

Ardtornish Estate Woodlands

Long-term Forest Plan

2019 - 2038

Please refer to the Long Term Forest Plans (LTFP) Applicant's Guidance for more information on what should be included in this template. As a guide, your LTFP should be 15-20 pages long.

Please insert further tables and charts as required. Append maps, ensuring that they are clearly labelled.

A. Description of Woodlands

A.1 Property Details			
Property Name:	Ardtornish Estate		
Business Reference Number:	114582	Main Location Code:	68/139/0005
Grid Reference: (e.g. NH 234 567)	NM704 473	Nearest town or locality:	Lochaline
Local Authority:	Highland		
LTFP Plan area (hectares):	1440 hectares		
Owner's Details			
Title:	Mr	Forename:	Hugh
Surname:	Raven		
Organisation:	Firm of Ardtornish Farms	Position:	Director
Primary Contact Number:	019767421288	Alternative Contact Number:	
Email:			
Address:	Ardtornish Estate Office, Morvern, By Oban, Argyll		
Postcode:	PA80 5UZ	Country:	Scotland
Agent's Details			
Title:	Mr	Forename:	Miller
Surname:	Harris		
Organisation:	Kirn Ltd	Position:	Director
Primary Contact Number:	01397702244	Alternative Contact Number:	07917126053
Email:	miller.harris@btconnect.com		
Address:	Kirn Ltd, 1 Galloway Place, Fort William		
Postcode:	PH33 6UH	Country:	Scotland

A.2 Location and Background

Provide details on the wider context of the LTFP area. Append a 1:25,000 or 1:50,000 map with contours and the grid reference of the main forest entrance. The map should show the estate boundary based on the Business Reference Number (BRN) and the woodland boundary, if different.

The estate extends to some 14,250 hectares/35,200 acres and is run as a mixed Highland Estate with farming, forestry, sporting, renewable energy and holiday letting enterprises. The woodlands include mature policy woodlands, native broadleaf woodlands and new native woodlands. The woodland include important designated sites and the Policy woodlands are designated as a Designed landscape. The estate has been owned by the Raven family since 1930.

Ardtornish Estate lies at the southern end of the Morvern Peninsula in Lochaber. There are several designated sites present including Lochaline SSSI; Morvern Woods SAC; Garbh Shlios SSSI; Beinn Ladain and Beinn na h-Uamha SSSI and SAC; Ardtornish Gardens Designed Landscape, with other areas of semi-natural woodlands. The estate has an important sporting enterprise with an annual cull of 45 stags and 90 hinds plus calves. The proposal is to introduce a range of management prescriptions across the estate, to better integrate the conservation interests with the land use objectives to improve overall estate viability.

The Long-Term Forest Plan is part of a suite of measures to improve the woodland structure and wildlife habitat. The estate has already started this process through new woodland establishment which started through several Woodland Grant Schemes and Scottish Forestry Grant Schemes, which have expanded the native woodland areas through planting and natural regeneration. An application under the current Forestry Grant Scheme has been made with the objective of bringing the East Lochaline Woodlands, which is a SSSI and SAC designated site, back towards favourable condition.

A.3 Existing Schemes & Permissions

Provide details on any existing forestry permissions, grants, EIA approvals, previous plans, or cases in progress.

Type (e.g. Felling Licence)	Ref. No.	Details
FGS Contract	17FGS19757	Ardtornish Woodland Creation
Felling Licence	FLA 02164	Selective Felling Torr Molach
FGS - WIG Contract	16FGS13937	East Lochaline WIG New Deer Fence
FGS -SMF Contract	16FGS13789	East Lochaline SMF
SFGS Contract	030901339	Andrew's Wood Woodland Creation
SFGS Contract	030900444	Inninmore Woodland Creation
WGS Contract	030003052	Gleann Geall 3 (Uladail) Woodland Creation
WGS Contract	030002068	Gleann Geall Compt 2 Woodland Creation
WGS Contract	030000883	Gleann Geall (Uladail Tom na Dubh) Woodland Creation

A.4 Stakeholder Engagement

Include a summary of the main points from Scoping and where they are addressed in the plan. Append pre- and post- scoping maps, and the full Scoping Report.

Scoping – Main Points	LTFP Reference (section/page):
Designated Sites in unfavourable condition declining	C1; C2.1; C2.3; C2.4; C2.5; C2.6; C2.7; C2.11; c2.12; C2.13 & C2.15
Protected Species	C1; C2.1; C2.3; C2.4; C2.5 C2.7; C2.11 & C2.13
Deer Fencing	C1; C2.5; C2.7 & C2.11
Raptors	C1; C2.1; C2.3; C2.4; C2.6; C2.7 and C2.11
Wading Birds	C1; C2.1; C2.3; C2.4; C2.6; C2.7 and C2.11
Archaeology and Historic Environment	C1: C2.1; C2.3; C2.9; & C2.10
Deer Management	C1; C2.3; C2.5; C2.6; C2.7 & C2.11
Community Interests	C1; C2.1; C2.3; C2.4; C2.5; C2.6; C2.7; C2.11; c2.12; C2.13 & C2.15

A.5 Long Term Vision and Management Objectives

Tell us how you intend to manage the forest in the long term and your goals for its development.

Vision

Describe your long term vision for the LTFP area.

The Ardtornish Estate's vision is to bring all the designated woodlands on the estate towards favourable condition while maintaining other objectives including employment and landscape, which provide important socio-economic benefits to this remote and fragile area of Scotland. The long-term vision for these woodlands is to create a diverse age range of native species consistent with the priority woodland habitat types through: -

- Management and control of browsing and grazing
- Enrichment planting where necessary
- The limitation and elimination of non-native species.
- Ongoing monitoring of regeneration and woodlands.
- Management of woodlands using low impact silvicultural systems

Management Objectives

Give your objectives of management and also how you will manage the forest area sustainably. Your objectives should be specific and you should also be able to measure their outcomes.

No.	Objectives (including environmental, economic and social considerations)	Indicator of objective being met
1	To enhance and expand the existing woodland cover within and outwith the SSSI/SAC through a combination of approaches, combining both short-term and long-term measures	Designated woodland moving towards favourable condition through reduction in and removal of threats. Non-designated woodlands are expanding and woodland structure is improving through combination of species and age diversification.
2	To reduce browsing pressure to enable existing and new seedling establishment and subsequent increase in age class structure	Natural regeneration occurring and seedling/sapling performance through HIA show that woodland structure is improving in respect of age and species diversification
3	To manage the designated woodlands in a way which will bring them towards favourable condition	Site condition monitoring demonstrating that woodlands are moving towards favourable condition through reduction in and removal of threats.
4	Increase the percentage cover of Upland oak woods and Upland mixed ash woods through natural regeneration, enrichment planting and bracken control	Natural regeneration occurring and seedling/sapling performance through HIA show that woodland structure is improving in respect of age and species diversification.
5	To maintain and enhance the provision of public access on the estate for the enjoyment of the woodlands.	Regular inspections of footpaths and maintenance maintaining access
6	Protect sites of archaeological importance existing within the woodland.	Inspection and monitoring of sites and proactive management where threats identified
7	To integrate management of the woodland into the economic and social operation of the wider estate, creating local employment where possible.	Resources being made available to local businesses on competitive basis. Retaining local employment on estate and with use of estate resources.

A.6 General Site Description

Provide details under each of the headings below. Append maps if appropriate for each subsection.

A.6.1 Topography

The northern half of the estate is situated on a sizeable outcrop of granite creating a varied terrain of broken ridges running down steeply to the rocky indented coastline of Loch Linnhe on west to broad open gently sloping strath of Gleann Geall. To the south, the change in geology to basalt creates the distinctive stepped basalt landscape, with a series of wide flat terraces dropping down to the coast and generally terminating in steep exposed basalt rock faces and steep slopes leading down to the coast

A.6.2 Geology and Soils

In the northern half of the estate the underlying geology is quartz-feldspar granulite of the Moine complex, which gives rise to poor nutrient status more generally, which can require nutrient inputs for tree establishment. On the southern half of the Estate the underlying geology is extrusive volcanic rock consisting of mafic lava, tuff and basaltic rocks. This gives rise to base rich soils of higher fertility which results in much richer woodland structure. Soils, including peaty gleys, iron pans and peats are more prevalent to the north, and on the steeper slopes associated with the basalt geology to south which are more brown earths and podsols.

A.6.3 Climate

The climate of Morvern is temperate and oceanic and tends to be changeable. Mean temperature is around 10°C, ranging from 3/4°C in winter to around 15°C in summer. Mean rainfall is around 2000mm. There are very few days with snowfall or frost due to the oceanic influence prevalent on the West Coast of Scotland.

A.6.4 Hydrology

The river systems on the estate drain north to south terminating in Loch Aline. The main river systems are the Allt Beithach and the Black Water which both rise at the extreme north end of the estate, flowing through Gleann Geall into Loch Arienas/River Aline and then out to Loch Aline at Kinlochaline. There are numerous feeder streams and burns. The Rannoch River rises in Loch Tearnait and flows generally east to west, terminating in Loch Aline at Achrannich. All the rivers are relatively short spate rivers. The estate has harnessed several of the rivers for hydro power in the last 10 years

A.6.5 Windthrow

Not relevant other than around the Designed Landscape where loss of specimen trees and woodland cover would impact on the structure of the woodland cover within the designated area.

A.6.6 Adjacent Land Use

The Forest Enterprise (FES) is a major landowner in Morvern, with the main objective of commercial forest management. Other neighbours are traditional Highland Estates with sporting as their prime objective along with forestry and to a lesser extent upland stock farming. A few others are managing for conservation purpose. Ardtornish is a mixed Highland Estate with a mix of businesses including conservation, hill farming, sporting, forestry and renewable energy all taking place on land adjacent to the LTFP area.

The land adjacent to East Lochaline and Inninmore is managed under Organic status which will preclude use of herbicides for the control of non-native species and bracken.

There is a working sand quarry at the southern end of Lochaline West woods.

A.6.7 Access

The A884 runs north-south through the heart of the estate, with access to the woodlands either via smaller public roads or internal estate roads and tracks. Some of the woodlands are very remote with long access by footpaths.

