policy
- Galloway FD Deer Management Strategy Plan

In line with Forest Enterprise policy, Galloway FD has undergone a management audit that is part of the process leading to certification under UKWAS. Membership of the scheme indicates that the District's forests and management practices have been found to be sustainable both in terms of silviculture and environmental impact. Membership of the scheme is conditional on periodic audit and consistent attainment of audit standards.

Penninghame Forest Design Plan will be included in this audit process.