# Appendix 1: The Forest Planning Framework in Scotland

## FC Scotland prepares Land Management Plans within the following planning framework:

**1. The National Level**

Document name: **The Scottish Government's Scotland Performs 2007 – Present**

Document purpose: Reports on the Scottish Government's attempts to create a more successful country through the seven purpose targets.

Document name: **The Scottish Government's Land Use Strategy 2011 – Present**

Document purpose: Takes a strategic approach to achieving a more sustainable and integrated approach to land use in Scotland. Focusing on common goals for different land users it provides a set of principles for use as a policy guide and decision making tool.

Document name: **The Scottish Forestry Strategy 2006 – 2016**

Document purpose: Describes how the Scottish Government will deliver its forestry policies in Scotland and sets out the priorities for the next five to ten years.

Intended audience: Local Forestry Commission Scotland team; Forestry Commission conservancy team; key stakeholders; statutory consultees; general public.

**2. The Regional Level**

Document name: **Highland Forest & Woodland Strategy 2006 - Present (Consultative Draft)**

Document purpose: Provides a regional expression of the Scottish Forestry Strategy, describing priorities and programmes for using trees, woodlands and forestry to help meet the needs of the Highlands.

Intended audience: Local Forestry Commission Scotland team; key stakeholders; statutory consultees; general public.

**3. District Level**

Document name: **The Forest District Strategic Plan 2014 – 2017**

Document purpose: Serves as a guide to the management of forests within Inverness ,Ross and Skye Forest District.
This document describes the role and strategic directions for Inverness Ross & Skye Forest District in managing approximately a tenth of Scotland's National Forest Estate (NFE) over the three years from 2014-2017. Actions against key commitments of the National Startegic Directions are applied to relevant areas of the district to reflect the local, economic, social and ecological individuality of the forests. Strategic objectives are presented within the context of the Scottish Executive's strategic priorities for forestry in Scotland (e.g. to create a diverse forest resource for the future; make a positive contribution to the

**4. The Forest Level**

Document name: **Land Management Plan (Covering a ten year period from date of approval)**

Document purpose: Takes a holistic view of management at the landscape scale, outlining the medium to long term management for each forest.

Intended audience: Local Forestry Commission Scotland team; key stakeholders; statutory consultees; general public.

**5. Coupe Level**

Document name: **Work Plans (permanent coupe record)**

Document purpose: Each major forest operation has its own Work Plan. At this stage, a visit is made by local staff who identify site specific interests and outline the constraints and opportunities that are relevant to the site at a level of detail that far greater than a LMP

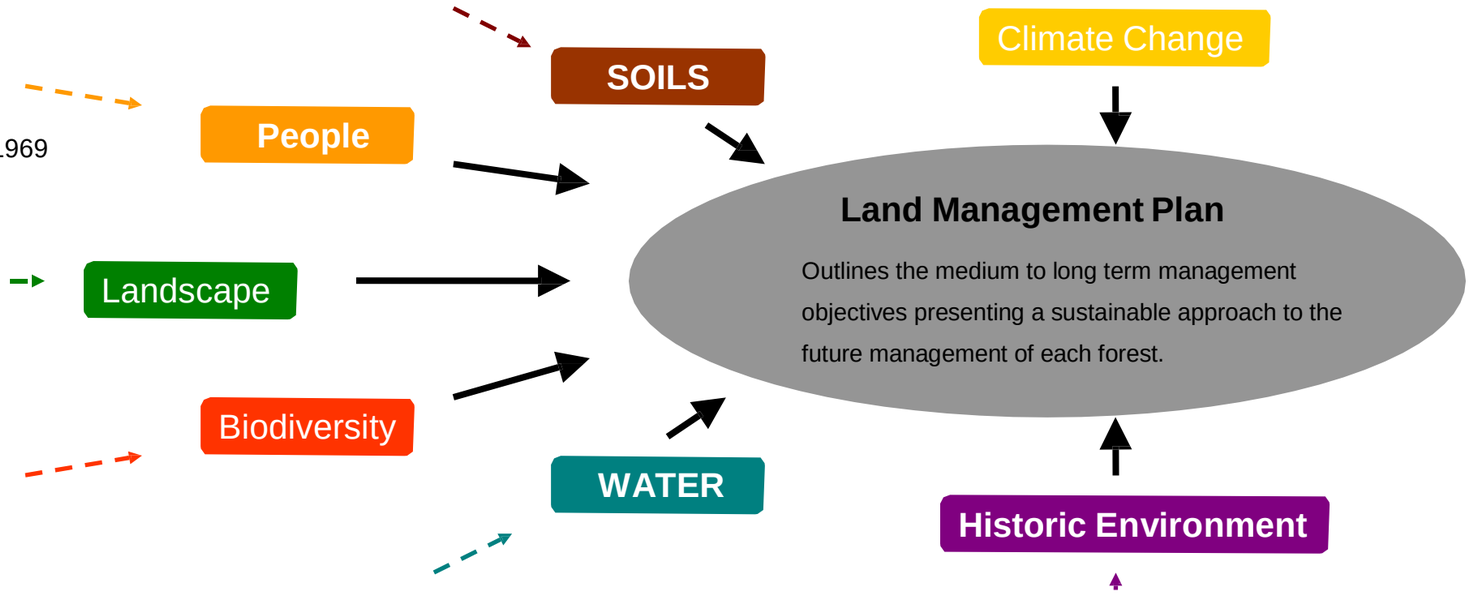
Intended audience: Local Forestry Commission Scotland team; key stakeholders; statutory consultees where required;

## APPENDIX 2: KEY POLICIES AND GUIDANCE

- UK Forestry Standard 2011
- UK Woodland Assurance Standard 2012
- Equality Act 2010
- Control of Substances Hazardous to Health Regulations 2002
- Provision and Use of Work Equipment Regulations 1998
- Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995
- The Highways act 1980
- Management of Health and Safety at Work Regulations 1999
- Health and Safety at Work Act 1974
- Occupier's Liability (Scotland) Act 1960
- Land Reform (Scotland) Act 2003
- Employers Liability (Compulsory Insurance) Act 1969

- UK Forestry Standard 2011
- UK Woodland Assurance Standard 2012
- World Soil Charter
- European Soil Charter
- The Waste Management Licensing Regulations 1994
- Control of Pesticides Regulations 1986
- Integrated Pollution Prevention and Control Directive 2008
- Environmental Liability Directive 2004
- Control of Pesticides Regulations 1986
- The Scottish Soil Framework 2009

- UK Forestry Standard 2011
- UK Woodland Assurance Standard 2012
- The UN Framework Convention on Climate Change
- The Kyoto Protocol
- EC Directive 2003/87/EC
- Climate Change (Scotland) Act 2009




- UK Forestry Standard 2011
- UK Woodland Assurance Standard 2012
- Policy on Control of Woodland Removal 2008
- Environmental Impact Assessment (Forestry) (Scotland) Regulations 1999

- UK Forestry Standard 2011
- UK Woodland Assurance Standard 2012
- Wildlife and Natural Environment (Scotland) Act 2011
- Conservation (Natural Habitats) Amendment (Scotland) Regulations 2007
- Nature Conservation (Scotland) Act 2004
- Deer (Scotland) Act 2003
- Protection of Badgers Act 1992
- EC Birds Directive 2009
- Convention on Biological Diversity 1992
- EU Habitats Directive 1992

- UK Forestry Standard 2011
- UK Woodland Assurance Standard 2012
- EU Water Framework Directive 2000
- Water Environment and Water Services (Scotland) Act 2003
- Water Environment (Controlled Activities) (Scotland) Regulations 2005
- Water Environment (Diffuse Pollution) (Scotland) Regulations 2008
- Environmental Protection Act 1990

- UK Forestry Standard 2011
- UK Woodland Assurance Standard 2012
- UNESCO World Heritage Convention
- Ancient Monuments and Archaeological Areas Act 1979
- European Convention on the Protection of the Archaeological Heritage Valetta 1992
- Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997
- Treasure Trove Scotland

# Kinloch Hills and Broadford

## Land Management Plan Brief

### 1. Project Background

#### Kinloch Hills

**Landscape setting**

There are 3 main hills in the block that run down to Loch Alsh and the Sound of Sleat. Because of this these slopes are highly visible from Kyle of Lochalsh, Balmacara and the Glenelg Peninsula, highly popular tourist areas and Glenelg is a National Scenic Area (NSA).

**Soil, climate, geology, slope stability**

The underlying bedrock of the block is mostly sandstone and mudstone with conglomerate in the Leitir Fura area. The sedimentary rock has many small basalt and micro gabbro dykes intersecting on north west, south east alignment. They are less resistant to weathering than the sandstone and have therefore created the network of burns that drains from the

The climate roughly varies from warm, moist and sheltered on the coast line with cool and wet for the rest of the land but varying in exposure. The exposure varies from moderate on the hill slopes to severely exposed of 520m with sub alpine climate towards the summits.

The soils are roughly upland brown earths close to the coastal areas with peaty surface water gleys on the hill slope with podzols on the higher hill ground over 500m. In the mid slope, flatter areas on the north and west areas of the block the soil is made up of weakly flushed blanket bog dominated by deer grass, cotton grass, and purple moor grass with unflushed blanket bog at higher elevations with a greater abundance of heather.

There is a single area of slope stability risk. It is of moderate to high risk on the north side of Kylerhea Glen above the public road which is the only land route to Kylerhea. The report commissioned by FES indicates this slope has had landslides in the past, up to 200m long as per the photo below. It was planted with broadleaves in 2006 but this has failed and is currently a bare hill side dominated by heather (*Calluna* spp),bracken and *Molinia*. Landslides from here have covered the road in the past. The report recommends establishing woodland cover to reduce the risk of landslides.

Previous Landslides in Kylerhea Glen

**Forest composition**

This forest lies on the east coast of Skye. The total land holding is 7388ha of which 5060ha is open with only 1676ha of productive high forest and approximately 500ha of land that has been felled. The majority of productive conifers is in the north west of the block and are mostly Lodgepole pine (512ha) and Sitka spruce (261ha) planted in the 1970's. There are substantial areas (approx. 100ha) where trees have been planted on high elevation (over 330m) on poor ground and have subsequently failed.

The Lodgepole pine has been heavily infected with Dothistroma Needle Blight and as such there has been substantial areas of felling in the north of the block. The majority of this area is on weakly flushed blanket bog and therefore according to FES Peatland Policy this will not be re-planted and peatland restoration will be undertaken.

## Broadford

**Landscape setting**

This block is 333ha and is split by the A87 road adjacent to Broadford village. The east side is on a small hill, the west side is on a gentle slope with an easterly aspect. It can be viewed from Broadford village and along the A87, is not highly visible but is within a highly used tourist area.

**Soil, climate, geology, slope stability**

The soil in the east block is mostly podzolic with brown earths near the coast and some patches of gley. The west block is made up of brown earth in the south and unflushed blanket bog in the north. The climate is mostly warm and moist with increasing exposure with altitude. The east block is mostly sandstone and mudstone with 3 basalt, andesite and rhyolite extrusions. The west block is mostly a gabbro intrusion. There is one area of slope instability in the south east of the block, this is however of low risk and as such the report indicate that no special recommendations are necessary. Half of this area is in a red coupe due to be felled in 2019 so it will be important to ensure culverts and drains are well managed during felling and restock operations.

**Forest composition**

The forested area is 78% Sitka spruce with 6% Lodgepole pine mostly planted in pure stands. A large proportion of the west block is open with young planting around it. This was due to windblow being cleared from this block. The east block is mostly made up of Sitka spruce planted around 1970 and areas restocked in 2013 which are establishing well. An area of forest to the south of this was sold to the community in 2014.

## 2. Project Objectives /Outcomes

Restore peatland where peat is greater than 50cm deep and establish peat edge woodland on drier soils.

Maintain productive conifers to the west of Beinn Bhreac where stands are accessible with current roads using harvester / forwarder extraction, a new planned road will be required.

Manage Broadford East as a productive forest of commercial conifers whilst maintaining recreation as a high priority and designing the clearfell coupes to minimise landscape impact.

All designated sites to be in favourable condition within the LMP area.

Increase the amount of native broadleaves in Broadford West especially around the PAWS in the north of the block.

Develop a Land Management Plan delivered in accordance with United Kingdom Forestry Standard (UKFS) and the UK Woodland Assurance Standard.

Develop a Land Management Plan which delivers against the relevant objectives of the Inverness, Ross and Skye District Strategic Plan and Scotland's National Forest Estate and Strategic Directions

### 2.1 Strategic objectives

- **Healthy**: Adapting the National Forest Estate to climate change and build resilience to extreme weather events by diversifying structure and species and creating more windfirm stands.
- **Productive**: Continue to produce a sustainable supply of timber to contribute to Scotland's economy and recognise the potential of the Estate to assist transition to a low carbon economy.
- **Treasured**: Investigate opportunities for partnership working with communities, government bodies and NGOs.
- **Access**: Help visitors to experience and enjoy the outdoor environment, encourage use of the estate for health benefits and outdoor learning.
- **Cared for**: Manage designated land to bring qualifying features into, or maintain,

favourable ecological condition.

## 3. Project Scope

### 3.1 Key features that will influence the development of management proposals

- Broadford is well used by the local community for recreation; it is within easy walking distance of the town so provides good recreation facilities for the local community. Broadford has good road access and provides good site conditions for timber production.

- The Kyle Farm area of Kinloch Hills is mostly made up of deep peat which was planted in the 70's with Lodgepole pine and Sitka spruce. The Lodgepole pine became heavily infected with Dothistroma Needle Blight (DNB) and as such suffered reduced yield and substantial deaths. Most of these stands have been harvested to be restored to peatland. Some stands still remain to be harvested or mulched.

- The Kylerhea area is well used by tourists and locals for viewing wildlife where a hide has been built. There is another hide that is managed by RSPB at the car park at Kylerhea.

- The area at Beinn Bhreac contains a substantial area of larch. This is within 3km of a known infection of Phytophthora ramorum in larch to the SW so is at a high risk of becoming infected.

### 3.2 Known issues & opportunities to be investigated

Most parts of Kinloch Hills are highly visible from areas that are well used by local communities and tourists. As such it is important that landscape issues are considered carefully in the design of coupe boundaries and upper tree lines. Broadford is also very visible from the town itself.

Part of Broadford East was sold to the local community in 2012, this has since been felled and the community currently plan to create a campsite in this area. The Cuillin Hills NSA also overlooks Broadford Forest. It is therefore important that the design of the forest considers the local landscape and where it is visible from.

Kyle Farm area has had large areas of DNB infected Lodgepole pine removed. The remaining stands are very poorly stocked and have shown low yield. This means that there is not enough brash and to support machines to extract the timber. Because of this a lot of the remaining areas will need to be mulched on site and peatland restoration undertaken.

Visitor facilities at Kylerhea and Leitir Fura will be maintained to ensure visitor experiences are not negatively impacted. Waymarked paths will be retained throughout the forest at Kylelakin, Kylerhea, Leitir Fura and Broadford.

The area west of Beinn Bhreac will continue to be managed for productive conifers, however removal of the larch form this area will be high priority to prevent Phytophthora ramorum infecting these stands. This area is steep but accessible using harvester/ forwarder extraction.

The substantial felled area at Leitir Fura will be surveyed in 2022, and 2027 to monitor the progress of natural regeneration. If this is not meeting the objectives of establishing variable spacing native broadleaf woodland then enrichment planting or protection measures may be taken.

Slope instability is a known issue in Kylerhea Glen. Native broadleaf planting on the north side of the glen has had limited success. Opportunities will be considered here for further planting to help stabilise this slope.

Sleat Community have requested to buy firewood from FES to allow them to continue with their firewood business. A number of coupes in the Leitir Fura area have been reserved for this purpose.

A number of areas were restocked in 2005-2008 as part of a Scottish Forest Alliance project funded by BP to increase carbon storage. Many of these areas were damaged by deer and will need to be beaten up to

reach the desired stocking density.

4. **Inclusion** (Key documents to be produced)

- Management map
- Future habitat & species map
- CSM6 maps
- Water map
- Deer management plan
- SSSI management plan
- Open habitat management prescriptions
- Landform analysis & plan visualisations
- Summary of activities
- Appropriate Assessment
- EIA determination if necessary

5. **Exclusion**

- Detailed site specific management plans (work plan)

6. **Project Organisation**

| **LMP TEAM- responsible for undertaking the revision** | |
|---|---|
| Ben Griffin | Planning Forester |
| Isabelle Destor | Environment Forester |
| Chris Nixon | Harvesting Forester |
| Mike Beveridge | FM Forester |
| Russell Cooper | Wildlife Ranger Manager |
| Renate Jephcott | Landscape Architect |
| Ross MacMillan | Wildlife Ranger |
| Sally Phillips | Civil Engineer |

| | |
|---|---|
| Bruce Taylor | Recreation Forester |
| | |
| **GOVERNANCE- Responsible for overall management of the project** | |
| Project Sponsor | Doug Mitchell (Planning Manager) |
| Strategic direction | IRS FD Management Team |
| Forestry Commission Scotland | Martin MacKinnon (Development and Operations Advisor) |
| Silvicultural Advisor | Tor Stokes |

## 7. Time frame

| | |
|---|---|
| Internal Scoping Meeting | September 2017 |
| External Stakeholder and Community Consultation | December 2017- January 2018 |
| Draft plan completion | February 2018 |
| Detailed consultation internal and external. | March 2018 |
| Review of commentary & amendments | March 2018 |
| Internal review | March 2018 |
| Submission of final plan | March 2018 |

## 8. Risks

- Plan takes longer to put together than March 2018.
- Stakeholders & community consultation is more complex and time consuming than anticipated.

Mitigation: If the above project milestones are not being met then this will be reported to the project sponsor. If the final deadline will not be met then an extension will be applied for from Forestry Commission Scotland however this will impact other Land Management Plans in the Forest District.

## Appendix 4: Review of the previous plans 2005-2017

The objectives and management prescriptions within the former Forest design plans were influenced by the rationales of the Inverness, Ross and Skye Forest District Strategic Plan. The plan was extended with approval from Highland Conservancy until 2018.

The table below details a review against the stated FDP objectives.

| Objective | Review against progress |
|---|---|
| **Landscape**<br>Felling of non-natives on the Leitir Fura face to allow this whole area to return to native broadleaves. | Final coupe in Leitir Fura felled in 2016 as per the plan. This will be monitored for natural regeneration 5 years after felling. If natural regeneration is not occurring to the densities required then enrichment planting will be undertaken. The upper edge will be created through natural regeneration to reflect the landscape form. |
| **Landscape**<br>Remove hard upper edges in Kyle Farm to create a boundary that reflects the landscape scale and character. | Kyle Farm felling was overtaken by DNB infection which has lead the felling programme. Part of the upper edge visible from the Skye Bridge has been removed and is being replanted with native broadleaves. |
| **Biodiversity**<br>Protect and expand biodiversity.<br>Manage SAC to maintain favourable status. | Deer numbers kept to a level to encourage natural regeneration and increase open hill ground vegetation.<br>Progressive conversion of commercial plantation in Kyle farm to peatland or peat edge woodland.<br>Internal fences removed.<br>Removal of non-native trees from the limestone pavement area in Broadford West to return this to native broadleaf woodland<br>Maintain wetland habitat in Broadford East near the A87 (calcareous and marshy grassland) |
| **Recreation**<br>Promote new recreational/ interpreted access at key locations on the estate. | Paths maintained in Hill of the fox area.<br><br>Kylerhea car park expanded and RSPB hide built onsite.<br><br>Broadford Car Park at Sgianadin expanded and picnic benches installed in 2010.<br><br>Broadford loop path created in 2013 to provide a circular walk from Broadford or Sgianadin Bay. |
| **Recreation**<br>Promote and respect the cultural an environmental interests of the Kinloch Hills area for the benefit of the local and wider community. | Interpretation provided at Leitir Fura and Kylerhea wildlife hide. |
| **Archaeology**<br>Protect sites of historic interest whilst enhancing their value to the public | Maintained car park and public access at Leitir Fura<br><br>Township remains have been cleared non-native conifers to improve access and visibility of the sites. |
| **Water**<br>Improve riparian management whilst protecting private water supplies. | Quality and quantity of drinking water from private supplies has been maintained.<br>No decrease in the quality of the watercourses that have their catchment in the forest.<br>Forest and water guideline followed during operations. |
| **Soil**<br>Preserve soil structure and fertility. | Followed forest and soil and forest and water guidelines during operations.<br><br>Establishment of native broadleaves on the North side of Kylerhea Glen to expand broadleaf cover and stabilise the hill which is known to be unstable. |
| **Community and other stakeholders**<br>Embrace, value and accommodate the input and participation of stakeholders, neighbours, and particularly the local community to work together in the spirit of the partnership. | Community consultation with Broadford and Sleat Communities. Sleat community were very interested in buying timber for firewood.<br><br>Broadford community were sold part of the NFE to develop allotments and a community campsite.<br><br>Consultation with Broadford Community about a joint project to deer fence a section of the red coupe in Broadford forest. |

| | |
|---|---|
| **Timber**<br>Maximise revenues from timber production within environmental constraints.<br><br>Carry out harvesting of timber in respect of primacy of nature. | Stands in Kyle farm have been prioritised for felling based on the severity of DNB infection. This targets the coupes which posed most risk to spread infection and also felled the timber before it degraded too much.<br><br>Only areas where there is good access and the site conditions allow establishment of conifers with minimal chemical use will commercial restocking be undertaken. |

# Appendix 5: Consultation record

| Consultee | Contact Name | Consulted | Contact | Contact sent/Response received /Issue raised | FES response |
|---|---|---|---|---|---|
| Statutory & regular consultees | | | | | |
| RSPB | Alison MacLennan | Meeting 27/10/17 | | Highlighted all areas which are known for particular birds such as black grouse, sand martins, ptarmigan and upland waders. Asked to retain patches of broadleaves on drier knolls in the peatland to create a mixed habitat. Highlighted where there has been white tailed eagles nesting so it is important to keep drove road users away from the nesting area. There is a pond at the Kylerhea wildlife hide that would benefit from being opened up. | All comments taken account of. Peatland with peat edge woodland will meet a lot of these objectives. Non-native removal from Leitir Fura will benefit bird habitats. |
| Scottish Natural Heritage | Sarah McGrory | Email 26/02/18 | | Email sent of the current maps and the brief. | Very good range of comments on the LMP- include designated sites to be at favourable condition as objective in the plan. Highlighted NSA and golden eagles in Broadford west and the FCIN on such. I responded by email on 20/3/2018. |
| Highland Council | Nick Richards | Email 26/02/18 | | Email sent of the current maps and the brief. | |
| Highland Council | Kirsty Cameron | email | | Email sent of the current maps and the brief. | |
| Mountaineering Scotland | David Gibson | Email 26/02/18 | | Email sent of the current maps and the brief. | |
| Scottish Water | John Stoddart | Email 26/02/18 | | Email sent of the current maps and the brief. | Not in a catchment of interest to Scottish Water |
| Scottish Environment Protection Agency | Aden McCorkell | Email 16/01/2018 | | No response received | |
| Scottish and Southern Electricity | John Sharpe | Email | | Email sent of the current maps and the brief. | |

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|---|---|---|---|---|---|
| Skye District Salmon Fisheries Board | Jim Rennie | Email | | Email sent of the current maps and the brief. | |
| CONFOR | Jamie Farquhar | Email | | Email sent of the current maps and the brief. | |

| Neighbours & local community | | | | | |
|---|---|---|---|---|---|
| Broadford Community | N/A | Community Meeting Broadford Village Hall 27/11/17 | | Some questions about the size of the clearfells in Broadford. Asked if there was potential for CCF in Broadford. Community also asked about a link path that bisects the block to create a shorter loop path. | FES explained that felling coupes in Broadford are being lead by the wind blow damage that is occurring along the stand edges. The large red coupe will remove the stand that is being damaged by the wind and will fell to a good windfirm boundary. |
| Sleat Community | N/A | Community Meeting Sabhal mor Ostaig<br><br>28/11/17 | | Some complaints about dog fouling at Leitir Fura and the drove road being overgrown. Good response when discussing Leitir Fura being returned to broadleaf cover. | FES explained that the drove road will have better waymarkers installed and the natural regeneration will be cut back. |
| Kyleakin Community | N/A | Community Meeting Kyleakin Village Hall<br><br>29/11/17 | | No feedback | |
| South Skye Deer Management Group | Duncan MacDonald | Armadale castle<br><br>07/03/18 | | Positive feedback however lots of interest in how FES would protect the large areas of native broadleaf tree that would be established in the plan. They were also interested that the thicket stage native broadleaf planting would provide good roe deer habitat and could increase roe deer numbers. | FES explained the strategy for deer management is keep the overall populations down and then focus shooting around the main areas that are restocked. FES demonstrated the native BLs have been established in areas such as Kylerhea Glen. |
| Broadford and Strath Community Company | Adele Beck | 08/2/18 | | Looked at how FES could collaborate on a deer fence to help establish broadleaves with an aim to provide firewood in to the future. | Agreed that FES would look in to costing the additional deer fence but also agreed that we needed a legal agreement that BSCC would maintain their part of the fence so that it can be kept deer proof. |
| Kinloch Lodge | Lord and Lady MacDonald | | | Email sent of the current maps and the brief. | |
| Sleat and Strath Football Club | | | | Email sent of the current maps and the brief. | |
| Scottish Woodlands Old Corry Wood | | | | Email sent of the current maps and the brief. | |
| Lucilla Noble | | | | Neighbouring forest landowner at Kinloch. | |

# Appendix 6: Forestry & Water

The Scottish Environmental Protection Agency (SEPA) is implementing the Water Framework Directive (WFD) in Scotland. This is a legal framework for the protection, improvement and sustainable use of all water bodies in the environment across Europe. All significant water bodies across Scotland have been assessed for ecological and chemical status and catchment plans have been drawn up to ensure water bodies are brought up to an acceptable level. IRSFD lies entirely within the Scotland River Basin Management Plan Area and the LMP area is located within the Isle of Skye Coastal catchments.

FES recognise the importance that the proposed forest restructuring, felling, restocking etc., including the proposed road construction within this LMP, does not lead to any deterioration of the water bodies or water dependent areas within the plan area and any of the neighbouring water bodies.

There are no forestry related pressures on any of the water bodies.

The potential impact of future run of river hydro proposals will be assessed through individual planning applications submitted by the developer and are not included as part of the LMP.

Rhododendron ponticum is the only invasive non-native species (INNS) recorded within the plan area. These are only present at low levels and as such there are no plans to undertake control of these species, they will however be monitored and action will be taken if they start to threaten native species and habitats.

As standard all forestry and associated Civil Engineering (new road creation, bridges and culverts) operations must comply with the Forest and Water Guidelines 2011 and The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR). The requirement for registration or SEPA authorisation for projects will be undertaken at the site planning (work plan) stage and this level of information is not detailed in the LMP. Routes for forest road creation are provided at a 1:20000 scale on Map 5: Management.

A link to further information on the Forest and Water Guidelines (2011) and the Water Environment (Controlled Activities) (Scotland) Regulations 2011 is located below;

Forestry Commission - UKFS - Water

SEPA Water Regulations

Table -Summary of water bodies, status & pressures

| River Name | River Number | Overall Condition in 2016 |
|---|---|---|
| Broadford | 20709 | Good |
| Abhainn Lusa | 20710 | Good |
| Abhainn Ceann Loch Eishort | 20714 | Good |
| Allt na Criopag | 20711 | Good |

**Map 7** shows the flood risk areas for Kinloch Hills and Broadford area. The map shows the main areas at risk of flooding are as follows:

- Glean na beiste- An area of high risk of flooding (once in every 10 years). This is completely within the forest; however flooding does not affect any infrastructure or buildings.
- Allt Anavig- A small river that shows potential to flood where it passes under the main road (NG73582597). The catchment for this is entirely in the Kyle Farm area of the forest. This area is due to be clearfelled and replanted with native broadleaves, it will also partly be restored to peatland in the wetter areas. The process of establishing broadleaved woodland and peatland restoration would reduce the chance of flood risk on this burn as the woodland increases interception of rainwater and increases percolation of the surface water and the peatland restoration acts as a good storage of surface water that is then slowly released.
- Broadford River- This is shown as an area of high risk flooding however the Broadford forest is only a small part of the catchment for the river so management of the NFE will have little impact on the flooding.
- Kylerhea Glen- There is an area of high risk flooding in Kylerhea Glen for which the majority of the catchment is in the NFE. This catchment is mostly made up of open hill ground however the north side of the glen has been planted with broadleaves and is showing success in establishing native broadleaves via natural regeneration. There are also plans to establish native woodland on the south side of the glen. This will increase surface water filtration and interception of the rainwater and therefore reduce the risk of flooding in the glen. This is not a high priority area for flooding as no infrastructure or buildings are threatened by it.
- Abhainn Ceann Loch Eishort- This is an area at high risk of flooding and half of the catchment is in the NFE. This area will continue to be managed as productive forest however the riparian zones will be wider and coupes will be phased in order to minimise the area of clearfelled ground at any one time. This will reduce the risk of flooding in this area. The area at risk is currently a football pitch that was bought from FES in 1993 by the local football club however there may be a chance that this could have houses built on it. Given the risk of flooding this would not be recommended, also the

conditions of sale were that the land could only be used for recreation purposes.

The role of forestry and woodland in natural flood management is increasingly being recognised as a sustainable means of protection which can deliver multiple benefits. The plan has been developed in accordance with current best practice (UKFS). Clearfelling is being phased with an aim to gradually restructure the forest where possible. Felling coupe size has been considered to achieve an appropriate balance between operational practicality, environmental impact and cost effectiveness; this has included consideration of any potential downstream effects on flood risk.
A central aim of the restocking of the next rotation (outlined on **Map 6: Future habitat and species**) is to restore riparian woodland and manage these areas under lower intervention post establishment. This will provide a long-term protective buffer along the significant watercourses and contribute to flood mitigation through increased hydraulic roughness and protection against siltation. Peatland restoration measures undertaken in Kyle Farm will increase the water holding capacity and reduce flooding in the surrounding areas.

Opportunities for internal wetland and peatland habitat restoration are largely only revealed after felling, when landform is clear and hydrology can be accurately assessed. Therefore site level proposals of this nature are agreed at work plan stage with the Open Habitat Ecologist and the FD Environment team. Sites for peatland restoration will be assessed for restoration suitability using the criteria as set out in the FC Practice Guide – Deciding future management
options for afforested deep peatland (Forestry Commission, 2015).

Historic drainage which does not meet UKFS will be addressed as following;

- During forest road maintenance and upgrade operations the associated forest road drainage will be assessed and where necessary realigned to ensure that water is discharged slowly into buffer areas.
- At the restocking stage active forest drains which do not meet UKFS standard will be remediated to meet the current standard.
- At the restocking stage inactive (blocked) forest drains, which did not meet UKFS standard, will be left to revegetate.

At the restocking stage consideration will also be given to remediate any forest drains which flow directly into watercourses, where practicable and reasonable to do so.

Branches and tree tops (lop and top) produced by felling and thinning operations are not considered as waste in terms of this plan, because the material will be incorporated in the brash mat to aid machine traction and flotation thus protecting fragile soils. Additionally material will be retained on site to achieve deadwood objectives. Other branches and material left after harvesting contribute to the functional ecology of the woodland and are an important
feature of nutrient recycling that will increase biodiversity and may assist future productive woodland establishment. Where the felling to recycle of non-native species occurs the arisings have subsequent use including protecting vulnerable native tree regeneration from grazing mammals and again, contributing to the functional ecology of the woodland. On steep ground sites where whole tree harvesting systems are implemented techniques for the utilisation of residues will be explored.

## Appendix 7 – Summary of activities

**Table 1a – Clearfell (2019 -2029)**
*The table below outlines all of the clearfelling as illustrated on the CSM6 Management Map.*

| Phase | Coupe | Gross Area (ha) | Fell Year | Volume ($m^3$) |
|---|---|---|---|---|
| 1 | 14038 | 64 | 2019 | 15,063 |
| 1 | 16131 | 50 | 2021 | 20,702 |
| 1 | 14065 | 65 | 2023 | 8,552 |
| 1 | 14029 | 69 | 2024 | 22,461 |
| 2 | 14051 | 87 | 2025 | 21,700 |
| 2 | 16967 | 8 | 2028 | 3,044 |
| 2 | 16971 | 32 | 2028 | 17,624 |
| 2 | 14999 | 57 | 2029 | 20,083 |
| **Total** | | **432** | | **129227** |

**Table 1b- Clearfell by species (2019-2029)**
The table bellows shows the net area felled by species over the plan period as illustrated on the CSM6 Management Map.

| | | Net Area (ha) by Species | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Coupe Number** | **Fell Year** | **CP** | **DF** | **EL** | **HL** | **JL** | **LP** | **NS** | **SP** | **SS** | **Grand Total** |
| 14038 | 2019 | | | | 9 | 2 | 21 | 1 | 1 | 18 | **52** |
| 16131 | 2021 | | | 2 | 9 | | 1 | | | 13 | **25** |
| 14065 | 2023 | | 3 | 6 | 3 | 3 | 12 | | 16 | 10 | **53** |
| 14029 | 2024 | | | | 5 | 2 | 5 | | 2 | 13 | **27** |
| 14051 | 2025 | | | | | 1 | 8 | | | 2 | **11** |
| 16967 | 2028 | 1 | | | | 1 | 3 | | | 1 | **6** |
| 16971 | 2028 | | | | 1 | | | | | 9 | **10** |
| 14999 | 2029 | | | | 3 | 2 | 6 | | | 4 | **15** |
| **Grand Total** | | **1** | **3** | **8** | **30** | **11** | **56** | **1** | **19** | **70** | **199** |

**Table 2: Restocking (2019 – 2029)**

*The table below outlines all of the restock planting as illustrated on the CSM6 Establishment Map.*

| **Phase** | **Coupe** | **Restock Year** | **Species** | **Gross Area (Ha)** | **Note** |
|---|---|---|---|---|---|
| Phase 1 | 14067a | 2018 | MB | 57 | Part of SFA site that will be mounded and restocked in 2018 |
| Phase 1 | 14067b | 2020 | MB | 22 | 5 year fallow site to be restocked |

| | | | | | |
|---|---|---|---|---|---|
| Phase 1 | 14067c | 2020 | SS/LP | 18 | 5 year fallow , good access better ground will be mounded and restocked with productive conifer. Leaving riparian woodland buffer. |
| Phase 1 | 14058a | 2022 | MB | 145 | Felled area that will be restocked with low density native broadleaves. |
| Phase 1 | 14058c and 14009b | 2022 | SS/LP | 66 | Areas with good access and drier ground conditions will be restocked with productive conifers- Sitka spruce and Lodgepole pine 3:3 mixture. |
| Phase 1 | 14062a | 2020 | MB | 57 | SFA site that is partly stocked but requires beat up with native BLs. |
| Phase 1 | 14007a | 2021 | MB | 59 | SFA site poorly stocked, will be surveyed for peat and natural regeneration and beaten up as required |
| Phase 1 | 14010a | 2020 | MB | 8 | Areas to be restocked adjacent to P2016 restocking. |
| Phase 1 | 14004a | 2023 | MB | 133.0 | Currently felled, will be restocked with group planting with some fencing and some tubes. Will provide seed source to regenerate. Natural regeneration of conifers will be expected and will produce a mixed species stand. |
| Phase 1 | 14009a | 2023 | MB | 114 | Currently felled, will be restocked as peat edge woodland which will be a mix of native broadleaves planted at low density (500-1000 sph) across 50% of the site. |
| Phase 1 | 14012a | 2024 | MB | 100 | Restock of conifer site that was felled to recycle. |
| Phase 2 | 14031a | 2025 | MB | 164 | Clearfell site that is expected to regenerate naturally. This will be monitored in 2025 to assess regeneration levels and beaten up as required. |
| Phase 2 | 16131a | 2025 | SS/ MC | 38 | Will be planted with SS and another conifer in the north. Maybe pacific silver fir/ douglas fir. |

| | | | | | |
|---|---|---|---|---|---|
| Phase 2 | 16131b | 2025 | MB | 12 | MB area to be deer fenced in conjunction with the community land. Will be mounded. And planted at 2500sph for productive conifers. |
| Phase 2 | 14029a | 2026 | SS | 90 | Productive conifer restock, pure SS. Mounded. |
| Phase 2 | 14065a-d | 2028 | MB/SP | 72/18 | Native broadleaf to include some Oak low down near the sea and pure silver birch nearer the car park. Scots pine higher up. |

Total area of restock over plan period: **1076 ha (212ha Conifer, 864ha Broadleaf)**

**Table 3: Natural Regeneration**

*The table below outlines all land allocated for natural regeneration as illustrated on the CSM6 Establishment Map. Sites designated for natural regeneration will assessed on a 3 – 5 Year cycle.*

| SCPT | Gross Area (ha) | Establishment Year | Prescriptions |
|---|---|---|---|
| 6658A | 21 | 2025 | Felled in 16/17, will be monitored for natural regeneration in 2025 |
| 6658B | 11 | 2025 | Felled in 16/17, will be monitored for natural regeneration in 2025 |
| 6659A | 19 | 2025 | Felled in 16/17, will be monitored for natural regeneration in 2025 |
| 6659B | 12 | 2025 | Felled in 16/17, will be monitored for natural regeneration in 2025 |
| 6660D | 2 | 2025 | Felled in 16/17, will be monitored for natural regeneration in 2025 |
| 6660A | 10 | 2025 | Felled in 16/17, will be monitored for natural regeneration in 2025 |
| 6660B | 6 | 2025 | Felled in 16/17, will be monitored for natural regeneration in 2025 |
| 6661B | 11 | 2025 | Felled in 16/17, will be monitored for natural regeneration in 2025 |
| 6661A | 12 | 2025 | Felled in 16/17, will be monitored for natural regeneration in 2025 |
| 6661D | 2 | 2025 | Felled in 16/17, will be monitored for natural regeneration in 2025 |
| 6663A | 18 | 2025 | Felled in 16/17, will be monitored for natural regeneration in 2025 |
| 6684A | 41 | 2025 | **Woodland creation,** expect will naturally regenerate, will be monitored in 2025 and every 5 years afterwards. |
| **TOTAL** | **165ha** | | |

**Table 4: Forest road upgrade and new roads**

The table below outlines all proposed forest road upgrades and new roads as illustrated on the CSM6 Management Map. In addition to this the quarry at NG628258 will be further extended to provide additional roadstone for harvesting at Broadford East in 2020 and the quarry at NG729254 will be extended to provide stone for the upgrade to harvest Kyle Farm 7.

| Phase | Name | Length | Operation | Year |
|---|---|---|---|---|
| Phase 1 | Kinloch Farm | 977 | New Road | 2019/20 |
| Phase 1 | Broadford East | 1895 | Upgrade | 2020/21 |
| Phase 2 | Sleat Woodfuel | 1933 | Upgrade | 2024/25 |
| Phase 2 | Kylerhea | 2279 | Upgrade | 2022/23 |
| Phase 2 | Kyle Farm 7 | 4545 | Upgrade | 2024/25 |

**Clearfell and Restock Summary**

Over the plan period we are Clearfelling 432 ha. We are restocking 1076 ha. A total of 363 ha are to be managed for natural regeneration. The difference between the restocking figure and clearfell figure is accounted for largely by the fallow system (3 – 5 Years post felling).