Members of the public following the Scottish Outdoor Access Code have the right of responsible access across all these sites and there are access gates in various locations within existing boundary fences. Any proposed new fences will have several deer gates and self-closing pedestrian gates to allow access to and from the enclosure at various points around the perimeter.

The estate promotes many guided walking routes around the estate and the Scottish Wildlife Trust promote a route from their car park at Glen Dubh. There is a well-established walking route through the entire length of Inninmore to the bothy. This path needs repair and upgrade at burn crossings. There is access from the village of Lochaline along the western shore of Loch Aline which leads to Ardtornish gardens and beyond. There is a footpath from Achranich through to Eгнаig at Garbh Shlios on the shores of Loch Linnhe.

A.6.8 Historic environment

The estate has a rich historic environment which has played a key part in the history of Scotland. Old Ardtornish was in the possession of Somerled, the Lord of The Isles in the 12th Century. There are many historic remnants from pre-clearance days when the population of the peninsula was about 2500. Some of the residents from St Kilda were relocated to Morvern in 1930. The estate has extensive archaeological interests, many of which have been surveyed and recorded as part of previous woodland management and renewable projects. There is potential for further features to be found and recorded.

A.6.9 Biodiversity

Flora

North and South Uladail are covered by the Morvern Special Area of Conservation (SAC) but are not designated as SSSIs. Morvern Woods SAC is designated for the Annex I habitat types Mixed woodland on base rich soils associated with rocky slopes and Western acidic oak

woodland. Glen Dhu also falls within the Morvern Woods SAC and the part of the site (land to the west of the track) is designated within the Beinn Ladain and Beinn na h-Uamha SSSI. Tor Molach and Glac Mor are not designated sites. East Lochaline is designated under the Loch Aline SSSI and falls within the Morvern SAC. Inninmore Woods is designated under the Inninmore Bay SSSI and falls within the Morvern Woods SAC and Garbh Shlios is designated under the Garbh Shlios SSSI and falls within the Morvern SAC.

Deigned Landscape

The Gardens surrounding Ardtornish House are designated as Designed Landscape and Gardens. Many of the woodlands are assessed as being Ancient Woodlands

Raptors

The estate and the Morvern Peninsula have a large population of nesting eagles, both Golden and White-Tailed Sea Eagles. Ospreys and peregrine falcon have also been recorded.

Deer

Red deer are endemic to the area and are considered both an asset and a threat to woodland and other biodiversity interests. Deer densities are too high to achieve native and designated woodland management objectives without fencing. The scale of the Estate, neighbouring estate objectives and deer migration will make deer density reductions, to a level where deer fencing could be removed, will be difficult to achieve. Heavy culling will also impact on neighbouring landowners sporting objectives.

A.6.10 Invasive Species

All sites

The estate will encourage best practice in respect of bio-security by educating estate staff and visitors to follow current guidance to reduce the risk of pathogens including *Phytophthora ramorum* and Chalara dieback of ash.

Bracken coverage is extensive on most sites where the tree canopy has fragmented and there is open ground. Bracken is a significant constraint on woodland expansion and regeneration.

1 – North Uladail

No non-natives recorded

2 – Torr Mor (South Uladail)

No non-natives recorded

3 – Glen Dhu

Mature beech present

4 - Tor Molach

Rhododendron present in small numbers in seedling and small bush form at southern end of woodland along with cotoneaster

5 – Glac Mor

No non-natives recorded

6 – East Lochaline

Cotoneaster is present occasionally throughout the wood. Mature beech is present in an isolated, very small stand at the southern end of woodland.

7 – Inninmore

Mature beech, Scots pine and larch present to east of Inninbeg. Cotoneaster is present on the cliffs above the woodland area.

8 – Garbh Shlios

Mature beech is present in very small numbers (3) and silver fir (2)

9 – Andrews Wood

Beech, sycamore and conifers are present along fringe of the plantations. No rhododendron recorded

10 - West Lochaline

Non-native trees present, including Larch and Douglas fir as well as invasive species of Rhododendron and Cotoneaster.

11- Garden and Achrannich Woods

Policy and garden woods associated with the main house and buildings. Mixture of native, exotic and specimen broadleaf and conifer trees and shrubs. Cultivars of rhododendron present and some rhododendron and potential for spread from adjacent land.

12- Rannoch

No rhododendron or non-native species recorded. Potential of spread from adjacent land

11. -Outlying Woods

No non-native invasive species recorded but potential for seed from neighbouring seed sources. Some of the woodland contain exotic conifer species.

A.7 Woodland Description

Provide a brief description of woodland types and any relevant past management. Also complete the Tables below, with reference to Appendix 2 of the Long Term Forest Plan – Applicant’s Guidance.

1 – North Uladail (Plan 3a)

Summary

The wooded area at North Uladail is part of a larger Morvern Woods SAC but is not designated as a SSSI. The site is a matrix of Upland oak woodland, blanket bog and wet heath. The woodland area is ancient semi-natural woodland, predominantly NVC habitat type W11 *Quercus petraea* - *Betula pubescens* - *Oxalis acetosella* woodland with Oak canopy but with a very small patch of W9 *Fraxinus excelsior* - *Sorbus aucuparia* - *Mercurialis perennis* woodland (Upland Mixed Ashwood) on richer soil. There is bracken in open areas (e.g. power line wayleave), and although extensive throughout (>90% in open areas), it is not too dense and has ground flora below. The north section of the two wooded areas is deer fenced and the southern section (adjacent to the road) is stock fenced and has seasonal cattle grazing within it.

Stand Structure

The stand is mainly even-aged oak woodland with little or no understorey. In the wooded areas the canopy cover is over 90% but the age structure is poor, with mature or post mature trees (some senescent) and some seedlings but these are not thriving.

Regeneration

There is evidence of seedling regeneration of the major species i.e. oak, rowan, birch, hazel and ash; however, this is heavily browsed and not getting away to form larger seedlings, saplings and young trees.

Herbivore impact

All the regeneration present shows signs of heavy browsing and high herbivore impacts, mainly from deer but also domestic stock (cattle). This has been preventing successful regeneration to sapling and pole stage trees.

Species Composition

The species composition is primarily oak, with birch also present and rowan less frequent.

Threats and Damage

The key threat to the woodland is the impact of herbivore browsing pressure (deer and domestic stock) and the resulting lack of a diverse age structure.

2 – Torr Mor (South Uladail) (Plan 3a)

Summary

South Uladail is part of a larger Morvern Woods SAC but is not designated as a SSSI. The site is a matrix of three major wooded areas with intervening habitats of wet heath and blanket bog. There is a former native woodland planting scheme in the southwest of the site. The three wooded areas are: - woodland flanking the south of the river, the northern slopes of Tom na Dubh and Doire Buidhe in the east of the site. The woodland here is predominantly composed of Upland Oak woodland, mainly W11 *Quercus petraea* - *Betula pubescens* - *Oxalis acetosella*, although there are small areas of W17 *Quercus petraea* – *Betula pubescens* – *Dicranum majus*. On richer and wetter soils there are small patches of W9 and W7, but these are rare. Bracken occurs in open areas within the woodland and although extensive in these areas, it has not formed a deep litter layer. As a result, woodland ground flora and some regeneration is surviving beneath the bracken.

Stand Structure

The stand structure in all three woodland areas is mature and post mature trees (mainly oak). There are some highly degraded woodland areas of senescent oak. There is a patchy understorey consisting of pulses of birch regeneration at pole stage and, particularly in Doire Buidhe, some hazel at sapling stage.

Regeneration

There is good regeneration of the key species (oak, rowan, birch, hazel) throughout. The seedlings are most frequently young/new seedlings in the field layer that have not been browsed. There is frequent rowan regeneration at young sapling stage (1m high) but all of this has been subject to recent browsing and now these are dead stems; however most have some regrowth at the base. There are pulses of poles stage birch regeneration that forms thickets, but this is patchy and not consistent throughout.

Herbivore impact

All the areas of woodland have Very High/High herbivore impact levels as evidenced by impacts on indicators (using HIA). The herbivore impacts are the result of seasonal cattle grazing and the presence of deer within the enclosure.

Species Composition

All the key tree species for the main habitat type (W11) were present, with oak dominant, birch frequent, rowan and hazel occasional and holly and bird cherry rare. Ash and alder were present in the rarer patches of W9 and W7 woodland. Trees in the planted area include

Scots pine, birch and rowan.

Threats and Damage

The key threat to the three areas of mature woodland is the impact of high browsing pressure due to presence of seasonal cattle grazing and the existence of deer within the enclosure.

3 – Glen Dhu (Plan 3a)

Summary

This site covers 5ha on the eastern flank of the Black Water river and includes gentle sloping ground as well as steep-sided gorge woodland. The site is predominantly Upland Oak woodland (W11 *Quercus petraea* - *Betula pubescens* - *Oxalis acetosella*) with Upland Mixed Ash woodland (W9 *Fraxinus excelsior* – *Sorbus aucuparia* – *Mercurialis perennis*) in inaccessible areas of the gorge. There are some areas of bracken on the slopes above woodland and Molinia dominated patches of wet heath and flushes (seepage from adjacent moorland down to the river). The site is unfenced at both ends where the track passes through and is also unfenced along the river. There is a stock fence to the North Uladail site running along the eastern boundary (to the E and SE of track).

Note: The western side of the river is included in the Rahoy Hills Nature Reserve managed by SWT and is ***not*** included in this site or this Long-Term Forest Plan.

Stand Structure

The site comprises mainly even-aged oak with little or no understorey. There are some younger trees (birch) but these are occasional. The inaccessible gorge has a greater species diversity and more diverse age structure (saplings, young trees and mature trees) being unaffected by browsing pressure. In the northern section of the site there is greater diversity of tree species including some ash and occasional elm. There is an understorey present in this area with seedlings and saplings of hazel, birch and rowan surviving.

Regeneration

Oak, rowan, birch seedlings are present in the W11 areas on the gentler slopes, however, these are subject to heavy browsing pressure, unless they are current year seedlings in the field layer. In the gorge (W9 woodland) area hazel, ash, rowan, willow, birch and oak regeneration is succeeding.

Herbivore impact

The herbivore impact on the gentle slopes adjacent to the track is Very High/High and as a result there is little or no understorey. This situation is slightly improved in the northern part of the site (north of Waypoint 55) where the pressure appears to be less, and an understorey of regeneration is present. In the gorge the inaccessible nature of the terrain has prevented browsing impacts and, as a result, there is a greater diversity of both species and age class.

Species Composition

Oak, birch and rowan are present in the W11 area of woodland with birch and oak abundant and rowan frequent. Hazel and willow are present in the northern section but less so in the woodland to the south, which is mainly oak with birch. In the W9 woodland area in the gorge oak, rowan and birch are abundant with ash and elm frequent, and holly, willow and alder occasional.

Threats and Damage

The key threat to the area of woodland on the gently sloping ground adjacent to the track

woodland is the impact of high browsing pressure. The gorge woodland is inaccessible for browsing animals and is not under threat.

4 - Tor Molach (Plan 3b)

Summary

Torr Molach woodland is the area that surrounds the hills of Tor Molach and Tom na Corr to the north of Ardtornish House. The small patch of isolated woodland (Grid Ref NM709482) to the northeast is included within this site. The woodlands are all unfenced and open to the hill ground. The southern part of the woodland flanks the main house and gardens and adjoins the garden fence. Most of the site is Upland Oak woodland with predominantly W11 *Quercus petraea* - *Betula pubescens* - *Oxalis acetosella* woodland community with some W17 *Quercus petraea* – *Betula pubescens* – *Dicranum majus* woodland on poorer soils - mainly in the northeast of the site. A small patch of W9 *Fraxinus excelsior* – *Sorbus aucuparia* – *Mercurialis perennis* woodland exists on a base-rich rocky outcrop. The woodland area to the south which flanks the track and garden is mixed woodland with planted beech and conifer species of larch, spruce and pine alongside oak, birch, rowan and some hazel. In this area there is scattered Rhododendron – small bushes and seedlings but at a low density.

Stand Structure

The stand structure in the mixed woodland is high forest with little or no understorey. The oak here is mainly even-aged with poor regeneration and there are areas of senescent oak. The native woodland in the northeast of the site is open canopy/post mature. Bracken is extensive in these open canopy areas but not dense and there is oak and hazel regeneration beneath the bracken.

Regeneration

Frequent and sometime abundant new oak seedlings were seen in field layer (unbrowsed) but large older seedlings were heavily browsed, and saplings were rare. Hazel and oak regeneration is present under the bracken but not surviving to large seedling or sapling stage.

Herbivore impact

The herbivore impact on this site is High as evidenced by impacts on indicators (using HIA) and the lack of understorey and absence of older seedlings and saplings. Deer signs in the woods include frequently used deer tracks heading down from hill through woodlands towards the track and a deer track linking both areas of woodland either side of a wetland area. There was also evidence of cattle grazing on *Molinia* within the woodland.

Species Composition

The species composition in mixed woodland in the southwest of the site consists of oak and birch woodland with planted species of beech, larch, spruce and pine. Holly and hazel occur less frequently throughout. There is a small patch of W9 woodland with elm, ash, oak, birch and rowan and a small area of W17 on poorer soils

Threats and Damage

The key threat to this woodland is the lack of a diverse age structure and poor regeneration caused by presence of browsing by deer and cattle grazing. There is a risk of spread from the rhododendron at southern end of woodland and there are also rare plants of cotoneaster in this area.

5 – Glac Mor (Plan 3b)

Summary

This site is woodland on west-facing, steeply sloping ground above an area of wetland and either side of the Allt Dubh Dhoire and its tributaries. The woodland is mainly W11 *Quercus petraea* - *Betula pubescens* - *Oxalis acetosella* woodland with small areas of W7 *Alnus glutinosa* – *Fraxinus excelsior* – *Lysimachia nemorum* adjacent to the watercourses. The woodland is predominantly birch with some oak and frequent hazel. The structure is open, with extensive bracken dominating the open areas, with *Molinia* where the ground is wetter.

Stand Structure

The woodland is mainly open structure with mature birch and shrubby hazel. Oak is less frequent and senescent trees occur in the more open areas. The stand structure is more diverse adjacent to the watercourse, but most of the woodland is open canopy and post mature, with extensive coverage of bracken.

Regeneration

Regeneration of rowan, birch, alder and hazel is present, though heavily browsed. Birch regeneration is occurring on the wet heath areas adjacent to the woodland.

Herbivore impact

The current herbivore impact on this site is High, with signs of browsing on all seedlings unless new and in the field layer. The open structure and extensive bracken coverage suggest high historical browsing impacts and a resulting decline in woodland cover.

Species Composition

The woodland is predominantly birch with oak, rowan with shrubby hazel. Areas adjacent to the watercourse have alder and more rarely, ash and hawthorn.

Threats and Damage

The key threat to this site is the declining woodland cover due to the historical and present impacts of browsing and the expansion of bracken into open woodland ground.

6 – East Lochaline (Plan 3c)

Summary

This woodland is situated on the eastern shore of Loch Aline, is designated under the Loch Aline SSSI and is part of the Morvern woods SAC. The site consists largely of steep wooded slopes on predominantly base-rich soils. Approximately 70% of the woodland is dominated by Upland mixed ash woods BAP Priority Habitat (W9 *Fraxinus excelsior* – *Sorbus aucuparia* – *Mercurialis perennis* and W7c *Alnus glutinosa* – *Fraxinus excelsior* – *Lysimachia nemorum*), with the remainder dominated by W17 and W11 Upland oakwood. Other native woodland habitats recorded on the site include W1, W2 and W4 Wet woodland, W22 Blackthorn scrub and W21 Hawthorn scrub. Most of this is in the mature life class.

The woodland interest is described in the SSSI citation as follows:

*The Loch Aline SSSI woodlands have developed on predominantly base-rich soils where they represent upland mixed ash woodland and are dominated by ash, with wych elm, hazel, bird cherry, holly and rowan, except in the wetter areas towards the base of the slopes where alder dominates and on the plateau above the slopes where the soil conditions are more acidic and oak *Quercus* spp. and birch *Betula* spp. become more prominent. The woodland ground flora is very rich and is composed primarily of grasses, herbs and ferns, together with a diverse range of woodland calcicoles. Amongst the grasses are wood millet, wood melick,*

mountain melick, and wood false brome. The herbs include sanicle, wild garlic, dog's mercury, and enchanter's nightshade. The epiphytic lichen flora of the ash wood contains species of restricted distribution in the UK. In the steep rocky stream gorges, wych elm is the dominant tree and ferns such as the soft and hard shield ferns, hart's tongue and Wilson's filmy fern are found. At the top of the slope, cliff ledges allow species intolerant of grazing to survive, including the common and serrated wintergreens.

The Loch Aline woodlands are some of the best woods in Lochaber for calcicole bryophytes and good assemblages of Atlantic bryophyte species are found in the humid conditions provided by the steep rocky gorges. The bryophyte flora includes seven Nationally Scarce species, for example *Ulota calvescens*, *Calypogeia suecica* and *Radula aquilegia*, and nine that are considered strictly Atlantic. There are also several sub-Atlantic and western British bryophytes present.

The W9 Upland ash woodland in the north of the site, the area of W7 Upland ash/alder woodland lies along the slower slopes adjacent to the road and the area of W11/17 Upland Oakwood is to the south of the net station.

Stand Structure

W9 Upland Ash Woodland

Ash, rowan, hazel and willow were observed in multiple age classes and birch and oak in 2-4 age classes. The other species were observed at single age* (mainly canopy trees). Approximately 80% is under canopy cover and there is fallen deadwood throughout the compartment.

W7 Upland ash/alder woodland

Ash, birch, oak, hazel, willow and alder were observed in 2-4 age classes and rowan, elm and bird cherry in single age*. Approximately 70% is under canopy cover with open areas colonised by bracken. Fallen deadwood is present throughout the compartment.

W11/17 Upland Oakwood

Oak was only seen as mature tree whereas birch, rowan and hazel were observed as mature tree and seedling stage (however some seedlings were in the field layer). This compartment is open woodland with only 30-40% canopy cover. The remaining areas are dominated by bracken on drier ground and wet heath on saturated soils and flushes. The bracken has remnant woodland ground flora beneath the bracken cover.

** Note that, as this survey was a walk through, this observation is limited to the woodland seen. However, apart from the more diverse stands on inaccessible steep slopes and scarp, this is likely to be consistent with most of the site.*

Regeneration

North Section

Regeneration of ash, rowan, birch, oak, hazel and hawthorn was present but was heavily browsed apart from new seedlings still in the field layer. There is a notable absence of thriving young trees (less than 10 years old)

Mid -section and lower slopes

Regeneration of ash and rowan. birch, oak, hazel and alder was observed and apart from

new seedlings in the field layer all of this was heavily browsed. As in compartment 1, there was an absence of young trees and an age gap below pole stage. The only exception to this is on inaccessible steep slope/scarp

South Section

Regeneration of birch and oak was observed and, unless in the field layer, this was subject to heavy browsing pressure. The birch regeneration was evident both around the margins of the wet areas and the high canopy woodland.

Herbivore impact

There is evidence of heavy browsing impacts on both seedlings/saplings and basal shoots. Shrub layer trees have a browsing line and/or evidence of browsing. Deer tracks are evident through the site running parallel to contours both within the woodland and on the top edge. Fresh deer dung and hoof prints also present. Deer entry points seen where fence is down at the top of the slope/scarp.

Species Composition

All the key species of this habitat type (W9) were present with ash the dominant species in the canopy. The understorey is predominately composed of birch, hazel and rowan.

All the main species of this woodland type (W7) are present with alder being the dominant canopy species, with abundant ash, elm and oak. The understorey is mainly rowan, hazel and birch with occasional willow, hawthorn and blackthorn.

This woodland is open W11 and W17 and is dominated by oak and birch. Understorey species of rowan and hazel are present but other species are absent or rare, as is typical of this woodland type.

Threats and Damage

This area has now been enclosed within a deer fence under a WIG Species and Habitat contract, supported by a separate woodland Management Plan. This plan will be incorporated into the LTFP and should address the main herbivore impacts. Other threats include tree diseases such as Dutch elm disease and Chalara (Ash Dieback)

7 – Inninmore Plan (3d)

Summary

This woodland is designated under the Inninmore Bay SSSI and is also part of the Morvern Woods SAC. The site consists largely of steep slopes below an escarpment of cliffs. The site is part stock fenced and part deer fenced. The northern section at the top of the scarp is stock fenced.