Maps 5 & 6 spatially detail all of the proposed felling & restocking within the LMP.

**Table 5: Summary of activities in the first phase (2017-2022)**

| District team | Activity | Area/ Location | Indicative date |
|---|---|---|---|
| **Environment** | Natural Regeneration Monitoring | 355 ha | 2021 |
| | Species monitoring & surveying – Black Grouse, Juniper, Scottish Crossbill, Crested tit, watervole etc | Whole Plan area | Pre-operational work plan surveys & sighting recording |
| | Peatland surveying and restoration | 450ha | 2021 |
| | | | |
| **Recreation & Tourism** | Improve the barge site at Skinidin | Broadford Skinidin | 2019 |
| | Fell non-natives at the Leitir Fura road endtrance to open up the views and make visibility better at the junction to the county road. | Leitir Fura road entrance | 2018 |
| | Open up the drove road and include way markers. | Drove road from Leitir Fura | 2018 |
| | | | |
| **Deer Management** | Deer culling, focussed on restocked sites | Whole Plan area | ongoing |
| | Nearest neighbour monitoring | Whole Plan area | In alignment with fell coupes |
| | | | |
| **Civil Engineering** | See Table 4 above | | |
| | | | |
| **Harvesting and Restock Operations** | See coupe summaries above | Whole plan area | In alignment with LMP sequence |
| | | | |
| **Planning** | EIA determination & Prior notification for all applicable harvesting and restock operations | Whole plan area | ongoing |
| | Plant health monitoring – DNB surveys | Pine subcompartments | Annual |

| | | | |
|---|---|---|---|
| | SDA surveys of restocked coupes | Restocks sites at year 1 and 5 | Sept-March Annually |

# Appendix 7a- Coupe Summary

| 1.1 Table of Clearfelling (Phase 1) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Coupe No.** | **Total Area (Ha)** | **Spp by Ha (SS)** | **Spp by Ha (SP)** | **Spp by Ha (LP)** | **Spp by Ha (NS)** | **Spp by Ha (Larch)** | **Spp by Ha (X con)** | **Spp by Ha (BLeaf)** | **Open Land by Ha** | **Restock Year** | **Monitoring Comments** |
| 14038 | 64 | 18 | 1 | 21 | 1 | 11 | | | 12 | 2024 | |
| 16131 | 50 | 13 | | 1 | | 11 | | | 25 | 2026 | |
| 14065 | 65 | 10 | 16 | 12 | | 12 | 3 | | 12 | 2028 | |
| 14029 | 69 | 13 | 2 | 5 | | 7 | | | 42 | 2029 | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| **Totals** | 248 | | | | | | | | | | |
| **1.2 Table of Clearfelling (Phase 2)** | | | | | | | | | | | |
| 14051 | 87 | 2 | | 8 | | 1 | | | 76 | 2030 | |
| 16967 | 14 | 1 | | 3 | | 1 | 1 | | 8 | 2033 | |
| 16971 | 32 | 9 | | | | 1 | | | 22 | 2033 | |
| 14999 | 57 | 4 | | 6 | | 5 | | | 42 | 2034 | |
| **Totals** | 190 | | | | | | | | | | |

| 1.3 Table of CCF Felling (Phase 1) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Coupe No.** | **Total Area (Ha)** | **Volume ($M^3$)** | **Spp by Ha (SS)** | **Spp by Ha (SP)** | **Spp by Ha (LP)** | **Spp by Ha (NS)** | **Spp by Ha (Larch)** | **Spp by Ha (X con)** | **Spp by Ha (BLeaf)** | **Open Land by Ha** | **Silv.Method** | **Monitoring Comments** |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| **Totals** | | | | | | | | | | | | |
| **1.4 Table of CCF Felling (Phase 2)** | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| **Totals** | | | | | | | | | | | | |

# Appendix 7a- Coupe Summary

| 1.5 Table of Thinning (Phase 1 & 2) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Coupe No.** | **Total Area (Ha)** | **Species** | **Thin-able Area (Ha)** | **Prescription for Thinning** | **Final Thinned Area (Ha)** | **Final Vol/Ha Removed** | **Monitoring Comments** |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

| 1.6 Table of Total Felling for Approved Plan Period | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Method** | **Total Area (Ha)** | **Total Volume ($M^3$)** | **Spp by Ha (SS)** | **Spp by Ha (SP)** | **Spp by Ha (LP)** | **Spp by Ha (NS)** | **Spp by Ha (Larch)** | **Spp by Ha (X con)** | **Spp by Ha (BLeaf)** | **Open Land by Ha** | **Comments** |
| **Clearfell** | **438** | **129227** | | | | | | **129227** | | | |
| **Thinning** | | | | | | | | | | | |
| **CCF** | | | | | | | | | | | |
| | **438** | **129227** | **Grand Total of Felled Timber Proposed for Plan Period** | | | | | | | | |

| 1.7 Table of Restocking | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Coupe No.** | **Total Area (Ha)** | **SS (Ha)** | **LP (Ha)** | **SP (Ha)** | **NS (Ha)** | **Larch (Ha)** | **Other Con. (Ha)** | **Native Mixed B/Leaf** | **Other B/Leaf** | **Open (Ha)** | **Year** | **Restock Method & Density** (Restock/Nat Regen/Alt Area/Coppice/Open) | **Monitoring Comments** (Including any reason not to restock) |
| 14067a | 57 | | | | | | | 57 | | | 2018 | Restock / beat up of a failed planting | |
| 14067b | 22 | | | | | | | 22 | | | 2020 | Restock | |
| 14067c | 18 | 9 | 9 | | | | | | | | 2020 | Restock | |
| 14058a | 145 | | | | | | | 145 | | | 2022 | Restock | |
| 14058c 14009b | 66 | 33 | 33 | | | | | | | | 2022 | Restock | |
| 14062a | 57 | | | | | | | 57 | | | 2020 | Restock / beat up of a failed planting | |
| 14007a | 59 | | | | | | | 59 | | | 2021 | Restock / beat up of a failed planting | |
| 14010a | 8 | | | | | | | 8 | | | 2021 | Restock / beat up of a failed planting | |
| 14004a | 133 | | | | | | 66 | 67 | | | 2023 | Restock | |
| 14009a | 114 | | | | | | | 114 | | | 2023 | Restock | |
| 14012a | 100 | | | | | | | 100 | | | 2024 | Restock | |
| 14031a | 124 | | | | | | | 124 | | | 2025 | Natural Regeneration | |

# Appendix 7a- Coupe Summary

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16131a | 38 | 19 | | | | | 19 | | | | 2025 | Restock | |
| 16131b | 12 | | | | | | | | 12 | | 2025 | Restock | |
| 14029a | 90 | 90 | | | | | | | | | 2026 | Restock | |
| 14065a-d | 90 | | | 18 | | | | 72 | | | 2028 | Restock | |

| 1.8 Table of New Planting / woodland creation | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Coupe No.** | **Total Area (Ha)** | **SS (Ha)** | **LP (Ha)** | **SP (Ha)** | **NS (Ha)** | **Larch (Ha)** | **Other Con. (Ha)** | **Native Mixed B/Leaf** | **Other B/Leaf** | **Open (Ha)** | **Year** | **Planting Method & Density (Planting/Nat Regen)** | **Monitoring Comments** |
| 14031a | 41 | | | | | | | 41 | | | 2025 | Natural Regeneration | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

| 1.9 Table of Civil Engineering | | | | |
|---|---|---|---|---|
| **Proposed Activity (Road/Quarry)** | **OS Grid Reference** | **Forest/Coupe** | **Description (Length/Area/Construction)** | **Monitoring Comments** |
| New Road | NG698170 | 14029 | 977m new road to access a red coupe at Kinloch Farm | |
| Road Upgrade | NG636253 | 16131 | Upgrade of main access road (1895m)in to Broadford block to access coupe 16131 | |
| Road Upgrade | NG700187 | 14038 | Upgrade of road (1933m) to harvest coupe 14038 | |
| Road Upgrade | NG786224 | 14065 | Upgrade of road (2279m) to harvest coupe 14065 | |
| Road Upgrade | NG729243 | 14051 | Upgrade of 2 access roads (4545m) to access coupe 14051 | |
| Quarry | NG628258 | 16131 | Expand existing quarry to provide roadstone for upgrading the road to harvest coupe 16131 | |
| Quarry | NG729254 | 14051 | Expand quarry to provide stone to upgrade road to access coupe 14051 | |

**Other Tree Felling in Exceptional Circumstances**

FLS will normally seek to map and identify all planned tree felling in advance through the LMP process.

However, there are some circumstances requiring small scale tree felling where this may not be possible and where it may be impractical to apply for a separate felling permission due to the risks or impacts of delaying the felling.

# Appendix 7a- Coupe Summary

Felling permission is therefore sought for the LMP approval period to cover the following circumstances:

- Individual trees, rows of trees or small groups of trees that are impacting on important infrastructure (as defined below*), either because they are now encroaching on or have been destabilised or made unsafe by wind, physical damage, or impeded drainage.

*Infrastructure includes forest roads, footpaths, access (vehicle, cycle, horse walking) routes, buildings, utilities and services, and drains.

The maximum volume of felling in exceptional circumstances covered by this approval is 40 cubic metres per Land Management Plan per calendar year.

A record of the volume felled in this way is detailed below will be considered during the five year Land Management Plan review:

| **1.10 Table of Other Felling** | | | | |
|---|---|---|---|---|
| **Date** | **Forest/Coupe** | **OS NGR** | **Volume** | **Comments** |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

# Appendix 8: Tolerance Table

| | Adjustment to felling coupe boundaries | Timing of restocking | Change to species | Wind throw or environmental response | Adjustment to road lines |
|---|---|---|---|---|---|
| **Scottish Forestry's approval not normally required (record and notify SF)** | <10% of coupe size | Up to 5 planting seasons after felling (allowing fallow periods for Hylobius). | Change within species group<br>E.g. Scots pine to birch,<br><br>Non-native conifers e.g Sitka spruce to Douglas fir,<br><br>Non-native to native species (allowing for changes to facilitate Ancient Woodland policy). | | Departures of up to 60m from the centre of the roadline |
| **Approval by exchange of letters and map** | 10-15% of coupe size | 5 years + | Change of coupe objective likely to be consistent with current policy (e.g. from productive to open, open to native species). | Up to 5 ha | Departures of greater than 60m from the centre of the roadline |
| **Approval by formal plan amendment** | >15% of coupe size | | Major change of objective likely to be contrary to policy,<br>E.g. native to non-native species, open to non-native, | More than 5 ha | As above, depending on sensitivity |

# Appendix 9: Management prescriptions on the National Forest Estate- Native Woodland

| Soil Group | Soil Types Relevant to IRS FD | Characteristics | Aim* | Species Prescription for Habitat Types Predominating in IRS Forest District |
|---|---|---|---|---|
| 1 | Brown Earths | Soils with typically good aeration and drainage throughout the profile and well-incorporated organic matter. These soils are mainly * fertile and allow deep rooting. Likely vegetation to be encountered includes fine grasses, holcus, bracken, bramble, foxgloves, violets and a diverse range of herbs. * However Podzolic Brown earths where nutrients have been leached are "Very Poor" | NW | W19 Juniper wood with sorrel on 1, 1u, 1z and 1b from sheltered sites up to sub alpine areas with DAMS < 22<br>W18 Scots pine with heather on 1z in cool to warm with DAMS < 18<br>W11 Upland oak-birch with bluebell on 1, 1u and 1z in cool to warm with DAMS < 18 |
| 3 & 4 | Podzols & Ironpan Soils | Developed on Acid * soils with high rainfall where nutrients are flushed into the lower horizons of the soil profile. Frequently induration or an impenetrable pan will prevent good drainage, resulting in a need to break this impediment with suitable cultivation that will allow freer draining and greater rooting depth.<br>Vegetation common to these soils are ericaceous plants, grasses including deschampsia flexuosa, nardus, carex and molinia. Light bracken and feather mosses may also be present. * NOT fertile soils | NW<br>RW | W18 Scots pine with heather on 3, 3m, 4, 4z and 4b Not in Sub-alpine climate, (Cool to Warm) DAMS < 18.<br>W19 juniper wood with sorrel on 3 and 4b Possible up to Sub-alpine zone<br>W17 Upland oak-birch with blaeberry on 3s and 3ms Mainly in Lower Cool to warm climate zone. DAMS < 18. |
| 5 | Groundwater Gleys | Dominant vegetation is commonly Deschampsia caespitosa, Holcus, salix spp and herbs. Occuring where a shallow water table causes waterlogging and therefore subject to compaction and poorly oxygenated. The soil is permeable but is affected by a fluctuating ground-water table. Moderate nutrient availability. | NW<br>RW | W7 Alder-ash with yellow pimpernel on 5 and 5f<br>Cool to Warm. Sheltered to Moderatedly exposed. (DAMS <16) |
| 6 | Peaty Gleys | Very Poor to medium nutritional availability, these soils are indicated by Molinia, Calluna and Erica spp, with sphagnum prevalent in the North and West.<br>High winter water table can be expected and good drainage will be required to achieve best results. | NW | W18 Scots pine with heather on 6z "moist" to "fairly dry"<br>W4 Birch with purple moor-grass on 6 and 6b. Cool to Warm. DAMS < 18. |
| 7 | Surface Water Gleys | Differing from groundwater gleys in that waterlogging is caused not by a high water table, but by induration preventing adequate drainage leading to a seasonally fluctuating water table. Resulting anaerobic conditions will restrict rooting.<br>Indicative vegetation includes Holcus, Juncus, Nardus and Deschampsia *caespitosa*. Again poor to moderate nutritional availability can be expected.<br>Drainage will be required along with micro site cultivation such as mounding. | NW | W11 Upland oak-birch with bluebell on 7b<br>W18 Scots pine with heather on 7z possibly on margins leading to drier knolls.<br>W7 Alder-ash with yellow pimpernel on 7, 7b and 7z Cool to Warm. Sheltered to Moderatedly exposed. (DAMS <16) |
| 8 | Flushed Basin Bogs | Juncus spp are prevalent. A shallower peat type, nutrient rich and containing some mineral grains. Peat is black in colour. | NW | W4 Birch with purple moor-grass on 8b and 8c. |
| 9 | Molinia Bogs | Often existing on hillsides where flushing is more pronounced. Moderate nutrition available. | NW | W4 Birch with purple moor-grass on 9a, 9b, 9c and 9d suitable for the transitional areas at the margins between productive forest blocks and peatland restoration sites. |
| | | | OG | 9e Trichophorum, Calluna, Eriophorum, Molinia Bogs will not be planted or restocked - restoration of peatland. |
| 10 | Unflushed Flat or Raised Bogs | Sphagnum dominated bogs, formed as peat levels rose to form a dome, reliant on precipitation for moisture and nutrients. Mineral grains are absent and the peat is reddish-brown and tends to be deeper. | OG | 10b Upland flat or raised bogs – priority areas for peat restoration. |
| 11 | Unflushed Blanket Bogs | Calluna, Eriophorum, Trichophorum Bogs including the hill peats located on upland plateaux and hillsides deeply dissected by burns. | OG | 11a A rare peatland type mainly restricted to the driest eastern uplands |
| | | | OG | 11b,c,d Unflushed blanket bogs - priority areas for peatland restoration |
| 14 | Eroded Bogs | Very poor nutritional status characterised by bog asphodel, deer grass, bog cotton etc. Can be dominated by either deep and frequent eroded areas (haggs) or frequent pools of standing water (flows). Very deep peat. | OG | 14 & 14h Hagged bogs – unsuitable for forestry or woodland – peatland habitat |
| | | | OG | 14w Pooled bogs – common across Northern Scotland forming the 'Flows' – peatland. |
| 15 | Littoral Soils | Formed on coastal sands and shingles, such as the dunes found at Morrich More near Tain. The category is split into shingle (15s), dunes (15d) and then sands with varying water table depths (15e,w,g,i). These sands can be distinguished by various levels of mottling. Coastal grasses and heathland plants predominate. | NW | W16 Lowland oak-birch with blueberry limited to "Warm" climate |

*NW – Native Woodland Expansion / RW – Riparian Woodland Expansion / OG – Managed Open Ground e.g. peatland restoration

NB – These prescriptions must be adopted within the local context set out in the main body of this FDP. Climate must be included as a determining factor in final species selection.

- Planting will generally become a mosaic of the woodland types recommended above, dictated by local conditions and agreed after "75% Site Completion Visits"
- Particular note should be made of the inadvisability of planting the peatland types 10 – 14 that may predominate on marginal FD sites
- No native woodland type likely to be suitable on sites wetter than SMR "Very Moist" and veg indicating SNR <4.5
- Due to Chalara fraxinea no new planting / restocking of Ash will be undertaken, this will be reviewd with new guidance from Forestry Commission Plant Health.
- Natural regeneration of Ash will be accepted where it occurs.

References:

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# Appendix 10: Management prescriptions on the National Forest Estate - Productive Forestry

| Soil Group | Soil Types Relevant to IRS FD | Characteristics | Species Prescription for Commercial Restocking |
|---|---|---|---|
| 1 | Brown Earths | Soils with typically good aeration and drainage throughout the profile and well-incorporated organic matter. These soils range from very rich to poor and usually allow deep rooting. Likely vegetation to be encountered includes broad leaved grasses, (e.g. Yorkshire fog, Bent), bracken, bramble, foxgloves, violets and a diverse range of herbs. | Douglas Fir on Poor (must be without heather) to Rich fertility with Moist to Dry soil moisture. Desirable intimate or group mixture; European Larch*, Norway Spruce or Western Red Cedar. Generally in sheltered areas with sufficient rainfall<br><br>Sitka or Norway Spruce on Poor to Medium fertility with Wet to Fresh soil moisture. Desirable intimate or group mixture; each other or European/Hybrid Larch<br><br>Scot's Pine in Podzolised areas on Poor to Medium fertility with Moist to Dry soil moisture. Desirable intimate or group mixture; Japanese/Hybrid or European Larch*<br><br>European Larch on Medium to Rich fertility with moist to Moderately Dry soil moisture. Desirable intimate or group mixture; Scot's Pine or Douglas Fir<br><br>Japanese/Hybrid Larch* on Poor to Medium fertility with Very Moist to Fresh moisture. Desirable intimate or group mixture; Scot's Pine<br><br>Sycamore on Medium to Rich fertility with Moist to Fresh soil moisture. Desirable intimate mixture: Ash† or European Larch*<br><br>Where improved climatic conditions allow:<br><br>Sessile Oak on Medium to Rich fertility with Moist to Slightly Dry soil moisture. Pedunculate Oak (Local seed source if possible) on Medium to Rich with Very Moist to Fresh soil moisture. Desirable intimate/group or blocky mixtures include; Norway Spruce, European Larch*, Western Red Cedar, Silver Birch or Ash<br><br>Silver Birch on Poor to Medium with Very Moist to Fresh soil moisture. Desirable intimate or group mixture: Oak or Scot's Pine<br><br>*Ash on Rich fertility with moist to Fresh soil moisture and less acidic sites. Mix in groups with; Sycamore, Oak or Beech |
| 3 | Podzols | Develop on unfertile acid soils with high rainfall where nutrients are flushed into the lower horizons of the soil profile. Very poor fertility. Induration or an impenetrable pan will prevent good drainage, resulting in a need to break this impediment with suitable cultivation that will allow freer draining and greater rooting depth.<br><br>Vegetation common to these soils are ericaceous plants, grasses including Wavy hair, Matt and Purple moor grass. Light bracken and feather mosses may also be present. | Scot's Pine with Moist to Dry soil moisture. Desirable mixture; intimate mixture with Hybrid Larch*<br><br>Sitka Spruce with Wet to Moist soil moisture. Mix with; Lodgepole Pine in wetter areas or Japanese/Hybrid Larch*<br><br>Japanese/Hybrid Larch* with Very Moist to Fresh soil moisture<br><br>Where improved climatic conditions allow:<br><br>Sessile Oak (not on 3m) with Moist to Fresh soil moisture. Desirable mixture; Hybrid Larch, Scot's Pine or limited Norway Spruce |
| 4 | Ironpans | Develop on free draining acid soils with high rainfall. The transfer of aluminium and iron in solution down through the soil profile develops an ironpan that is impervious to water and root penetration. Breaking of the ironpan is desirable, so as to allow drainage of the site and a potential increase in soil rooting volume and nutrient availability.<br><br>Vegetation and fertility is similar to that of Podzols above | Scot's Pine with Moist to Dry soil moisture. Desirable mixture; Japanese/Hybrid Larch<br><br>Japanese/Hybrid Larch* with Very Moist to Fresh soil moisture. Desirable mixture; Scot's Pine<br><br>Lodgepole Pine in elevated areas with Wet to Fresh soil moisture<br><br>Sitka or Norway Spruce (4 & 4b) with Wet to Fresh soil moisture. Desirable intimate or group mixture; Lodgepole Pine in wetter areas or Japanese/Hybrid Larch or Scot's Pine.<br><br>Sycamore (4b only) with Moist to Fresh soil moisture. Consider intimate mixture with Japanese/Hybrid Larch*<br><br>Cultivation that includes amelioration of the ironpan will be considered. |
| 5 | Groundwater Gleys | Dominant vegetation is commonly Tufted hair grass, Willows and herbs. Occurring where a shallow water table causes waterlogging and therefore subject to compaction and poorly oxygenated. The soil is permeable but is affected by a fluctuating ground-water table. Moderate nutrient availability. | These areas are generally presumed to be open or riparian zones.. Where rooting depth is adequate:<br><br>Sitka or Norway Spruce on Medium to Rich fertility with Very Wet to Moist soil moisture. Consider adding blocks of Downy Birch and Alder<br><br>Intimate mix of Downy Birch and Common Alder on Poor fertility with Very Wet to Moist soil moisture |
| 6 | Peaty Gleys | Very Poor to Rich nutritional availability, these soils are indicated by Purple moor grass, Calluna and Cross-leaved heath, with sphagnum prevalent in the North and West.<br><br>High winter water table can be expected and good drainage will be required to achieve best results. | Sitka Spruce on Poor to Medium fertility with Wet to Fresh moisture. Experience in IRS FD suggests this crop will rarely establish as a pure stand without fertiliser input. Intimate mix with Lodgepole Pine in wetter and poorer areas or with Japanese/Hybrid Larch* in more Pozolised areas. Consider adding blocks of Downy Birch<br><br>Downy Birch on Poor to Medium fertility with Very Moist to Fresh soil moisture |

| | | | |
|---|---|---|---|
| 7 | Surface Water Gleys | Differing from groundwater gleys in that waterlogging is caused not by a high water table, but by lateral surface-water movement through the soil profile developing a seasonally fluctuating water table. Resulting anaerobic conditions will restrict rooting. Indicative vegetation includes Tussock grass and Creeping Buttercup. Again poor to moderate nutritional availability can be expected.<br><br>Drainage will be required along with micro site cultivation such as mounding. | Sitka or Norway Spruce on Medium fertility with Wet to Fresh soil moisture. Desirable mixture; each other, Japanese/Hybrid Larch* or with Lodgepole Pine in wetter poorer areas<br><br>Where improved climatic conditions allow:<br><br>Pedunculate Oak on 7b Medium to Rich fertility with Moist to Fresh soil moisture. Desirable group or blocky mixture; Norway Spruce |
| 8 | Flushed Basin Bogs | Rushes are prevalent. A shallower peat type, nutrient rich and containing some mineral grains. Peat is black in colour. | Please note that there is a presumption against planting areas of deep peats where reasonable productive growth rates are not achievable due to intact hydrology and/or challenging climate.<br><br>Forestry Commission Scotland has developed guidelines for dealing with these soil types.<br><br>Where areas of deeper peat are encountered in intimate mosaic with more favourable soils Sitka Spruce (QSS) will be favoured in a mixture with Lodgepole Pine of disease resistant provenance or hybrid larch. On these more nutritionally challenged sites a proportion (up to 20%) of soil improving species such as birch will be considered. |
| 9 | Molinia Bogs | Often existing on hillsides where flushing is more pronounced. Moderate nutrition available. | |
| 10 | Unflushed Flat or Raised Bogs | Sphagnum Moss dominated bogs, formed as peat levels rose to form a dome, reliant on precipitation for moisture and nutrients. Mineral grains are absent and the peat is reddish-brown and tends to be deeper. | |
| 11 | Unflushed Blanket Bogs | Calluna, cotton-grass, deer grass bogs including the hill peats located on upland plateaux and hillsides deeply dissected by burns. | |
| 14 | Eroded Bogs | Very poor nutritional status characterised by bog asphodel, deer grass, bog cotton etc. Can be dominated by either deep and frequent eroded areas (haggs) or frequent pools of standing water (flows). Very deep peat. | |
| 15 | Littoral Soils | Formed on coastal sands and shingles, such as the dunes found at Morrich More near Tain. The category is split into shingle (15s), dunes (15d) and then sands with varying water table depths (15e,w,g,i). These sands can be distinguished by various levels of mottling. Coastal grasses and heathland plants predominate. | Corsican cannot be considered due to the current DNB moratorium on planting therefore Scot's Pine either pure or in intimate, group or blocky mixture with Birch.<br><br>Downy/Silver Birch depending on climate |

NB – These prescriptions must be adopted within the local context set out in the main body of this Forest Design Plan. Climate, (along with soils) must be included as **the** determining factor in final species selection.

- Planting will generally become a mosaic of the species recommended above and will include areas of non-productive open ground and broadleaf riparian zones. Species choide will be dictated by local conditions and agreed after site visits by management staff.
- No commercial forestry type likely to be suitable on sites wetter than SMR "Very Moist" and vegetation indicating SNR <4.5
- Origin for SS is QSS. However where conditions are sub-alpine then ASS is preferred
- Mixed stands mean that each species occupies at least 20% of the canopy. Blocky areas should aim to cover the area that 3-4 mature trees would cover. Mixtures may need management to favour one or more species. Intimate mixtures of broadleaves with Sitka Spruce or Scot's Pine will normally result in the conifer's dominating overtime so planitng in blocks is often the better option.
- * Due to current plant health restrictions there will be no planting of Larch species, Ash or Lodge pole pine (with the exemption of Alaskan provenance Lodge pole pine), this will reviewed throughout the life of the plan in accordance with industry best practice.
- For new plantations of productive conifers, UKWAs recquirement section 3.3.2 (proportions of different species depending on site suitability) will be met.

References:

Kennedy F (2002) *The Identification of Soils for Forest Management,* Edinburgh: HMSO

Pyatt, G; Ray, D; Fletcher, J (2001) *An Ecological Site Classification for Forestry in Great Britain; Bulletin 124,* Edinburgh: FCS

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Mason, B (2006) Managing Mixed Stands of Conifers and Broadleaves in Upland Forests of Britain, Information Note, Edinburgh: FCS

Wilson, S (2011) Using alternative conifer species for productive forestry in Scotland, Glasgow: Bell & Bain Ltd

http://www.forestry.gov.uk/fr/INFD-8CVE4D

# Appendix 11: Restock Prescriptions

| Legend | Species | Prescription |
|---|---|---|
| | Sitka spruce | 100% Sitka spruce planted at 2700 stems per hectare (sph) in order to achieve 2500 sph at year 5 |
| | Sitka spruce/ Lodgepole pine | This is Sitka spruce and Lodgepole pine planted at 2700sph in order to achieve 2500 sph at year 5. They will be planted in row mixtures of 3 and 3, 50/50 mix. This will be applied to sites where heather is prevalent (drier heath sites). There will also be a hand application of Phosphate fertiliser and possible nitrogen if required. |
| | Sitka spruce/ Scots pine | This is Sitka spruce and Scots pine planted at 2700sph in order to achieve 2500 sph at year 5. This will be planting of Scots pine in groups on the drier soils with the Sitka spruce focussed on the wetter areas. |
| | Sitka spruce/ ( Larch, Douglas fir, other conifers) | This is a resilient mixture planted at 2700sph to achieve 2500 sph at year 5. This will be planted in alternate rows at 50/50 mix. This will be planted on ground that is accessible for thinning machines and where the windblow risk is low. This allows thinning to be undertaken in the future to improve the final crop trees and select the most appropriate species, the mixed species can have a benefit on the yield and it also spreads the risk in case of pathogens/ climate change. Larch / Sitka spruce mixture have been planted before and are establishing well. Larch is currently not planted by FES due to the risk of infection from Phytophthora however this is specified for future restocking in case the situation changes. |
| | Conifer/ Broadleaves | This will be alternative conifers such as grand fir or pacific silver fir planted at 2700 sph in order to achieve 2500 sph at year 5. There will be native broadleaves planted in groups within the mixture, these will be small groups planted at 1100sph. This will offer a mixed type woodland to reduce the landscape impact. |
| | Conifer | Productive conifer of alternative species such as Grand fir or Pacific Silver fir planted 100% at 2700 sph in order to achieve 2500 sph at year 5. This area is where the current species trial is and the soils are good here so these species of alternative conifers could be potentially suitable. Currently Douglas fir, coast redwood and western red cedar are growing well here. |
| | Broadleaves (none productive) | Planting of mixed native broadleaves at 1100 sph (none productive). Along riparian zones this will mostly be in groups with open space surrounding. On the peatland areas this will be peat edge woodland where planting will only be targeted to the drier soils and will be at least 20% forest cover. See Map 8 showing the peatland prescriptions. |
| | Broadleaves (productive) | There is only one area of 12ha allocated to productive broadleaves in Broadford East. This will be a mixture of sycamore, oak and birch. Birch will be removed in early thinnings for firewood for the local community with the other species being selected for future better quality stems. |
| | Peat Edge Woodland | On peat soils exceeding 50cm in depth where ESC data shows the site has potential for native woodland to establish at least 20% canopy cover.<br><br>It is composed of native broadleaf species at low density with 50% open and 50% planted at 500 stems per ha. |
| | Atlantic Oakwood | Will be planted where ESC indicates that W11- Upland Oakwood would be suitable, it will be a mixture of sessile oak with birch, rowan and hazel. With alder and willow in the riparian zones. |

Forestry Commission Scotland
Coimisean na Coillteareachd Alba

# Deadwood management

## Summary guidance for FES staff

## 1. POLICY CONTEXT AND FOREST CERTIFICATION REQUIREMENTS

This document summarises the policy and management guidance that Forest Enterprise Scotland (FES) staff need to follow in relation to deadwood. It describes the approach that FES staff should adopt when planning and delivering the deadwood resource on the national forest estate (NFE). This document should be regarded as a FES-specific supplement to the Forestry Commission Scotland (FCS) Practice Guide entitled: *Managing deadwood in forests and woodlands (Humphrey & Bailey, 2012)*, which provides fuller details on some of the following content.

Current government policy (Box 1) requires FES to create a deadwood resource within forests and woodlands on the NFE, and many deadwood-dependent species are listed on the government's Scottish Biodiversity List. Furthermore, the Scottish Forestry Strategy (SFS) implementation plan (2015-18) includes mean deadwood volume as a progress indicator for delivery of the SFS. All of these policy objectives are reinforced by the requirements of forest certification, and this guidance complies with the United Kingdom Woodland Assurance Scheme (UKWAS) Fourth Edition; this is the certification scheme under which FES is certified.

**Box 1**

The UK Forestry Standard (UKFS) sets out the governments' approach to sustainable forest management in the UK. The UKFS Guideline document entitled: 'Forests and biodiversity' requires the following good forestry practice for deadwood:

23. Leave a proportion of standing and fallen deadwood: concentrate it in areas of high ecological value, where there is existing deadwood and where linkages can be provided between deadwood habitats – avoid uniform distribution across management unit.

24. Retain existing veteran trees and select and manage suitable individuals to eventually take their place

The UKWAS Fourth Edition has the following ***requirements***:

I. The owner/manager shall plan and take action to accumulate a diversity of both standing and fallen deadwood over time in all wooded parts of the WMU [woodland management unit], including felled areas.

II. The owner/manager shall identify areas where deadwood is likely to be of greatest nature conservation benefit, and shall plan and take action to accumulate large dimension standing and fallen deadwood and deadwood in living trees in those areas.

In addition, the UKWAS Fourth Edition gives the following ***guidance***:

- The owner/manager should refer to deadwood guidance produced by relevant statutory conservation agencies, forestry authorities and others when identifying areas of greatest nature conservation benefit and when planning actions to accumulate deadwood.
- Current evidence suggests that, over the long term, deadwood (not including stumps, which are usually retained after felling) should accumulate to roughly 20 $m^3$ per hectare averaged – though not uniformly distributed – across the WMU.
- In most hectares there should be a few standing and fallen stems contributing to the overall deadwood provision.
- Deadwood management should not conflict with safety of the public or workers or the health of the woodland.

The UKWAS guidance of 20$m^3ha^{-1}$ is an average and deadwood will not be evenly dispersed across a WMU. For example, ancient semi-natural woodlands and natural reserves will have much more than 20$m^3ha^{-1}$ and productive stands will have much less.

Mueller & Buetler's (2010) review found published thresholds ranging from 10 to 80 $m^3$/ha for boreal forests, and from 10 to 150 $m^3$/ha for lowland forests. A threshold is a critical volume of deadwood above which a deadwood–dependent species (or group of species) is more likely occur. These threshold studies are useful for giving an indication of the range of deadwood volumes that are ecologically significant. Encouragingly, Humphrey *et al* (2003) demonstrated that even 'normal' plantation management systems in the UK seem to deliver enough deadwood to satisfy the UKWAS guidance. However, their measurements included low stumps (left after felling), which are explicitly excluded from the UKWAS guidance. Nevertheless, this finding is encouraging from the perspective of FES, which has to follow UKWAS guidance.

## 2. DEADWOOD MANAGEMENT PRINCIPLES

Deadwood provides a habitat and food resources for thousands of species of animals, plants, bryophytes, lichen and fungi (and unknown but enormous numbers of microbes). This habitat is 'partitioned' into innumerable ecological niches, with each species occupying a different niche according to parameters such as tree species, diameter, age, and exposure (the drying effects of sun and wind). Furthermore, because the physical nature of deadwood changes through time due to processes of decay, different assemblages of organisms use a piece of deadwood at different stages of decay. Deadwood is therefore a diverse and dynamic habitat and different organisms require different kinds of deadwood spread differently through space and time. This is problematic for woodland managers trying to create the 'best' deadwood resource to enhance biodiversity on their land. Simply put, it is impossible for managers to provide habitat for all saproxylic (deadwood dependent) species all the time.

Given there is no single 'solution' to providing deadwood habitat, it is best to adopt a set of management principles when planning and delivering deadwood on the NFE. The following set of principles reflects the consistent findings of research across various deadwood taxa and will maximise the overall biodiversity benefits that can be accrued by FES. The principles have been developed with experts from SNH and the underpinning science is expanded upon in Appendix 1.