The site is predominantly Upland mixed ash woodland with woodland types W9 *Fraxinus excelsior* – *Sorbus aucuparia* – *Mercurialis perennis* and W7 *Alnus glutinosa* – *Fraxinus excelsior* – *Lysimachia nemorum*. There are also large sections of planted beech and some smaller areas of larch within the woodland.

The woodland interest is described in the SSSI citation as follows:

The southwest facing coastal basalt cliffs of Aoineadh Mor and Aoineadh Beag support woodland unequalled elsewhere in Lochaber for the species- richness of its ground flora. Woods on similar soils at Drimnin and Loch Aline are different in canopy composition, and those at Glencrippesdale and Camas Salach face north and lack the more warmth-loving

species.

Woodland on the steep slopes is dominated by ash and wych elm, but a wide variety of other tree and shrub species (notably birch *Betula* spp., oak *Quercus* spp., hazel, rowan, holly, bird cherry, blackthorn and hawthorn) are also present. Towards the western end of the site a small area has been planted with beech, a non-native species here. The ground flora is extremely rich in calcicolous woodland herbs, with several less common species, including smooth-stalked sedge, hairy-brome and great horsetail, here at its only mainland location in Lochaber, adding to the woodland's significance. Stream gorges and boulder screes provide a sheltered, humid environment for a variety of ferns. The bryophyte flora is diverse, with many Atlantic species and the lichen flora, which includes nutrient-demanding species and several rarities, adds further interest to the woodland.

Stand Structure

The woodland has an estimated overall canopy cover of 70% comprising ash, elm and oak throughout but did not have a diverse age range structure. There are significant levels of seedlings present, although the level of recruitment of saplings and young trees is a poor. There are areas of non-native canopy trees, primarily beech with some larch, covering approx. 4ha of the site (7% of the total area).

Regeneration

Abundant regeneration of all key species, including elm, is present in the woodland but there is a notable absence of saplings and young trees. Beech is regenerating within the planted area. Birch, ash and hawthorn are expanding on the fringes of the woodland.

Herbivore impact

The herbivore impact is Moderate to High, with the greatest browsing pressure in the eastern section of the woodland where there is ingress from deer due to a failure in the deer fence near the north-eastern corner of the site.

Species Composition

The site is predominantly W9 woodland with ash, elm, and oak with stands of Atlantic hazel-wood sub-feature. Birch, rowan, alder, hawthorn, blackthorn and holly are also present.

Threats and Damage

The key threats to this woodland are the lack of regeneration and structural diversity, the moderate to high browsing pressure and subsequent impacts and the presence of non-native tree and shrub species (beech and cotoneaster).

Ref: *Servant, G., Boulton, A. & Strachan, I., 2014. Site Condition Monitoring of Woodland features at Inninmore Bay SSSI, Cycle 3. Scottish Natural Heritage Commissioned Report*

8– Garbh Shlios (Plan 3e)

Summary

This woodland is designated under Garbh Shlios SSSI and is part of the Morvern Woods SAC. It is located on an extremely remote and inaccessible part of the south coast of Morvern and consists largely of steep slopes and steeply incised ravines, altogether covering over 1000ha. The SSSI is dominated by open land habitats (>90% of the area of the site) consisting largely of wet heath and blanket bog on acidic soils over granite bedrock and is notified for its

broadleaved woodland feature – Upland oak woodland which is located along the coastline in ravines and gullies and covers some 60-70ha in total.

The woodland interest is described in the SSSI citation as follows:

The woodlands are an outstanding example of mixed deciduous woodland and have evolved in a largely undisturbed manner and exhibit a natural progression from sea level through steep wooded stream gorges up to birch scrub and onto open heath without the imposition of roads, powerlines or other artificial barriers.

*The Garbh Shlios SSSI woodlands have developed on predominantly acid soils and are dominated by sessile oak with birch *Betula* spp. as a secondary canopy species. Ash, wych elm and hazel are also present where there are base-rich soils, usually but not always in the ravines. A sparse shrub flora includes holly, aspen and guelder rose. Woodland glades support bracken, purple moor grass and heather, whilst under the canopy a herb-fern field layer predominates.*

*The vascular plant, bryophyte and lichen floras are all very rich, with over 100 species of flowering plants and ferns recorded and include highly oceanic woodland species such as hay-scented buckler fern *Dryopteris aemula* and Tunbridge filmy fern *Hymenophyllum tunbrigense*, giving added interest to the woodland.*

Stand Structure

The canopy cover is approximately 70% in the wooded areas of the site and contains mature and senescent oak and birch. There is a poor age range structure for the key tree species, apart from on very steep ground where there are some young trees. An understorey of hazel is present on some of the very steep ground.

Regeneration

There is reasonable evidence of a range of seedlings present mainly along the upper fringe of the existing woodland, including birch, rowan, oak, willow, ash, hazel and elm; however, there is heavy browsing pressure on these and, as a result, there is a lack of young trees developing into saplings, apart from areas on the steep slopes and gorges. The upper fringes have some small patches of birch regeneration some 15-20 years old.

Herbivore impact

The recorded impacts in the SCM visit in November 2014 showed that the browsing impacts ranged from High to Very High.

Species Composition

The Upland oak woodland is a mixture of W11 and W17. Oak is present and most common followed by birch. Hazel is present in shrubby form on the steep slopes. Non-native beech is present but in small numbers (3 mature beech recorded in SCM visit)

Threats and Damage

The key threat to the wooded areas at Garbh Shlios are the lack of recruitment of regeneration; the inadequate range of age classes of canopy species; the high browsing pressure and subsequent impacts and the presence of non-native tree species (beech)

Ref: *Servant, G., Boulton, A. & Strachan, I. 2015. Site Condition Monitoring of Woodland features at Garbh Shlios SSSI, Cycle 3. Scottish Natural Heritage Commissioned Report*

9 -Andrews Wood (Plan 3c)

Summary

The woodland is a north-facing plantation which was established in 2007. There is a small element of original native woodland which is a continuation of the East Lochaline Woodlands. There are no designations over the site which is deer fenced and has an access running through south to north from Old Ardtornish

Stand Structure

Most of the woodland is native woodland planted in 2007 and consists of downy birch, alder, sessile oak, rowan and shrub species of hawthorn, hazel and willow. There is a small stand of native broadleaves to the north of the enclosure and is effectively a continuation of the southern end of East Lochaline Woodlands. Oak is only seen as mature trees whereas birch, rowan and hazel were observed as mature trees and seedling stage (however some seedlings were in the field layer). This section is open woodland with only 30-40% canopy cover. The remaining areas are dominated by bracken on drier ground and wet heath on saturated soils and flushes on the lower flats. The bracken has remnant woodland ground flora beneath the bracken cover. There is a narrow strip of conifer, mainly larch and Scots pine along the western fringe and new planting of conifers was carried out to maintain this.

Regeneration

Regeneration of birch and oak was observed within the field layer on the section immediately south of the East Lochaline enclosure but constrained by heavy bracken cover with very few seedlings making above field layer. The wetter flats are restricted by powerline wayleave, with limited birch and willow regeneration. There is a large area of gorse in the centre of the enclosure.

Herbivore impact

There have been several incursions of both stock and deer to the enclosure which has resulted in medium browsing impacts to both the new planting and the natural regenerations.

Species Composition

This original woodland is open W11 and W17 and is dominated by oak and birch. Understorey species of rowan and hazel are present but other species are absent or rare, as is typical of this woodland type. The new planting equates to W17 woodland. There is a narrow fringe of non-native woodland along the western boundary of Scots pine, larch and sycamore

Threats and Damage

The key threats are marauding deer and stock incursions. Bracken is re-establishing and constitutes an additional threat to establishment of the planted and new regeneration opportunities.

10 -Lochaline West (Plan 3b)

Summary

This is an east facing woodland on the steep basalt scarp slopes above Loch Aline. The woodland is a mixed woodland with a wide range of species present and a reasonable understorey which suggests a pulse of regeneration around 20 years ago. The native species would indicate a W9 and W11 woodland types on ESC basis which has been enriched with non-native species including sycamore, European larch, Douglas fir, Grand fir and Scots pine. The diverse structure of the woodland gives it a 'Policy' type feel and matches the garden

woodland within the Designed Landscape. There is an actively mined quarry at the southern end of the woodland. Most of the site is assessed and being on an Ancient Woodland site suggesting potential continuous woodland cover.

Stand Structure

The canopy cover is approximately 70%/80% of the wooded areas of the site and has contains mature and senescent broadleaves interspersed with groups on non-native broadleaves and conifers. There is an understorey in birch, ash, alder and sycamore from an earlier pulse of regeneration approximately 20 years old. The field layer includes regeneration of mainly birch, ash and sycamore which is being heavily browsed by deer and not being released the broadleaf element constitutes approximately 90% of the canopy.

Regeneration

There is good regeneration of the key native species (ash and birch) along with sycamore throughout. The seedlings are most frequently young seedlings in the field layer that have not been browsed. Little is being released to the sapling stage due to browsing and canopy shade. There are pulses of poles stage ash/birch/sycamore regeneration that forms thickets, but this is not consistent throughout.

Herbivore impact

All the areas of woodland have Very High/High impact levels. The herbivore impacts are the result of presence of deer.

Species Composition

All the key trees species for the main habitat type (W9 and W11) were present, with ash and birch being dominant, oak, elm, alder, rowan and hazel occasional. Sycamore is also dominant in overall canopy. Conifers, including European larch, Douglas fir, Grand fir and Scots pine are present and form approximately 10% of canopy.

Threats and Damage

The key threat to the mature woodland is the risk from pathogens such as *Phytophthora ramorum* (larch) and Ash Dieback. The impact of high browsing pressure due to presence of deer is restricting the release of new regeneration. There is some bark stripping on ash saplings.

11 -Garden and Achrannich (Plan 3b)

Summary

The 20th century gardens of Ardtornish contain a valuable collection of species Rhododendrons and other ericaceous trees and shrubs. The native species would indicate a W9 and W11 woodland types on ESC basis which has been enriched with specimen species of trees and shrubs including non-native species including sycamore, European larch, Douglas fir, Grand fir and Scots pine. Some of the site is assessed and being on an Ancient Woodland site suggesting potential continuous woodland cover.

Stand Structure

The canopy cover is approximately 50%/60% of the wooded areas of the site and contains mature and senescent broadleaves interspersed with groups on non-native specimen broadleaves and conifers and shrubs typical of a formal arboretum. Most of the area lies within a deer fence and is managed.

Regeneration

There is good regeneration of the key native species (oak, ash and birch) along with sycamore throughout through the fringes of the gardens which are less formally managed.

Herbivore impact

All the areas of woodland have Moderate/Low impact levels. The herbivore impacts are the result of presence of occasional deer.

Species Composition

All the key trees species for the main habitat type (W9 and W11) were present, with ash and birch being dominant, oak, elm, alder, rowan and hazel occasional. Sycamore is also dominant in overall canopy. Conifers, including European larch, Douglas fir, Grand fir and Scots pine are present and form approximately 10% of canopy.

Threats and Damage

The key threat to the mature woodland is the risk from pathogens such as *Phytophthora ramorum* (larch) and Ash Dieback. There is the potential for rhododendron spread into the gardens

12- Rannoch Glen (Compartment 12 Plan 3b)**Summary**

Small enclosure to the south east the Gardens which was deer fenced about 20 years ago. The fence has been damaged and deer now have access to the enclosure. The fence has allowed the release of a significant pulse of regeneration which has assisted the woodland structure.

Stand Structure**W17 Upland Oakwood**

Oak was only seen as occasional mature tree whereas birch and rowan were observed as mature tree and sapling and seedling stage. This compartment is 40%/50% canopy cover with a good understorey and some seedlings present in the ground layer. There areas are dominated by bracken on drier ground and wet heath on saturated soils and flushes. The bracken has remnant woodland ground flora beneath the bracken cover.

Regeneration

There has been good regeneration recently of mainly birch. These is now being at or approaching sapling stage with some seedlings in field layer.

Herbivore impact

All the areas of woodland have moderate impact levels due to the enclosure now being open to deer due to fence failure. Impacts could be expected to increase with loss of deer rage through the enclosure of East Lochaline recently.

Species Composition

All the key trees species for the main habitat type (W17) were present, with birch being dominant and oak, alder, rowan and hazel occasional.

Threats and Damage

The main threat is now from browsing impacts from deer and farm stock. Bracken is restricting further expansion of the woodland. There is the potential for rhododendron spread into the gardens.

13. Outlying Woodland Remnants (Compartments 13aand 13b: Plan 3b)**Summary**

These are the small woodland remnants throughout the wider estate. These are mainly native remnants separate from the main woodland blocks above which have survived browsing impacts. Most of the areas are open to browsing and the woods are generally

becoming senescent due to lack of regeneration. There are small blocks of conifers and non-native broadleaves within compartment 13b. Within compartment 13b, along the coastal fringe there is a corridor of hazel, hawthorn and blackthorn which creates an excellent wildlife corridor.

Stand Structure

These are generally open woodlands with consisting of mainly mature/senescent trees with little or no regeneration present. Where the woodland cling to steep sided gorges, limiting access to browsing animals the structure is slightly better with occasional saplings and seedlings present, however, these areas are very limited in scale. There is scrub woodland along the coastal fringe of 13b.

Regeneration

There is virtually no regeneration present due to most of the woodlands being open to browsing animals

Herbivore impact

All the areas of woodland have very high/high browsing impacts.

Species Composition

The species composition in compartments 13a and 13d are W17 or W4 and and dominated by birch with occasional oak, alder, rowan and willow. The woodlands in 13b are richer in composition with key trees species suggesting habitat type W9 and W11. Species present includes ash and birch being dominant, oak, elm, alder, rowan, hawthorn, blackthorn and hazel.

Threats and Damage

The main threat is from browsing impacts from deer and farm stock. Ash could be at risk from AD. Bracken is constraint to achieving woodland expansion if herbivore impacts are controlled.

Gleann Geall Woodlands (Plan 3f)

Summary

These are woodland blocks established over last 10 years consisting of a mix of native broadleaf and commercial conifer species. Eight blocks, extending to some 90 hectares were planted along the Allt Beithach river or its tributaries as riparian woodlands with objective of improving the water quality and the fisheries. These were planted with mixture of native broadleaves, consisting of birch, alder, oak, rowan, willow and hawthorn. To the west of Gleann Geall three other blocks extending to some 50 hectares were planted with a combination of commercial conifers and broadleaves with objective of improving design impacts of existing commercial forest blocks which had been felled.

Stand Structure

These are young plantations still in the formative stage.

Regeneration

Not applicable

Herbivore impact

Recent damage to watergates has resulted in herbivores getting access to two of the blocks which has caused damage to the young trees.

Species Composition.

The native woodlands are birch dominated (60%) with other species planted according to site conditions and including alder, oak, rowan, willow spp and hawthorn.

Threats and Damage

The main threat is from browsing impacts from deer and farm stock. Flash floods are risk to fences and Watergates.

Woodland Expansion (See Appendix 5)

In 2018 the Estate has embarked on a programme of woodland expansion which is detailed in the attached appendix.

Table 1 - Area by species

This shows the current and future species composition within the entire Long Term Forest Plan area.

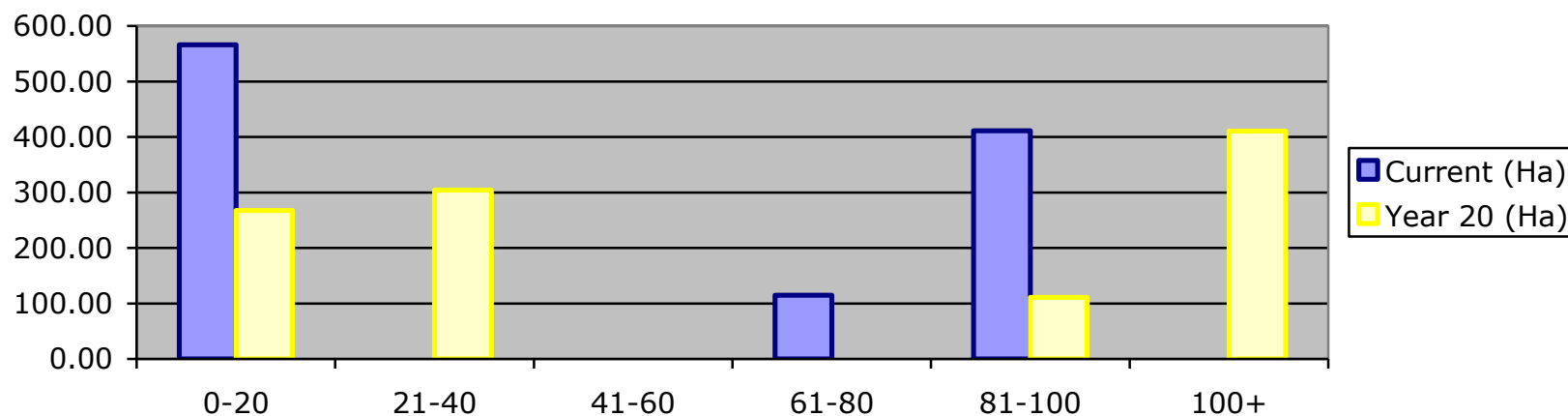
Area by species						
Species (Add relevant species groups, or OG/OL)	Current*		Year 10*		Year 20*	
	Area (ha)	%	Area (ha)	%	Area (ha)	%
Mixed mature native broadleaf	411.41	29%	571.31	40%	805.46	56%
Mixed mature conifer/ broadleaf	94.22	7%	86.58	6%	86.58	6%
Native broadleaf (NP) <20 years	164.18	11%	171.82	12%	18.23	1%
Native broadleaf (NN/RN) <20 years	382.74	27%	278.40	19%	249.01	17%
Non-native broadleaf	17.47	1%	17.47	1%	17.47	1%
Mixed conifer	3.03	0%	3.03	0%	3.03	0%
Scots pine	0.02	0%	0.02	0%	0.02	0%
Sitka spruce	19.37	1%	19.37	1%	19.37	1%
Open Ground with potential for regeneration	229.06	16%	173.50	12%	122.33	8%
Designed open Ground	119.06	8%	119.06	8%	119.06	8%
Total	1440.56	100	1440.56	100	1440.56	100

* Of whole Forest Plan area (including open ground (OG)). Any mixtures such as Mixed Conifer (MC) should be broken down and included as an individual species component where a species occupies more than 10%.

Table 2 – Area by age

This shows the woodland area broken down by age class and will show how well the woodland is distributed across the age classes. This information can be provided as a chart below. Double click on the chart below and paste your area figures into the spreadsheet that appears.

Age class (years)	Current	Year 20
	Area (ha)	Area (ha)
0-20	566.29	267.24
21-40	0	304.05
41-60	0	0
61-80	114.74	0
81-100	411.41	110.74
100+	0	410.41
Total	1092.44	1092.44





A.8 Plant Health

Provide details on any known plant health issues within the LTFP area and their effect on the forest plan.

There are no known plant health issues within the Forest Plan area. However, *Phytophthora ramorum* and Ash Dieback have been recorded on adjacent properties. The management of PR may include pre-emptive felling of larch crops. If infected, sanitation felling will be carried out. In respect of Ash crops, trees will be monitored for potential AD symptoms. Signage, education and strict bio-security measures will be employed to mitigate risk of infection from third party access.

B. Analysis of Information

B.1 Constraints and Opportunities

Identify constraints and opportunities. Append maps as appropriate and provide map reference.