1. *Retain and create as much deadwood as possible and create new deadwood on a continuing basis*.
2. *Retain and create as many kinds of deadwood as possible.*
3. *Favour native tree species when creating and retaining deadwood.*
4. *Favour the retention and creation of large-diameter deadwood.*
5. *Retain and create high stumps and snags (standing deadwood) within woodland and permanent open areas (but not on clear fells that will be restocked).*
6. *Design the distribution of deadwood to maximise connectivity at the WMU and coupe scale.*

### 2.1 How to create deadwood

UKWAS guidance recommends the creation of snags. However, FES staff must not kill standing trees using techniques like ring barking and chemical injection to create standing deadwood, irrespective of where this 'artificial' deadwood is located. The potential liabilities and health and safety implications associated with such features are too significant for FES. Cutting of high stumps by harvesting machines is also no longer acceptable because the machines are not designed for such work and the safety of the machine operators may be compromised. This means that snags will not be created on the NFE. Therefore, the creation of deadwood, to augment retained, naturally-occurring deadwood, should be achieved using only the methods listed below to create 'new' deadwood and 'future' deadwood:

Creating new deadwood

- Retaining large-diameter (> 20cm) logs at the edge of coupes following operations.
- Retaining smaller-diameter logs in deadwood piles at the edge of the coupe.
- Creating brash piles at the edge of coupes.
- For specific, project-based reasons (e.g. to create standing deadwood for a single-species project) creating high stumps or standing deadwood using a qualified and certified arboriculturist, or a qualified chainsaw operator if creating high stumps of 1.5m or less. This is an expensive option and is only recommended for the purposes of creating habitat for an endangered species on a very small scale.
- For specific, project-based reasons, drilling tree stumps to create water-filled holes for larvae e.g. pine hoverfly *Blera fallax*.

Creating future deadwood

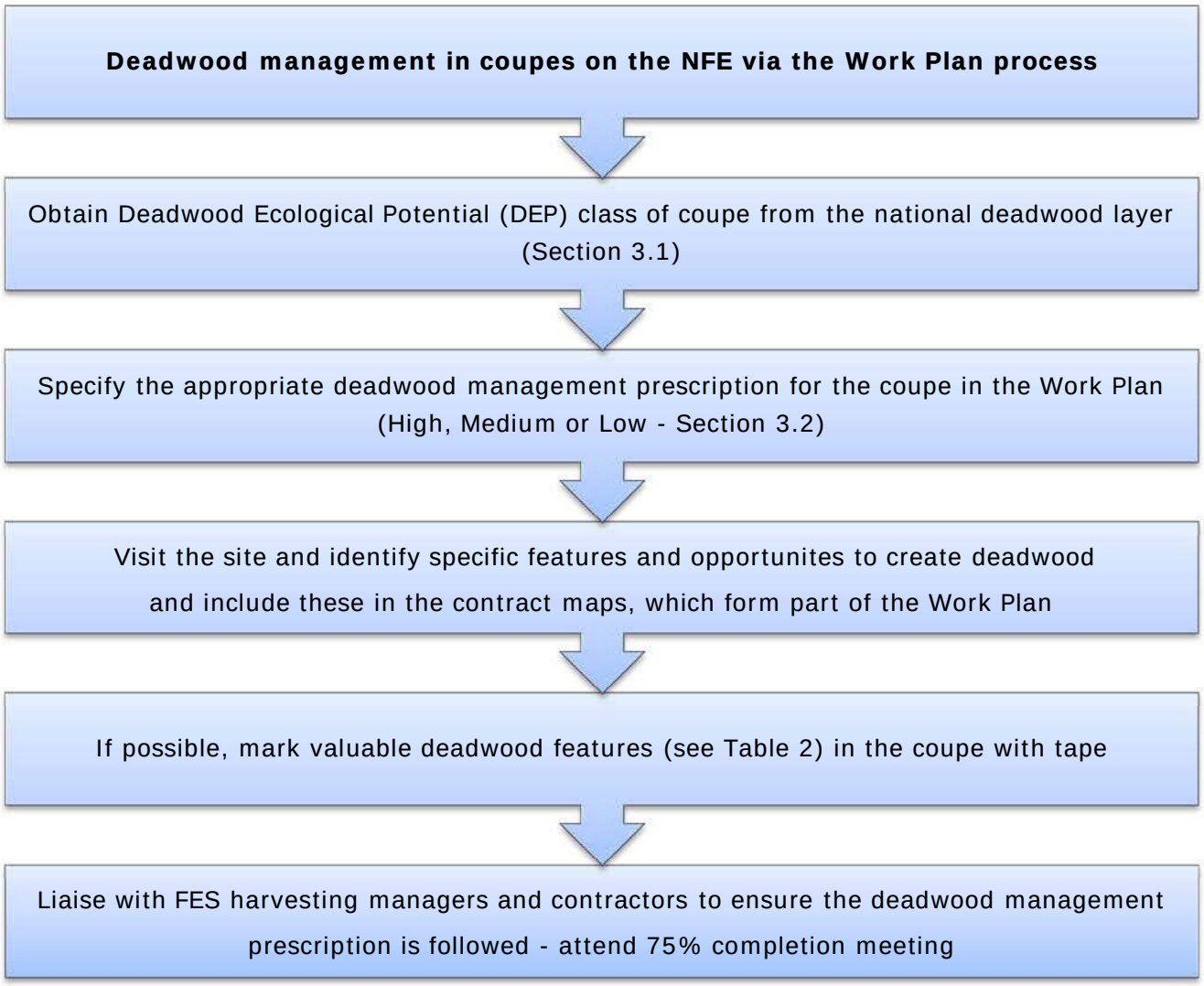
- Retaining damaged and dying trees wherever possible (providing they do not pose an obvious health and safety risk).
- Retaining wind-blown trees in appropriate locations
- Retaining individual live trees or small groups of live trees on clear fell sites. These are likely to be damaged by wind or blown over at some point and are therefore 'future' deadwood.

*Note – Ongoing research suggests that deadwood that dies naturally is more valuable for biodiversity than deadwood that is created by cutting or killing of the tree. This is because trees that go through the entire process of dying and the subsequent decay stages support a wider spectrum of species, in successional stages. Trees that are killed artificially can be colonised rapidly by a small number of generalist species that subsequently inhibit colonisation by more specialist species. Research in Finland is detecting this pattern in fungal communities on deadwood. FES guidance on deadwood management will be revised in light on new research, but meantime the focus is on deriving deadwood from trees that die through natural processes.*

## 3. DEADWOOD MANAGEMENT ON THE NFE THROUGH THE WORK PLAN PROCESS

Retaining and creating deadwood is probably the most cost-effective method of enhancing biodiversity on the national forest estate. FES Environment staff are responsible for ensuring the delivery of deadwood on the NFE, and should therefore make deadwood management a priority and allocate sufficient time and resource for this work. The overall objectives of deadwood management on the NFE are: i) to minimise the operational inconvenience caused by deadwood; ii) to satisfy UKWAS and other policy requirements; and iii) to maximise the biodiversity gains by adopting the management principles listed in Appendix 1.

The following flowchart summarises the approach FES Environment staff should follow to manage deadwood at the coupe level via the Work Plan process, and further details are provided in Sections 3.1 to 3.4:



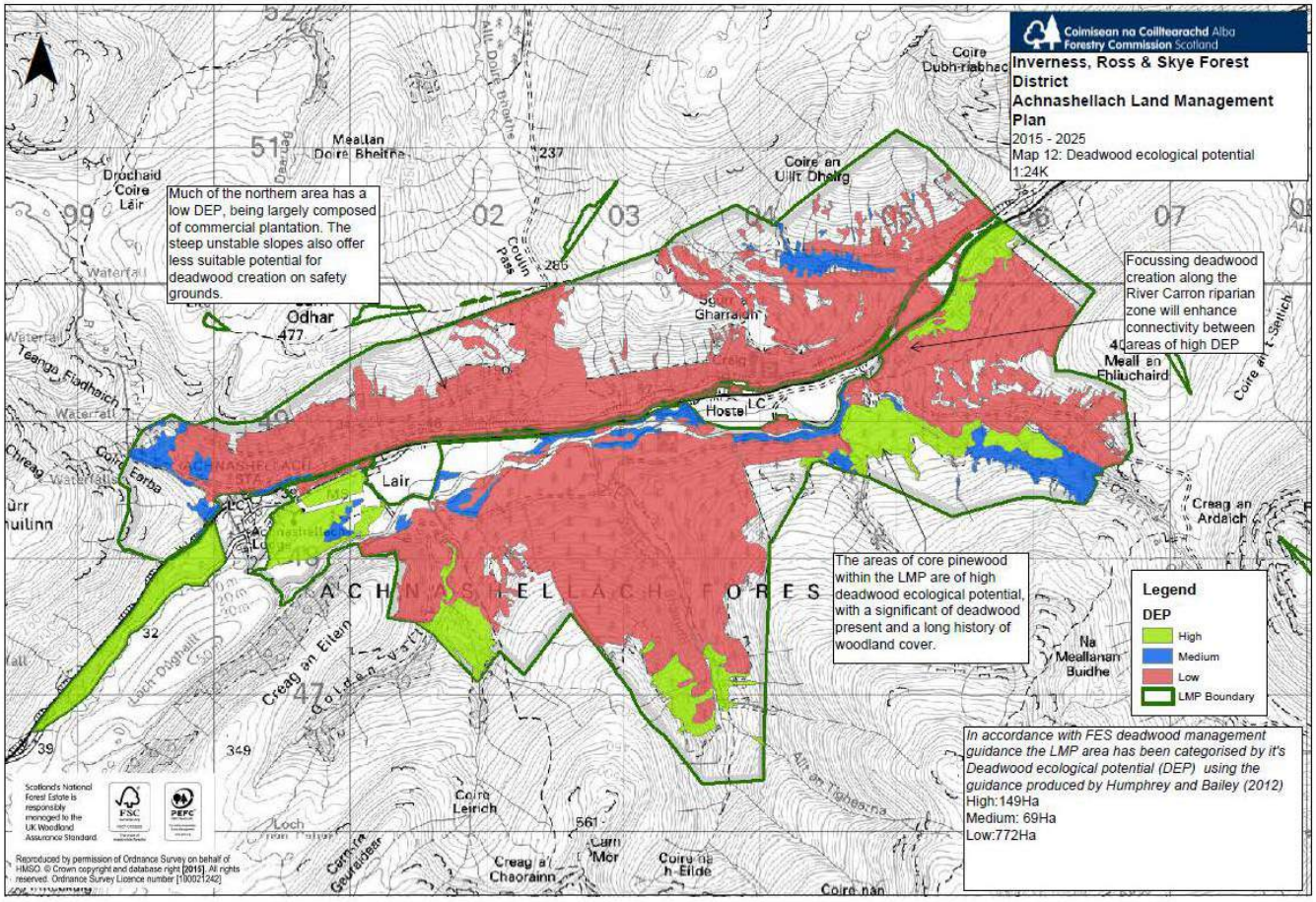
### 3.1 WMU deadwood ecological potential classes

The UKWAS term 'woodland management unit' (WMU) equates to an FES Land Management Plan (LMP), and therefore a WMU may include several individual blocks. For each WMU, all areas have been assigned the appropriate 'deadwood ecological potential' (DEP) class in a national deadwood layer, based on different woodland management categories (see Table 1). This layer is available on ForesterWeb and also on forest district servers. A map showing the DEP classes for the whole WMU should be included in Land Management Plans at the time of the plan production or revision (see Map 1 below).

Table 1 – Deadwood Ecological Potential classes of FES woodland management categories

| **Deadwood ecological potential (DEP) class** | **FES woodland management categories included in this DEP class** |
|---|---|
| High | Natural reserves, ancient semi-natural woodlands, native pinewoods, riparian buffers along watercourses, PAWS with high ecological potential, wood pasture. |
| Medium | Minimum intervention areas of broadleaved woodlands, PAWS, LEPOs, long-term retentions, LISS coupes. |
| Low | All other stands (i.e. stands where timber production is the priority) |

Map 1 – Deadwood Ecological Potential map for Achnashellach Land Management Plan




### 3.2 Deadwood management prescriptions for coupes

When a coupe comes up in the Work Plan process, apply the appropriate deadwood management prescription (High, Medium or Low). The deadwood management prescriptions for each DEP class are shown in Table 2 below; this is a simplified and FES-specific version of the measures detailed in Table 2 of Humphrey & Bailey's (2012) FCS Practice Guide.

Wherever possible during pre-operational surveys, identify particularly valuable features and record these features in work plans, so that they can be included in contracts and retained during operations. Particularly valuable features should be marked using tape prior to commencement of operations. Liaise with FES harvesting managers and contractors to ensure deadwood management prescription is followed and that valuable features are retained during harvesting

Particularly valuable features are veteran and dying trees; large-diameter standing deadwood, particularly of native species; and deadwood from native broadleaves. These deadwood types are under-represented on the NFE and increasing their abundance is a priority.

Table 2 – DEP class deadwood management prescriptions

| DEP class | Deadwood management prescription |
|---|---|
| **High** | 1. Retain all existing veteran trees and deadwood apart from that which is a health and safety risk [a]<br>2. Retain all wind blow apart from that which is a health and safety risk<br>3. Deadwood distributed throughout the coupe<br>4. Seek opportunities to create particularly valuable deadwood e.g. import some large-diameter logs from nearby coupes when they are thinned or clear felled |
| **Medium** | 1. Retain all existing veteran trees and deadwood apart from that which is a health and safety risk 2. Only harvest wind blow of significant value or which poses a health and safety risk<br>3. Seek opportunities to create particularly valuable new deadwood e.g. when felling big trees, retain some large diameter logs at the edge of the coupe<br>4. Where wind blow is harvested, retain some blown trees in a group as 'future deadwood' [b] |
| **Low** | ***During thinning***<br>1. Retain all existing deadwood apart from that which is a health and safety risk<br>2. Take obvious opportunities to create particularly valuable new deadwood e.g. when felling big trees, retain one or two large diameter logs at the edge of the coupe<br>3. Where wind blow is harvested, take opportunities to retain a few blown trees in a group as 'future deadwood' in a location that will not restrict future operations e.g. in the corner of a coupe<br><br>***During clear felling***<br>1. Retain all deadwood and living trees in areas that are uneconomic or too difficult to harvest (e.g. wet, steep or rocky areas)<br>2. Where an obvious opportunity arises, create new deadwood in a location that will not restrict future operations e.g. a pile of logs and brash in the corner or along the edge of a coupe<br><br>***Additional notes for Low DEP class areas***<br>1. Deadwood should only be retained in areas that will not restrict future operations<br>2. Standing deadwood (snags) should not be retained on clear fells, except in areas that will not restrict future operations and that do not pose a health and safety risk e.g. in the corner of a coupe<br>3. Large diameter (>20cm) deadwood logs and snags are particularly scarce on the NFE. Take opportunities to retain this kind of deadwood. When harvesting large diameter trees, seek opportunities to retain some standing deadwood, if safe to do so, and consider retaining a few large-diameter logs on site in a location that will not restrict future operations.<br>4. Large diameter deadwood from native broadleaves is particularly scarce. When harvesting large diameter native broadleaves, retain standing deadwood, if safe to do so, and retain some large diameter logs on site in a location that will not restrict future operations. |

*Notes for Table 2: a. A health and safety risk equates to deadwood that has the potential to fall on recreation routes, or other places likely to be used by people, or buildings, or other infrastructure; b. These retained, living trees will have a high likelihood of being damaged by wind, or blown over, and dying naturally, thereby becoming high-value deadwood.*

### 3.3. Riparian zones and in-stream deadwood

Riparian zones often have large accumulations of deadwood and are an important resource in terms of planning linkages between High and Medium DEP class areas. The deadwood in riparian zones can make a significant contribution to the overall deadwood volume in a WMU, and regeneration or planting of riparian trees should be a priority to provide future deadwood.

The maintenance and management of buffer strips of riparian trees, and the consequent input of woody debris, influences a wide range of physical habitat characteristics within watercourses; including light, temperature, flow, sediment transport and substrate conditions, thereby promoting high levels of biodiversity within the river environment (Gurnell *et al* 1995).

Photo 1 – Riparian woodland with abundant deadwood.

Riparian woodland is the main source of inputs of large woody debris into watercourses, which has beneficial impacts for many species, including fish (Howson *et al* 2012). Inputs of large woody deadwood are probably inadequate in most areas of the NFE (i.e. below natural levels of input) and the direct input of woody debris into watercourses should be employed as a management action – particularly into watercourses used for breeding by trout and salmon and where riparian deadwood is limited or absent. The design and management of riparian woodland to sustain the delivery of large woody debris to watercourses is an explicit action in the UK Forestry Standard Guidelines on forests and water. Further advice on large woody debris input to watercourses is available from the FES ecologists.

Photo 2 – Fallen trees are a major source of woody material within rivers. Such natural events are important for the ecology of fish and invertebrates.

### 3.4 Visitor Zoning Operations

The FC Practice Guide (Humphrey & Bailey, 2012; pages 15 to 16) gives advice on minimising risks to public and worker safety. Where dangerous trees, wind blow or dead stems have to be removed from within priority Visitor Zoning areas:

- Retain as many as possible on site.
- Move the stems to an area where they would provide significant ecological benefit (as identified above).
- Alternatively, they could be cut into manageable blocks and moved out of site as per the visitor zoning guidance.
- Larger diameter native species are likely to provide the highest benefit and retention of these stems on site should be a priority.
- Opportunities should be taken to retain significant native standing deadwood in place and use them as a focus for highlighting their biodiversity benefit through interpretation. This will always have to be weighed up against H&S and the practicalities of doing so.

The health and safety of people on site and members of the public is paramount. Environment staff should work with CRT staff to ensure standing deadwood within one tree length of roads, tracks and paths are risk assessed. Two documents provide guidance in this regard: OGB1 and the NTSG guidance entitled 'Common sense risk management of trees' (see references). New paths and tracks should be designed to avoid veterans (important future deadwood) and areas of minimum intervention where possible.

Antisocial behaviour is not sufficient reason for removing or minimising deadwood in WIAT sites. Following guidelines above, retention on-site of large diameter lengths of broadleaf, particularly native species, moved to shady damp areas (protected by shrubs such as bramble) will reduce potential for burning.

## 4. GLOSSARY

Ecological niche – The place occupied by an organism within an ecosystem, including its habitat and its effect on other organisms and the environment

Saproxylic – Pertaining to species that live on or in deadwood for at least part of their life cycle

Snag – Standing dead tree

Species diversity – A measure of the diversity within an ecological community that incorporates both species richness and the evenness of species' abundances

Species richness – The number of species within an ecological community or within an otherwise defined area or volume

Woodland Management Unit – The area to which management planning documentation (e.g. Forest Design Plan or Land Management Plan) relates. A WMU is a clearly defined woodland area, or areas, with mapped boundaries, managed to a set of explicit long term objectives.

## 5. ACKNOWLEDGEMENTS

This guidance draws upon previous work by Keith Black, Kenneth Sinclair, Philippa Murphy, Graeme Findlay and Yvonne Grieve (especially for Visitor Zoning section). Many other FES staff – including Richard Thompson, Dave Anderson, Giles Brockman, Charles Hutchinson and Colin Leslie – have provided invaluable views and information on this subject. Andrew Jarrott kindly provided several photos.

## APPENDIX 1 – RESEARCH-BASED DEADWOOD MANAGEMENT PRINCIPLES

1. ***Retain and create as much deadwood as possible and create new deadwood on a continuing basis***. As explained above, UKWAS guidance recommends about 20m$^3$/ha, which is an average, but in some sites much higher volumes will exist or the creation of higher volumes per hectare will have even greater ecological gains. As the deadwood volume increases, so does the deadwood diversity and therefore the species richness and diversity of associated organisms. For example, Mueller & Buetler (2010) demonstrated that the number of critically endangered saproxylic beetle species was positively correlated with the amount of deadwood available in their sampling plots. They recommended establishing several forest stands with deadwood amounts >20 to 50 m$^3$/ha within a network (WMU). Constant inputs of new deadwood are necessary to maintain a spectrum of ages and stages of decay into the future – so new deadwood needs to be created on a continuing basis. This is necessary because deadwood changes continually. For example, Makinen *et al* (2006) found that all Scots pine, Norway spruce and birch stems (snags) had fallen down by forty years after their death. Veteran trees are important in this regards as they represent future deadwood, and have the potential to capture the entire spectrum; starting with newly dead wood when the veteran dies.

2. ***Retain and create as many kinds of deadwood as possible.*** As the number of kinds of deadwood increases in an area, the number of microhabitats increases. Consequently, the species richness and diversity of associated organisms increases. For example, Hjalten *et al* (2010) showed that there were clear differences in saproxylic beetle assemblages between different deadwood substrate types. Brunet & Isacsson (2009) conclude that for high species diversity there is a requirement for snags in different stages of decay, size and degree of sun exposure. Therefore, FES managers should attempt to create and maintain deadwood of as many different ages (from newly dead to nearly completely decayed), heights (stumps to high snags), sizes (from small branches on the ground to large-diameter snags), types (snags, logs, stumps, log piles, felling debris etc), and degree of exposure (always shaded at one extreme to always exposed to direct sunlight at the other) as possible. In addition, deadwood from a wide range of tree species should be retained to support more exacting species of fungi (Hielmann-Clausen 2003), bryophyte (Rothero 2008), lichen and invertebrate. There is no exact recipe for the provision of this varied resource, so FES managers should simply aim for as much variety at the coupe level as is reasonably possible, taking advantage of the available opportunities.

3. ***Favour native tree species when creating and retaining deadwood.*** Deadwood retention and creation should utilise native tree species wherever possible. However,

deadwood from non-native tree species is still valuable and is certainly better than no deadwood.

4. ***Favour the retention and creation of large-diameter deadwood.*** Numerous studies show that bigger snags and logs support more species, particularly rare species. For example, Brin *et al*. (2011) showed that more indicator saproxylic species were observed in large logs than in small logs. Studies in Scandinavia (e.g. Kruys et al 1999) confirm that decaying logs >20cm provide a much richer habitat for bryophytes than smaller diameter logs. This is thought to be due to larger logs holding more moisture, providing a greater range of micro-habitats, decaying more slowly and being less likely to become over-grown by competitive vegetation. One informative conclusion of Humphrey *et al* (2003) was that large diameter, well-decayed deadwood, which is particularly valuable for biodiversity, occurs at a very low frequency and volume in most forest and stand types in the UK. The UKWAS Standard defines large as greater than 20cm diameter.

5. ***Retain and create high stumps and snags within woodland and permanent open areas (but not on clear fells that will be restocked).*** Several studies (e.g. Hjalten *et al* 2010) indicate that there are clear differences in species' assemblage composition between substrate types e.g. low stumps compared to high stumps. Low stumps left after harvesting provide important habitat for many deadwood species, including fungi and beetles. However, the higher parts of high stumps and high snags (>2m high) support different species, and can be particularly important for lichens (see Photo 3).

   High snags (frequently called standing deadwood) on clear fell sites are much less valuable for deadwood species in Scotland. This is because of the extreme exposure makes the wood unsuitable for most deadwood species. Additionally, in Scotland, we have a much-reduced invertebrate fauna due to past extinctions, and none of the remaining species are dependent on exposed deadwood snags. Exposed wood is good for some lichens, but replanting of clear fells means that snags will shaded by dense conifers within a relatively short timescale and lichens cannot survive without light. Snags on clear fells are not important for birds

   Therefore, it is important to retain and create (but see Section 2.1) high stumps and snags within woodland and permanent open areas, in order to provide habitat for a wide range of species. Snags on clear fells are ecologically much less important and are a significant constraint on operational activity. Snags should not be retained on clear fells that will be restocked, except in locations that will not constrain future operations e.g. along the edges or in the corner of coupes.

Photo 3 – Naturally-occurring Scots pine 'bones' within woodland and open woodland are particularly important for lichens in Scotland. These valuable features should be retained (unless they pose a health and safety risk e.g. by being close to tracks).

6. ***Design the distribution of deadwood to maximise connectivity at WMU and coupe scales.*** Numerous papers indicate that the spatial distribution and connectedness of the deadwood resource is an important determinant of occurrence of many saproxylic species. Studies of saproxylic beetles show that they respond to habitat factors (e.g. amount of deadwood) at different spatial scales i.e. at both the forest stand and landscape scales. For example, Bergman *et al* (2012) showed that some beetle species respond to both local (e.g. forest stand) and landscape (e.g. forest block) habitat factors. In this study, 16 oak-dependent saproxylic species showed a clear relationship with substrate (snag) density at scales ranging from 52m to >5200m. How large and connected areas of High deadwood volumes (>20 to 50 $m^3$/ha) need to be is still unknown for most groups, even though some information indicates that the surroundings also play an important role (Oakland *et al* 1996). Several research projects (e.g. Franc *et al* 2007, Ranius & Roberge 2011) recommend concentrating deadwood into a network of low-intensity-management sites within a more intensively-managed-forest matrix.

## APPENDIX 2 – EXAMPLES OF GOOD DEADWOOD MANAGEMENT

**Retain and create as much deadwood as possible and create new deadwood on a continuing basis.**

Photo 4 – A long-term retention on a hillside that will be subject to wind blow, which will cause many of the trees to die naturally at different times. This will create large amounts of deadwood on a continuing basis for many years.

Photo 5 – Retention of native tree species within a crop of exotic tree species. Such retentions act as 'life boats' for many species of invertebrates, fungus and lichens, allowing them to persist in the coupe. The retention also facilitates and maintains dispersal of many species within a forest block. Many of the trees in the retention will be subject to wind damage, which will create a range of deadwood habitats on the tree and on the ground. The trees will be damaged and will die at different times, thereby providing a range of deadwood habitats at different stages of the decay process. This is a far more valuable way of creating deadwood than retaining lots of dead and bark-less snags across a restock.

Photo 6 – A large retention of wind thrown trees and six living trees at the edge of a coupe. The blown trees will die at various times in the future, thereby creating inputs of new deadwood on a continuing basis. Dying trees are extremely valuable deadwood habitats. This is because changing assemblages of species colonise the wood as it goes through the varying decay stages: from weakened and dying, to recently dead, and right through to the stage where the tree is almost decomposed. So, from death to decomposition, each tree provides a spectrum of changing habitats that are invaluable for literally thousands of species. The standing trees are likely to snap in the wind and die or blow down and die. Either way, it creates very valuable deadwood habitat in the future.

**Retain and create as many kinds of deadwood as possible.**

Photo 7 – Log and brash piles created in a corner of a coupe that was not going to be restocked. This 'deadwood centre' provides habitat for many species of invertebrate, fungus and lichen. In addition, such features are often used as resting places or breeding sites by protected species such as otters and pine martens, and reptiles and amphibians. By providing these features in appropriate locations (e.g. in riparian zones or at the edge of permanently open ground), it minimises the likelihood that protected species will rest or breed in the middle of productive areas. This reduces the constraints associated with these widely-distributed species.

Photo 8 – A ‘deadwood centre’ at the edge of a productive coupe. The opportunity to create this feature arose because of the accumulation of different types of deadwood in a location that will not hinder future operations. Off cuts have been placed in the deadwood centre and a few living pines with poor form have been retained. These will likely be damaged by wind at some stage and are therefore ‘future deadwood’. Having ongoing inputs of new deadwood over time is important because different species use different decay stages of deadwood.

Photos 9, 10 and 11 – Examples of deadwood retained in locations that will not impinge on future operations. In all cases, a variety deadwood has been collected into 'deadwood centres' along of edge of coupes that will be restocked in the future. The bottom photo shows an area with a retained snag, a large-diameter stump with retained log section, and a variety of brash and small diameter deadwood.

**Favour native tree species when creating and retaining deadwood.**

Photo 12 – Retained birch snag. Deadwood from native tree species is more valuable than deadwood from non-native tree species.

Photo 13 – Rot holes in dead and dying broadleaf are very valuable habitats for a range of saproxylic species. Such habitats are very scarce on the NFE and should be retained.

Photo 14 – Retained Scots pine snags following removal of spruce crop.

**Favour the retention and creation of large-diameter deadwood.**

Photo 15 – Large-diameter deadwood supports remarkable biodiversity but is rare on the NFE. Large diameter deadwood from native broadleaves is particularly valuable and scarce.

Photo 16 – These large diameter and flared butts are valuable deadwood habitat, but have been left over the drain at roadside. In such cases, ask the machine operator to lift them into the edge of the adjacent coupe.

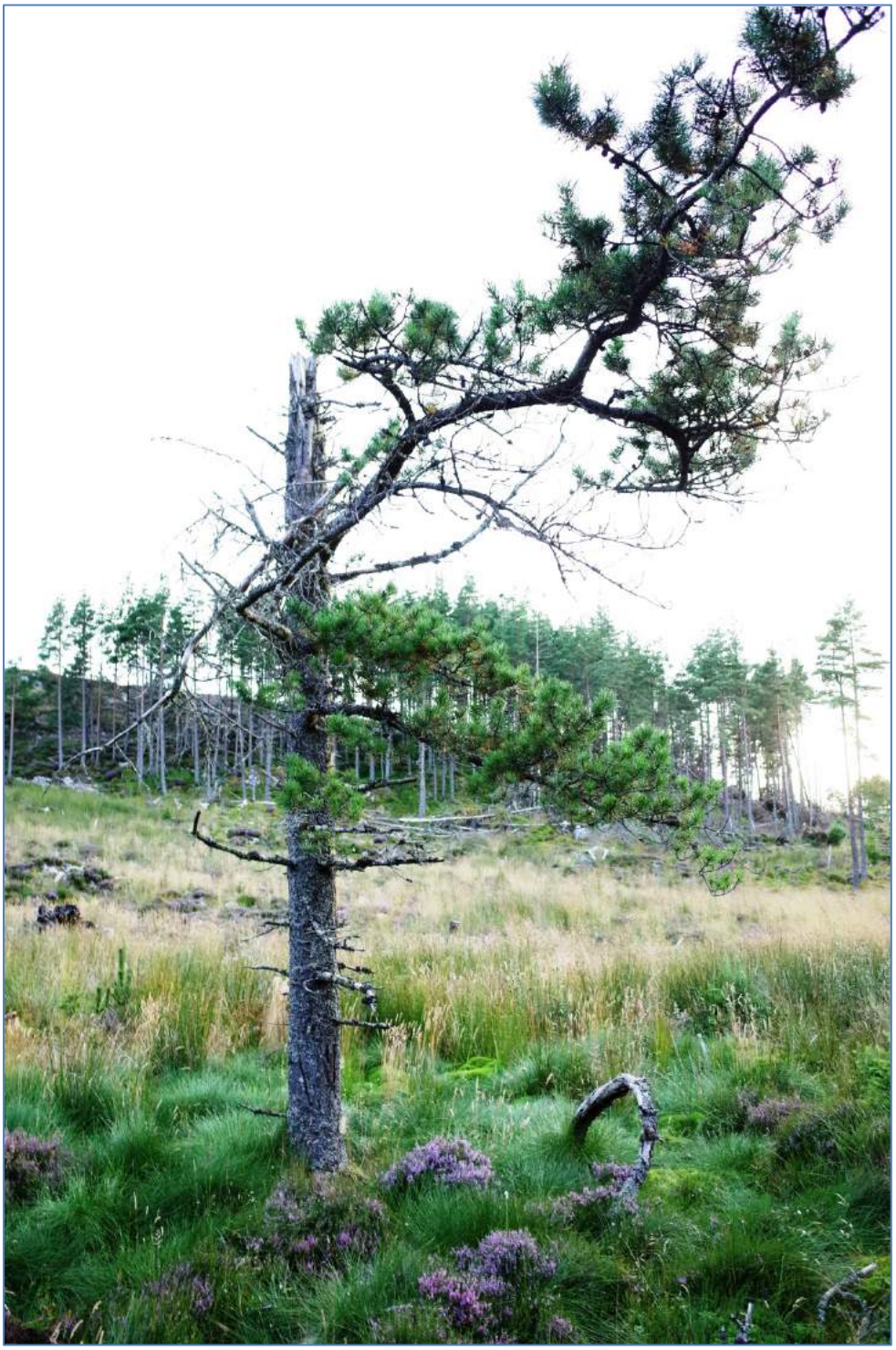
Photo 17 – Large diameter, windblown tree left in-situ on the boundary of two productive coupes. An extremely valuable and ever-changing habitat, left in a location that will not hinder future operations.

**Retain and create high stumps and snags (standing deadwood) within woodland and permanent open areas (but not on clear fells that will be restocked)**

Photo 18 – High stumps resulting from trees snapping should be retained during thinning operations (unless they pose a health and safety risk e.g. by being close to tracks).

Photo 19 – High stumps with cavities are particularly important for a range of birds, mammals and invertebrates and should be retained.

Photo 20 – Snapped trees such as this provide a range of deadwood habitats, including dying branches. These trees are likely to die standing and go through much of the decay process whilst standing. This provides different habitat to stems on the ground. On clear fells, retain any such trees along edges of coupes.



**Design the distribution of deadwood to maximise connectivity at the WMU and coupe scale.**

Photo 21 – A network of retentions of dead, dying and living trees (future deadwood) in Galloway Forest Park.

Some species have extremely limited dispersal ability (e.g. see Jackson *et al* 2012), and habitat fragmentation occurs for some saproxylic insects at a local scale through the isolation of single deadwood pieces (Schiegg 2000). Therefore, as a general rule, deadwood at the coupe level should have a high level of connectivity to benefit such species. In practice, this means that there should only be a few metres between individual logs and snags, or that it should be clumped and touching or nearly touching in the case of felling debris such as branches and logs (Photo 18). This approach is compatible with minimising operational inconvenience as deadwood can be clumped along coupe edges or in corners.

Photo 22 – Felling debris and logs clumped to ensure habitat connectivity for dispersal-limited species.

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# Forestry Commission Scotland
# Slope Stability Project - Geotechnical Assessment

| | | | |
|---|---|---|---|
| **Forest ID:** | 517 | **O.S. Grid Ref:** | NG 77111 21218 |
| **Forest District:** | Inverness, Ross & Skye | **Date of Assessment:** | 10th December 2013 |

| **Phase 1 BGS Information (Ref. 1)** | | | |
|---|---|---|---|
| **BGS Polygon Name:** | Kylerhea | | |
| **Likelihood Score:** | Minor Road: 4 (4,4) | **Hazard Score:** | 4 (4,4) |

## 1. Geology

**Solid – from British Geological Survey (Scotland)**

Beinn Na Seamraig Formation, TBS-SDST (Sandstone) – throughout, except extreme NW corner. Kinloch Formation, TBK-STMD (Sandstone & Mudstone) – in extreme NW corner only.

**Superficials – from British Geological Survey (Scotland)**

Till and Morainic Deposits (Undifferentiated), TIMO-XDSV (Diamicton, Sand & Gravel) – Lower, mid & upper slopes, mainly in central in east.

**Noted on Site:**

Superficials were observed in the cut soil slopes along the road. These comprised light brown fine to coarse SAND and GRAVEL in a fine grained matrix. Gravels are sub angular.

## 2. Geomorphology / Area Description (see DWG KYL_001 Feature Plan)

| Area | Description |
|---|---|
| General Site | The Kylerhea polygon is situated in the east of the Isle of Skye approximately 1km to the west of Kylerhea Village. It is positioned on the southern flanks of the Sgurr na Connich which is the highest peak on the Sleat peninsula.<br><br>The polygon lies on the slopes above a single track unnamed road which runs east to west. This road is a lifeline road and the only access into Kylerhea and to the ferry terminal. The ferry service runs in the summer months between Kylerhea and Glenelg on the Scottish mainland. |
| Area 1 | The Kylerhea polygon has been classified as one area due to the terrain being similar across the polygon. The slope angles across the site are generally between 15° and 25°, with locally steeper areas in the vicinity of rock outcrops, along the unnamed road and in the gully sides. The slopes are boggy in places and there are numerous channels which flow downslope towards the unnamed road in the south.<br><br>In the far west of the site there are a number of rock outcrops up to 3m high (Photo 1). There were rare boulders observed on the slopes in the vicinity of the rock outcrops. These are currently stable and are unlikely to be disturbed.<br><br>There are three main gullies which cut through the site north to south; one in the west of the site, one in the centre (this is the largest) and one along the eastern boundary. Numerous landslides were observed in the gully sides (Photos 2 to 4). These |

| | |
|---|---|
| Area 1 | landslides range in size from approximately 3m wide by 3m long up to 30m wide by 60m long (Photo 4).<br><br>  <br>**Photo 1. Rock outcrops in the west of site (E 176512, N 820865)**<br><br>The larger landslides appeared to be translational landslides which have graded into debris slides of displaced scree material. It is likely that further sliding of the scree into the gullies will occur. There is the potential for landslide debris to fall into the gully leading to the potential creation of debris dams. Material could back up behind such dams until eventually the dam fails suddenly releasing significant quantities of debris and water downslope. Such debris dam failure leads to significant downstream erosion, obstruction of culverts and potentially debris flows.<br><br>The main western gully and central gully carry streams which flow below the unnamed road through 3m high bridges. These bridges will allow significant quantities of debris to pass below the road; however, a large debris flow event down either of these main gullies could potentially block the bridge area and affect the unnamed road. The eastern gully carries a stream which flows under the road through a 1m diameter culvert. This is highly vulnerable to blocking with debris and should be maintained to be clear and allow water and debris to pass through freely.<br><br>  <br>**Photo 2. View of landslides up western main gully (E 176803, N 821283)** |

**Photo 3. Landslides in eastern main gully (E 177598, N 821114)**

From a review of the aerial photographs there appears to be a relict back scarp of a rotational landslide approximately 500m long along the north east boundary of the polygon. This is thought to be the landslide recorded by the BGS (see section 3). It is likely this landslide occurred following the release of pressure and toe support when the glaciers retreated. If this is the case then the north eastern slopes in the polygon are likely to comprise a large quantity of displaced material from the historic landslide. The large landslides observed in the gully sides on Photo 4 are in this area.