Factor	Constraint	Opportunity
Woodland SSI/SAC in unfavourable condition	<p>Working within the constraints of statutory designations on woodland management operations</p> <p>Grazing and browsing impacts</p> <p>Lack of structural and species diversity.</p> <p>Threat from non-native species</p> <p>Fragmentation of habitat and loss of woodland extent</p> <p>Potential conflict between statutory site objectives with estate sporting aspirations</p> <p>Potential socio-economic impacts</p> <p>Management constraints due to organic status of adjacent land use</p>	<p>The following measures can assist with the long-term management of the woodlands:-</p> <p>Set up management systems to monitor and put in place plans and objectives which will be designed to bring the woodlands back towards favourable condition.</p> <p>Manage deer as part of a collaborative DMP.</p> <p>Create enclosures to encourage regeneration, reduce browsing pressure and opportunities to introduce secondary species and shrubs to create opportunities for successor species and create structural and species diversity</p> <p>Consider woodland expansion through natural regeneration.</p> <p>Create improvements to grazing and provision of alternative shelter habitats outwith the SSSI/SAC boundary.</p>



		<p>Use estate staff to manage/monitor and implement plans where feasible</p> <p>Manage the woodland</p>
Fencing Impacts	<p>Deer Welfare</p> <p>Biodiversity</p> <p>Landscape and Cultural Heritage</p> <p>Access</p>	<p>Follow Joint Agency Guidance on Deer Fencing</p> <p>Opportunity to consider strategic fence</p> <p>Short, medium and long- term fencing strategy will be used to identify requirement for new fences and removal of redundant fences</p> <p>Plan fence lines in accordance with Joint Agency guidelines</p> <p>Provide gates and pedestrian gates to facilitate access</p> <p>Avoid desire lines</p> <p>Hold fences back from public roads</p> <p>Survey for presence of EPS and design to mitigate impacts</p> <p>Monitor and repair fences</p> <p>Consider marking of deer fences over life of fences where there is risk of bird strikes</p> <p>Survey for presence of EPS include mitigation against potential impacts</p>
Biosecurity	<p>Rhododendron host to PR</p> <p>Access</p>	<p>All works to meet UK Forestry Standards and current forest guidelines.</p> <p>Remove all rhododendron</p> <p>Follow current FCS Biosecurity guidelines</p> <p>Education and awareness of staff/contractor/public about risk to forests and to promote the “Keep it</p>



		<p>Clean” guidance</p> <p>Follow PR Guidance</p> <p>Monitoring of threats</p> <p>Improving forest resilience through species diversity and health. Maintain forest vigour. Matching species selection to site. Use of ESC to confirm suitability of species use.</p>
Historic Environment	Protection of archaeology	<p>Survey and record sites</p> <p>Monitor sites</p> <p>Pro-actively manage sites where woodland management objectives impact</p> <p>Maintain sites as designed open ground within woodland</p> <p>Obtain Scheduled Monument consent where required</p> <p>Provide interpretation of sites</p> <p>Work with local groups to survey and monitor</p> <p>Use grazing to manage sites</p> <p>Consider bracken control</p>
Public access Employment	Impact on site planning and restock design Impact on all operational work Impact on landscape design	<p>Follow current woodland design guidelines and maximise open ground along forest edge and watercourses</p> <p>Diversify woodland structure – species and age class</p> <p>Train estate staff to carry out forest operations</p> <p>Create pedestrian access through use of gates on desire lines</p> <p>Apply low impact silvicultural systems where appropriate and maintain species diversity</p>



		<p>Consider timing of operations to minimise disruption during times of higher usage</p> <p>Follow current Forest and Water Guidelines</p>
Deer Management	<p>Impact on all operational work</p> <p>Impact on fencing proposals</p> <p>Road Safety</p>	<p>Follow Joint Agency Guidelines in respect of locating and alignment of fences</p> <p>Carry out compensatory culls where there is a loss of deer range.</p> <p>Manage woodland in presence of deer where appropriate.</p> <p>Deer Management Plan to support LTFP</p> <p>Liaise with neighbouring forest owners regarding deer management</p> <p>Liaise through local ADMG</p>
Raptors	<p>Disturbance of protected species.</p> <p>Loss of habitat</p> <p>Damage to habitat</p>	<p>All works to meet UK Forestry Standards and current Forest and Water Guidelines</p> <p>Design of woodlands, timing of operations and design of infrastructure</p> <p>Surveys and monitoring</p> <p>Education and awareness</p>
Community Interests	Community Interests	<p>Consultation on woodland proposals and availability to discuss proposals/actions with stakeholders.</p> <p>Regular stakeholder meetings</p> <p>Access and forest management interactions</p> <p>Support local woodland and processing interests through collaborative projects</p>



		<p>Plan woodland operations to minimise disruption to access.</p> <p>Protect and improve access routes</p> <p>Interpretation and promotion of woodland resource to benefit wider community tourist interests.</p> <p>Educational projects with local schools</p> <p>Processing and Marketing of non-timber woodland products locally</p>
<p>Outline how you intend to incorporate the constraints and opportunities into the management objectives.</p>		
<p>The progress will be assessed against base line data gathered at start of process or comparison with SNH Site Condition Monitoring Reports. Ongoing HIA surveys will record the progress over the period of the plan and identify where remedial action required to remove threats and achieve objectives. .</p>		

C. Management Proposals

C.1 Silvicultural Practice

Outline silvicultural practice and management prescriptions. Include any past management practice that is relevant and the strategies to address the issues identified during the analysis phase.

The key management strategy for all the woodlands in this Long-Term Forest Plan will be to assist with bringing the designated woodland sites towards favourable condition through the exclusion of deer and livestock to reduce browsing and grazing pressure and to control of invasive non-native species threats.

The site condition surveys show that natural regeneration of most key species is already present in most of the sites and therefore the reduction of browsing and grazing should allow seedlings to get away and will help produce a more diverse age structure and bring the woodlands back towards favourable condition.

Woodland condition will be assessed through Woodland Habitat Impact Assessment Method (See Appendix 3). The Woodland Herbivore Impact Assessment method (HIA) is a method of assessing and monitoring the impact of large herbivores (cattle, sheep, deer, goats, pigs, horses) on habitats that are already wooded or may develop woodland. The method is subjective in that it is based on observations, not detailed measurements. It depends on the observer paying close attention to the overall appearance of the habitat as well as to indicators within the habitat. The method is suitable for land managers wishing to monitor herbivore impacts on a regular basis with the aim of adjusting herbivore pressure, either by deer culling, or by adjusting the stock grazing regime, to achieve a woodland



condition target. Estate staff will be trained to carry out the HIA within the woodlands. The HIA will direct operational plans such as deer and fence management

Deer fencing will be required, where appropriate, to reduce browsing pressure. While excluding browsing animals will be necessary to ensure regeneration becomes established, Ardtornish Estate has a vision and plan to reduce deer numbers over the next 3-5 years, towards maintaining a population of between 3 and 4 animals per km², thereby reducing browsing pressure in the long-term and with the objective of offering the opportunity to consider fence removal at the end of their useful life. Strategic fencing will be considered where it will allow deer densities to be reduced to a level where restructuring can be achieved through natural regeneration.

Another aspect of the management strategy for these woodlands is to encourage expansion of the priority woodland habitats types in open areas within the woodlands through natural regeneration by carrying out bracken control. Where seed sources of key species are not present, or where there is a potential future risk from pathogens such as Chalara Ash Dieback, then enrichment planting will be considered with the long-term vision of future proofing all the woodlands. Enrichment planting will use local seed sources of species present and where possible match the NVC woodland types for the individual woods.

There is a relatively low incidence of invasive non-native species within the woodlands and targeted removal will be another priority for management to prevent re-establishment and expansion. There is an ongoing threat from rhododendron from seed spreading from adjacent sources and from regeneration within areas already treated. Cotoneaster is recorded as a threat on several designated sites and its control will be targeted to where it assists in bringing woodland towards favourable condition. Bracken control maybe carried out where it is restricting woodland regeneration/expansion. Bracken control through mechanical control may be carried out where there will be an impact on Organic status of a section of the estate or by chemical means elsewhere (in line with best practice guidance) will reduce the dominance of this species and give the site more opportunity for natural regeneration and woodland cover expansion.

The mature beech trees within designated sites form an important landscape component and their loss would be significant. It is proposed that the mature beech will be retained for its natural life span. Regeneration of beech within designated sites will be controlled to prevent spread. Beech could also mitigate the potential impact of Ash Dieback of ash if estate trees become infected. Sycamore are present in West Lochaline and it is regenerating along the fringes and again these could provide an alternative to ash if AD results in loss of ash

Selective felling in non-designated sites to create opportunities for age class diversity through release of understorey saplings and new regeneration. Low impact silvicultural systems are a type of woodland management that helps to increase species and structural diversity. It normally causes less rapid change to the landscape and to the physical environment than clear felling systems and so can help the Estate meet their multi-purpose objectives. In the context of climate change, varied silvicultural systems will increase the resilience of forests and may limit the damage caused by extreme events, such as gales or pathogen and pest outbreaks.



New planting of native woodland is planned and the opportunity to increase cover will be taken where appropriate. Use of strategic fencing can reduce visual impact and allow expansion in areas adjacent to existing woodland and allow woodland linkages for wildlife and biodiversity benefits be achieved. (See Appendix 5)

These woodland sites are important components of the landscape and the health and condition of canopy cover will be a priority for the estate, along with ensuring that there are opportunities for public access. This will help promote the estate and immediate locality as a tourist destination.

Any archaeological interest of the sites will be protected in line with current Forest Archaeological guidance and as advised by archaeological advisors.

C.2 Prescriptions

Please provide maps as set out in Appendix 2 of the Forest Plan Applicant's Guidance and complete the associated Tables. Provide any further details required along with the map references.

C.2.1 Felling

Selective felling within non-designated sites to create gaps in canopy to allow release of understorey to assist in age class diversity and ensure continuous woodland cover. Areas of proposed felling/selective felling/thinning within designated sites will require consent from SNH. Further consultation and specific and detailed operational plans will be set out in Sustainable Management of Forest applications to be submitted through the Forestry Grant Scheme.

Compartment 27: (Inninmore) Selective felling of approximately 0.5 ha (0.5% of stand) of beech to create gaps in canopy to encourage regeneration of native species. Felling will be restricted to smaller trees to minimise impact on landscape and will be linked to the control of Beech regeneration. Beech will be left on site as deadwood. Trees to be felled will be marked and approved for felling by FCS/SNH before work starts.

Compartment 10: (West Lochaline) Approximately 4 hectares (4.5% of overall canopy) of selective felling of larch is planned in phase 1. This is felling of larch as precaution against potential infection by PR. Most of the larch is contained on the steep slopes and without cable crane extraction system will be very difficult to extract. Proposal would be to leave the inaccessible trees through felling to re-cycle and create a deadwood resource. Stems closer to the track along east of compartment will be recovered for biomass or local utilisation. Extraction will use skidding or high-lead to roadside and forwarded to yard at Achrannich for processing.