Area 1

**Photo 4. Landslides in central main gully (E 177181, N 821382)**

Numerous open slope 'hillside' debris flows were observed on site with some of these having a relatively small run out whilst others have become channelised and have a large run-out. The largest (starting at location E 177359, N 821174) observed on site is approximately 30m wide and extends 150m to 200m downslope towards the unnamed road below (Photo 5). The debris flows are likely to have been caused initially by a shallow translational landslide which graded into a flow due to loss of internal strength and the introduction of water into the mass.

It is understood from the information provided by the Forestry Commission district that a debris flow from the site has previously blocked the unnamed road (further details are unknown). Evidence of landslides and debris flows which have occurred directly upslope of the unnamed road was observed during the assessment (Photo 6).

| | |
|---|---|
| Area 1 | From the conditions observed on site and the previous landslide history, it is considered likely that a debris flow will occur in the future which will affect the unnamed road.<br><br>  <br>**Photo 5. Debris flows towards unnamed road (E 177359, N 821174)**<br><br>  <br>**Photo 6. 5m wide Landslide above unnamed road (E 177415, N 820896)**<br><br>**Cut slopes along Unnamed Road**<br><br>There are occasional cut soil slopes up to 4m high along the unnamed road (Photo 7), with cobbles and boulders eroding out of the slope; however, these had been contained on the verge at the toe of the cut slope and it is unlikely that they will affect the unnamed road. |

**Photo 7. Cut soil slope along unnamed road (E 176465, N 820799)**

A 7m high by 10m wide cut rock slope was observed along the unnamed road at E 177538, N 820843. This has small ravelling failures present which have been contained on the verge at the toe of the slope.

**Drainage Along Unnamed Road**

Area 1

There is a mixture of steel, stone and plastic culverts along the road varying in size from 200mm up to 1m diameter. The majority of the culverts were allowing water to pass through freely; however, in some of the culverts, vegetation has grown around the culvert inlets and outlets preventing a visual inspection.

At location E 176758, N 820973, a plastic pipe has been installed in the ditch alongside the unnamed road (Photo 8). The joints along the pipe are not sealed (as shown in Photo 8). The area around the break in the pipe was dry suggesting that water is not flowing into the pipe and is therefore not effective. At location E 176808, N 820968, it was observed that the ditch along the unnamed road has become blocked and requires clearing.

**Photo 8. Pipe in ditch along unnamed road (E 176758, N 820973)**

| Elements at Risk | Description |
|---|---|
| Unnamed Road | The polygon lies on the slopes above a single track unnamed road which runs east to west. This road is a lifeline road and the only access into Kylerhea and to the Kylerhea ferry terminal. The ferry service runs in the summer months between Kylerhea and Glenelg on the mainland. |
| Kylerhea River | The streams flowing through the site flow into the Kylerhea River to the south of the polygon. This river is not classified by SEPA. |

**3. Summary of Hazard Present on Site**

**See – Table 1. Slope Stability and Risk (STAR) Assessment &**

**DWG KYL_002 Kylerhea - Hazard Areas Plan**

**Reported Significant Events:**

There have been two reported events within or near to the Kylerhea polygon:

| Location: | Description: | Geology: | Dimensions |
|---|---|---|---|
| Coire An Fhraoich [8133] (177213, 821840) | Deep-seated rock slide (Smith, 1984)? | TBS-SDST TIMO-XDSV | L = 890m, W = 700m |
| FCS Landslide: NG 765208 | Debris, large, inactive, Age: 2006 | TBS-SDST TIMO-XDSV | L = 150m, W = 70m? |

| Area | Hazards (in order of hazards) | Hazard Category |
|---|---|---|
| Area 1 | Debris flows, landslides, rock outcrops and boulders | Very High |

**4. Summary of Risk Levels present on Site**

**See – Table 1. Slope Stability and Risk (STAR) Assessment &**

**DWG KYL_003 Kylerhea - Source of Risk by Area Plan**

A risk plan has been produced which highlights the level of risk from a particular area. This is the level of risk to forest infrastructure (e.g. roads and paths) and 3rd party land and infrastructure (e.g. buildings, trunk roads, power lines). The risk plan does not indicate the level of risk to Forestry Commission or Forestry Commission contract workers working in the Areas as it is anticipated this will be included in the working method statement.

| Area | Elements at Risk | Risk Category |
|---|---|---|
| Area 1 | Unnamed road, Kylerhea River | High |

| 5. Summary recommendations for Remedial Works and Costing<br>(For details see Table 1. Slope Stability and Risk (STAR) Assessment) | |
|---|---|
| General | 1. Prior to foresting operations FC should undertake an inspection of all culverts and ditches. Culverts and ditches should be maintained so that they are clear of debris and allow water to pass through freely.<br>2. The road authority should be made aware of the risk to the unnamed road and they should make sure the culverts and ditches along the road remain clear to allow water and debris to pass underneath.<br>3. The foresting risk assessment and method statement needs to take into account the potential for disturbance of rock outcrops and boulders on the slope during foresting. |
| Debris Flows | 4. The whole site was identified as having the potential for debris flows.<br>It would be appropriate to liaise with the local road authority to determine the historic frequency of events and the importance of the lifeline road to all and agree the options on a cost benefit basis.<br>There are a number of ways to reduce to the likelihood of debris flows occurring or affecting the unnamed road on this site and these include:<br>• Use silviculture to increase slope stability. Establish woodland on the lower slopes with trees of a variety of rooting depths and at a density that encourages root development and slope stabilisation. Forestry Commission are already looking into this as a long term management plan for unstable slopes – liaise with Kim Leech or Ben Lennon.<br>• Installation of drainage grips across the slopes to intercept surface water and direct it into predefined channels and gullies. This will require an assessment of the catchment area and the culvert sizes along the unnamed road to determine if they are equipped to adjust to any change in the drainage regime.<br>• Install debris flow catch fences along the unnamed road for the length of the site as it would be difficult to predict where an open slope debris flow may occur based on a site walkover; hence this approach is non-targeted.<br>• A targeted approach for remedial and or containment works based on detailed debris flow mapping to identify locations where debris flows may originate and where they may affect the road. This could possibly be assisted by using a Geoelectrical Resistivity Survey (Ghazali et al, 2012). This survey can be applied to identify:<br>○ Zones of soil or weathered rock with high water content,<br>○ Areas of groundwater flow. |
| Landslides | 5. Due to the presence of large (most probably historic) landslides on the site it is essential that any construction or drainage work is subject to further assessment to determine the risk of reactivation of the slides. |
| **Approximate Cost for Risk Management / Remediation** | **£ *** |
| * Costs will be determined by the approach chosen to deal with the risk from debris flows. The engineered options will require further assessment. | |

| | | |
|---|---|---|
| **Prepared:** | M. Humphreys<br>Michelle Humphreys: BSc (Hons), FGS | **Date:** 14/4/15 |
| **Checked:** | GM Butler<br>Gillian Butler: BSc (Hons), MSc, FGS | **Date:** 14/04/15 |
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## 6. Attachments

**Tables:**

Table 1. Slope Stability and Risk (STAR) Assessment

**Drawings:**

Drawing No. KYL_001 – Kylerhea Feature Plan

Drawing No. KYL_002 – Kylerhea Hazard Areas Plan

Drawing No. KYL_003 – Kylerhea Sources of Risk by Area Plan

## 7. References


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## 8. Slope Stability And Risk (STAR) Tables

**Slope Angle Categories**

| Slope Angle Description | Angle (deg.) | Colour |
|---|---|---|
| Very Low | 0 - 5 | |
| Low | > 5 - 20 | |
| Moderate | >20 - 30 | |
| Moderately Steep | > 30 - 33 | |
| Steep | >33 - 40 | |
| Very Steep | > 40 - 45 | |
| Extremely Steep | > 45 | |

**Hazard**

| Hazard Description | Value | Hazard |
|---|---|---|
| Minor failure / erosion / weathering - typically slopes < 25°. | 1 | Low |
| Moderate slope failure - typically slopes < 25°. Small rock fall individual blocks <0.1m3. | 2 | Low to Moderate |
| Substantial slope failure – typically slopes 25° to 40°. Moderate rock fall <10m3. | 3 | Moderate to High |
| Large slope failure – typically slopes at 25° to 40°. Large rock fall 10 to 50m3. | 4 | High |
| Major slope failure – typically slopes at > 40°. Major rock fall >50m3. | 5 | Very High |

**Receptor Type**

| Receptor Type Description | Value |
|---|---|
| Undeveloped land | 1 |
| Unoccupied / Infrequently visited building / Public rights of way | 2 |
| Roads / Footpaths | 3 |
| Residential property / Commercial buildings (single to few lives) | 4 |
| Major public buildings (many lives) | 5 |

**Receptor Vulnerability**

| Receptor Vulnerability Description | Value |
|---|---|
| Little or no effect | 1 |
| Nuisance or minor damage | 2 |
| Significant damage | 3 |
| Major damage / Major Injury | 4 |
| Total loss / Loss of life | 5 |

**Pathway**

| Pathway - Interaction of Hazard with Element at Risk? | Pathway Value |
|---|---|
| Almost Certain | 1 |
| Likely | 0.8 |
| Possible | 0.6 |
| Unlikely | 0.4 |
| Rare | 0.2 |
| Barely Credible | 0 |

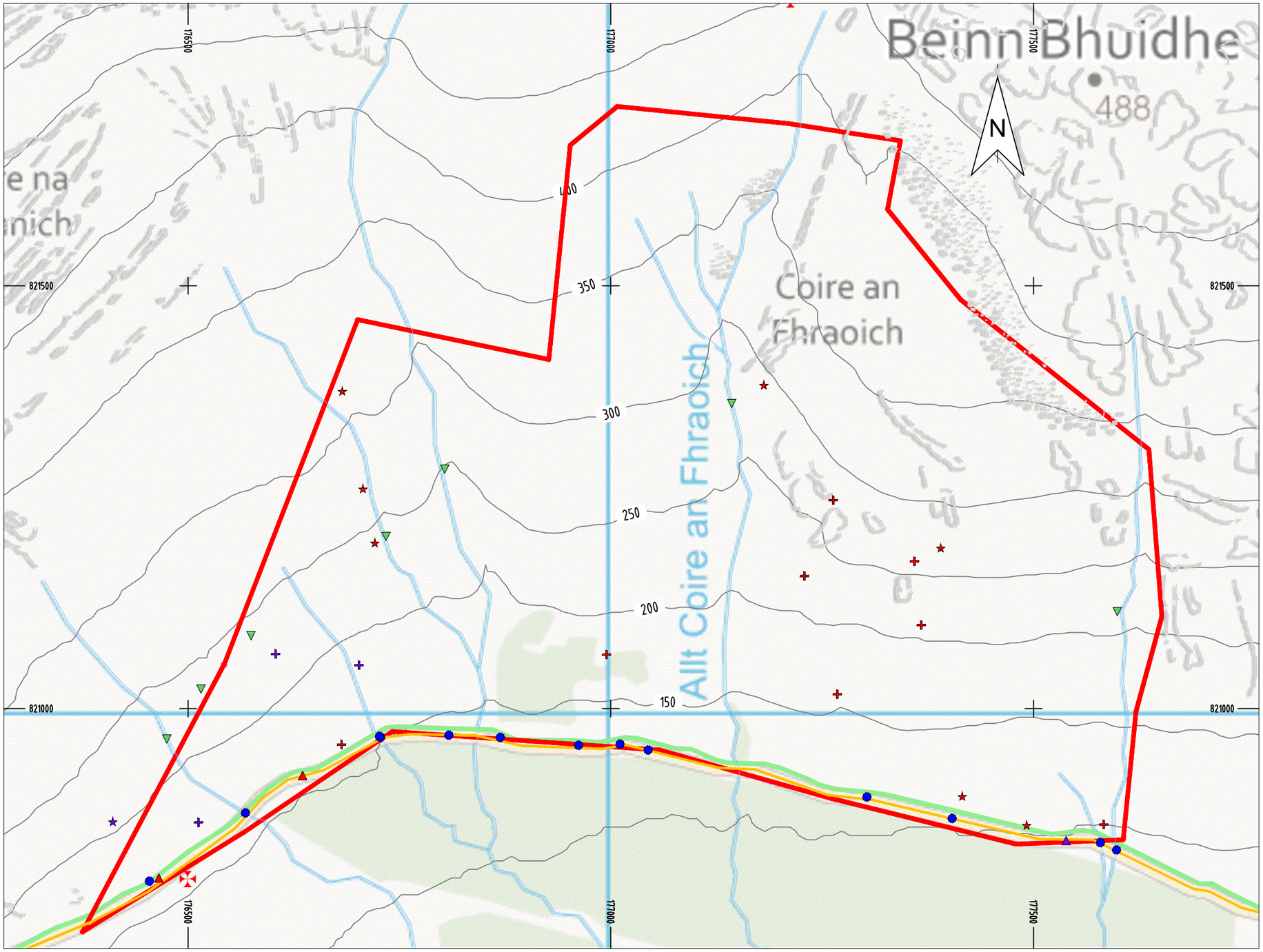
**Risk Values, Categories and Actions**

| Risk Value | Risk Category | Action |
|---|---|---|
| **<10** | **Low** | **Normally accepted** |
| **10 to < 25** | **Low to Moderate** | **Significant Risk - need to be made aware of hazards and monitor** |
| **25 to < 75** | **Moderate to High** | **Significant Risk requiring remedial measures / risk management actions** |
| **75 to < 100** | **High** | **Significant Risk requiring major remedial measures** |
| **100 or >** | **Very High** | **Significant Risk requiring urgent action e.g. evacuation or interim measures followed by remedial measures** |

**Table 1. Kylerhea - Slope Stability and Risk (STAR) Assessment**

| | | | | Slope Stability And Risk (STAR) Assessment | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Hazard Source Area** | **Hazards (in order of hazard)** | **Location of Element at Risk** | **Element at Risk (EAR)** | **Hazard** | **Hazard Category** | **Receptor Type** | **Vulnerability** | **Pathway** | **Score** | **Risk Category** | **Potential Risk Management / Remedial Works** | **Priority** | **Outline Costs** |
| Area 1 | Debris flows | Unnamed Road | Road users | 5 | Very High | 4 | 5 | 0.8 | 80.0 | High | Consider ways to reduce risk from debris flows:<br>• Establish woodland on the lower slopes to encourage slope stabilisation.<br>• Install drainage grips across the slopes to intercept surface water run off.<br>• Install debris flow catch fences.<br>• Undertake detailed debris flow mapping possibly incuding ageoelectrical resistivity survey to identify zones of soil and weathered rock with high water content and areas of groundwater flow. | As soon as practicable | £ - * |
| | | Kylerhea River | Ecology | 5 | Very High | 4 | 2 | 0.4 | 16.0 | Low to Moderate | | | |
| | Landslides | Unnamed Road | Road users | 3 | Moderate to High | 4 | 4 | 0.6 | 28.8 | Moderate to High | Due to the presence of large (most probably historic) landslides it is essential that any construction works in this area is subject to further assessment to determine the risk of reactivation of the slides. | Prior to foresting operations | £ - |
| | Rock Outcrops and boulders | Unnamed Road | Road users | 2 | Low to Moderate | 4 | 4 | 0.2 | 6.4 | Low | Foresting risk assessment and method statement need to take into account the disturbance of boulders on the slopes during any foresting operations. | During foresting operations | £ - |
| | Cut rock and soil slopes | Unnamed Road | Road users | 1 | Low | 4 | 2 | 0.6 | 4.8 | Low | The verge / ditch below cut soil and rock slopes should be kept clear to contain fallen material.<br>Drainage systems along the unnamed should be inspected to ensure they are kept clear. | Drainage systems and ditches should be subject to routine inspection and maintenance by Forestry Commission. | £ - |
| | | | | | | | | | | | | **Total** | **£ -** |

Notes:
1. Where costs for an area are '£ -' this means these will be standard maintenance costs for Forestry Commission and as such are not classed as capital expenditure costs as part of the Geotechnical Assessments
2. Where costs for an area are '£ - * Costs will be determined by the approach chosen to deal with the risk from debris flows. The engineered options will require further assessment.




FORESTRY COMMISSION

- Class A Road
- Class B Road
- Class C Road
- Legal Boundary
- Site Boundary

FEATURE POINTS

- Borrow Pit (BP)
- Boulders (B)
- Bridge (BR)
- Concave Break in Slope (CCB)
- Convex Break in Slope (CCV)
- Culvert (C)
- Cut Rock Slope (CRS)
- Cut Soil Slope (CSS)
- Debris Flow (DF)
- Embankment Slip (ES)
- Erosion (ER)
- Gulley (G)
- Landslide (LS)
- Mast / Pylon (TM)
- Peat Slide (PS)
- Reported Event (RE)
- Rock Crag (RC)
- Rock Outcrop (RO)
- Rock Slope (RS)
- Scree Slope (SC)
- Spoil Heap (SP)
- Spring (SPR)
- Tension Crack (TC)
- Wet Ground (WG)

**Notes**:

1. Do not scale from this drawing.
2. All dimensions are in metres unless otherwise stated.
3. OS Map data obtained from OS Opendata
4. Aerial photograph and topographical data (DTM) provided by Forestry Commission

| | |
|---|---|
| drawn | MH |
| date | MAY 14 |
| scale | 1:5,000 |
| original size | A3 |

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

| | |
|---|---|
| client: | FORESTRY COMMISSION |
| project: | SLOPE STABILITY PROJECT |
| title: | KYLERHEA GEOTECHNICAL ASSESSMENT FEATURE PLAN |
| project no: | 01727AA |
| fig no: | KYL_001 |

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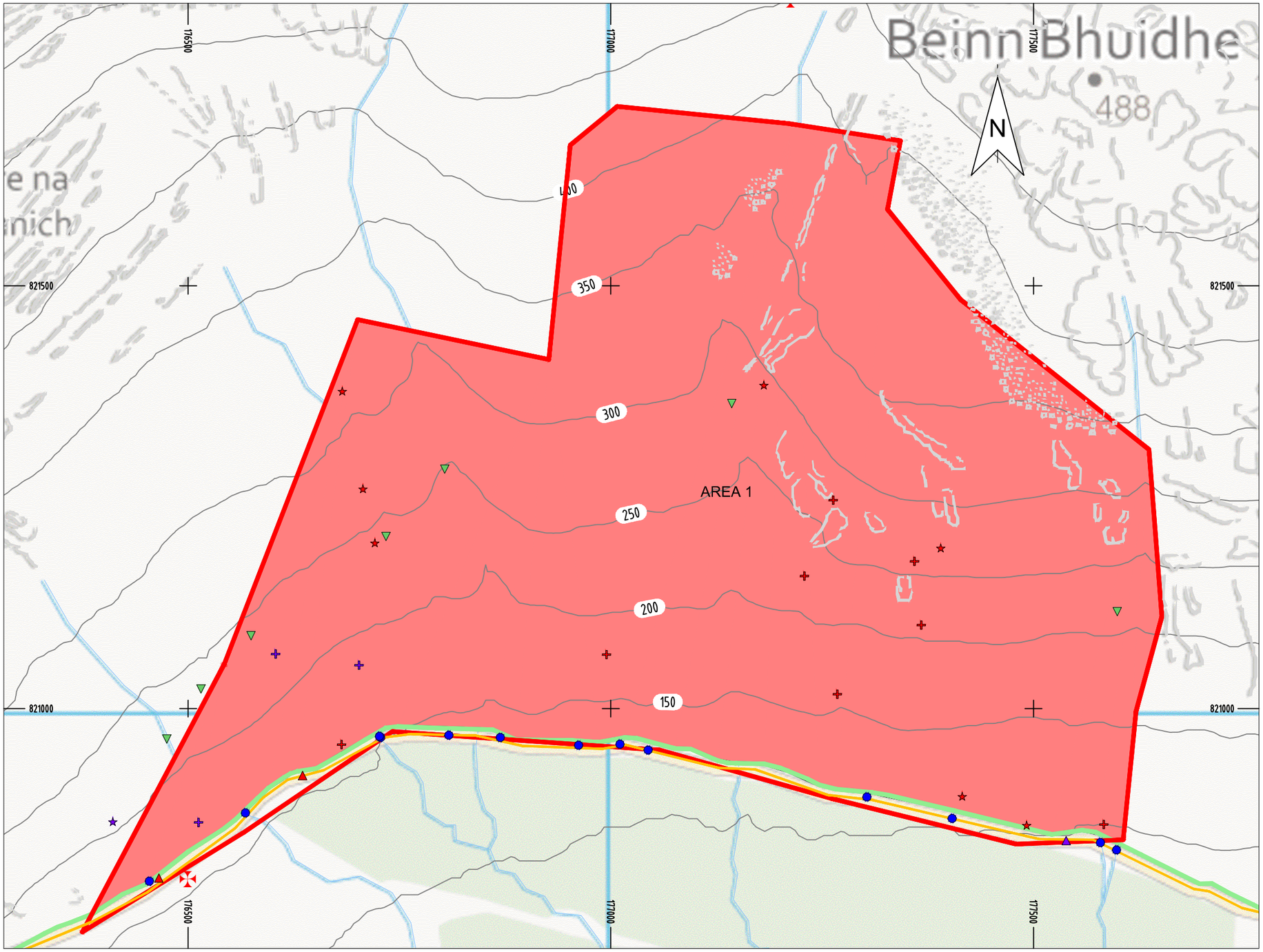


FORESTRY COMMISSION

- Class A Road
- Class B Road
- Class C Road
- Legal Boundary
- Site Boundary

HAZARD AREAS

- Low
- Low to Moderate
- Moderate to High
- High
- Very High

FEATURE POINTS

- Borrow Pit (BP)
- Boulders (B)
- Bridge (BR)
- Concave Break in Slope (CCB)
- Convex Break in Slope (CCV)
- Culvert (C)
- Cut Rock Slope (CRS)
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**Notes**:

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| | |
|---|---|
| drawn | MH |
| date | MAY 14 |
| scale | 1:5,000 |
| original size | A3 |

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SPECIALISTS MANAGING THE EARTH

client: FORESTRY COMMISSION

project: SLOPE STABILITY PROJECT

title: KYLERHEA GEOTECHNICAL ASSESSMENT HAZARD AREA PLAN

project no: 01727AA

fig no: KYL_002

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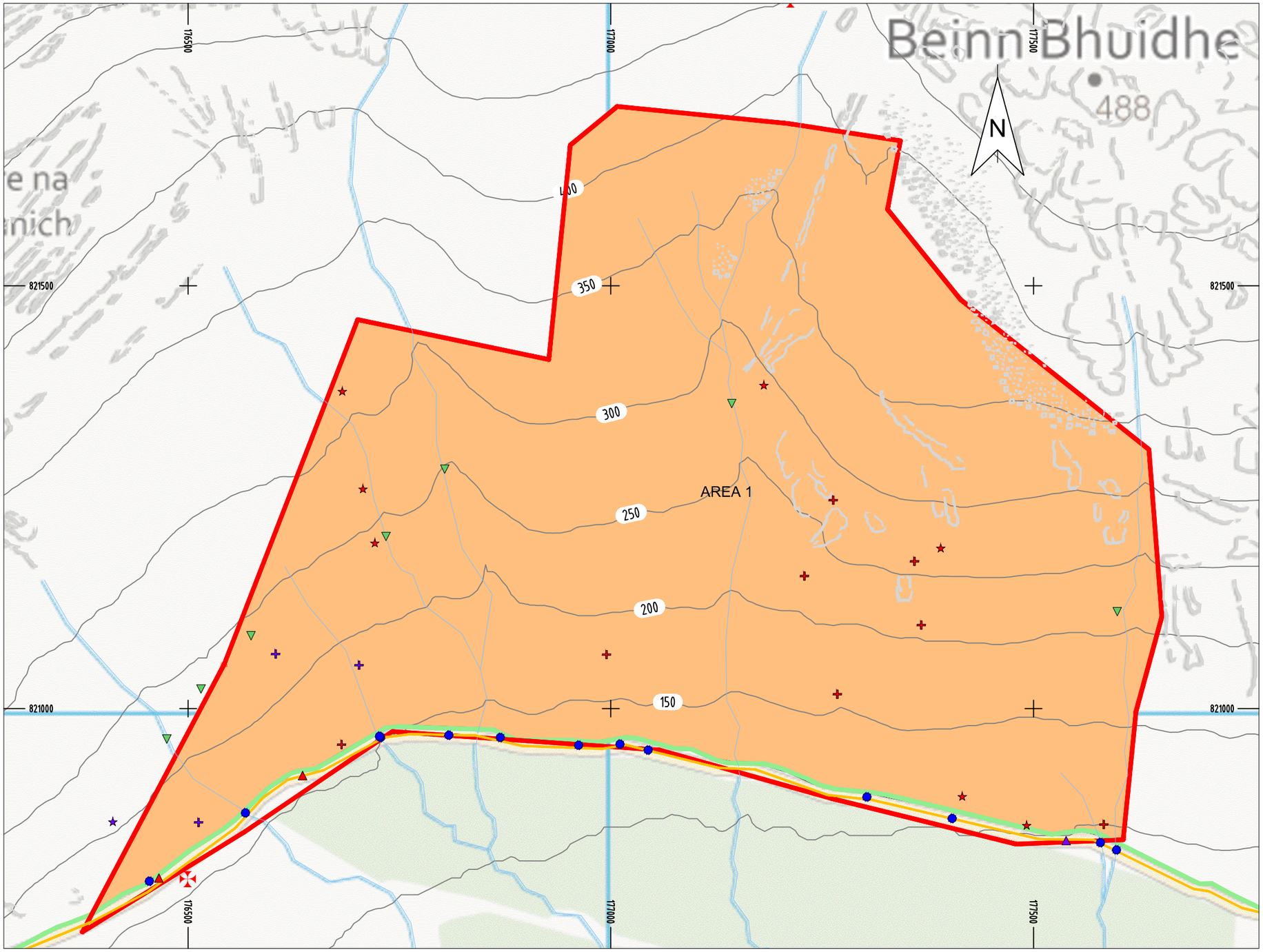


FORESTRY COMMISSION

- Class A Road
- Class B Road
- Class C Road
- Legal Boundary
- Site Boundary

RISK AREAS

- Low
- Low to Moderate
- Moderate to High
- High
- Very High

FEATURE POINTS

- Borrow Pit (BP)
- Boulders (B)
- Bridge (BR)
- Concave Break in Slope (CCB)
- Convex Break in Slope (CCV)
- Culvert (C)
- Cut Rock Slope (CRS)
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- Rock Slope (RS)
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4. Aerial photograph and topographical data (DTM) provided by Forestry Commission

| | |
|---|---|
| drawn | MH |
| date | MAY 14 |
| scale | 1:5,000 |
| original size | A3 |

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

client: FORESTRY COMMISSION

project: SLOPE STABILITY PROJECT

title: KYLERHEA GEOTECHNICAL ASSESSMENT
SOURCE OF RISK BY AREA PLAN

project no: 01727AA

fig no: KYL_003

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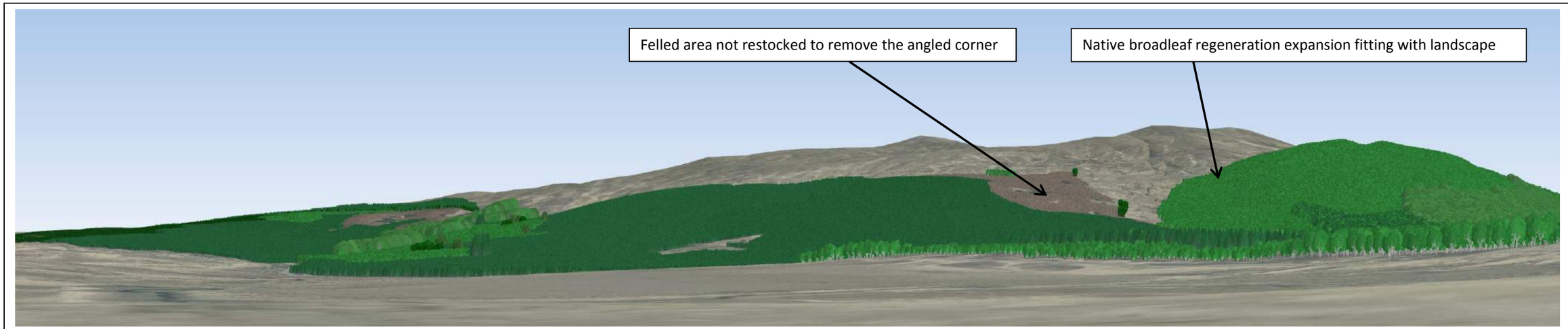
Appendix 14- 3D Visualisation from various viewpoints (see Map 18 for viewpoint location)

Drumfearn 2018

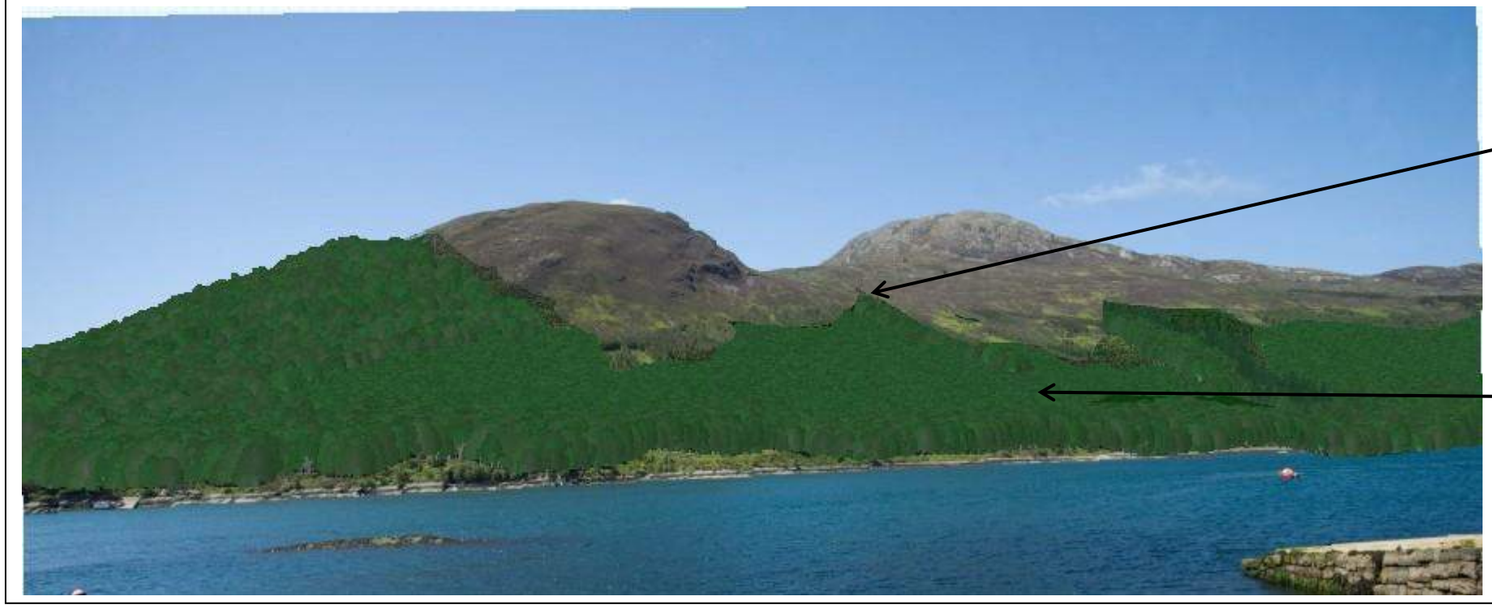
Drumfearn 2045



Appendix 14- 3D Visualisation from various viewpoints (see Map 18 for viewpoint location)

Glenelg Ferry 2018

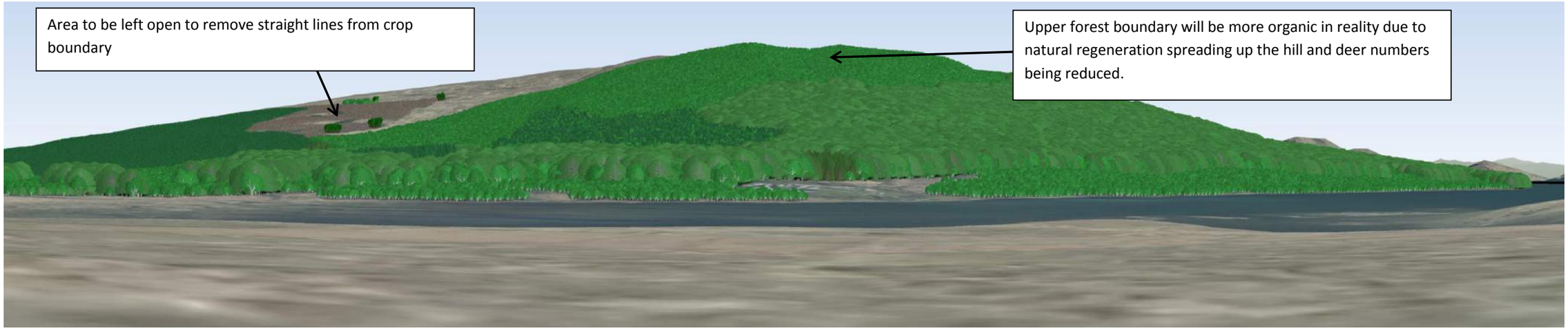
Glenelg Ferry 2035



Appendix 14- 3D Visualisation from various viewpoints (see Map 18 for viewpoint location)

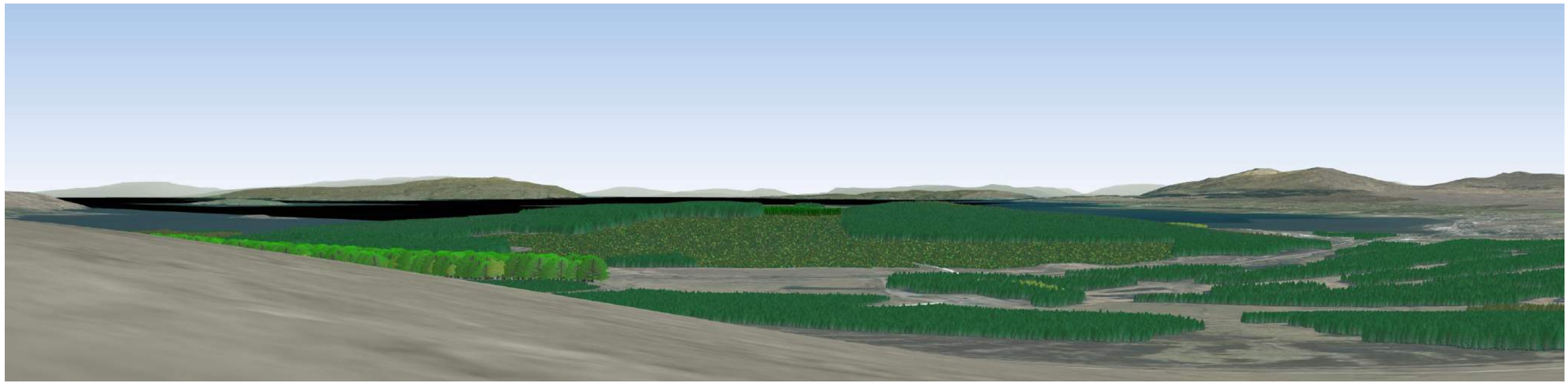
Loch na Dal 2018

Loch na Dal 2045

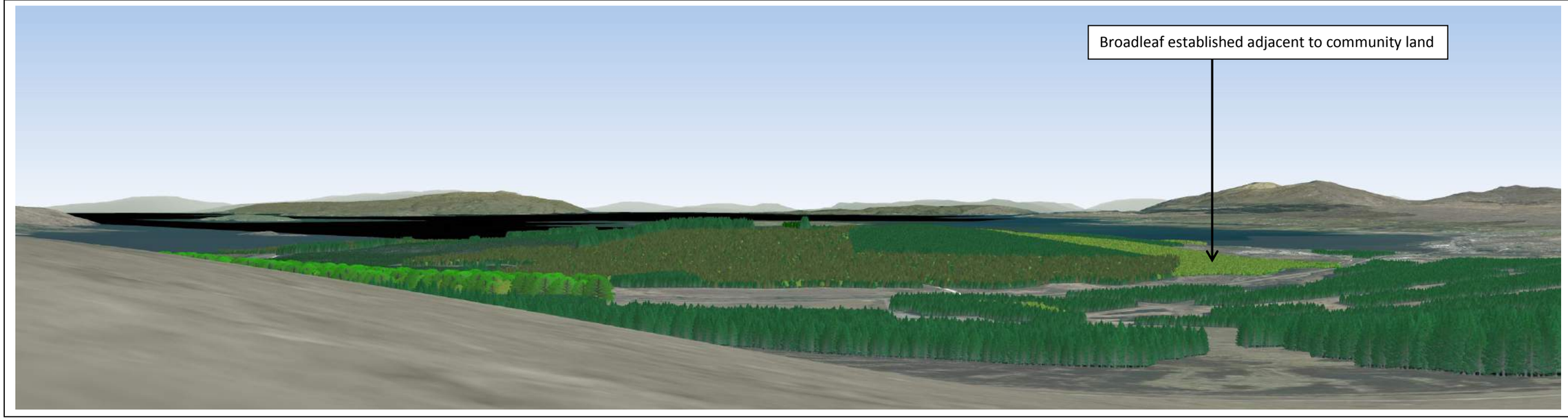


Appendix 14- 3D Visualisation from various viewpoints (see Map 18 for viewpoint location)

Cuillin NSA 2018 looking east to Broadford



Cullin NSA 2035 looking east to Broadford



# Runicaleach, Kylerhea, Isle of Skye

# Archaeological Topographic and Measured Survey Report

*AOC 70172*

***30th March 2017***

AOC Archaeology Group

ARCHAEOLOGY | HERITAGE | CONSERVATION

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# Runicaleach, Kylerhea, Isle of Skye

# Archaeological Topographic and Measured Survey Report

| | |
|---|---|
| **On Behalf of:** | **Forestry Commission Scotland** |
| **National Grid Reference (NGR):** | **NG 2310 7910** |
| **AOC Project No:** | **70172** |
| **Prepared by:** | **M. Peteranna** |
| **Illustrations by:** | **C. MacIver** |
| **Date of Fieldwork:** | **22nd-24th February 2017** |
| **Date of Report:** | **30th March 2017** |
| **OASIS No.:** | **aocarcha1-281126** |

**This document has been prepared in accordance with AOC standard operating procedures.**

| | |
|---|---|
| **Authors: Mary Peteranna** | **Date: 30th March 2017** |
| **Approved by: Cathy MacIver** | **Date: 31st March 2017** |
| **Draft/Final Report Stage: Final** | **Date: 1st April 2017** |

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# Contents



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## List of plates

## List of appendices

## Abstract

This report details the results of a desk-based assessment and archaeological survey conducted at the ruins of a post-medieval settlement to the north of Kylerhea on the Isle of Skye.

The dispersed settlement consists of twenty-five buildings in four groups across open ground and within forest plantation on the southeast facing slopes above the Kyle Rhea. The buildings comprise stone structures and associated enclosures, remnants of boundary walls and areas of rig and furrow cultivation. Several outlying sites, including possible shielings and a possible hut circle were recorded beyond the area of main settlement. An additional site containing ruinous buildings was also identified outside of the survey area. It was not recovered due to time limitations.

## 1.0 Introduction

1.1 An archaeological topographic and measured survey of Runicaleach township, located near Kylerhea on the Isle of Skye, was conducted in February 2017on behalf of Forestry Commission Scotland. The purpose of the survey was to provide an assessment of the character and extent of the sites and to create a detailed record of the sites for the purposes of conservation management before woodland harvesting.

1.2 Thirty-three sites were recorded in the primary settlement area, which was concentrated on the southwest side of the Allt Eas nam Muc. Three outlying sites were recorded at the sheep fank near Kylerhea Minor Light, one outlying site was noted off the forest track at a point 220m west of the sheep fank and a fifth outlying site was recorded approximately 200m north of the main settlement.

## 2.0 Project Background

2.1 A ruinous township found to the north of Kylerhea is referred to as *Runicaleach* on historical mapping. It is located in commercial forestry land on the southeast coast of the Isle of Skye in the parish of Sleat overlooking the Kyle Rhea, a narrow strait of water separating the island from the Scottish west coast mainland (**Figure 1**). The site consists of ruinous settlement structures located around the southeast end of the *Allt Eas nam Muc* and is spread across an area of partly open and partly forested ground.

2.2 The site is accessed from the Kylerhea Otter Haven to the south, off a forest track that passes through the settlement in a northeasterly direction. The archaeological survey was undertaken to identify the location and extent of all elements of the archaeological landscape to be used for forest management ahead of felling. Measured and topographic survey was conducted in order to create a complete record of the sites and their landscape situation.

2.3 Prior to the survey, the only recorded visit to the site had been conducted by the Ordnance Survey in 1961. The National Record of the Historic Environment (record no. NG72SE 2) provides the 1961 Ordnance Survey visit description: “a depopulated township, overlooking the Kyle Rhea, at about 200 feet OD, consists of about 30 ruined houses, 6 small enclosures or garths. There are large areas of lazy-bed cultivation along the hill slopes.”

## 3.0 Character of the Study Area

3.1 The survey area is situated on the southeast-facing slopes of Beinn na Caillich, a peak on the larger mountain Sgurr na Coinneach. Commercial coniferous forestry covers the settlement in part, and the surrounding landscape comprises undulating, terraced ground with areas of outcrop and numerous stream courses that slope southeastwards down into the narrow straits of Kyle Rhea. Recent forest operations have included the felling and replanting of forest to the north side of the *Allt Eas nam Muc*.

3.2 The settlement area has in the past traditionally been used for medieval and/or post-medieval settlement and agriculture and includes some areas of rough grazing (Historic Land Use Assessment, HES 2017). The underlying geology of the area is of the Sleat Group and comprises a mix of sandstone, mudstone, siltstone and conglomerate bedrock (BGS 2017).


***Figure 1: Location of the Runicaleach survey area***

## 4.0 Desk-based Assessment

### 4.1 Methodology

4.1.1 Prior to undertaking fieldwork, a desk-based study was conducted in order to assess the archaeological potential of the area based on previously recorded sites and any historical documentation. All available historical and archaeological records, aerial photographs and historical maps was conducted using the Highland Historic Environment Record (HHER), the National Record of the Historic Environment (NRHE), Ordnance Survey (OS) Name Books, Historic Environment Scotland's databases, the National Library of Scotland, statistical accounts and other available records, literary sources or online resources about the site.

### 4.2 Historical Accounts

4.2.1 The Old and New Statistical Accounts for the Parish of Sleat (OSA Vol. XVI 1795; NSA Vol. XIV 1845) were consulted. There was no specific information about the area but there were general descriptions of parish life and prehistoric antiquities in the parish.

4.2.2 The OSA describes the parish as being "subdivided into 26 different farms or tenements...there is hardly any barley, the sea-ware growing on the shore being almost entirely laid out in manuring potatoes...done in the lazy bed way (MacPherson 1795: 535-6)." The 1,788 inhabitants live mostly off potatoes and herrings, with some oats while there are only 12 ploughs in the parish. Animal husbandry for black cattle was undertaken.

4.2.3 The NSA (McIvor 1840) recorded that the population had increased since the last account to 3,000 by 1837, with the entire parish owned by Lord Macdonald. He described that potatoes were planted in spring, after which most workers moved south for employment (319). They would return at *Martinmas* to pay the landlord rents, with winter being "spent in idleness (319)." Inhabitants survived mostly on potatoes and poverty was a severe problem due mostly to overpopulation. The tenant determined how the land was managed, while the tacksman planted a rotation of crops and reared sheep and cattle. In contrast, crofters focused on potatoes (319) and kept stock in over-crowded hill pastures (319-20). He described that since the time of the 1795 account, "lands which were then possessed by labouring tenants are now converted to sheep-farms. This has reduced the people's means of support...an extent of poverty prevails among them now, to which formerly they were strangers (322)."

### 4.3 Cartographic Sources

4.3.1 Historical maps were consulted at the National Library of Scotland (2017) online**.**

**a) John Thomson's Atlas of Scotland**
***Skye island,* 1832**
Thomson's map identifies the area as *Runicaleach*, but there are no depictions of any structures on this map (**Figure 2**).

**b) First Edition 6-inch-to-the-mile Ordnance Survey (OS) maps:**
**Inverness-shire (Mainland), Sheet XLVII & XLII**
**Survey dates: 1876 & 1875 Publication dates: 1881 & 1880**
The area where the settlement is located straddles both of the maps (**Figure 3**). There is no indication of any settlement buildings depicted therein and it is shown as open moorland. The remains of a footpath can be seen traversing through the area where the settlement is known to exist (south of the bend in the *Allt Eas a' Mhuic*), suggesting that the settlement had long since been abandoned by the 1880s or that the area was not surveyed by the OS.

**c) Second Edition 6-inch-to-the-mile Ordnance Survey maps:**
**Inverness-shire – Mainland Sheet XLVII & XLVIIa (includes: Glenelg; Glenshiel; Lochalsh; Sleat; Strath)**
**Publication date: 1903 Date revised: 1899**
**Inverness-shire – Isle of Skye Sheet XLII (includes: Glenelg; Glenshiel; Lochalsh; Sleat; Strath)**
**Publication date: 1904 Date revised: 1901**
There are no changes to the area by the time of the 2nd edition OS map.

## 4.4 Ordnance Survey Name Books

4.4.1 Ordnance Survey Name Books were consulted online and the following information about names on the OS first edition maps were found:

*Rudha Na Caillich*: This name is applied to a large & bare headland situated about one mile to the South East of Rudha Buidhe and about two miles and a half to the N E [North East] of Ryle Rhea ferry its signification is the "old womans point" on the property of The Hon [Honourable] Lord McDonald Armadale Castle.

*Allt Eas A' Mhuic*: This name is applied to a large Stream falling into Kyle Rhea about one mile to the S.W. [South West] of Rudha na Caillich and about one and a half mile to the N [North] of Kyle Rhea ferry Its Signification is the "Burn of the pigs waterfall" the property of The Hon [Honourable] Lord McDonald Armadale Castle.

*Beinn na Caillich*: This name signifies, "Old Womans Hill" and is applied, to a large hill, situated about one and three fourth miles to the N.W. [North West] of Kylerhea Inn, about seven miles to the S.E. [South East] of Broadford, and about four and a half miles to the S.S.W. [South South West] of Kyleakin Property of Lord McDonald.

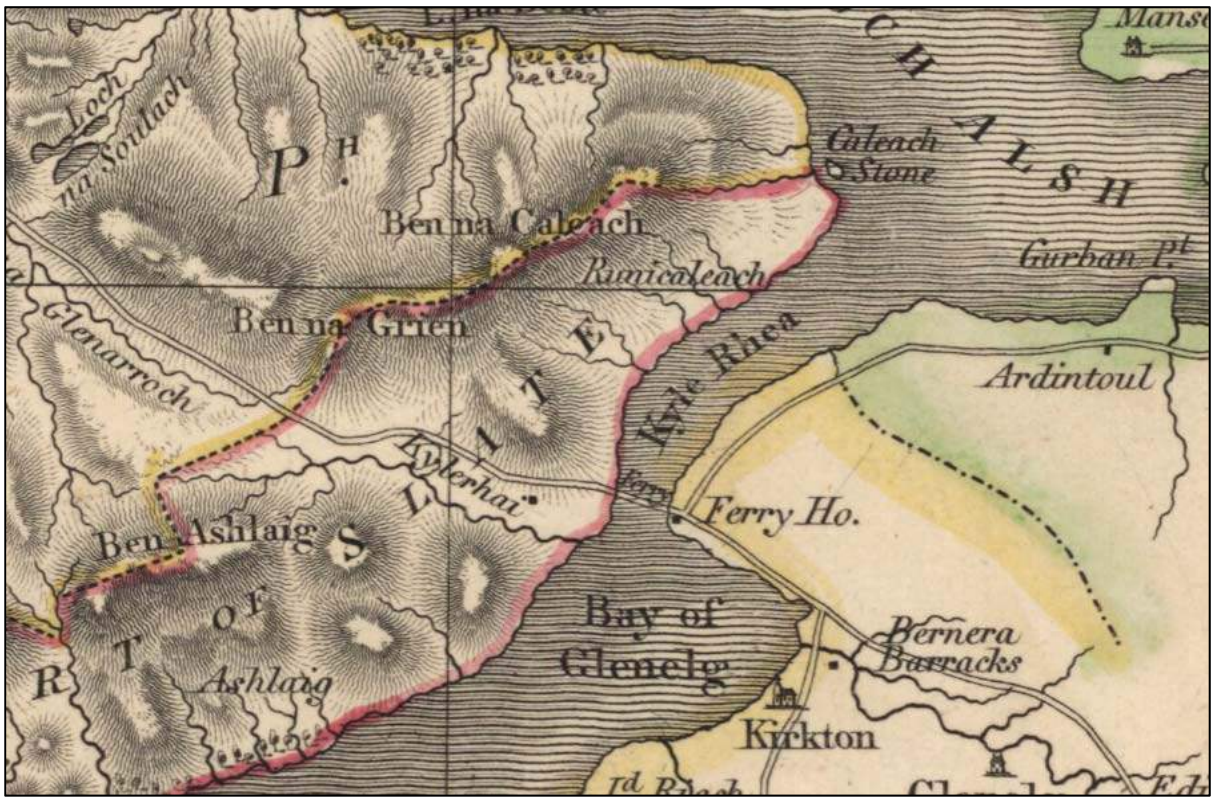


***Figure 2: Extract from Thomson's 1832 map depicting Runicaleach***

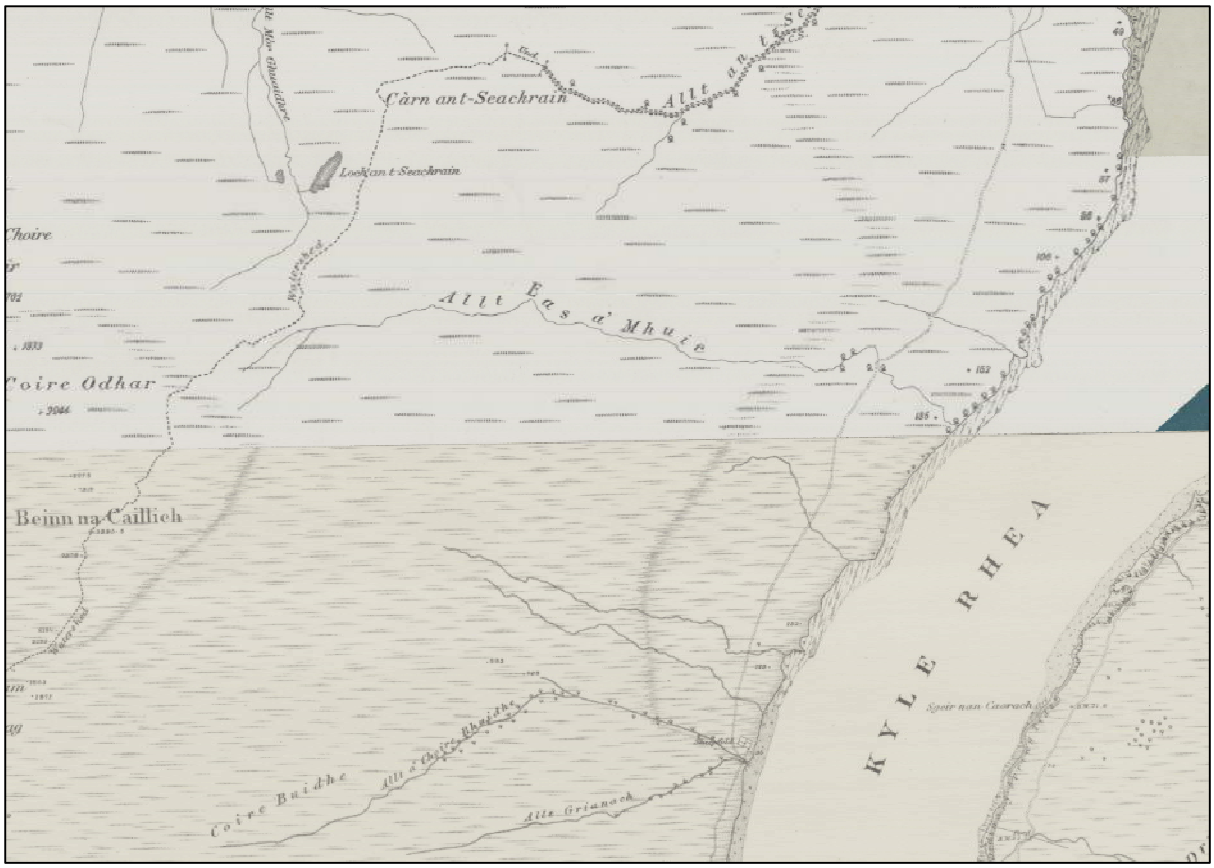


***Figure 3: Combined extracts from the 1880 and 1881 First Edition OS maps***

## 4.5 Aerial Imagery

4.5.1 Aerial photographs (not rectified) were consulted at the National Collection of Aerial Photography (HES 2017) online. There was no information identified to augment the other known records.

a) UNI: NCAP-000-000-076-286
Date: 08 October 1974
Location: Beinn na Caillich; Strath; INVERNESS-SHIRE; SCOTLAND

b) UNI: NCAP-000-000-076-375
Date: 08 October 1974
Location: Lochain Beinn na Caillich; Strath; INVERNESS-SHIRE; SCOTLAND

c) UNI: NCAP-000-000-076-377
Date: 08 October 1974
Location: Beinn na Caillich; Strath; INVERNESS-SHIRE; SCOTLAND

## 4.6 Historic Environment Sources

4.6.1 A search was undertaken on the Highland Council Historic Environment Record (HHER) and the National Record of the Historic Environment (on *Canmore*). The records (HHER No.MHG5424 and NRHE No.NG72SE 2) only list the notes from the 1961 Ordnance Survey record of Runicaleach (NG 7910 2310).

## 5.0 Survey Methodology

5.1 The archaeological survey was conducted by two archaeologists on 22-23 February 2017. The survey area was systematically walked across the landscape in 20-50m transects following the natural contours. Ground conditions varied across the site, from hummocked deer grasses and dense heather on open ground to dense woodland in the conifer plantation.

5.2 Measured survey and topographic survey was undertaken across the survey area, which extended approximately from the north side of the Allt Eas nam Muc for a distance 500m to the southwest from a height of 40m OD to 120m OD. The survey area was extended for approximately 500m to the northeast of the Allt nam Muc, where the ground was surveyed up to a height of about 250m OD to check for any high level shielings. It was also extended for approximately 650m to the southwest to the sheep fank near Kylerhea Minor Light and west of it to a height of 60m OD.

5.3 Sites were recorded using a Trimble Geo-XR rover (DGPS equipped) in EGNOS mode. This proved to be accurate to between 10-30cm on open ground. Sites within dense woodland were surveyed using offset measurements and compass bearings. It had been intended to use a combination of total station and GPS survey. However, due to the spread of sites across varying terrain this would have proven too time-consuming and of little enhanced value to sites in such a condition as these buildings were found.

5.4 Digital photographs were taken of each site and data was compiled on written and sketch records. The detailed site gazetteer and photograph register are found in **Appendix 3** and **Appendix 4**.

## 6.0 Results

### 6.1 Summary

6.1.1 Twenty-five buildings were recorded within the Runicaleach survey area. The sites, which were situated on terraces on southeast-facing slopes running downhill to the Kyle Rhea, varied in level of preservation, depending upon the localised ground conditions. All were built of stone and boulder construction with rubble coursing. Curvilinear stone-built enclosure walls and linear fragments of stone-built dykes were also recorded in association with the buildings. One site, a subcircular boulder/turf bank, was interpreted as a possible hut circle, and may be unrelated to the post-medieval settlement.

6.1.2 Based on what was visible during survey, the buildings were of simple construction, with very little evidence for internal partitions, compartments or attached cells. The sites are dispersed across the hillside but are located within the same landscape setting, situated mostly within a 500m x 500m area between the Allt Eas nam Muc to northeast and an unnamed burn to the southwest. The settlement can be looked at in terms of four clusters of buildings.

### 6.2 Sites A – H

6.2.1 Located in open ground under the line of the overhead power lines on the southwest side of the Allt Eas nam Muc, this group comprises five buildings of drystone, rubble-coursed construction and double-faced walls with rounded corners. Site A is the most prominent of the group, measuring 7m by 3.3 m internally and situated on the top of a prominent knoll, with buildings D and E tucked into the exposed outcrop to the southeast side of it. The circular enclosure, Site C, surrounds an open hollow in the terrain, running from the northwest side of site A. The denuded remains of wall fragments indicated that the enclosure linked to the east side of site D, which is built into the base of outcrop on the west side and

was connected to site E, which is built into a steep outcrop on the southeast side. Based on construction, the group appears to have been built contemporaneously and it is possible that the enclosure was either a contemporary or later attachment. A twinning pen (site B) was almost certainly a later build inside the west corner of Site A.

6.2.2 On the northeast side of the burn, site F is a smaller, but similar stone building, measuring 4m by 2.3m internally. A possible structure, noted on the OS map, to the northeast of site F was not located, although site G, a possible structure built into outcrop, may represent the remnants of it. A final building, site H, built on a knoll to the west of the main group, consists of the degraded remains of a stone structure under dense heather. It is probably contemporary with A, D, E and F, although it was difficult to characterise, having been mostly destroyed, probably during power line construction.

### 6.3 Sites J – R

6.3.1 This group of four buildings and attached enclosure walling is located within mature conifer woodland on the northeast side of a small unnamed burn. The buildings (sites K, L, M and Q) consist of two long structures measuring between 8-8.5m by 2.5-3.8m internally and two smaller structures between 3.3-4.5m by 2m internally. They are built of drystone, rubble-coursed construction and double-faced walls with rounded corners. An amorphous, almost oval, enclosure, site O, is located to the south side of the group, while fragments of walling attached to the buildings probably formed further enclosures or boundary alignments.

6.3.2 To the south side of the burn, fragments of possible wall banks, site P, were in a mostly denuded and degraded condition. The presence of the banks suggests that a structure might have been present, and this would agree with the OS map which shows a section of walling in this location.

6.3.3 To the west-southwest of site P, the OS map also indicated that two buildings were present on the west side of the forest track within a partly open and partly wooded tract. There was no evidence for any surviving structures, other than a possible fragment of wall and curvilinear stone/turf bank (site S).

6.3.4 Downhill from the settlement, outside of the woodland edge to the southeast, pockets of rig and furrow had survived, as well as several other small fragments of linear stone walling. It is likely that there had been further areas of lazy bed evidence and boundary walls prior to the woodland being planted.

### 6.4 Sites T – Z

6.4.1 Six buildings and one attached enclosure were recorded in a mixed area of open and dense mature woodland at approximately 100-115m OD to either side of a disused track. Site T and site U comprised two similar, moss-covered stone buildings. They are defined by elongated subrectangular walls measuring 13-13.5m by 3m internally and of drystone, rubble-coursed build. A suboval stone enclosure, site V, links the two buildings and would have created a closed pen between the sites.

6.4.2 Site W and site X are similarly built, with moss-covered low stone walls measuring between 8-11m by 3.5m internally. A degraded stone wall alignment, probably the remains of a boundary dyke, runs to the northwest side of the buildings.

6.4.3 Two smaller buildings, site Y and site Z, were recorded in isolation to the northeast of this group. Both were built of drystone, rubble-coursed construction with double-faced walls and rounded corners. They measured from 4.5-5.5m by 2m internally. Site Z was located under dense wind blown and standing trees and was unable to be recorded completely.

### 6.5 Sites A' – F', L' – M'

6.5.1 This group of sites was located mostly in mature dense woodland, and had been breached at the centre by the forest track. Similar to the other groups, it comprised two buildings connected by an enclosure and three other buildings with elements of further enclosure or boundary walling. Three of the buildings had not been previously identified on the OS map, and two buildings shown on the map to the south of this group were no longer there.

6.5.2 Site B' and C' comprised drystone, rubble-coursed construction with double-faced walls and rounded corners, with the larger of the two, Site C' measuring 9.5m by 3.8m internally. They were connected by an amorphous stone enclosure wall on the south side. To the north of the buildings, site E' consisted of a heather-covered 11m-long subrectangular building of rubble-coursed construction. A second stone-built enclosure wall, site D', was located to the northwest side of the building. A possible small structure, site F', too difficult to define, was located northwest of here. In addition, site B' contained two twinning pens, most likely later additions in opposing corners of the building.

6.5.3 The degraded remains of two further stone buildings were located to the southeast of this group, within dense woodland. Site L' survived in the best condition, as a clearly definable subrectangular drystone building measuring 6m by 3.7m internally. To the northeast of this, Site M' had been mostly degraded by forest ploughing and was difficult to define.

### 6.6 Outlying sites

6.6.1 A small stone building was recorded approximately 250m north of group A'-F' at 115m OD. Site G' comprised a suboval, almost amorphous, rubble-coursed building with two cells. It can be characterised similarly to many shieling sites on Skye. A linear fragment of stone wall to the south of this probably formed the remains of a field boundary. Site H' is located 315m southwest of site G' and was also interpreted as a probable shieling. It had been built into a boulder outcrop overlooking an area of rig and furrow.

6.6.2 The remains of one building and two probable buildings were located on the sheep fank site near the Otter Haven at Kylerhea Minor Light. Site I' was in a similar condition to site E', appearing as the low remains of a subrectangular stone building under dense heather. On the south side of the sheep fank, below spreads of collapsed stone, two fragments of rubble stone wall formed site J' and site K'. They were interpreted as the remains of subrectangular buildings that had been robbed out for construction of the sheep fank. Areas of field boundaries and rig and furrow were visible in the landscape north of here.

6.6.3 Approximately 150m southwest of group A'-E', a low, circular boulder/turf bank, site I, was located in open ground at 50m OD. Being of different character to the rest of the archaeological landscape, it was interpreted as a possible prehistoric hut circle, or small pen.

6.6.4 Upon completion of the survey, the surveyors noted an additional building or group of buildings 20m west of the forest track. The site, or group of sites, was not able to be surveyed due to time constraints, but a spot recording located it 220m west of the sheep fank at 70m OD.

## 7.0 Conclusion

7.1 *Runicaleach* can be best described as a dispersed settlement, spread out across terraces and built between outcrops and stream courses. Other than the size of the buildings, the archaeological survey was unable to identify any characteristics within the buildings to distinguish them between houses and byres, bothies or pens. In general the groups consisted of attached enclosures that joined buildings together, with additional surrounding

buildings of different sizes. The groups probably reflect small holdings for individual families, with the various buildings representing dwellings, byres and workshops.

7.2 The extent of settlement at Runicaleach is not shown on any known historical mapping nor mentioned in any sources identified by the author. However, the place-name is identified on Thomson's 1832 map, indicating that settlement was present here at that time. Based on the descriptions in the Old and New Statistical Accounts, between the period of 1795 and 1840 most of the lands occupied by tenant farmers had been taken over for sheep farms and left only small, over-crowded areas of land to sustain impoverished families. The lack of any depiction of the settlement on the First Edition OS map suggests that the settlement had been long abandoned by 1875/6. It had probably been cleared for large scale sheep farming.

## 8.0 References

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# Runicaleach, Kylerhea, Isle of Skye