Compartment 4: (Torr Molach) Selective fell to recycle approximately 1.0 ha of larch which was too difficult to access during SF operations in 2018. This would only occur if there was phytophthora infection and would be carried out under a SPHN.

Compt 13c: (Old Ardtornish) Selective fell of approximately 0.5 ha to create gaps in canopy to allow restructuring with native species. Timber would be used on estate for firewood or biomass.



Compt 8: (Garbh Shlios) Selective fell to recycle a couple of beech trees, <0.01ha, which could provide seed source for non native species which could compromise the condition of SSSI/SAC. Trees to be felled will be marked and approved for felling by FCS/SNH before work starts.

The A884 is a consultation route for timber haulage. Prior to harvesting and timber haulage, Highland Council TEC services will be consulted regarding use of road.

(See Plans 6b and 6d.)

C.2.2 Thinning

Selective thinning within non-designated sites to create gaps in canopy to allow release of understorey to assist in age class diversity and ensure continuous woodland cover.

Compartment 10: (West Lochaline) Thinning and cleaning of some 28.86 ha will be carried out to create opportunities for the creation of understorey to improve in each phase.

Thinning will be low crown at an intensity of less than 20% in accordance with LISS objectives.

The A884 is a consultation route for timber haulage. Prior to harvesting and timber haulage, Highland Council TEC services will be consulted regarding use of road.

(See Plan 6b)

C.2.3 LISS

Across most of the established woodlands, lower impact silvicultural systems will be practiced unless site designation would preclude intervention. Surveys and monitoring of the current woodland structure will be carried out to advise of potential opportunities to enhance current woodland structure. No more than 10% of established canopy will be felled in in any five-year period unless justified in terms of biodiversity or bio-security.

The LISS adopted will include group selection system, coppice with standards; and single tree selection systems depending on woodland and location. Enrichment under planting will be used where natural regeneration is not feasible or where main species are missing or in low numbers within a canopy. This can also be used where there is a threat from pathogens to a main canopy species.

Overall LISS will apply to all woodlands within the LTFP. This will achieve:

- increase species and structural diversity
- encourage natural regeneration to expand native woodlands
- bring native woodlands and designated woodland features into active management and good ecological condition
- support management of rural and urban woodlands for public access

Compartments where LISS will be used are as follows:

Comt 27: (Inninmore) Selective felling to recycle of individual beech trees to create gaps in canopy to allow regeneration and to slowly naturalise the woodlands and help bring towards favourable condition. Selective felling will be of smaller poles stage beech crops or large



diseased/dangerous trees. Main canopy will be left untouched, where possible, maintaining native woodland elements.

Compt 10: Selective felling for sanitation purposes of larch. Low crown thinning and cleaning of some 28.86 ha of mixed broadleaf will be carried out to create opportunities for the creation of understorey to improve woodland age structure. Light thinning intensity of less than 20% of canopy

Compt 8: Selective felling to recycle of a couple individual beech trees to create gaps in canopy to allow regeneration and to slowly naturalise the woodlands and help bring towards favourable condition and remove the threat of non-native regeneration within the designated woodlands.

(See Plans 6a, 6b,6c, 6d, & 6e)

C.2.4 Long Term Retentions (LTR) / Natural Reserves

All woodlands within the plan will be managed as either Natural Reserves or Long-Term Retentions unless sanitation felling is required. All woodlands will be managed to ensure continuous cover.

C.2.5 Restocking Proposals / Natural Regeneration

Restocking proposals will be designed to help work towards bringing 100% of features into favourable condition on designated sites such as SSSI and SAC, and this has been identified as a priority for SNH. In all woodlands proposals will be designed to increase species and structural diversity through low impact silvicultural systems management; encourage natural regeneration to expand native woodlands; bring native woodlands and designated woodland features into active management and good ecological condition; improve management of woodlands for public access; control predators to benefit black grouse; reduce deer impacts to a level that will allow regeneration of conifer and broadleaved species

Natural Regeneration: Natural regeneration will be the preferred method of restructuring within most of the woodlands. Natural regeneration will be achieved through exclusion of browsing animals from the woodlands and control of vegetation where this is considered a constraint. There are significant areas of advance regeneration present within most of the woodlands which have been, or are enclosed, but in most cases, this is being constrained by herbivore impacts. If RN not successful, then areas felled will be planted using local seed sourced planting stock in accordance with FCS Guidance.

Natural regeneration (RN) is expected to occur where deer fences are being retained in the following compartments:

Compartments: 1, 2, 4, 5, 6, 7, 8, 9, 10, 11, & 12.

Enrichment Planting – Enrichment planting will be considered where specific species are absent or under-represented within the existing canopy, or where there is a potential threat from pathogens to a specific species. Local seed sources will be used in line with FCS Guidance, Seed Sources for Planting Native Trees and Shrubs in Scotland. Enrichment planting will be considered if natural regeneration is failing to occur. Trees will be planted on hand mounds and protected with individual trees protectors where it can be demonstrated



that their use will help ensure establishment and to protect against voles and herbivore threats. Where tree protectors are proposed their use will be agreed with FCS/SNH in respect of type, number and location and they will be removed once the saplings are beyond potential threat from pests and herbivore impacts.

Any works proposed within designated sites will require the consent of SNH. Further consultation and specific and detailed operational plans will be set out in Sustainable Management of Forest applications to be submitted through the Forestry Grant Scheme.

Enrichment planting is proposed in following compartments:

Compts: 1, 2, 4, 5, 6, 7, 8, 9 & 10.

In areas where specific species are present but are underrepresented, such as elm within Innimore (Compt 7), individual tree protectors may be used to protect and assist establishment to sapling stage, getting the seedlings beyond grazing and other vegetation competition. Where tree protectors are used, they will be removed once the saplings are beyond potential threat from pests and herbivore impacts. Where bracken is restricting regeneration, selective use of individual tree protectors can be used on main canopy species to assist establishment such as in East Lochaline, Compts 6 & 9: This will be appropriate where mechanical control is not possible or to protect seedlings during control works. Tree protectors will be removed when they reach the end of their useful life.

Within designated sites enrichment planting will only be carried out should monitoring demonstrate that woodlands are at threat or where improving species diversity will help bring woodlands towards favourable condition. All operations will be approved by FCS/SNH and any works proposed within designated sites will require the consent of SNH. Further consultation and specific and detailed operational plans will be set out in Sustainable Management of Forest applications to be submitted through the Forestry Grant Scheme.

Bracken control through mechanical control may be carried out where there will be an impact on Organic status of a section of the estate or by chemical means elsewhere (in line with best practice guidance) will reduce the dominance of this species and give the site more opportunity for natural regeneration and woodland cover expansion.

All plants will be sourced with reference to FC Practice Note Using Local Stock for Planting Native Trees and Shrubs. If local seed sources are not available, the FCS will be contacted for permission to plant alternative sources which will be from climatically similar locations.

(See Plans 6a, 6b,6c, 6d, & 6e)

Table 3 – Felling

This shows the scale of felling within the felling phases in the context of the whole Forest Plan. This includes any areas of 'LISS – Fell' (i.e. removal of final overstorey).

SCALE OF PROPOSED FELLING AREAS (including LISS final fell areas)												
Total Forest Plan Area:		hectares										
Felling	Phase 1	%	Phase 2	%	Phase 3	%	Phase 4	%	Long Term Retention	%	Area out-with 20yr plan period	%
Area (Ha)	6.01	<1%	0	0	0	0	0	0	0	0	0	0

Table 4 – Thinning

This shows the area of thinning over the first 10 years of the Forest Plan.

Species	Thinning (ha)
Mixed broadleaves (syc/pbi/ash/ar)	28.86
Total	28.86

Table 5 – Restocking

This table provides information on the restocking proposals for the first 10 years of your Forest Plan. Restocking should be listed on a coupe by coupe basis.

Felling Phase	Map Identifier(s)	Species to be planted	Area (ha) to be planted
1	10	Native broadleaf (sok 50%/pbi 30%/elm 5%/nsh/15%)	4.00
1	27	Native broadleaf (sok 50%/pbi 30%/elm 5%/nsh/15%)	0.5
1	13c	Native broadleaf (sok 50%/pbi 30%/elm 5%/nsh/15%)	0.5
1	4	Native broadleaf (sok 50%/pbi 30%/elm 5%/nsh/15%)	1.0
1	8	Native broadleaf (sok 50%/pbi 30%/elm 5%/nsh/15%)	0.01
Total Restocking Area			6.01

C.2.6 Protection

All Compartments

Fencing and culling of deer and will be the main methods of protection from herbivore impacts. The browsing impacts are one reason why the designated site is failing to meet targets and is deemed to be in unfavourable condition. Due to the population of deer on outside of the woodland it would be impossible to manage deer densities within the woodland to a level where it could be expected to achieve the necessary increase in seedling performance and recruitment across all species without fencing. Deer management will follow SNH Best Practice. Overall, it is the Estates intention to bring deer populations in line with carrying capacity of available range.

It is proposed to include additional fencing around and within designated sites and carry out compensatory culls where deer range is lost. Fence design will include adequate open ground to allow control within enclosures. All fences will be checked and maintained on a regular basis. Any damage will be repaired immediately.

Monitoring will include habitat assessment; assessment of deer population through direct and indirect population assessment; monitoring of seedling performance and success; data recording and damage assessment.

The Estate will liaise with DMG in respect of culls and potential impacts on deer populations.

Monitoring through HIA process will identify whether protection methods are adequate to achieve the stated objectives.

All works to meet UK Forestry Standards and current forest guidelines.

C.2.7 Fence erection / removal

Deer/stock exclusion fence – existing deer fences will be maintained where they are viable and if not, they will be removed and replaced with new fences. The siting and location of the fence will be carefully considered to minimise adverse landscape impact and negative effects on biodiversity, wildlife and public access. To this end a strategic fence will be considered where this can deliver the overall objectives and allow removal of redundant fences.

Consideration will be given to a strategic fence enclosing compts 2, 4, & 5 which will exclude deer from the main designated woodlands as well as creating opportunities to consider woodland expansion through a combination of new planting; natural regeneration enrichment planting and specimen tree planting.