# Archaeological Topographic and Measured Survey Report

## Section 2: Appendices

# Appendix 1 Site plans

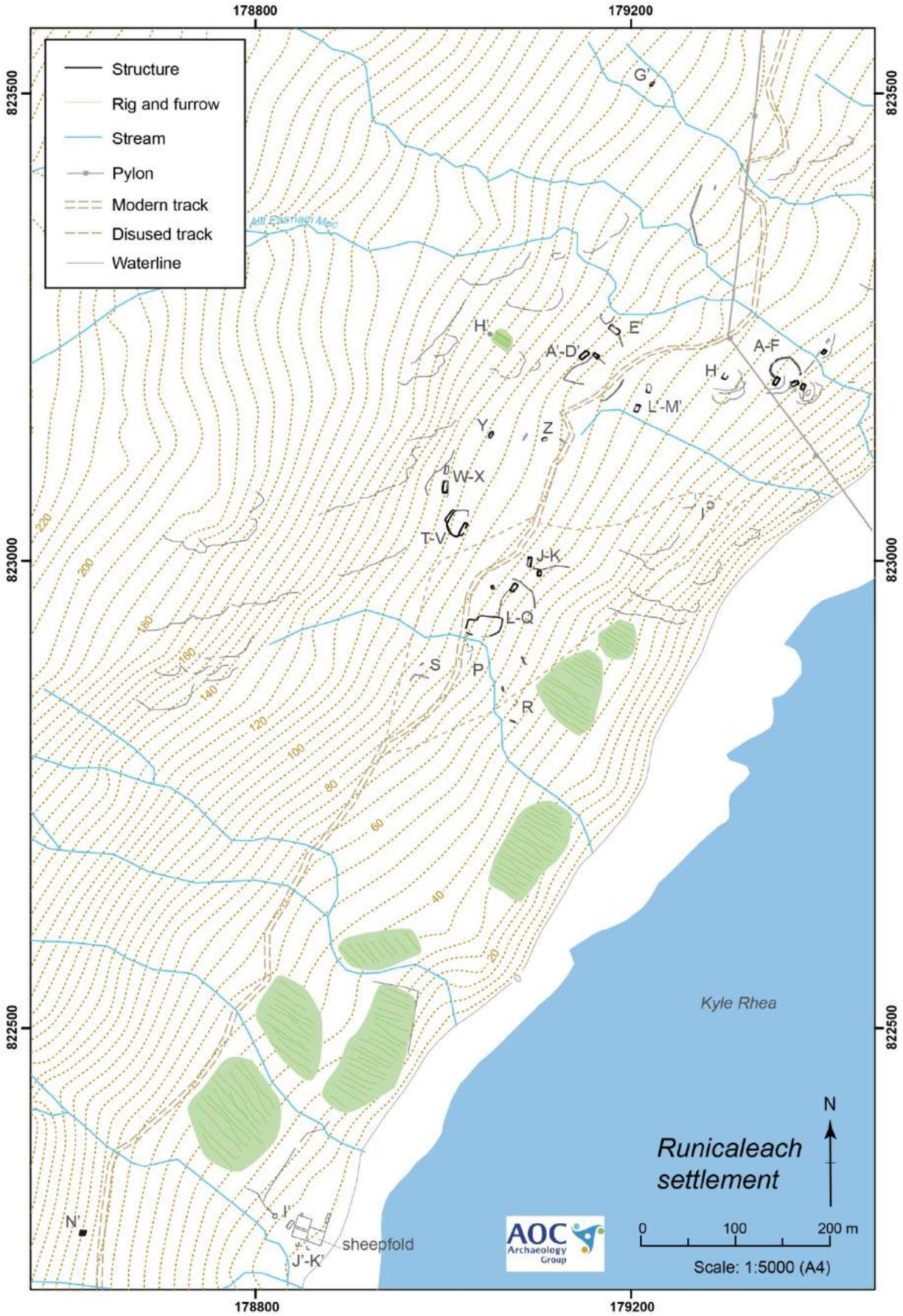


***Figure 4: Plan of Runicaleach settlement 1:5000***

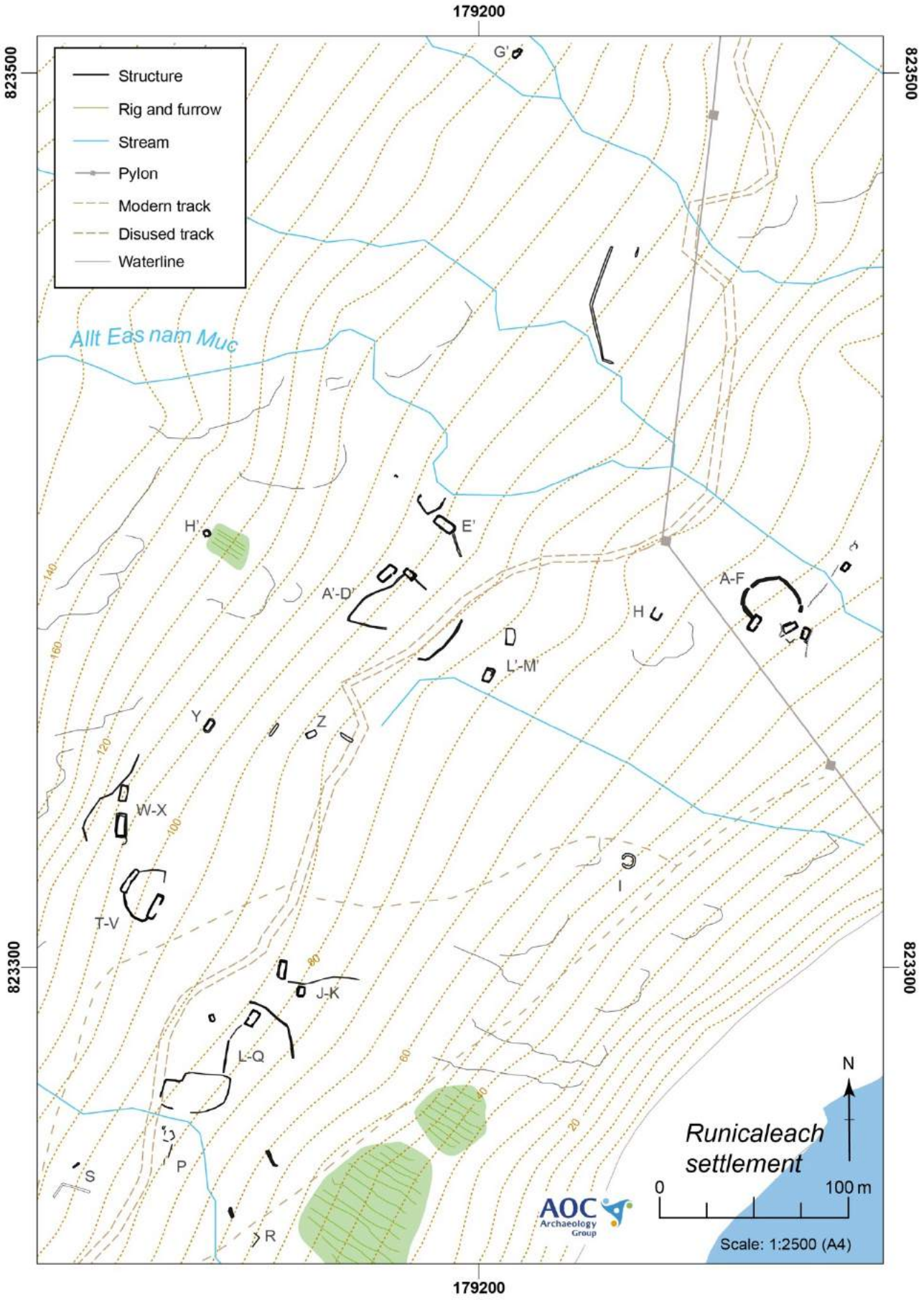


***Figure 5: Plan of Runicaleach settlement 1:2500***


***Figure 6: Plan of sites A – H, 1:500***

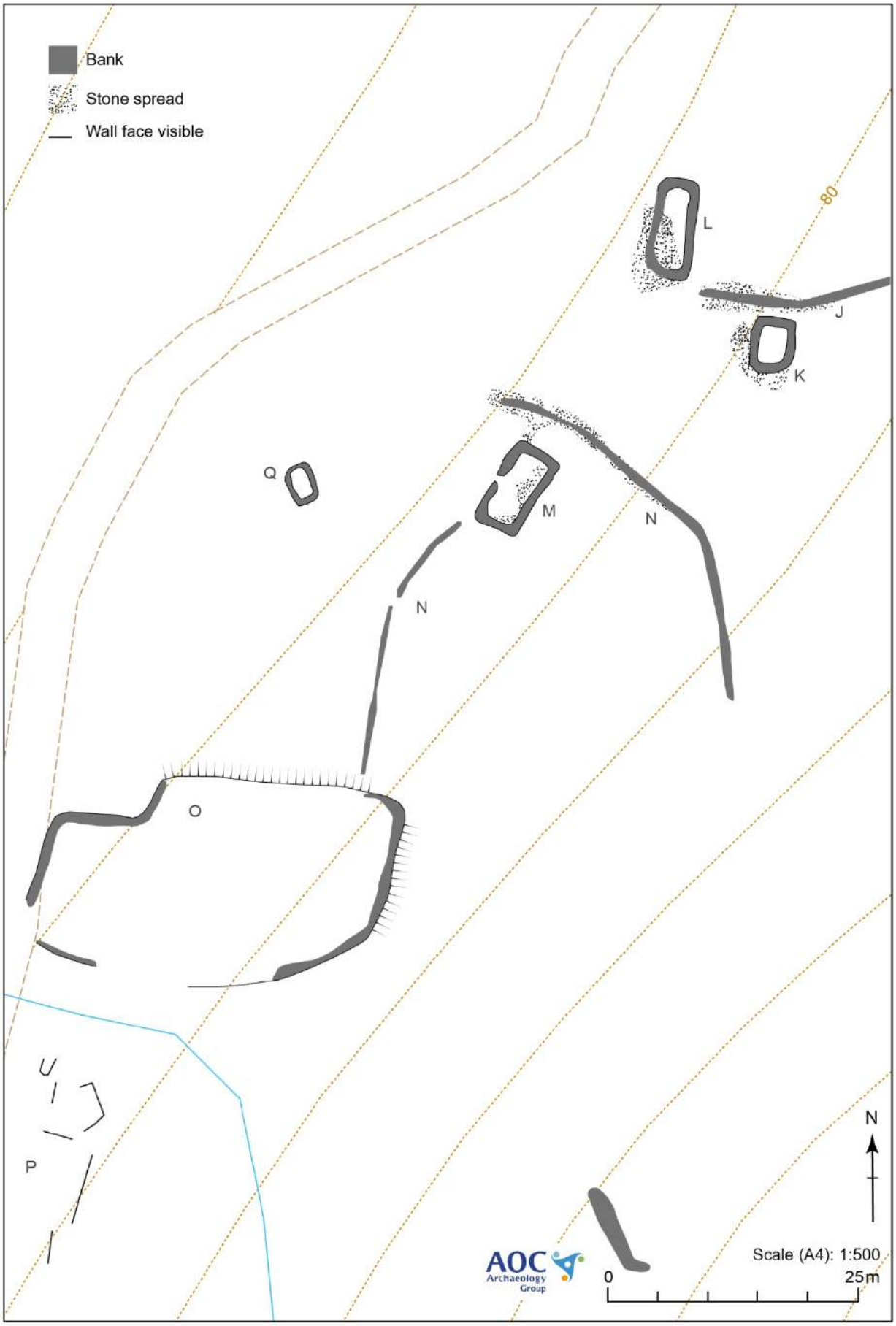


***Figure 7: Plan of sites J - P, 1:500***

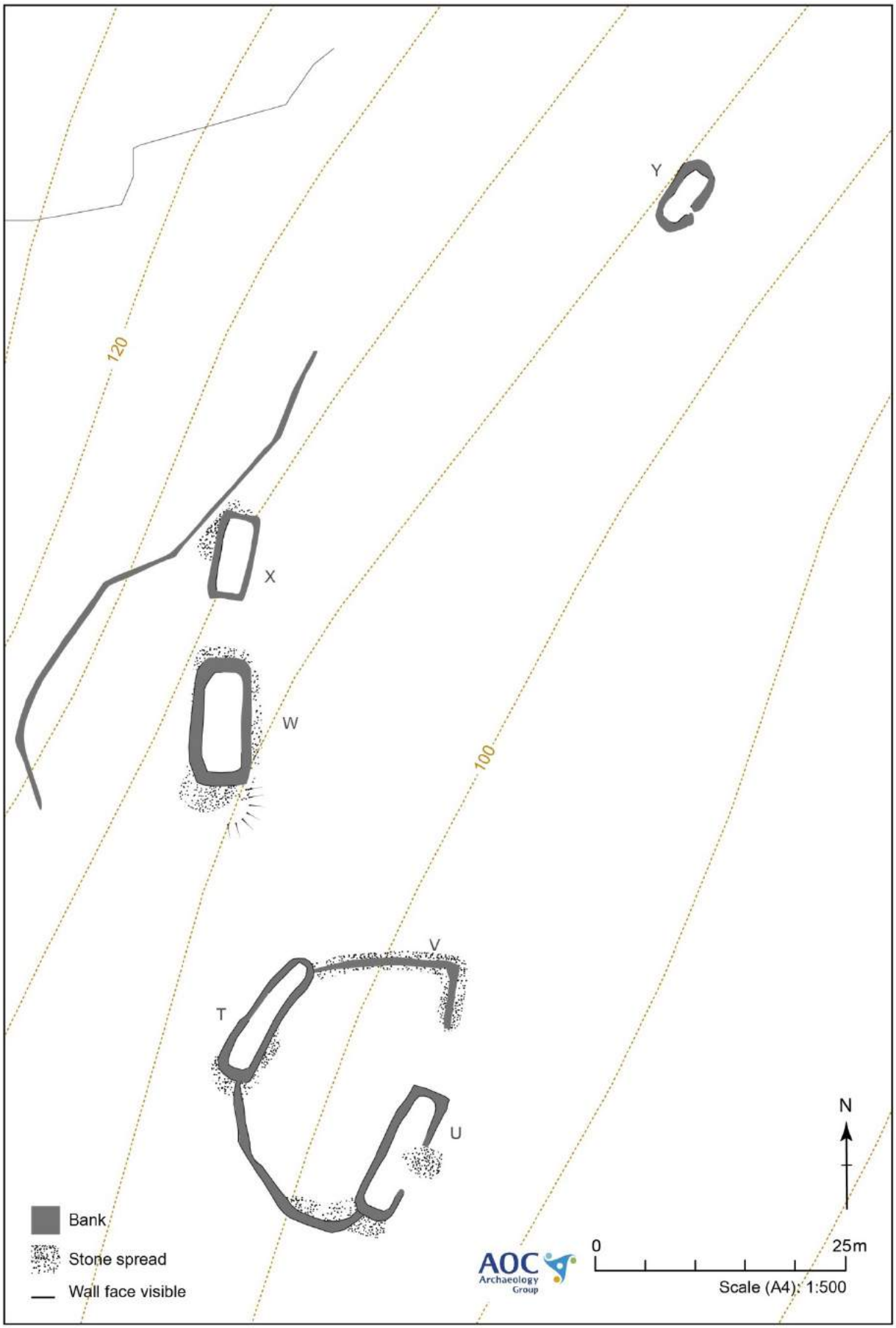


***Figure 8: Plan of sites T – Y, 1:500***

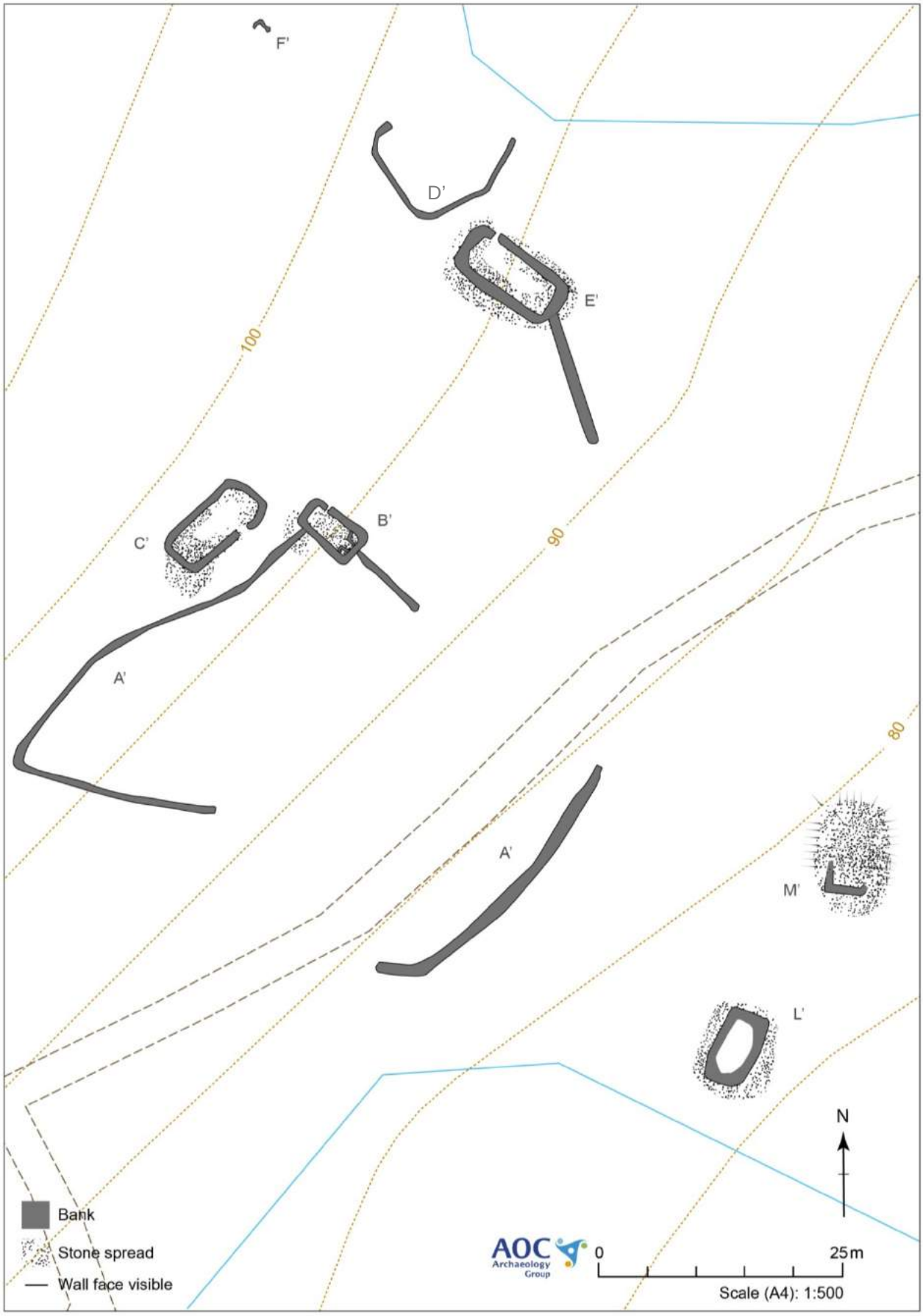


***Figure 9: Plan of sites A' – F' and L'-M', 1:500***

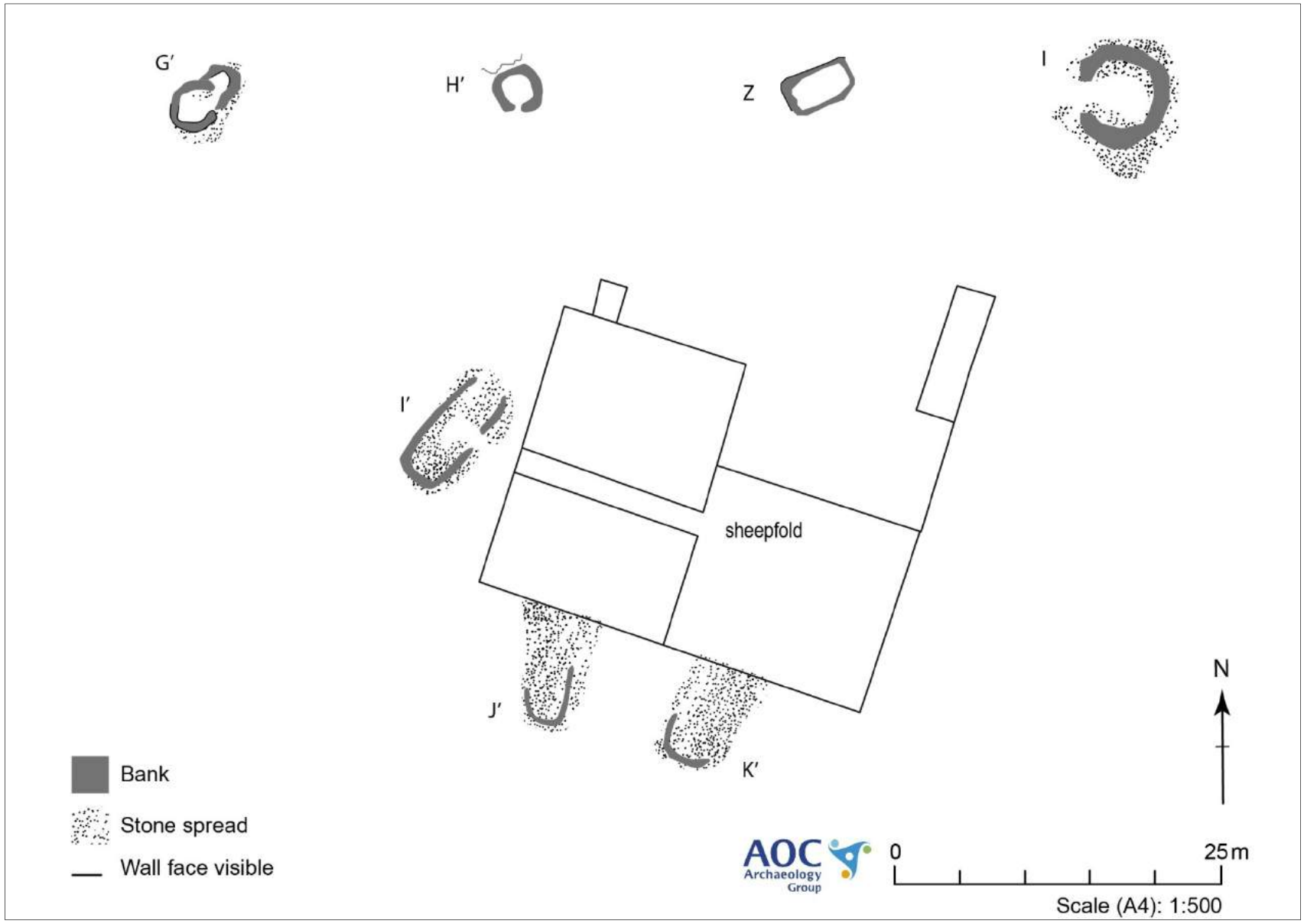


***Figure 10: Plan of sites I' – K' near the sheep fank; showing insets of sites G', H', I and Z***

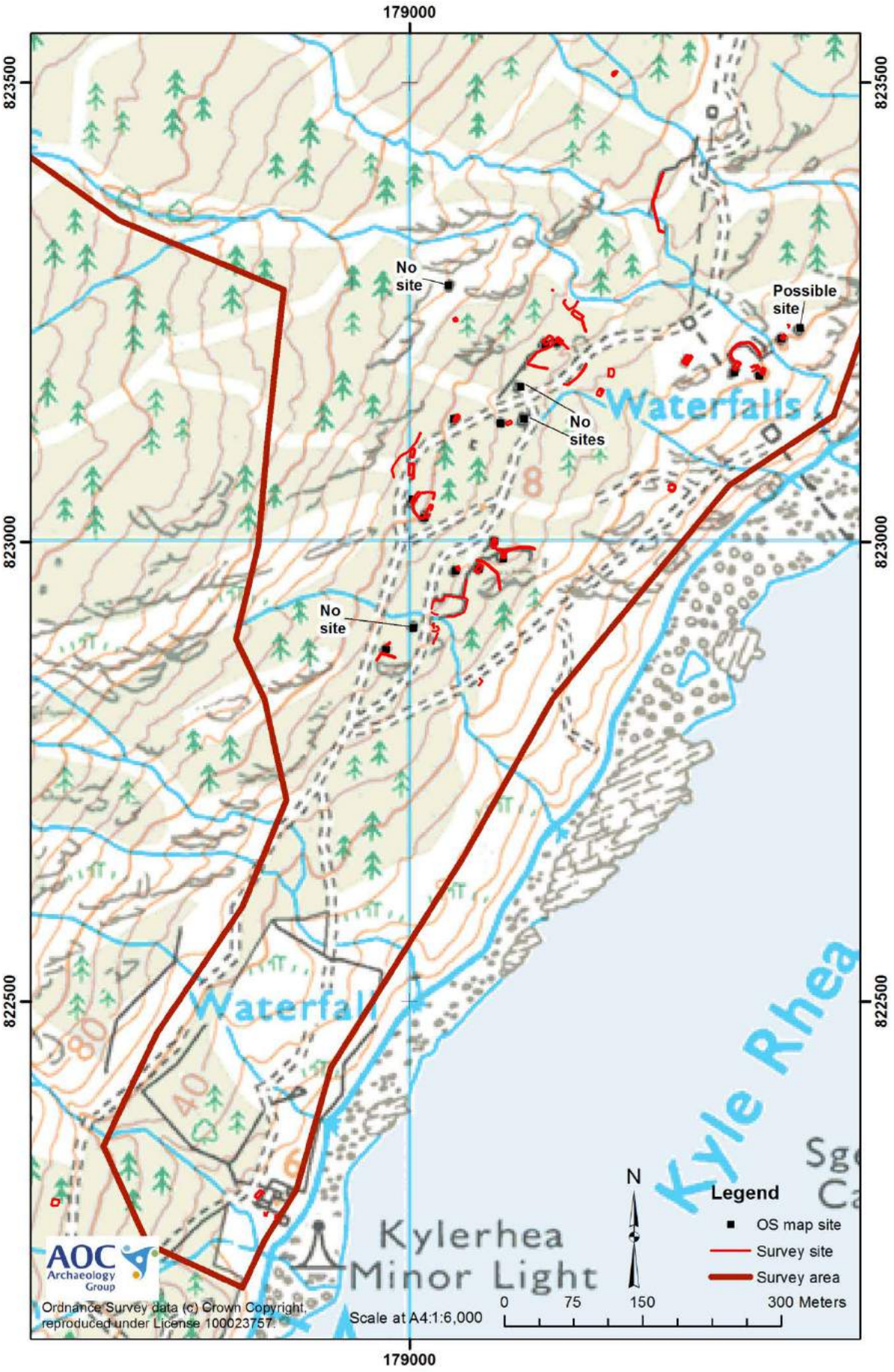


***Figure 11: Plan of survey sites over the Ordnance Survey map sites***

# Appendix 2 Site photographs

*Plate 1 Site A, survey in progress, facing NE*

*Plate: 2 Location of sites A, C-E, facing WSW*

*Plate 3: Overlooking sites A-E, with site E in front and site A in back left and sites B/C in centre; survey in progress, facing ENE*

*Plate 4: Site F (centre, above waterfall) from site E, facing N*

*Plate 5: Site F, facing SE*

*Plate 6: Site I (centre), Kyle Rhea in background, facing SE*

*Plate 7: Looking over the N end of Site L, facing N*

*Plate 8: Site M, under thick moss, facing ENE*

*Plate 9: Site T, facing SW*

*Plate 10: Location of sites A'-C' (above the forest track), facing ENE*

*Plate 11: Site B', survey in progress, facing SE*

*Plate 12: Site C', survey in progress, facing NE*

*Plate 13: Landscape location of site H' (centre) within area of rig and furrow, facing S*

*Plate 14: View over the sheep fank by Kyle Rhea Light, facing S*

*Plate 15: Location of site I' (centre, under bracken) in front of the sheep fank, facing SE*

*Plate 16: SW gable end of Site L', facing ENE*

*Plate 17: View over the Kyle Rhea from site R, facing SE*

*Plate 18: View along the Kyle Rhea from site A, facing SSE*

# Appendix 3 Gazetteer of Archaeological Sites

| Site No. | Site Name | Site Type | Description | Alignment | Condition | Period | Ht OD (m) | Easting | Northing |
|---|---|---|---|---|---|---|---|---|---|
| **A** | Runicaleach | Building | Under bracken, heather and moss is a subrectangular stone building measuring 11m NNE-SSW by 6m externally with an entrance to the SE measuring 0.7m wide. Walls measure c. 0.8m wide, built from drystone and mixed rubble with 2 faces and some boulders. The S gable stands to 1.5m high, the N gable to 0.5m high, the E wall to 1-2m high and the W wall to 0.3m high. The building has rounded corners and a small tree growing internally. There is a twinning pen (site B) is situated in the SW corner and collapsed stone spread around the sides. | NNE-SSW | Degraded | Post-medieval | 55 | 179353 | 823193 |
| **B** | Runicaleach | Twinning pen | A rubble stone-built twinning pen in the SW corner of site A measures 1m in diameter over walls 0.4m wide and up to 0.5m high. It is a later addition to site A, built up against the walls but collapsed inwards. | - | Degraded | Post-medieval | 55 | 179352 | 823189 |
| **C** | Runicaleach | Enclosure | A turf/stone bank spread 2-2.5m wide and up to 0.5m high on N edge forms a subcircular enclosure attached to the N corner of site A. It runs to the NE side and almost up to site D. It encloses a large natural hollow, probably forming a stock enclosure. On the S edge a natural steep break of slope acts as a barrier. To the SE side of the enclosure is a shallow ditch with a small bank of upcast to downslope edge running NE-SW from the entrance to site C. It is filled in at SW end but opens up to NE end. It is probably a draining area for the enclosure site C and runs into the burn on the NE end. | NW-SE | Degraded | Post-medieval | 55 | 179347 | 823203 |
| **D** | Runicaleach | Building | Under bracken, heather and moss is a subrectangular stone building measuring 9m E-W by 5m externally with an entrance in the S wall measuring 0.5m wide. Walls measure 0.7m wide and up to 1m high, with some large boulders visible under the vegetation, and are less well preserved on the N side. The building has rounded corners and collapsed stone spread around the edges. There may have been an attached cell on the outside of the W gable but is very denuded and hard to discern under heavy vegetation cover. It is built into outcrop on the W end and is situated on a terrace below site A and adjacent to site E. | E-W | Degraded | Post-medieval | 50 | 179373 | 823192 |

| Site No. | Site Name | Site Type | Description | Alignment | Condition | Period | Ht OD (m) | Easting | Northing |
|---|---|---|---|---|---|---|---|---|---|
| **E** | Runicaleach | Building | Under bracken, heather and moss is a subrectangular stone building measuring 8m NE-SW by 4m externally with an entrance to the NW measuring 0.5m wide. Walls measure 0.7m wide, built from drystone and rough coursed stone with some large boulders in the facing, and survive up to 1m high. The building has rounded corners and a possible length of wall attached to the exterior SW corner. The building is located adjacent to site D on a small terrace between two outcrops of bedrock to the E and W. | NE-SW | Degraded | Post-medieval | 55 | 179384 | 823189 |
| **F** | Runicaleach | Building | A small subrectangular stone building under heather measures 5.8m NE-SW by 4m externally with an entrance formed by upright stones in the SE wall measuring 0.8m wide. Walls measure up to 0.7m high, built with roughly coursed stone facing with occasional boulders at the base. The building is situated on a small terrace up against bedrock to the NE side of the burn. | NE-SW | Degraded | Post-medieval | 55 | 179404 | 823221 |
| **G** | Runicaleach | Structure? | Under grasses, bracken and moss is a hollowed area with remnants of a possible stone bank built up against the outcrop NE of site F. The area measures 4m by 5m, but it not easily definable. Appears in the location of a possible structure marked on OS mapping. | - | Very degraded | Post-medieval | 55 | 179412 | 823236 |
| **H** | Runicaleach | Building? | Under dense heather is the remains of a U-shaped stone-built wall extending between 12-14m long NE-SW by 6m externally. The banks are spread up to 1.5m wide and stand 0.4-0.75m high, highest at the SW end. Only a small sections of coursed stone is visible at the SW end. The NE end is very denuded and difficult define, possibly having been removed during the overhead electricity line pylon construction. It is situated on a terrace downslope from the track and overlooking site A. It is almost certainly the remains of a subrectangular stone building. | NE-SW | Very degraded | Post-medieval | 65 | 179303 | 823196 |
| **I** | Runicaleach | Structure | Located on a narrow terrace is a moss-covered subcircular stone/turf bank measuring 10.5m N-S by 9m over banks spread 2-3.5m wide and standing up to 0.5m high. The structure appears to consist of a denuded boulder-built wall, with an internal space 5.8m in diameter, possible the | N-S | Very degraded | Unknown | 40 | 179281 | 823057 |

| Site No. | Site Name | Site Type | Description | Alignment | Condition | Period | Ht OD (m) | Easting | Northing |
|---|---|---|---|---|---|---|---|---|---|
| | | | remains of a hut circle or stock pen. Mostly degraded on the west side with no clear wall faces or entrance visible. | | | | | | |
| **J** | Runicaleach | Enclosure/ dyke | The heather-covered remains of a stone/turf bank spread 1-1.5m wide extends for approximately 40m to the edge of the slope at the E end and to building L at the W end. Probably formed an enclosure or dyke. | - | Degraded | Post-medieval | 70 | 179135 | 822992 |
| **K** | Runicaleach | Building | A heather-covered subrectangular stone building measures 6m N-S by 4.5m externally, with the N end abutting the wall of site J. The walls measures approximately 0.7m wide and up to 0.5m high, although there is no stonework visible under the vegetation and there is a spread of collapsed stone to the south side. It is located on the NE side of dense conifer plantation. | N-S | Degraded | Post-medieval | 75 | 179102 | 822984 |
| **L** | Runicaleach | Building | A moss-covered subrectangular stone building measures 10m N-S by 4.5m externally with walls 0.7m wide and up to 1m high at the N end. There is a spread of collapsed stone on the south side, where it has been ploughed and disturbed by conifer plantation. It is located to the NW of site K. | N-S | Very degraded | Post-medieval | 75 | 179090 | 822998 |
| **M** | Runicaleach | Building | A densely moss-covered subrectangular stone building measures 9.5m NE-SW by 5m externally with walls 0.7m wide and up to 0.8m high. The building consists of drystone construction with rubble coursing, rounded corners and a flat interior, where there is a spread of collapsed stone against the centre of the SE wall possibly marking a partition. There is a probable entrance, 1m wide, in the NW wall. Enclosure banks site N run off the N and S sides of the building. | NE-SW | Degraded | Post-medieval | 75 | 179077 | 822969 |
| **N** | Runicaleach | Enclosure/ dyke | Sections of moss-covered stone/turf banks, forming enclosure dykes run off the NE and SW sides of building site M. The banks follow the break of slope and are in varying degrees of preservation, though mostly spread up to 1m wide and standing 0.5-0.8m high. Run into enclosure site O at the S end. | - | Degraded | Post-medieval | 75 | 179059 | 822941 |

| Site No. | Site Name | Site Type | Description | Alignment | Condition | Period | Ht OD (m) | Easting | Northing |
|---|---|---|---|---|---|---|---|---|---|
| **O** | Runicaleach | Enclosure | A stone/turf amorphous enclosure bank is located to the S of building sites M and Q within the forest plantation. It encloses an area that measures approximately 35m E-W by 21m. The E end consists of a stone-revetted edge, while the N and S sides have been mostly ploughed out by forest planting. The W end is the best-preserved section, consisting of a stone wall 0.6m wide and up to 0.6m high. | E-W | Very degraded | Post-medieval | 75 | 179045 | 822919 |
| **P** | Runicaleach | Structures? | Under grasses and moss at the edge of the forest plantation are fragments of linear turf/stone banks with some upright stones visible. A U-shaped hollow on the S side of a small stream course may also have formed a structure. The condition of the remains were very poor and impossible to discern. Debris from construction of the forest track may have contributed to the site condition. | - | Very degraded | Post-medieval | 75 | 179031 | 822906 |
| **Q** | Runicaleach | Building | A small, moss-covered stone building measures 3.5m NW-SE by 2.5m externally over walls up to 0.5m wide and 0.4m high. It comprises drystone construction with rubble coursing, enclosing an area 2.5m by 2m internally with no visible entrance. | NW-SE | Degraded | Post-medieval | 75 | 179054 | 822970 |
| **R** | Runicaleach | Platform | An L-shaped fragment of low bank encloses an area 20m NE-SW by 4m to the SE side of a disused track; possibly related to track construction. | NE-SW | Very degraded | Post-medieval | 55 | 179078 | 822848 |
| **S** | Runicaleach | Bank | Under dense heather, a section of stone/turf bank stands up to 0.3m high and measures 6m long. This is located near the position of a possible structure marked on OS mapping. There is a possible fragment of stone/turf bank forming a possible enclosure to the S. | - | Very degraded | Post-medieval | 85 | 178976 | 822888 |
| **T** | Runicaleach | Building | An elongated, slightly curving subrectangular stone building under moss and bracken measures 15m NE-SW by 4.5m externally with walls 0.5-0.6m wide and up to 1m high on the NW side. It comprises drystone construction with rubble coursing, and there is no visible entrance. Enclosure site V is attached to the NE and SW ends of the building. There is collapsed stone spread on the interior and around the outside. | NE-SW | Degraded | Post-medieval | 100 | 179009 | 823049 |

| Site No. | Site Name | Site Type | Description | Alignment | Condition | Period | Ht OD (m) | Easting | Northing |
|---|---|---|---|---|---|---|---|---|---|
| **U** | Runicaleach | Building | An elongated, subrectangular stone building under dense moss measures 15m NE-SW by 5m externally with walls 0.6m wide and up to 0.5m high. It is mostly degraded on the SE side and the S gable has been ploughed out. Enclosure site V runs from the S side. | NE-SW | Very degraded | Post-medieval | 95 | 179020 | 823035 |
| **V** | Runicaleach | Enclosure | The moss-covered remains of a stone built wall encloses an area 27m NE-SW by 17m. The stone banks are spread up to 1m wide and stand 0.5-0.9m high. | NE-SW | Very degraded | Post-medieval | 100 | 179007 | 823030 |
| **W** | Runicaleach | Building | A subrectangular stone building under dense moss and grasses measures 13.5m N-S by 5.5m externally with walls 0.7m wide and up to 0.5m high. It comprises drystone construction with rubble coursing. The building tapers to the N end and there may have been a cell attached to the S gable, where the outside stone face is visible and best preserved. There is no visible entrance and collapsed stone is spread to all sides. | N-S | Degraded | Post-medieval | 105 | 179005 | 823084 |
| **X** | Runicaleach | Building | The low remains of a moss-covered stone building measures 9.3m N-S by 4m externally with walls 0.6m wide and up to 0.3m high. There are about 10 trees growing within the interior. There is no visible entrance. There is a low stone dyke to the NW side of sites V-W, running NE-SW for approximately 60m. | N-S | Very degraded | Post-medieval | 105 | 178994 | 823095 |
| **Y** | Runicaleach | Building | A subrectangular stone building under moss and grasses measures 7m NE-SW by 5m externally with walls spread 0.7m-1m wide and standing up to 0.7m high. There is an entrance 0.5m wide in the SE wall and collapsed stone is spread on the outside. | NE-SW | Degraded | Post-medieval | 100 | 179054 | 823137 |
| **Z** | Runicaleach | Building | Located and only partially visible under dense wind blown trees is a moss-covered, subrectangular stone building measuring approximately 5m ENE-WSW by 3.5m externally. The walls measure approximately 0.75m wide and stand up to 1.2m high on the NE side. Some drystone rubble coursing is visible. | ENE-WSW | Degraded | Post-medieval | 90 | 179107 | 823131 |

| Site No. | Site Name | Site Type | Description | Alignment | Condition | Period | Ht OD (m) | Easting | Northing |
|---|---|---|---|---|---|---|---|---|---|
| **A'** | Runicaleach | Enclosure | A moss-covered stone wall measures 0.5m wide and up to 0.7m high and comprises drystone construction with rubble stone coursing. It runs to the SE side of site B' and up to C' and extends to the SE side of the forest track, with has truncated a section of the wall. It would have enclosed an area approximately 46m NW-SE by 35m. | NW-SE | Degraded | Post-medieval | 85 | 179134 | 823202 |
| **B'** | Runicaleach | Building | A moss-covered subrectangular stone building measures 8m NE-SW by 4m externally with walls 0.6m wide and up to 1.2m high at the gable ends. It comprises drystone construction with rubble coursing and there is collapsed stone on all sides. There is a probable entrance in the NE wall and two twinning pens built into the SE gable end. The S pen measures 1m in diameter and 0.4m high and the E pen measures 0.3m by 0.4m and 0.4m high. Enclosure A' is attached to the SW wall. | NE-SW | Degraded | Post-medieval | 90 | 179164 | 823218 |
| **C'** | Runicaleach | Building | A moss-covered subrectangular stone building measures 11m NE-SW by 5.5m externally with walls 0.6m wide and up to 1.2m high at the gable ends. It comprises drystone construction with rubble coursing and there is collapsed stone on all sides. It is located to the NW of building site B' and enclosure site A'. | NE-SW | Degraded | Post-medieval | 90 | 179152 | 823218 |
| **D'** | Runicaleach | Enclosure | Under dense bracken and moss is a stone wall with banks spread up to 1m wide and standing up to 0.6m high. It is mostly degraded on the NE side where appears to have terminated at the edge of a burn. Encloses an area approximately 15m NE-SW by 12m. | NE-SW | Very degraded | Post-medieval | 90 | 179168 | 823263 |
| **E'** | Runicaleach | Building | A bracken and moss-covered stone building measuring 13m NW-SE by 5.5m externally with walls 0.6m wide and standing up to 0.7m high. There is a possible entrance in the N corner and rough stone coursing is visible in places. It may have had rounded corners. There is collapsed stone to all sides. | NW-SE | Very degraded | Post-medieval | 90 | 179191 | 823229 |

| Site No. | Site Name | Site Type | Description | Alignment | Condition | Period | Ht OD (m) | Easting | Northing |
|---|---|---|---|---|---|---|---|---|---|
| **F'** | Runicaleach | Structure? | The possible remains of a structure under moss and grasses comprises a stone bank a possible hollow on the NE side. It measures 3.5m overall and was impossible to interpret. | - | Very degraded | Post-medieval | 95 | 179156 | 823274 |
| **G'** | Runicaleach | Building | Under bracken, heather and moss is a stone building measuring 6m NE-SW x 3.5m externally with walls 0.5m wide and standing 0.5m high. It comprises drystone construction with rubble coursing best visible at the SW end. There are two compartments: internally, the NE cell measures 1.5m in diameter and the SW cell measures 3m NW-SE by 2.3m. The entrance is in the SE wall. A fragment of stone/turf dyke to the SE of the building may have formed part of a field dyke or enclosure. | NE-SW | Very degraded | Post-medieval | 115 | 179225 | 823513 |
| **H'** | Runicaleach | Building | The very degraded remains of a structure under bracken and moss is located on the side of slope against a rock outcrop. It comprises a stone-built subcircular bank that measures approximately 3-3.5m in diameter and stand up to 0.4m high. There is collapsed rubble to all sides and on the interior, making it very difficult to define | - | Very degraded | Post-medieval | 115 | 179048 | 823244 |
| **I'** | Runicaleach | Building | Located on the W side of the sheep fank under dense bracken is the remains of a stone building measuring 9m NE-SW by 4.5m externally. The subrectangular stone bank, mostly denuded at the NE end, is spread up to 0.9m wide and stands up to 0.4m high. There is a possible entrance in the SE wall. | NE-SW | Very degraded | Post-medieval | 5 | 178834 | 822290 |
| **J'** | Runicaleach | Structure? | The remains of U-shaped stone bank spread up to 1.2m wide and standing up to 0.5m high appears to have formed a structure that is now mostly denuded. Unable to define and interpret; probably robbed out for the sheep fank to the NE. | - | Very degraded | Post-medieval | 5 | 178845 | 822266 |
| **K'** | Runicaleach | Structure? | The remains of U-shaped stone bank spread up to 1.2m wide and standing up to 0.5m high appears to have formed a structure that is now mostly denuded. Unable to define and interpret; probably robbed out for the sheep fank to the NE. | - | Very degraded | Post-medieval | 5 | 178855 | 822264 |

| Site No. | Site Name | Site Type | Description | Alignment | Condition | Period | Ht OD (m) | Easting | Northing |
|---|---|---|---|---|---|---|---|---|---|
| **L'** | Runicaleach | Building | Within dense conifer plantation is a densely moss-covered stone building measuring 8m NE-SW by 4.5m externally with walls 0.6m wide standing up to 1.3m high at the SW end. It comprises drystone rubble coursing with facing visible in the SW gable. There is a probable entrance in the SE wall. | NE-SW | Very degraded | Post-medieval | 70 | 179209 | 823162 |
| **M'** | Runicaleach | Building | Within dense conifer plantation is a densely moss-covered stone building measuring 10.3m N-S by 7m overall. Only the S wall is clearly definable, comprising rubble stonework up to 0.7m high and 0.7m spread. The rest of the structure is mounded with turf and collapsed stone, making it very difficult to define. | N-S | Very degraded | Post-medieval | 70 | 179220 | 823189 |
| **N'** | Runicaleach | Buildings | Stone buildings located approximately 1m W of the forest track. Not surveyed. | - | Degraded | Post-medieval | 70 | 178619 | 822278 |

# Appendix 4 List of Survey Photographs

| Photo No. | Site No. | Direction facing | Description | Taken by | Date |
|---|---|---|---|---|---|
| **1** | - | SE | Working shot of survey near Sites A-C | MP | 22/02/2017 |
| **2** | A | SE | Looking over Site A | MP | 22/02/2017 |
| **3** | A | NE | Looking over Site A | MP | 22/02/2017 |
| **4** | A | NE | Looking over Site A | MP | 22/02/2017 |
| **5** | A | SE | Looking over Site A | MP | 22/02/2017 |
| **6** | A | SE | Looking over Site A | MP | 22/02/2017 |
| **7** | B | SW | S end of Site A with twinning pen Site B in right corner | MP | 22/02/2017 |
| **8** | D, E | E | Site E (front) and site D (back), with site A in far left | MP | 22/02/2017 |
| **9** | D, E | ENE | Site E (front) and site D (back), survey in progress | MP | 22/02/2017 |
| **10** | A-E | ENE | Overlooking sites A-E, with site E in front and site A in back left with sites B/C in centre and the enclosure area of Site C to right; survey in progress | MP | 22/02/2017 |
| **11** | F | NNE | Landscape view showing site F in centre left | MP | 22/02/2017 |
| **12** | F | N | Landscape view showing site F in centre | MP | 22/02/2017 |
| **13** | H | SSW | Landscape view from site H, looking towards Kylerhea | MP | 22/02/2017 |
| **14** | A | NW | Landscape view of site A | MP | 22/02/2017 |
| **15** | C | NW | View across the bank forming enclosure site C, in the centre and running to back right | MP | 22/02/2017 |
| **16** | A, C-E | WSW | Landscape view from the burn overlooking sites A, C-E from right to left (site A in centre right and site E in centre left) | MP | 22/02/2017 |
| **17** | - | SW | Landscape view from sites A-E towards Kylerhea | MP | 22/02/2017 |
| **18** | F | NNE | Site F, located to the NE side of waterfall; survey in progress | MP | 22/02/2017 |
| **19** | - | NE | Landscape view from site F towards Kyle of Lochalsh | MP | 22/02/2017 |
| **20** | F | NW | Site F, with the pylon and burn in back | MP | 22/02/2017 |
| **21** | F | NW | Site F, the ranging pole marking the upright entrance stones | MP | 22/02/2017 |
| **22** | F | SE | Site F, landscape view over Kyle Rhea | MP | 22/02/2017 |
| **23** | E | SW | Landscape view over the location of site E | MP | 22/02/2017 |
| **24** | G | SW | Location of possible site G, with site F in back left | MP | 22/02/2017 |
| **25** | A | SSW | Site A (centre) sitting on knoll above Kyle Rhea | MP | 22/02/2017 |
| **26** | A | ESE | Site A (centre) sitting on knoll above Kyle Rhea | MP | 22/02/2017 |
| **27** | H | NE | Looking over the end of site H with A in background above Kyle Rhea | MP | 22/02/2017 |
| **28** | H | NE | SW gable end of site H, showing the visible section of stonework | MP | 22/02/2017 |
| **29** | I | SE | Landscape location of subcircular bank, site I with Kyle Rhea in background | MP | 22/02/2017 |
| **30** | I | SE | Landscape location of subcircular bank, site I with Kyle Rhea in background | MP | 22/02/2017 |
| **31** | K | NE | SE end of site K at the edge of conifer plantation | MP | 22/02/2017 |
| **32** | L | N | N gable end of site L at the edge of the conifer wood | MP | 22/02/2017 |
| **33** | L | NE | N gable end of site L at the edge of the conifer wood | MP | 22/02/2017 |
| **34** | M | ENE | View over site M, under dense moss | MP | 22/02/2017 |
| **35** | M | ENE | View over site M, under dense moss | MP | 22/02/2017 |
| **36** | M, N | S | View over site M, under dense moss, site N running off in the centre background | MP | 22/02/2017 |

| Photo No. | Site No. | Direction facing | Description | Taken by | Date |
|---|---|---|---|---|---|
| **37** | - | NE | Landscape view over Kyle Rhea from the woodland outside sites K-M | MP | 22/02/2017 |
| **38** | - | SE | Landscape view over Kyle Rhea from the woodland outside sites K-M | MP | 22/02/2017 |
| **39** | S | SW | Possible site S, under dense bracken | MP | 22/02/2017 |
| **40** | T | SW | View over site T | MP | 22/02/2017 |
| **41** | U | NE | View over site U, site V running off in centre background | MP | 22/02/2017 |
| **42** | T | SE | Looking downhill over site T | MP | 22/02/2017 |
| **43** | W | SSW | View over the NNE end of site W, under dense moss with disused track to left | MP | 22/02/2017 |
| **44** | W | NNE | View over SSW end of site W, possible cell in front | MP | 22/02/2017 |
| **45** | X | S | View over low, moss-covered remains of site S | MP | 22/02/2017 |
| **46** | X | SSW | View over low, moss-covered remains of site S | MP | 22/02/2017 |
| **47** | Y | NE | Looking over SW end of site Y | MP | 22/02/2017 |
| **48** | Z | SSW | Standing wall of site Z, located under dense wind blown tree | MP | 22/02/2017 |
| **49** | B' | WSW | Site B', with Site A' in background | MP | 22/02/2017 |
| **50** | B' | WSW | Site B', with Site A' in background | MP | 22/02/2017 |
| **51** | B' | WSW | Site B', with Site A' in background | MP | 22/02/2017 |
| **52** | B' | SE | Site B', survey in progress; forest track in background | MP | 22/02/2017 |
| **53** | B' | SE | Site B', survey in progress; forest track in background and site A' running off to centre right | MP | 22/02/2017 |
| **54** | B' | SE | Site B', looking over NW gable end | MP | 22/02/2017 |
| **55** | B' | S | Twinning pen in S corner of B' | MP | 22/02/2017 |
| **56** | B' | SE | Twinning pen in E corner of B' | MP | 22/02/2017 |
| **57** | C' | NE | NE gable end of site C' | MP | 22/02/2017 |
| **58** | C' | NE | NE gable end of site C' | MP | 22/02/2017 |
| **59** | E' | ESE | View over site E' under bracken and moss; Kyle Rhea in back | MP | 22/02/2017 |
| **60** | F' | WSW | Possible site F' | MP | 22/02/2017 |
| **61** | F' | S | Landscape view of possible site F' | MP | 22/02/2017 |
| **62** | - | SE | Landscape view, showing area of rig and furrow to S of sites J-O | MP | 22/02/2017 |
| **63** | - | SE | Landscape view, over area of rig and furrow to S of sites J-O | MP | 22/02/2017 |
| **64** | - | NE | Landscape view, from sites J-O | MP | 22/02/2017 |
| **65** | A'-C' | NE | Location of sites A'-C' in relation to forest track | MP | 23/02/2017 |
| **66** | A'-C' | NE | View over enclosure wall site A' with site C' in centre and site B' in background | MP | 23/02/2017 |
| **67** | A'-C' | NE | View over enclosure wall site A' with site C' in centre and site B' in background; survey in progress | MP | 23/02/2017 |
| **68** | A'-C' | ENE | View over site C' in centre and site B' in background; survey in progress | MP | 23/02/2017 |
| **69** | A'-C' | ENE | View over site C' in centre and site B' in background; survey in progress | MP | 23/02/2017 |
| **70** | G' | SE | Landscape view over site G' (centre) | MP | 23/02/2017 |
| **71** | G' | WSW | View over site G' | MP | 23/02/2017 |
| **72** | H' | S | Landscape location over site H' (centre right), shows area of rig and furrow | MP | 23/02/2017 |
| **73** | H' | W | Site H', remains of small structure under dense moss | MP | 23/02/2017 |

| Photo No. | Site No. | Direction facing | Description | Taken by | Date |
|---|---|---|---|---|---|
| **74** | H' | WNW | Site H', remains of small structure under dense moss | MP | 23/02/2017 |
| **75** | H' | N | Site H', remains of small structure under dense moss | MP | 23/02/2017 |
| **76** | sheep fank | S | View over sheep fank by the Kyle Rhea lighthouse | MP | 23/02/2017 |
| **77** | I' | SE | Bracken-covered structure site I' in front of the stone walls of the sheep fank | MP | 23/02/2017 |
| **78** | L' | ENE | SW gable end of site L' | MP | 23/02/2017 |
| **79** | L' | NNE | SW gable end of site L' | MP | 23/02/2017 |
| **80** | L' | SSE | View over site L' | MP | 23/02/2017 |
| **81** | M' | S | View over the S wall of site M' | MP | 23/02/2017 |









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Appendix 16- Panoramic Photos from viewpoints shown on Map 18

Isleornsay Looking East

Drumfearn Looking East

Loch na Dal looking East

Drochaid Airigh na Saorach looking South East

**FOREST ENTERPRISE - Application for Land Management Plan Approvals in Scotland**

**Forest Enterprise - Property**

| | |
|---|---|
| Forest District: | Inverness Ross and Skye Forest District |
| Woodland or property name: | Kinloch Hills and Broadford |
| Nearest town, village or locality: | Broadford/ Kyle of Lochalsh |
| OS Grid reference: | NG749218 |
| Local Authority district/unitary Authority: | Highland Council |

**Areas for approval Ha**

| | Conifer | Broadleaf |
|---|---|---|
| Clear felling | 432ha | |
| Selective felling | | |
| Restocking | 212ha | 864ha |
| Natural Regeneration | | 363ha |

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

2. * I apply for an opinion under the terms of the Environmental Impact Assessment (Forestry) (Scotland) Regulations 1999 for ~~afforestation*~~ /deforestation*/ roads*/ quarries* as detailed in my application.

3. I confirm that the initial scoping of the plan was carried out with FC staff on 12th September 2017

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

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

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

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

Signed …… Forest District Manager

Signed…… Conservator

District ……

Conservancy……

Date ……

Date of Approval:

Date approval ends:

*delete as appropriate

# FORESTRY COMMISSION SCOTLAND

# Inverness, Ross and Skye Forest District SSSI Designated Sites Management Plan

## KINLOCH & KYLEAKIN HILLS
(MONADH CHAOL ACAINN IS CHEANN LOCH)

**Period covered by plan** 01 April 2018

**Review Date** 31 March 2028

**Record of Agreement**

| | **FES** | **SNH** |
|---|---|---|
| Name: | ……..… | ……. |
| Date: | …… | ……. |
| Title: | …… | ……. |

Address: Inverness, Ross and Skye Forest District
Tower Road
Smithton
Inverness
IV2 7NL

## CONTENTS

## Kinloch & Kyleakin Hills
## Designated Sites Management Plan

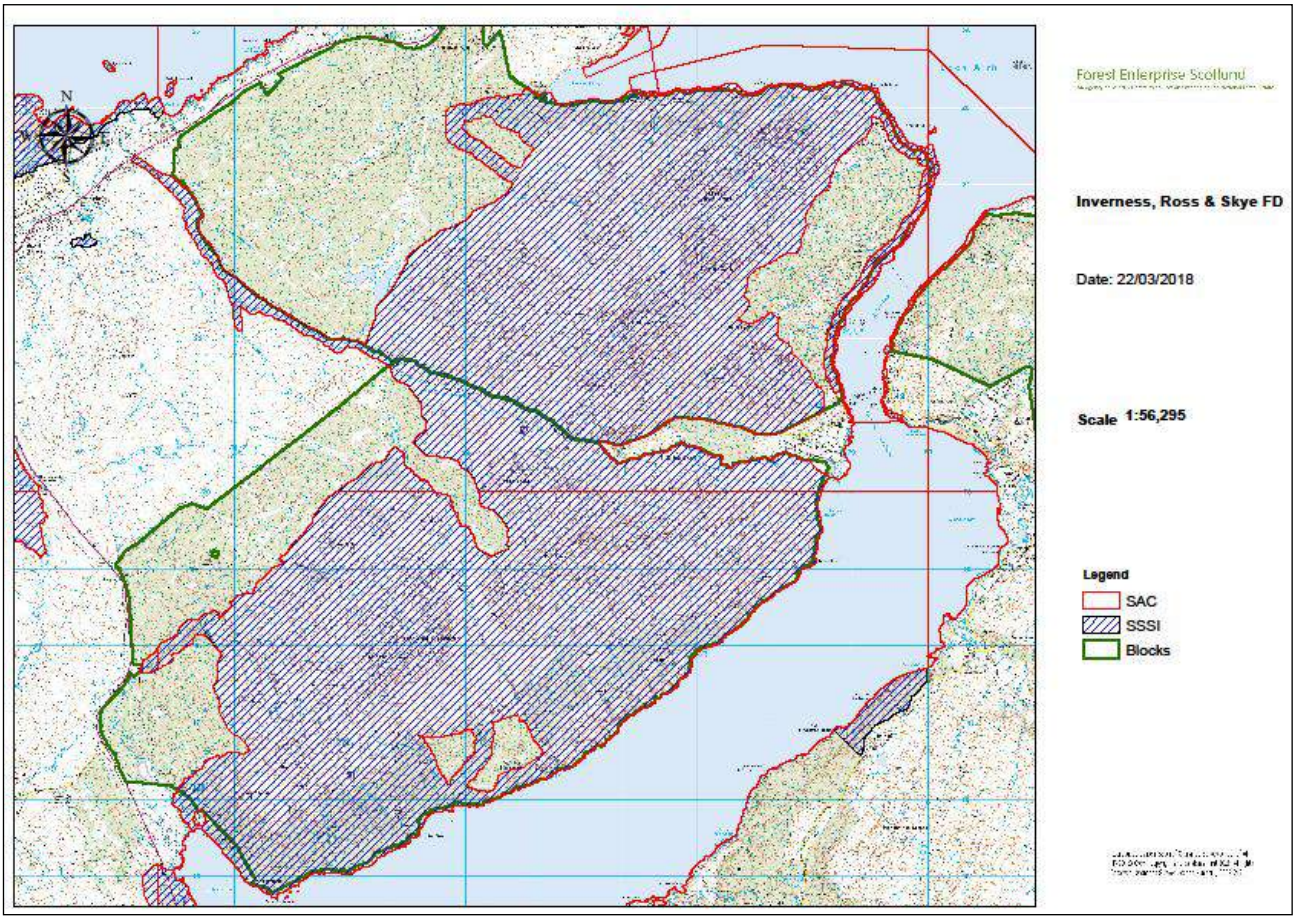
## 1. Introduction

### 1.1 Description of the designated sites covered by this plan.

The Kinloch Hills are a part of the National Forest Estate managed by Forest Enterprise Scotland and a large part of this landholding includes designations relating to the Kinloch and Kyleakin Hills.

Kinloch Hills Forest includes one of the largest upland native oak and ash woodland on FES land and Skye as well as extensive areas of peat bog and upland heaths of European importance that extend from the coastal shore of Loch Alsh to the mountain tops of Beinn na Caillich, 739m above sea-level.

Kinloch and Kyleakin Hills designated sites lie south of the Skye Bridge, extend east towards Broadford and to the south to Armadale (Map 1). The Kinloch Hills FES Forest is less than 1.5km from Kyle of Lochalsh and 7km from Broadford.




**Map1: Kinloch & Kyleakin Hills SAC and SSSI**
(FES legal boundary in green)

Kinloch and Kyleakin Hills were designated as a Special Area of Conservation (SAC) in 2005 due to their European significance and as a Site of Special Scientific Interest (SSSI) in 1964 for their importance at national level. There are seven SAC and nine SSSI features in this designation, summarised in table 1.

| Table 1: Summary of the Designations Relating to Kinloch Hills on the NFE | | | | | |
|---|---|---|---|---|---|
| Designated Site Name | PA Site code | Feature | Total Area of designation (ha) | Area in this plan (ha) | % on NFE |
| Kinloch and Kyleakin Hills SAC | 8282 | • Western acidic oak woodland<br>• Alpine Heath<br>• Subalpine heath.<br>• Dry heath.<br>• Wet heathland with cross-leaved heath.<br>• Mixed woodland on base-rich soils associated with rocky slopes.<br>• Blanket bog<br>• Otter | 5275.46 | 5039.4 | 95.7 |
| Kinloch and Kyleakin Hills SSSI | 8173 | • Alpine Heath.<br>• Subalpine dry heath.<br>• Subalpine wet heath.<br>• Blanket bog.<br>• Lichen assemblage.<br>• Torridonian (geological).<br>• Upland oak woodland.<br>• Otter. | 5266.9 | 5039.4 | 95.7 |

For further detail on the designations listed in Table 1, refer to the SNH documentation at the SiteLink page at www.snh.gov.uk/SNHi**.**

The designations also incorporate adjacent private ground around Loch na Dal in the south (coastal Kinloch oakwood, Leitir Cailleach birchwood) and Abhainn Lusa/Allt Mor in the mid-west (ravine woodland). This management plan is only applicable to the National Forest Estate.

Lochs Duich, Long & Alsh reefs SAC and Inner Hebrides and the Minches Candidate SAC directly border the NFE ownership. Although not in direct control of FES, these designated sites are taken into account in strategic and operational planning to prevent adverse negative impacts on their conditions from management activities undertaken in Kinloch Hills Forest.

### 1.2 General description of the qualifying features within the designated site on NFE land.

**Native woodlands.**

With regard to woodlands alone, the designations on the National Forest Estate (NFE) cover two different woodland types:

- The western acidic oak woodland includes the upland oak woodland.
- The mixed woodland on base-rich soils associated with rocky slopes.

In the north of Kinloch Hills, Mudalach Birchwoods remnants are one of the most extensive and diverse ancient semi-natural woodland on Skye. Much of the upland oak woodland feature is on steep, rocky shelves with a ground flora dominated by heather and luxuriant patches of bryophytes, woodrush and ferns. On more accessible, deeper soils the ground flora is dominated by grasses and bracken. The canopy here is fairly open. In some places abundant natural regeneration of native trees has taken place and an understorey of young trees and saplings is now visible. Species rich ash woodland has a diverse lower plant flora and occurs in a steep gorge above Corran na Mudlaich. Patches of wet woodlands are common in flushes and along the lower margins of the main birch woodland whilst a more species poor wet woodland occurs on the gentle slopes along the upper margins of Mudalach Birchwoods. Birch is dominant within the canopy, frequently accompanied by rowan with occasional holly, ash, hazel and eared willow. The age classes of the woodland are diverse with very old and senescent trees. Most of the mature birch trees appear to be derived from coppice or “phoenix” growth.

Within the south of Kinloch Hills, some fascinating remnants of ancient semi-natural woodland have survived. These consist of a mosaic of upland oak wood and species-rich ash wood with a luxuriant flora of oceanic ferns and lower plants. Some of the hazel understorey has been managed in the past for coppice whilst some very old widely spaced ash mature trees “standards” have survived in the upper storey.

Towards the east, oak becomes increasingly common, particularly on less accessible slopes above Port Mhealaraigh. North east, on gentler slopes occasional ancient oak pollards remain suggesting much of the site may have been managed as wood pasture. Veteran oak pollards are scattered throughout this area, some of which remain alive despite past shading pressure from previous commercial conifers.

**Alpine and subalpine Heaths**

Alpine heath is restricted to shallow soils on ridges and well-drained ground above 550m on a variety of slope aspects within the site. They also include rich communities of oceanic liverworts occurring among the short heather and blaeberry heath on sheltered N-facing slopes. Prostrate heather with extensive carpets of moss (montane heaths) is frequent on the higher, more exposed ground.

Most of the subalpine heaths exist in mosaic of dry & wet heath/mire complexes. Sub-alpine dry heath is widespread on steeper, well-drained slopes. On shallower slopes it is confined to small patches around boulders and outcrops. On the north side of Ben Aslak subalpine dry heath is restricted to the steep north-facing slopes where oceanic bryophytes are abundant.

Sub-alpine wet heath is widespread and abundant covering large areas within the gentle and steep slopes of shallow peat. Lower slopes and flushed wet heath are dominated by purple moor-grass and at higher altitudes deer grass.

**Blanket Bog**

Blanket bog is widespread and extensive on lower ground, mainly occurring on the gentle to moderate slopes. Higher up, blanket bog is more patchy but still widespread in hollows, basins and on terraces. It is frequently found in mosaic with both dry and wet heath.

**Bryophyte Assemblage**

The bryophyte interest is important within the following habitats: oak/hazel woodland, alpine heath, wet heath and blanket mire. The bryophyte assemblage is characteristic of a diverse, rich, markedly western oceanic woodland type and of montane hilltops among heaths. Some nationally rare and scarce species are present and several new notable species were recorded during past monitoring. The abundance of *Harpalejeunea molleri* as an epiphyte on ash trees is notable along with other oceanic species such as *Drepanolejeunea hamatifolia* and *Plagiochila bifara*. A tropical species, *Rhodobryum roseum* was recorded for the first time in Kinloch in 2012. Uncommon oceanic liverwort *Jubula hutchinsae* and the nationally scarce species (Preston 2006) *Eremonotus myriocarpus* were also recorded within one of the gorges during the survey.

**Lichen Assemblage**

A total of one hundred nighty lichen taxa have been recorded of which all but two are on trees, shrubs or lignum. This includes one Biodiversity Action Plan (BAP) species, two IUCN Red Data Book (RDB)(Vulnerable) and ten categorized as “Near Threatened”. In terms of rarity status, three are “Nationally Rare” and thirty eight “Nationally Scarce”. Forty eight of the lichens are species for which Britain has an “International Responsibility” (IR) to protect. The nationally rare and internationally threatened *Leptogium hibernicum* was recorded in 2012 on an ash tree. Other notable lichen species include *Leptogium burgessii*, *Biatora sphaeroides*, *Pseudocypellaria intricata* and *norvegica*, *Thelotrema petractoides* and *Collema fasciculare*.

**Otter**

The site supports a significant population of otter representative of the west coast of Scotland. There is a large number of holts used for shelter and breeding among boulders and rocks with excellent foraging intertidal and inland areas including freshwater pools around the coast.

**Geological interest.**

Nationally important geological exposures are located at Bealach Udal (Kylerhea Glen), Kinloch and along the coast at Kinloch. The two sites are complimentary and together their rock exposures provide the most comprehensive and detailed record of the three formations relating to the “Sleat Group” (a subdivision of Torridonian rocks). The sequences of sandstone, siltstone and shale, laid down between 1050 and 850 million years ago, display important geological structures vital to the understanding of the environmental conditions present during that period.

## 2 Management Objectives.

The main objective of this plan is to ensure that all the qualifying natural features within the Kinloch and Kyleakin Hills SAC and SSSI managed by FES are maintained in favourable condition. The long term aims are:

- To manage the designated site for biodiversity through a minimal intervention approach.

- To allow the existing native woodland resource to expand from its existing location through natural regeneration of tree species. In the short term, management will continue to monitor and remove the secondary regeneration of non-native conifers. Some areas out with the designated site will remain managed as productive non-native commercial plantation woodland.

- To restore some of the peat bogs out within the immediate boundary of the designated site at Lochan na Saile, Glen Arroch and Kyle Farm (see Map 5). This action will make the bogs within the designated site more robust by extending this habitat beyond the boundary. In the longer term it is proposed to assess further peatland within the designated sites for potential restoration programmes.

- To maintain the otter population and its distribution by avoiding disturbance from any forestry operations.

- To keep the geological exposures at Bealach Udal and Kinloch visible and accessible for the purposes of education and research.

- To continue the FES policy for the eradication of rhododendron and other invasive non-native (INNS) plant species;

Detail on the strategic objectives for Kinloch Hills Forest is given in the FES Kinloch and Broadford Land Management Plan (LMP).

In addition, any management undertaken within Kinloch Hills Forest will be planned to avoid impacts on the adjacent designated sites such as: Lochs Duich, Long & Alsh reefs SAC and Inner Hebrides and the Minches Candidate SAC.

**3. Condition of the natural features and pressures on Kinloch and Kyleakin SAC and SSSI on the NFE land.**

The most recent results of the Site Condition Monitoring (SCM) survey undertaken by SNH are given in Table 2 below. This data is specific to the condition status of the natural features of Kinloch and Kyleakin Hills SAC and SSSI on the NFE. The associated pressures responsible for the condition of the site are also detailed.

| Table 2 : Designated Natural Features of Kinloch & Kyleakin Hills and Site Condition Monitoring on NFE land | | | | |
|---|---|---|---|---|
| **SAC Feature** | **SSSI Feature** | **SCM date monitored** | **Condition** | **Pressures** |
| Western acidic oak woodland | Upland oak woodland | 24/03/2014 | Partially Recovering | **Over-grazing.**<br>Grazing levels above target levels in certain parts of the site. Continual need to review and amend grazing level through deer management to allow a full suite of native species to recolonise this block of woodland.<br><br>**Non-native trees/Invasive Non-native Species (2008).**<br>Improvement of the site condition since last SCM in 2013 due to large amounts of conifer felling that has taken place in 2016/2017 within and out with the designated sites south east of Leitir Fura on FES ground. |
| Mixed woodland on base-rich soils associated with rocky slopes. | NA | 26/06/2014 | Favourable | **As above.** |
| Alpine and subalpine heaths | Alpine heath | 11/09/2009 | Favourable | **Over grazing/trampling**<br>High grazing levels were identified in the SNH SCM 2009. Deer management was subsequently reviewed and this issue was addressed. The feature is now showing some signs maintaining light grazing or no grazing on alpine heath. |
| Blanket Bog | Blanket Bog | 19/10/2004 | Favourable | **Grazing - appropriate level.**<br>Maintaining light grazing or no grazing on blanket bog through deer management. |
| NA | Bryophyte assemblage | 11/08/2015 | Favourable | **Non-native trees/Invasive Non-native Species (2003).**<br>**Under-grazing.**<br>Improvement of the condition since last SCM in 2015 as rhododendron control is undertaken by immediate removal and/or treatment once identified on FES ground. Monitoring of rhododendron will continue to plan its removal if identified. |
| NA | Lichen assemblage | 11/08/2015 | Partially recovering | **Non-native trees/Invasive Non-native Species (2004).**<br>**Under-grazing.**<br>Improvement of the condition since last SCM in 2013 due to rhododendron control by immediate removal and/or treatment once identified has taken place on FES ground.<br><br>Manual cutting of non-native trees and their regeneration has taken place in the vicinity of veteran ash and hazel trees at Leitir Fura to conserve key lichen species. |
| Dry Heaths | Subalpine dry heath | 17/02/2015 | Favourable | **Grazing - appropriate level.**<br>**Presence/changing extent invasive species.**<br>Maintain light grazing or no grazing on alpine heath through continued deer management. |
| Wet heathland with cross-leaved heath | Subalpine wet heath | 11/09/2009 | Unfavourable Recovering Due to Management | **Over-grazing.**<br>Grazing levels being above target levels in certain part of the site. Improvement of the site condition since last SCM due to deer management. |
| Otter (Lutra lutra) | Otter (Lutra lutra) | 11/08/2004 | Favourable | **Disturbance.**<br>During management/operations undertaken by FES, measures/ mitigations are applied to avoid disturbance to otters. |
| NA | Torridonian | 15/08/2001 | Favourable. | **Degradation, destruction or encroachment with trees of the designated feature.**<br>No activities within this SSSI which could degrade or destroy the geological feature are carried out by FES. Any encroachment of vegetation on the geological feature is removed. |

## 4. Management and Monitoring

### 4.1 Management undertaken.

Over the years, the leading priority has been to remove non-native conifers from the SAC and to encourage a native woodland regeneration phase. The removal of non-native commercial plantation within the SAC has now been completed within the designated site; in 2016/2017, 67 ha of commercial conifer plantation, ringed by the SAC at Meall Port Mhealaigh and Leitir Fura. This is a major gain to the native woodland natural feature as it can now extend into the felled area. The site will be monitored for secondary regeneration of non-native conifers and this will be removed through routine maintenance work as necessary.

A summary of the management work completed up to 2017 is summarised in table 3.

**Table 3: Conservation Objectives (SSSI) & Management Undertaken.**

| Objective (SSSI) | Management undertaken |
|---|---|
| To maintain the extent & improve the condition of broadleaved woodland, bryophyte & lichen assemblages. | 1. Deer management has been a consistent action since at least 2002 (Chart 1). This effort has promoted the natural regeneration of native trees across the SSSI.<br><br>2. Monitoring for natural regeneration in woodland. Fixed point photography was established in 1999 and repeated in 2010 and 2015. A programme of measured surveys was started in 2015 and these are starting to show recruitment of regeneration.<br><br>3. Condition monitoring of ancient woodland at Mudalach was done in 2015. Showed positive recruitment of regeneration, but also highlighted some browsing impacts. Deer management reviewed as a result.<br><br>4. Planting of native trees. Replacement of losses in the SFA/BP planting areas. Some work completed by Trees for life up until 2016. Larger scale contract work completed in 2017/18.<br><br>5. Improvement of the site condition by felling the 67 ha Sitka spruce plantation at Leitir Fura/Port Mhealaraigh in 2016/2017. This area will be allowed to revert to native woodland through natural regeneration or through planting.<br><br>6. Secondary treatment to remove NNC regeneration over c296.0 ha over the period 2009-2017.<br><br>7. Removal of rhododendron plants as they have been found. Mostly close to Kinloch Lodge Hotel. |
| Maintain & improve the condition of alpine & sub-alpine heaths. | 1. Deer management as described above. |
| Maintain & improve the condition of blanket bog. | 1. Deer management as described above. |
| To maintain the otter population & its distribution.<br><br>Preventing disturbance & impacts on otters. | Pre operational surveys completed & mitigation identified to support the felling work at Leitir Fura in 2016/17. |
| Keep the geological features at Bealach Udal & Kinloch clearly visible & accessible for education & research. | No work completed.<br><br>The geological feature is maintained in favourable condition.<br><br>Since 2011 |

Other work that has taken place but which is not directly attributable to the conservation objectives, includes the maintenance of public access and recreation infrastructure around Kinloch Lodge Hotel/Leitir Fura and on the route known as the Drove road.

### 4.2 Deer Management

Deer management is fundamental to land and habitat management on the entire estate and its prescription and underlying rationale is outlined in this section.

Over the last eight years deer management on FES Kinloch Hills Forest Estate has been undertaken with the objective of reducing browsing impacts on designated features and planted tree.

A summary of the deer cull for Kinloch between 2009 and 2017 is shown in Chart 1.

The entire holding within FES ownership is no longer deer fenced, so the deer move freely from the surrounding land to the Kinloch Hills forest. FES as part of The South Skye Deer Management Group (DMG) effectively manages deer numbers over one discrete but extensive deer management unit.

The last full deer population assessment has been carried out in 2012 and it will be repeated again in 2022. Based on culling records and sightings the population is believed to have dropped and is now estimated at around 5 per 100ha which is in line with the recommendations from the 2009 SCM.

FES is developing a programme of surveying for natural regeneration on a shorter repeat time cycle. This survey includes a measure of habitat grazing impact that will allow the effect of the culling programme to be monitored and adjusted against.

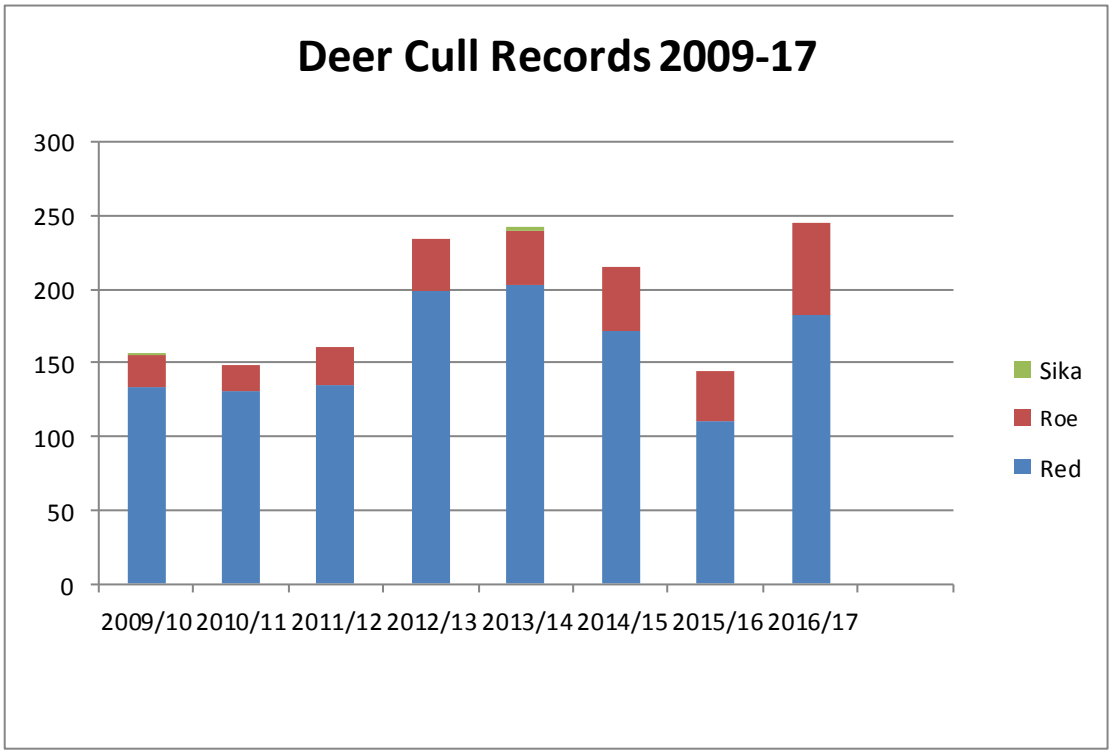



**Chart 1: Summary of deer culling data for Kinloch Hills Forest**

### 4.3. Monitoring

#### 4.3.1 Ancient Woodland Monitoring

A programme to monitor the restoration of ancient woodlands started in 2012 (base line survey) and will be replicated at approximately 5-yearly intervals to assess the regeneration of native trees within the native woodland habitat. The surveys also record the presence of non-native trees/regeneration species and the INNS. The results of these surveys are used to advise management decisions that are appropriate to the restoration of the native woodland: removal of non-native trees/INNS species, intervention planting in absence of a seed source of native tree species and deer management requirement to encourage natural regeneration of native trees.

#### 4.3.2 Fixed point photography monitoring

Fixed point photography monitoring was first set up in October 1999 at five points within the coastal oak remnant along the wood margins near Port Aslaig to record woodland regeneration and succession. Monitoring was extended to Runicaleach in 2010.

Monitoring was repeated in 2015. The series photographs show good progression towards succession of native natural regeneration, especially north of fixed point 1 and south of fixed point 3 (see Appendix 1).

#### 4.3.3 Natural regeneration surveys.

In 2015 and in 2016 an extensive survey of the natural regeneration on open/previously felled areas within Kinloch Hills Forest was undertaken to record the extent and density of tree regeneration.

An example of the data collected in summarised in Table 4. In the north of Kinloch Forest, the survey was conducted within part of the designated site at Mudalach Birchwoods (Maps 2) and in the south around Leitir Fura (Map 3).

**North Kinloch.**

Within the north Kinloch survey area at Mudalach, the survey highlighted abundant regeneration of oak and aspen localised on steep ground where a seed source was present. Within the birch woods, the survey highlighted highly localised birch saplings standing at 1800 stems/ha. Some of these birch saplings have colonised part of the wet heath within the western areas leading to an increase in extent of the native woodland feature within the designated site. Throughout the north Kinloch survey area, it was recorded that within the ground flora palatable species to deer were well represented suggesting that in general the threat from red and roe deer grazing impacts were low-medium throughout the survey area. However, some browsing from red deer was found on saplings on part of the palatable tree species. Therefore the survey emphasised the importance of continuing deer management within this northern part of the designated site. Within the east of Mudalach Birchwoods, in some of the areas deer fenced in the past, good natural regeneration of saplings and young trees at relatively high densities was observed.

Natural regeneration of Sitka spruce and Lodge pole was found at low density throughout the site. Sparse rhododendron bushes were confined to Glen Arroch on the NFE and these have been programmed for removal.

**South Kinloch**

In South Kinloch, the success of natural regeneration was recorded west of Leitir Fura where native species saplings have become well established with holly and ash well represented and birch is dominant on previously clear-felled areas. This can be partly explained by low herbivore impacts during a prolonged period. The survey noted that the frequency of saplings among these palatable species diminishes east of Leitir Fura, saplings being confined into less accessible rocky slopes beneath Meall Port Mhealaraigh. These areas previously felled or open are dominated by bracken which may further limit the natural regeneration of native trees.

Sitka spruce saplings were found scattered through the survey area at low density and their removal was undertaken in 2017.

**Port Aslaig**

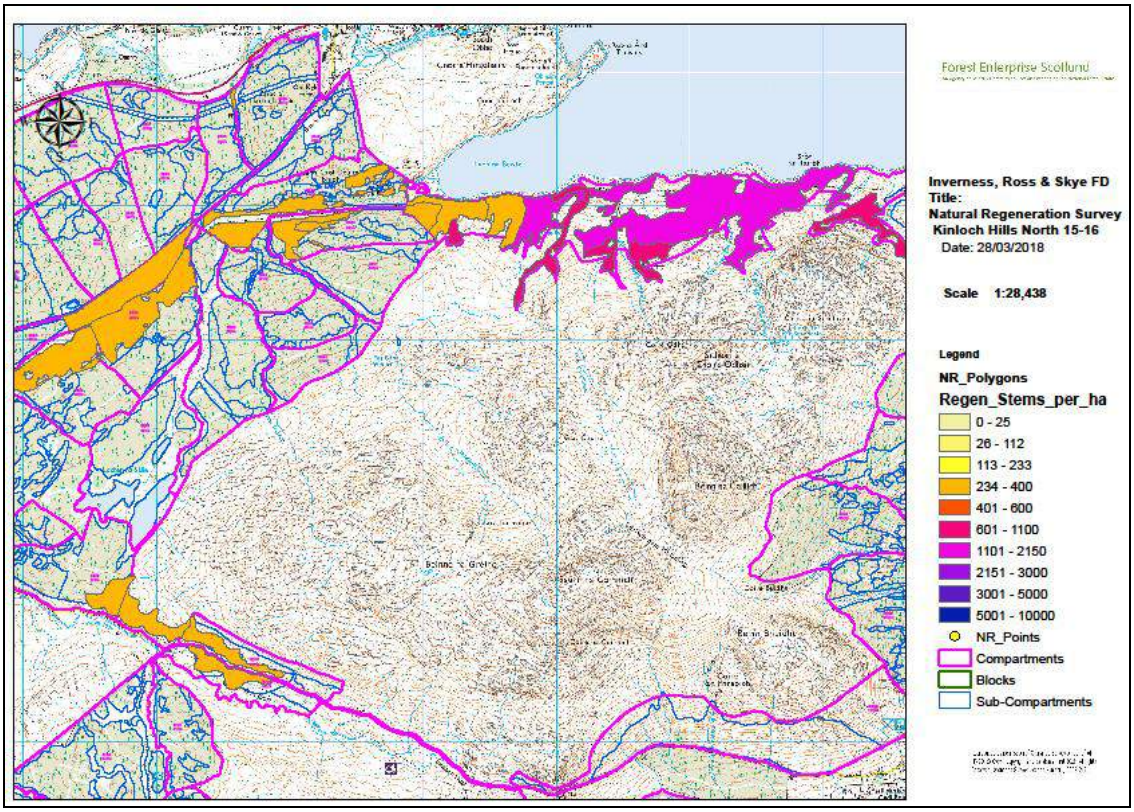
A survey was undertaken around the ancient semi-natural woodland (ASNW) at Port Aslaig, Kylerhea to map the extent and development of the natural regeneration within the survey area as a baseline for future monitoring (see Map 4 below).

A wide range of native species were recorded at sample plots as established which included: birch (downy/hybrid), hazel, eared willow, rowan, oak (sessile/hybrid), ash, holly and hawthorn. No non-native species were recorded within plot sample locations.

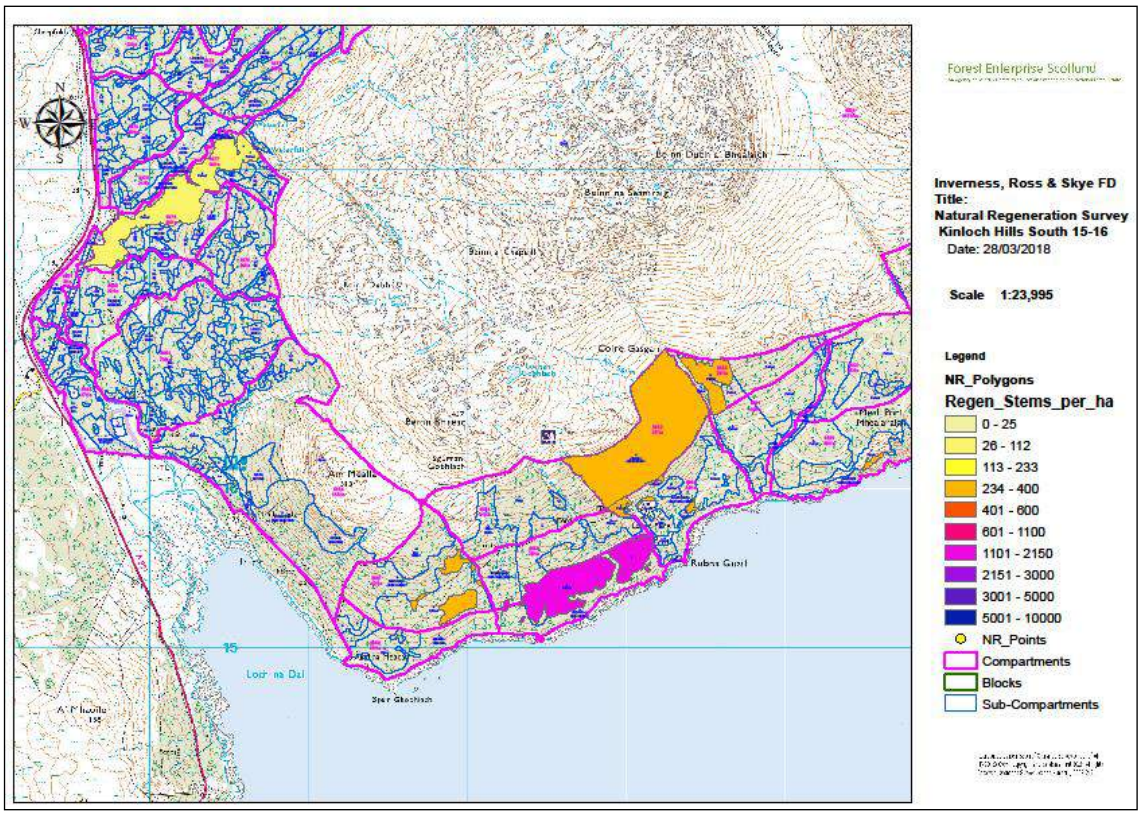
The survey highlighted that native seedlings and saplings at a density of more than 625/ha have colonised over 55 hectares of open ground. The height of tree seedlings and saplings relative to the surrounding vegetation and the record of palatable species such as holly and oak being established suggests herbivore impacts are currently low enough to allow the development of young trees. However it was noted that this cohort of young trees has not yet grown beyond the height of browsing animals and so may be vulnerable to grazing impacts should there be an increase in deer numbers.

Surveys for natural regeneration will continue on roughly a five year cycle to monitor changes to the woodland edge.

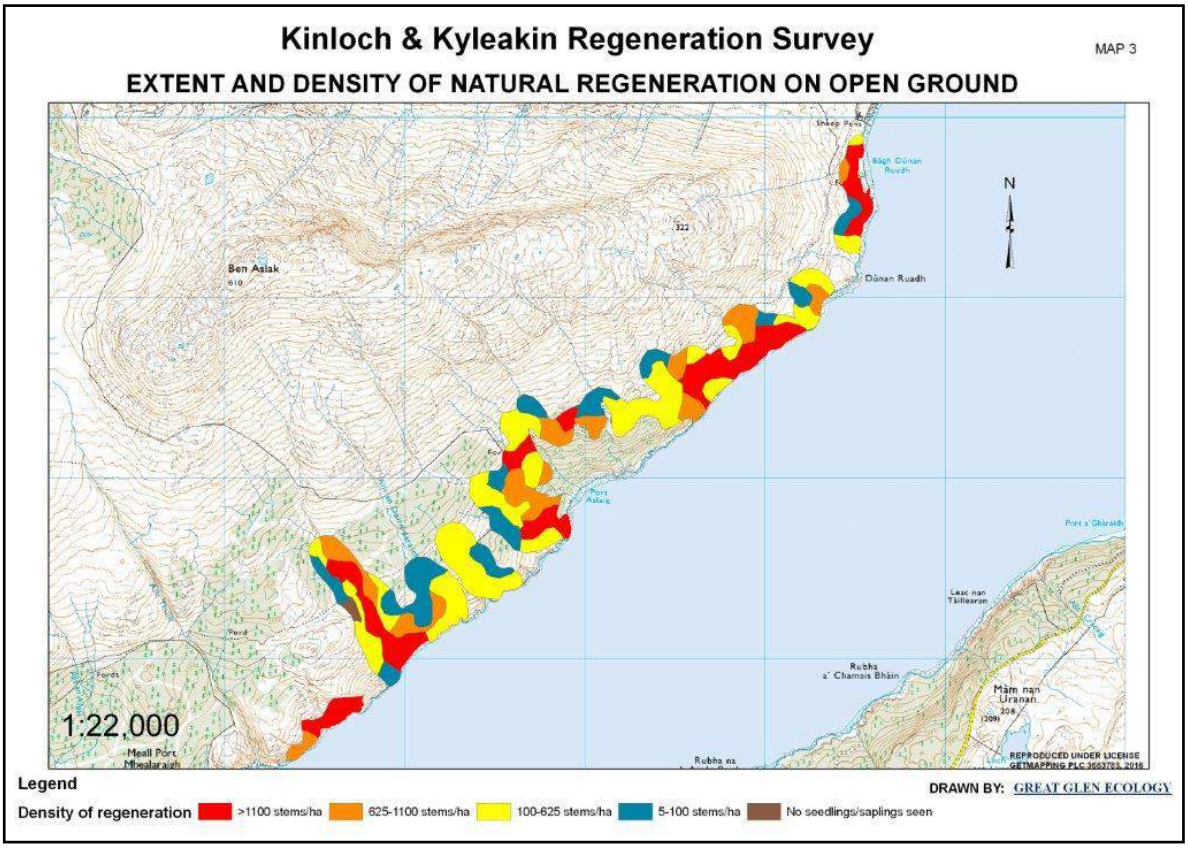
| Table 4: Summary of Natural Regeneration Survey Data (2015 or 2016) | | | | | | |
|---|---|---|---|---|---|---|
| **Compt** | **Area (ha)** | **Fell Year** | **Average Ht (m)** | **Stems/ha** | **Herbivore impact summary** | **Comments** |
| **Kyle Farm** | | | | | | |
| 6649, a | 9 | 2010 | <1.5m | 300 | Low | Area of upland birchwood and riparian woodland where conifers have been FTR or extracted. Mature birch/rowan/eared willow. Within the southern part of the compartment deer browsing high prevent natural regeneration of trees. |
| 6650, c | 6 | 2010 | >1.5m | 300 | Low | Commercial conifers felled and extracted. Regeneration of SS. No natural regeneration of native species seen but good seed source. |
| 6656,a | 17 | | <1.5m | 300 | Low | Clear felled LP with a few pockets of eared willow, birch & rowan. Reverting to mire. |
| 6654,a | 20 | 2012 | >1.5m | 300 | Low | Wind blow of LP most of which has been extracted although a few mature stems. |
| 6655,b | 14 | 2012 | >1.5 | 300 | Low | Wind blow of LP most of which has been extracted although a few mature stems. |
| **Kinloch Farm** | | | | | | |
| 6677 &6678, a | 21 | 2014 | 1.3 | 29 | Low | Sparse natural regeneration of birch/rowan/hazel and grey willow. Adjacent to PAWS and SAC so restoration to native woodland objectives. |
| **Aird na Meachan – Leitir Fura** | | | | | | |
| 6668, b | 0.1 ha | | | | Low | Area previously felled, adjacent to ASNW. Excellent regeneration of native broadleaved trees including birch/rowan and holly. |
| 6666, a | 16 | 2005 | <1.5 | 1800 | Low | Area previously felled, adjacent and to the east within ASNW. Excellent regeneration of native broadleaved trees including birch/rowan and holly. Within ASNW, hazel coppiced, ash, birch and rowan. Sycamore present near the road. Luxuriant lichens. |
| 6677, a | 4.5 | 2005 | <1.5 | 300 | Low | Several large ash trees under shading pressure from SS plantation. |
| 6665, a | 14 | 2005 | >1.5 | | Medium | Within ASNW, hazel coppiced, ash, birch and rowan. Sycamore present near the road. Luxuriant lichens. |
| 6751, a | 7 | | >1.5 | 800-1800 | Low | Open canopy dominated by old birch and occasional holly towards upper margins of woodland. As we go west, dense regeneration of birch saplings beneath an open canopy of over mature and senescent birch trees. Some goat willows. Birch and rowan are also colonising some heathy grounds. |




Map 2: Woodland Natural Regeneration Survey Kinloch Hills Forest (North) showing stems/ha per polygon surveyed.




Map 3: Woodland Natural Regeneration Survey Kinloch Hills Forest (South) showing stems/ha per polygon surveyed.




Map 4: Extent and density of natural regeneration at Port Aslaig.

**5. Future Management**

A summary of the proposed management actions and monitoring aimed specifically at improving further the condition of the designated natural features is summarised in Table 5 and illustrated on map 5.

5.1 Planting & Regeneration

The Scottish Forest Alliance/BP Kinloch & Kyleakin Hills Restoration Project objective to establish 480ha of new native woodland has had variable success. Consequently, there is a programme to replace plant losses in these areas, which will run over the next 3 to 5 years. Deep peat has been identified at one of these locations (Mudalach West, NG749243) and this soil type will be restored peat bog by not replanting it and assessing whether furrow flattening and drain blocking would be appropriate.

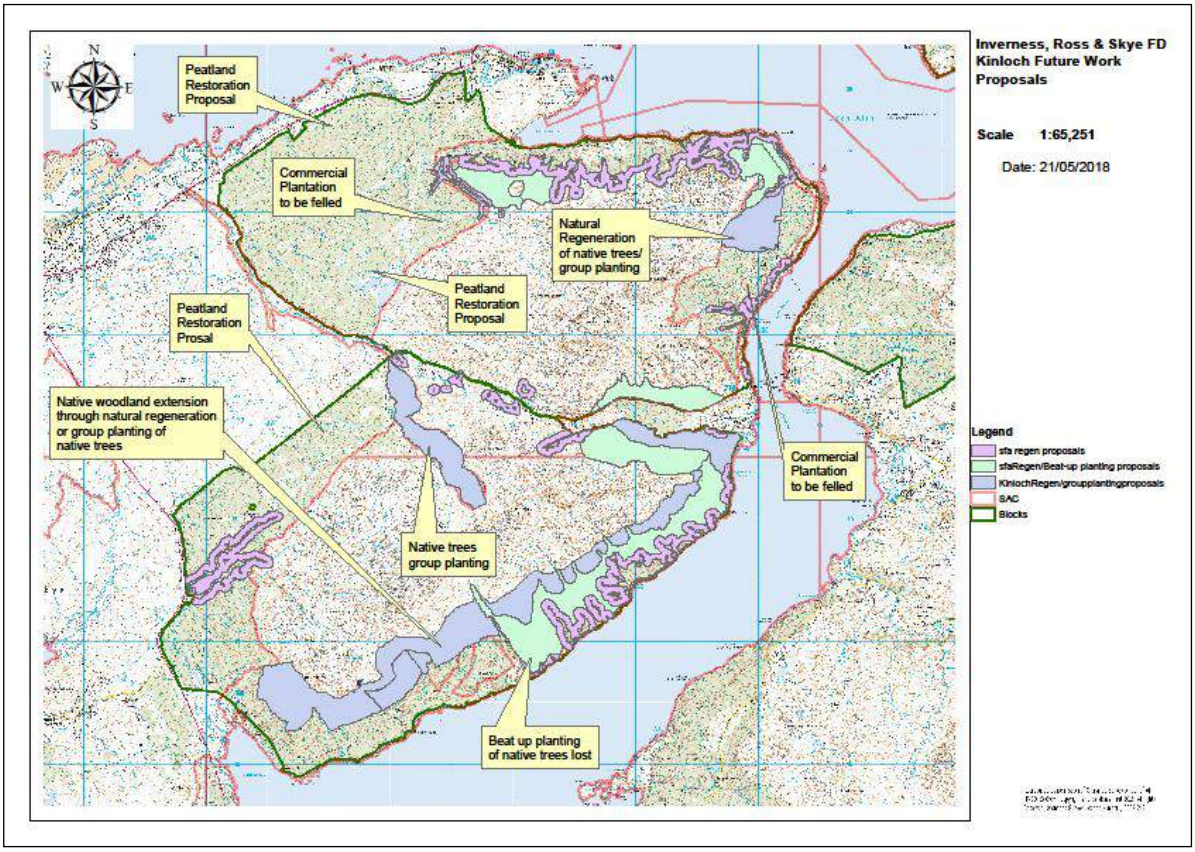
The existing native woodland will be encouraged to continue to expand its range by managing the deer population down to sufficiently low levels to sustain tree growth and development from seedling through to thicket stage.

5.2 Peat bog Restoration

Changes in environment and forest policy in relation to peat have meant that large areas of the undesignated land at Kinloch Hills (especially Kyle Farm) have been assessed as having better potential to be restored to peat bogs, rather than be restocked to productive forest. Most of this work will take place immediately adjacent to the SAC which will help to make the designated feature more robust and link it in to a wider habitat network.

Starting in 2018, a programme of peatland restoration will commence at Lochan na Saile (NG72302280). In the longer term it is proposed to assess other blanket bogs within the designated site for potential restoration programmes. Operations will include non-native tree removal, blocking old forestry drains with brash or earth bunds and ground smoothing to block old plough furrows.

| Table 5: Pressures & Proposed Management Actions | | | |
|---|---|---|---|
| Feature description | Pressures | Proposed action | Timescale |
| Broad-leaved woodland and bryophyte and lichen assemblages | Woodland Restructuring | Continue natural regeneration monitoring programme:<br>• PAWs site monitoring (5 year intervals).<br>• Regeneration surveys on SFA project area.<br>• Regeneration surveys on open ground to monitor expansion. | Next full NR survey in 2020 |
| | | • SFA/BP project zones – undertake enrichment planting of native species to replace losses. | 2018 - 23 |
| | | • Leitir Fura/Port Mhealary – assess site for native woodland restocking. Adjacent to SAC - NG737163. | 2019 |
| | | • Collection of tree (hazel) seed from Leitir Fura | Annually |
| | Invasive non-native plants. | • Monitor for rhododendron.<br>• Remove rhododendron plants & bushes as they are found.<br>• Monitor for other invasive species. | Annually. |
| | Non-native conifer trees and their regeneration | • Continue the removal of non-native trees and their regeneration within the designated site.<br>• Assess Port Aslaig in 2018, for treatment in 2019/20. | From 2018 onwards |
| | Deer- overgrazing | • Visual recording of deer.<br>• Continue actual deer management especially on areas planted with native trees and regenerating. | 2019 |
| Open habitats | Deer trampling & browsing. | • Visual recording of deer.<br>• Continue actual deer management. | 2019 |
| | Non-native conifer regeneration. | • Continue natural regeneration monitoring programme for SAC.<br>• Remove regeneration by hand-pulling or cutting with mechanical saws - rolling programme of maintenance either for volunteer work or contract. | Annually. |
| | Invasive non-native plants. | • Monitor for rhododendron and other invasive species.<br>• Remove rhododendron plants & bushes as they are found and other INNS. | Annually |
| Other Forest Activity | | | |
| Maintenance of public access infrastructure (roads, tracks, paths, car park area, signs & interpretation). | | • | |




Map 5: Planned Management Work at Kinloch Hills Forest within and adjacent to the SAC

## 5 List of Operations Requiring Consent

The Operations Requiring Consent (ORC) in the SSSI and SAC are summarised in Table 6. The numbers are the standard identification numbers used by SNH. Any operations likely to damage the natural features of an SSSI and not described in an ORC list will be avoided or treated as ORCs.

| Table 6: Operations requiring consent relevant to Kinloch & Kyleakin Hills SSSI | | |
|---|---|---|
| **ORC No.** | **Type of Operation** | **Proposed Operations** |
| **2** | Introduction of grazing or changes in the grazing regime | • Deer management. |
| **3** | Stock feeding and changes in stock feeding practices | • None proposed. |
| **6** | Application of pesticides including herbicides (weed killers) | • Manual application of glyphosate to treat invasive non-native plant species (eg rhododendron), should they be present. |
| **8** | Burning | • None proposed. |
| **9** | The release into the wild, feral or domestic animal, plant or seed | • Beating-up of the SFA/BP native woodland planting areas.<br>• Native woodland planting adjacent to the SAC at Leitir Fura, Glen Arroch and Kyle Farm. |
| **11** | The destruction, displacement, removal or cutting of any plant or plant remains, including tree, shrub, dead or decaying wood, moss or lichen. | • Felling/ring barking or chemical treatment of non-native trees and/or removal of non-native shrubs/trees.<br>• Collection of tree seeds for growing on in forest nurseries: acorns, hazel nuts.<br>• Maintenance of existing footpath/roadside verges/forest road surface: grading & patching.<br>• Manual pulling/cutting and/or motor-manual cutting of/ring barking of regenerating and mature non-native conifer (NNC) species. FES will maintain a programme to remove NNC regeneration within the SAC, advised by survey.<br>• Maintenance (vegetation control, ditch & drain maintenance) associated with forest walks/ forest roads and rights of way/areas of public access.<br>• Maintenance and replacement of recreational woodwork sign posts, way-markers, gates and fences (digging holes).<br>• Cutting of tree and shrub regeneration around veteran ash and hazel trees at Leitir Fura to conserve lichen interest. |
| **20** | Extraction of gravel and sub-soil. | • None proposed. |
| **26** | Use of vehicles except on existing tracks. | • Deer management (ATV for stalking). |
| **28** | The introduction of and changes in game bird management. | • None proposed. |

## 6. Access, Special Features, Reserved Rights, Lets & Leases

### 6.1 Recreation events & permissions

The area is accessed informally by members of the public and the local community.

The demand for permissions for special events, such as filming, has been very low. Every application is assessed and organisers are required to liaise directly with SNH where there is scope for their activity to have an impact on the designated site.

There is a radio transmitter mast on a leased site at NG75292060.

There are two powerlines running through the SAC on the NFE, for which there are wayleave agreements with the utilities company: a local supply through Kylerhea Glen and a strategic route that runs across the slopes at Mudalach. These agreements contain access rights for maintenance. It is the responsibility of the lease holder to liaise with SNH concerning any works that might impact on the designated site.

## 7. Approvals, agreements & signatures

I confirm that the above management plan which covers the FES landholdings within the Kinloch & Kyleakin Hills SSSI (8173) contains 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 (e), which covers consents via an agreed management plan.

SNH Signature …… Date ……..

SNH Name …….

SNH Job Title ……..

Address……..

Email ……..

Contact telephone number ……..

FES has a corporate requirement under UKWAS (2nd 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 site Kinloch & Kyleakin Hills SAC (8282) within its boundary on the NFE.

SNH Signature …… Date ……..

SNH Name …….

Fixed Point 3, South Kinloch near Kylerhea, NG 76635 18045– Looking south in 1999

Fixed Point 3, South Kinloch near Kylerhea, NG 76635 18045– Looking south in 2010

Fixed Point 3, South Kinloch near Kylerhea, NG 76635 18045– Looking south in 2015

## HABITATS REGULATIONS APPRAISAL PROFORMA

This proforma should be used to record SNH's Habitats Regulations Appraisal when SNH is a competent authority. It should also be used to record SNH's appraisal of a plan or project when SNH is providing advice to a competent authority.

The proforma is available in an electronic form on the SNH Dashboard. The Dashboard version is particularly suited to dealing with more straightforward Natura casework.

## APPRAISAL IN RELATION TO REGULATION 48 OF THE CONSERVATION (NATURAL HABITATS, &C.) REGULATIONS 1994 AS AMENDED[1] (HABITATS REGULATIONS APPRAISAL)

**Casework Management System Ref.**

## NATURA SITE DETAILS

**Name of Natura site(s) potentially affected:**

Kinloch & Kyleakin Hills SAC 8282

Adjacent SACs:
Lochs Duich, Long & Alsh Reefs
Inner Hebrides & the Minches

**Name of component SSSI if relevant:**

Kinlch & Kyleakin, 8173.

**Natura qualifying interest(s) & whether priority/non-priority:**

Priority Habitats
1. Blanket bog. Favourable 2016.
2. Mixed woodland on base rich soils associated with rocky slopes. Favourable 2014.

Category 'B' Habitats (good)
3. Western acidic oak woodland. Partially recovering 2014.

Category 'C' Habitats (significant)
4. Alpine & subalpine heaths. Favourable 2016.
5. Dry heaths. Favourable 2016.
6. Wet heathland with cross-leaved heath. Unfavourable recovering due to management 2011.
7. Otter. Favourable 2015.

[1] Or, where relevant, under regulation 61 of The Conservation of Habitats and Species Regulations 2010 as amended, or regulation 25 of The Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 as amended.

**Conservation objectives for qualifying interests:**

To avoid deterioration of the qualifying habitats 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 habitats that the following are maintained in the long term:

- Extent of the habitat on the site.
- Distribution of the habitat within site.
- Structure and function of the habitat.
- Processes supporting the habitat.
- Distribution of typical species of the habitat.
- Viability of typical species as components of the habitat.
- No significant disturbance of typical species of the habitat.

The Environmental Statement (2004) recognised the dynamic nature of habitats and that improvement in priority woodland habitat could not be achieved without a consequent impact on other features. Given the priority for woodland expansion potential impacts were considered acceptable so long as they met the overall conservation objectives for the site.

The overarching objectives for the land management plan are to work towards the achievement of the Natura objectives.

## STAGE 1: WHAT IS THE PLAN OR PROJECT?

**Proposal title:**

An exchange in land use/habitat types.

1. Conversion of 41.0 ha of planted woodland agreed under the Scottish Forestry Association/BP project back to peat bog: NG752243.

2. A compensatory area of 41.0 ha allocated to natural regeneration at Am Meallan, cpt 6684: NG711159. Surveys indicate that regeneration is beginning to establish in this zone.

| | |
|---|---|
| **Name of consultee:** | Forestry & Land Scotland; Giles Brockman |
| **Name of competent authority:** | Scottish Forestry |

**Details of proposal (inc. location, timing, methods):**

The original SFA/BP planting project established an area of 64.0 ha native woodland at Mudalach West. Since then it has become clear that a proportion of this site was wrongly identified as being suitable for planting. This proposal seeks:

1. Conversion of 41.0 ha of planted woodland agreed under the Scottish Forestry Association/BP project back to peat bog: NG752243.

2. A compensatory area of 41.0 ha allocated to natural regeneration at Am Meallan, cpt 6684: NG711159. Surveys indicate that regeneration is beginning to establish in this zone.

Timing:

1. Peat bog restoration: 2019-2024.
2. Natural regeneration: 2019-2039.

Methods:

1. Peat bog. The area will be assessed to ascertain whether physical operations will be necessary (2019). If input is required, it is anticipated that it will only amount to ground smoothing to remove the effects of mounding for planting and possibly drain blocking.

2. Natural regeneration will be promoted by continuing to miaintain low deer browsing impacts.

**STAGE 2: IS THE PLAN OR PROJECT DIRECTLY CONNECTED WITH OR NECESSARY TO SITE MANAGEMENT FOR NATURE CONSERVATION?**

Yes. This plan focuses on improving the favourable status of the Natura features.

**STAGE 3: IS THE PLAN OR PROJECT (EITHER ALONE OR IN COMBINATION WITH OTHER PLANS OR PROJECTS) LIKELY TO HAVE A SIGNIFICANT EFFECT ON THE SITE?**

*Each qualifying interest should be considered in relation to their conservation objectives. The following points should be considered:*

*i) Briefly indicate which qualifying interest could be affected by the proposal and how; if none, provide a brief justification for this decision, and then proceed to v), otherwise continue:*

*ii) refer to other plans/projects with similar effects/other relevant evidence;*

*iii) consider the nature, scale, location, longevity, and reversibility of effects;*

*iv) consider whether the proposal contributes to cumulative or incremental impacts in combination with other plans or projects completed, underway or proposed;*

*v) Where the impacts of a proposal are the same for different qualifying interests these can be considered together however a clear conclusion should be given for each interest*

*vi) give Yes/No conclusion for each interest.*

*- **If yes**, **or** in cases of **doubt**, continue to stage 4.*

*- **If** potential significant effects can easily be avoided, record modifications required below.*

*- **If no** for **all** features, a consent or non-objection response can be given and recorded below (although if there are other features of national interest only, the effect on these should be considered separately). There is no need to then proceed to stage 4.*

The plan will have a positive effect on blanket bog/mire habitat, which will be increased by 41.0 ha.

The plan does have an impact non dry/wet heath features, but this was originally factored in to the 2004 assessment that supported the SFA/BP planting proposal. At this level (41.0 ha), the impact is considered not to be significant.

The area for the compensatory regeneration woodland is situated above the existing native woodland on the slopes above the Kinloch Lodge Hotel. Recent surveys have indicated low densities of willow, rowan and birch. The pace of change is expected to be gradual, so that over the next 20 years the woodland structure will be open and scrubby, rather than high forest with a closed canopy. Regeneration of non-native species, such as Sitka spruce will be removed during maintenance operations.

With the increasing threats of tree diseases, such as to ash from Chalara (Hymenoscyphus fraxinea), the expansion of the woodland feature is of additional importance to this SAC feature.

Otters. This project will not have a significant impact on otters. Their main habitat zone is the coastal boundary of this SAC. Otters will use the water courses and inland wet land areas for hunting and holt locations, but the increased presence of natural woodland is unlikely to deter use.

**Mitigation or modifications required to avoid a likely significant effect & reasons for these:**

| | |
|---|---|
| *Mitigation: Monitoring.* | *Reason: To observe and report on habitat change.* |

**STAGE 4: UNDERTAKE AN APPROPRIATE ASSESSMENT OF THE IMPLICATIONS FOR THE SITE IN VIEW OF ITS CONSERVATION OBJECTIVES**

(It is the responsibility of the competent authority to carry out the appropriate assessment. The competent authority must consult SNH for the purposes of carrying out the appropriate assessment. SNH can provide advice on what issues should be considered in the appropriate assessment, what information is required to carry out the assessment, in some circumstances carry out an appraisal to inform an appropriate assessment and/or provide comments on an assessment carried out. Where we are providing advice to a competent authority our appraisal of the proposal should be recorded here.)

*The following points should be considered:*
*i) Describe for each qualifying interest the potential impacts of the proposal detailing which aspects or effects of the proposal could impact upon them and their conservation objectives.*
*ii) Evaluate the potential impacts, e.g. whether short/long term, reversible or irreversible, and in relation to the proportion/importance of the interest affected, and the overall effect on the site's conservation objectives. This should be in sufficient detail to ensure all impacts have been considered and sufficiently appraised. Record if additional survey information or specialist advice has been obtained.*
*iii) Each conservation objective should be considered and a decision reached as to whether the proposal will affect achievement of this objective i.e. whether the conservation objective will still be met if the proposal is consented to.*

| |
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| |

**STAGE 5: CAN IT BE ASCERTAINED THAT THE PROPOSAL WILL NOT ADVERSELY AFFECT THE INTEGRITY OF THE SITE?**
*In the light of the appraisal, ascertain whether the proposal will not adversely affect the integrity of the site for the qualifying interests. Conclusions should be reached beyond reasonable scientific doubt. If more than one SAC and/or SPA is involved, give separate conclusions. If mitigation or modifications are required, detail these below.*

| |
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| |

**Mitigation or modifications required to ensure adverse effects are avoided, & reasons for these**.

| *Mitigation:* | *Reason:* |
|---|---|
| | |

## ADVICE SOUGHT

*Include here details of or clear reference to, advice sought from PAD staff, Natura team, Ops staff, Area colleagues etc. If no advice sought, give brief reasons/justification*.

| |
|---|
| |

## CONCLUSION/ADVICE IN RELATION TO PLAN OR PROJECT

**When SNH is the competent authority**
*In view of the appraisal above outline below whether the plan or project can be consented/approved/undertaken.*

| |
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| |

**When SNH is advising the competent authority**
*In view of the appraisal above outline below the corresponding Natura model response position that will be used when advising the competent authority. Also include the response type from the Development Management and the Natural Heritage guidance as appropriate (see Development Management and the Natural Heritage, Annex 2, Table 1 and guidance in Annex 3 of the Natura Casework Guidance)*

Natura model response position:

| |
|---|
| Enter the response from the appropriate model response type |

Development management response type:

| |
|---|
| Enter the response type from the Development Management and the Natural Heritage guidance as appropriate |

| | |
|---|---|
| **Appraised by** | |
| **Date** | |
| **Checked by** | It is recommended that the proforma is checked by an appropriate member of staff e.g. the relevant Operations Manager, particularly when cases are complex or contentious, or where the appraiser is relatively inexperienced. |
| **Date** | |

Forestry Commission Scotland
Coimisean na Coilltearachd Alba

# Environmental Impact Assessment
# Screening Opinion Request Form

Please complete this form to find out if you need consent from Forestry Commission Scotland, under the **Forestry (Environmental Impact Assessment) (Scotland) Regulations 2017**, to carry out your proposed forestry project. Please refer to Schedule 2 Selection Criteria for Screening Forestry Projects under Applying for an opinion. If you are not sure about what information to include on this form please contact your local Conservancy office.

## Proposed Work

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

| Proposed Work | select | Area in hectares | % Conifer | % Broad-leaves | Proposed work | select | Area in hectares |
|---|---|---|---|---|---|---|---|
| Afforestation | ☒ | 41 | | 100 | Forest roads | ☒ | 2.5 |
| Deforestation | ☒ | 56 | 100 | | Forest quarry | ☒ | 2 |
| Location of work | | NG380240, please see attached maps | | | | | |

## Description of Forestry Project and Location

Provide details of the forestry project (size, design, use of natural resources such as soil, and the cumulative effect if relevant).

Please attach map(s) showing the boundary of the proposed work and other known details.

250ha of afforestation has already been approved as part of the Scottish Forstry Alliance project in 1998.

There is 11ha of deforestation adjacent to the SAC that is not being restocked for landscape reasons to remove straight edges from the landscape. There is also 45ha of forest that will not be restocked to be restored to peatland. This area is where peat depth is greater than 50cm and the soil and site type would not allow Sitka spruce to grow at Yield class 8 or above, Map 17a of the LMP shows the areas where peatland will be restored however only the north section is within the plan period and therefore part of this EIA scoping.

A new forest road will be built in order to access timber in the Kinloch farm area of the forest. This is an extention of the existing spur road, assuming a road width of 25m the total area affected is 2.5ha. This is not within the designated SAC.

In Broadford block coupe 16131 will be felled in 2021. The most northern part of this will not be restocked to allow expansion of the existing quarry at NG628258. This is to access roadstone to upgrade the forest road and allow coupe 16131 to be harvested and the timber be extracted.

There will also be expansion of the existing quarry at NG729254 (Kyle Farm area)to provide roadstone to upgrade the road to access coupe 14051 to be harvested and timber hauled from the coupe.

The afforestation is a single coupe above Kinloch Hotel (NG711160) where it is expected that natural regeneration of native broadleaves will colonise this area. This is 41ha and we will monitor this during the plan period.

| Provide details on the existing land use and the environmental sensitivity of the area that is likely to be affected by the forestry project. |
|---|
| The SSSI and SAC is mostly open with some areas of native woodland however one of the qualifying fetaures is native woodland.<br>The area to be deforested for landscape reasons is currently marginal ground for productive forestry, it is adjacent to the SSSI/SAC.<br><br>The peatland restoration area is mostly a mixture of poor quality Lodgepole pine and Sitka spruce with areas of oen ground within it. It is not part of the SAC/SSSI.<br><br>The proposed new forest road runs through productive conifer crop of Sitka spruce and larch, it is not part of the SAC/SSSI.<br><br>The area of afforestation mentioned above (41ha) is within the SAC/SSSI and SNH have been consulted on this. |

| Description of Likely Significant Effects |
|---|
| Provide details on any likely significant effects that the project will have on the environment (resulting from the project itself or the use of natural resources) and the extent of the information available to assist you with this assessment. |
| Afforestation of the SAC/SSSI will enhance the condition of the designated site as one of the qualifying features is native woodland. Please see the Habitat Regulations Appraisal in Appendix 19 that details this.<br><br>The area to be deforested for landscape reasons will improve the upper treeline margin, being more sympathetic to the landscape and reflecting the scale and shape of the landscape. It will also create more open habitat adjacent to the SAC which will increase the size of the open habitat area.<br><br>The peatland restoration areas will replace poor growing conifers with peatland that has more ecological and biodiversity value. The laying down of sphagnum and other vegetation on this site will store more carbon than replanting with conifer or broadleaf trees.<br><br>The new road line will remove 2.5ha of productive conifer ground. It will also be visible from the main road. |

| Include details of any consultees or stakeholders that you have contacted in order to make this assessment. Please include any relevant correspondence you have received from them. |
|---|
| The plan brief and maps have been sent to SEPA, SNH, Scottish Water, SSE, RSPB- see the appendix 5 showing complete consultation record. |

## Mitigation of Likely Significant Effects

If you believe there are likely significant effects that the project will have on the environment, provide information on the opportunities you have taken to mitigate these effects.

The afforestation of the SAC/SSSI is reducing the open habitat component of the deisgnated area, however it is only a very small proportion of the overall area of the SAC/SSSI.

The deforestation for landscape and peatland restoration will enhance the environment.

The new forest road will be visible from the A851however it is low down in the valley and follows an existing track/ ride so will make minimal impact on the landscape.

The larch around the Broadford quarry expansion (NG628258) will be felled to remove the risk of Phytophthora infection in the future, however this will be planted with fast growing productive conifers which will mask the quarry expansion over time.

The quarry expansion in Kyle Farm (NG729254) is in a very flat area and is not very visible from many places. There is peatland restoration to the north of it and sitka spruce and Scots pine to the south that we planted in 2014 which will help mask the quarry to the south.

## Sensitive Areas

Please indicate if any of the proposed forestry project is within a sensitive area. Choose the sensitive area from the drop down below and give the area of the proposal within it.

| Sensitive Area | Area |
|---|---|
| Sites of Special Scientific Interest (SSSI) | 41ha |
| Special Area of Conservation (SAC) | 41ha |
| Select... | |
| Select... | |
| Select... | |

## Property Details

| | | | |
|---|---|---|---|
| Property Name: | Kinloch Hills and Broadford | | |
| Business Reference Number: | n/a | Main Location Code: | n/a |
| Grid Reference: (e.g. NH 234 567) | NG748203 | Nearest town or locality: | Broadford |
| Local Authority: | | The Highland Council | |

| Owner's Details | | | | | |
|---|---|---|---|---|---|
| Title: | Mr | Forename: | Ben | | |
| Surname: | Griffin | | | | |
| Organisation: | Forest Enterprise Scotland | | Position: | Planning Forester | |
| Primary Contact Number: | 03000676017 | | Alternative Contact Number: | 07774926051 | |
| Email: | ben.griffin@forestry.gsi.gov.uk | | | | |
| Address: | Tower Road, Smithton, Inverness | | | | |
| | | | | | |
| Postcode: | IV2 7NL | | Country: | Scotland | |
| Is this the correspondence address? | | | Yes | | |

| Agent's Details | | | | | |
|---|---|---|---|---|---|
| Title: | | Forename: | | | |
| Surname: | | | | | |
| Organisation: | | | Position: | | |
| Primary Contact Number: | | | Alternative Contact Number: | | |
| Email: | | | | | |
| Address: | | | | | |
| | | | | | |
| Postcode: | | | Country: | | |
| Is this the correspondence address? | | | Select... | | |

| Office Use Only | |
|---|---|
| GLS Ref number: | |