Temporary, internal rotational deer fencing will be considered in larger enclosure at Garbh Shlios (Compts 8) where it will assist deer control and to assist in bringing designated woodland sites towards favourable condition.

Upgrading of existing stock fences will also be considered if HIA indicates that ongoing herbivore impacts are preventing woodland regeneration in Compt 7.



When fences have reached the end of their useful life, or where they have been superseded by a strategic fence or new internal fences they will be removed, and material disposed of in licenced landfill sites.

Fence marking will be considered where bird strike is considered a risk.

All fencing will be carried out with due reference to Joint Agency Fencing Guidance. The use of the area by the estate for sporting interest will also be considered. Fences will be checked and maintained regularly by estate staff.

C.2.8 Road Operations

No roading operations are proposed

C.2.9 Public Access

Members of the public following the Scottish Outdoor Access Code have the right of responsible access across all these sites and there are access gates in various locations in existing boundary fences. Any proposed new fences will have several deer gates and self-closing pedestrian gates to allow access to and from the enclosure at various points around the perimeter.

The estate promotes many guided walking routes around the estate and the Scottish Wildlife Trust promote a route from their car park at Glen Dhu. There is a well-established walking route through the entire length of Innimore to the bothy. This path needs repair and upgrade at burn crossings. There is access from the village of Lochaline along the western shore of Loch Aline which leads to Ardtornish gardens and beyond. There is a footpath from Achranich through to Egnais at Garbh Shlios on the shores of Loch Linnhe.

The estate will carry out regular checks of footpaths to ensure that they continue to be safe to be used by member of the public. This will include inspection of trees adjacent to main access routes. Maintenance will be carried out as necessary

Threshold signs will be used at strategic access point to advice of routes and points of interest. These will be supplemented waymarking where appropriate.

Self closing pedestrian gates will be maintained or placed on the main desire lines used for access.

The footpath in Compt 6 to Tennyson's Waterfall will be upgraded and marked through strimming of the bracken in summer to make the route obvious and the removal of some blown trees and overhanging branches to ensure that access along the proper route is maintained. This can be lined into the footpath going through Andrew's Wood (Compt 9) and onto Old Ardtornish (Compt 13c).

The footpath through Compt 7, Innimore requires significant works to make it safe for use. Sections of the original path have been lost to landslips and erosion. At one-point access through one of the main water courses is dangerous and consideration will be given to either bridging the watercourse or re-routing the path to a safer crossing point.

The footpath the west shore of Lochaline through Compt 10 requires to be maintained. This



is a well-used access from the village to the estate by both pedestrians and cyclists. This will be checked and maintained.

Footpath through Gleann Dhu between Compts 1, 3 & 61 will be maintained. Estate will work with SWT to promote access to Nature Reserve and interpretation.

Access from Achrannich to Eignaig (Compt 11 through to Compt 13a) has been upgraded through the renewable projects as far as loch Ternait. After Ternait the path becomes less distinct until the Garbh Shlios enclosure is reached. No additional works are proposed during the first phase of the LTFP.

The Garden and Torr Molach (Compt4, 5 10 & 11) have several formal paths. It is intended to use harvesting roads being created in Compt 4 to create longer circular routes from the garden through to Craigdarroch cottage. Once harvesting is completed, the intention is to re-instate the track to make a formal footpath which links into the garden via the Kennels track.

The track from Achrannich to Old Ardtornish through Compts 6 and 13c gives access along the east side of Loch Aline and onto the coast at southern extremity of the estate. This is an important access through Compt 13c and leading to the less formal paths through Compt 7

C.2.10 Historic Environment

All Compartments

Most of the woodlands have been surveyed by a qualified archaeologist and sites recorded and reported. There is potential for further sites and features being present. Prior to major operations the work site will be checked with a walkover survey by an archaeologist and any features discovered will be recorded and reported to the appropriate authorities and any mitigation applied. All works will follow FCS Forest Archaeology Guidance.

C.2.11 Biodiversity

All Compartments.

A review of management processes with objective of bringing all Designated woodland sites towards favourable condition which will improve biodiversity will be accrued out in support of the LTFP. This will be achieved through a collaborative management system to monitor woodlands and herbivore impacts between the Estate and SNH/FCS. Monitoring will be based around the HIA process detailed in Appendix 3.

The HIA will direct the operations required which of the proposed activities in the SSSI/Natura designated woodlands, not currently meeting 'favourable' condition and working towards bringing 100 per cent of the feature into 'favourable' condition, will help towards bringing 100 per cent of the feature into 'favourable' condition

Natural reserves, areas of woodland have been set aside where biodiversity is the prime objective of the Estate. This will be achieved by bringing the existing woodlands all into formal management and managed with the object of delivering maximum biodiversity, wildlife and landscape benefits. This will be through improving woodland structure through the reduction of herbivore impacts, encouraging natural regeneration and removal on

invasive non-native species where they are a threat.

Naturalisation of some woodlands will be carried out by removal of non-native species where they do not contribute to biodiversity or landscape. Changes will be gradual through LISS process unless removal is proposed for sanitation purposes where there is direct threat from pathogens.

Retained deadwood will be matched to the requirements of those species likely to be important on specific sites.

Natural regeneration will be used to improve woodland structure. Where necessary, enrichment/restocking and new planting will be used to introduce species either missing or in low densities within woodland types. This will include introduction of shrub species where historic herbivore impacts have eliminated them from woodlands.

Major woodland operations, where feasible, will be timed to avoid disturbance of protected species. Surveys for EPS will be carried out prior to forest operations which could disturb or impact on protected species.

Where sensitive raptor species or moorland bird species are recorded/found woodland management will include a network of open space and hunting corridors. Shrub species along woodland edge will be encouraged to improve habitat for wading birds.

Riparian woodland corridors will be protected and extended to maintain and improve habitat linkages.

New planting and restocking to comply with Supplementary Guidance to support the FC Forestry and Peatland Habitats Guidance. This will include peat depth surveys so that restructuring, and forest operations can be planned to avoid impact on GWTDE. Forest operations will be designed and planned to ensure that hydrology of any adjacent peatland habitats is not compromised. The location and design of restructuring/planting to be agreed with FCS/SNH.

Open ground and important non-woodland habitats will be protected

LISS management will improve forest resilience through species diversity and health and improve biodiversity.

Amend agricultural management processes adjacent to woodlands to remove potential threats.

All works will be carried out to meet UK Forestry Standards



C.2.12 Tree Health

There are reported cases with both Phytophthora ramorum and Ash dieback in adjacent forests, so risks are high.

Regular monitoring of trees will identify threats to tree health. This will be supplemented through education and awareness of staff/contractor/public about risk to forests and to promote the “Keep it Clean” guidance through signage and advice to visitors to the site

Invasive non-native species which could be a host to damaging pathogens, such as Rhododendron will be eradicated through a combination of mechanical and chemical control methods. It is proposed to follow current PR Guidance as well as current FCS Biosecurity guidelines.

LISS management proposals will improve forest resilience through species diversity and health and help maintain forest vigour. Matching species selection to site where enrichment planting and there are new woodland proposals. This will be achieved through use of ESC to confirm suitability of species use and appropriate silvicultural practice.

All works to meet UK Forestry Standards and current forest guidelines.

C.2.13 Invasive species

Where invasive species are deemed a threat to Designated woodlands, or where it is considered a reason for unfavourable condition status, the threat will be controlled and/or, where possible, eradicated. Rhododendron and cotoneaster spp are main invasive species threatening designated sites.

Historically beech and sycamore have been planted and, in some locations, these are a potential threat to designated woodlands through regeneration. Where woodland structure allows, that is, where there is sufficient regeneration of native species then regeneration of non-native species such as beech and sycamore will be controlled. However, where beech and sycamore have bio-diversity/landscape benefits, mature trees can be retained. If appropriate regeneration can be retained to maintain woodland structure future proof woodlands. Advice will be sought from FCS/SNH on specific prescriptions.

Where there are site sensitivities mechanical control of invasive species will be carried out. Monitoring will locate threats. Removal of individual plants of non-native species such as rhododendron and cotoneaster spp can be done by hand or larger bushes by lever and mulch system. Beech and sycamore regeneration can be hand pulled at seedling stage but will need a lever system for larger saplings.

On less sensitive sites, chemical control can be used through overall spraying of smaller bushes or trees or cutting stump or stem injection of larger bushes or trees.

Monitor on regular basis will prevent any spread or re-invasion.



C.2.14 New Planting

New planting proposals as set out on attached plans

C.2.15 Other: Vegetation Control

Bracken Control – Mechanical bracken control is proposed within woodland areas adjacent to the sections of the estate with organic status. This will be designed to create opportunities for natural regeneration to occur. Mechanical control will be the preferred management option; however, if bracken is preventing woodlands reaching favourable status and impacts on bryophyte interest can be protected, then herbicide treatment can be considered. A bracken management plan will be drafted for each woodland block where it is considered a threat.

Cleaning: In areas where regeneration of non-native trees species is considered a threat to native woodland or where they identified as a constraint.

C.2.16 Other: Deer Management

The estate has embarked on a process of deer management which will ultimately reduce the deer density outside enclosures to below 3 and 4 deer per 100ha. Active management of deer is being carried out within enclosures with a focus on areas of woodlands within designated sites.

Habitat Impact Assessments (HIA) are being carried out across the whole estate and there will be extended into all woodland areas to inform on deer management requirements to achieve specific objectives of each woodland area/compartiment.

A monitoring regime using the Herbivore Impact Assessment techniques will be established to measure the success of proposed operations and to allow early intervention and action to remedy any threat to achieving movement towards favourable condition. Monitoring by estate staff will take place in year 2 and 4 of any SMF - funded period, using simplified methodology as per App 1 over locations to be agreed by FCS and SNH before survey commences.

Fence-lines will be checked regularly, at least once per month or after severe weather, by Estate staff to ensure break-ins are dealt with at the earliest possible time. More exposed fences will be checked more frequently as will those at risk from rock fall and windthrow. Minor repairs will be carried out by Estate staff or external fencing contractors if too large for staff to deal with.

Strategic deer fencing will be considered to create larger enclosures and offering opportunity to remove internal fencing when they become redundant. See Plan 4.

Consideration will be given to the formation of a steering group consisting of the Estate, FCS and SNH which would meet annually to consider the monitoring results and HIA assessments and to decide whether additional management inputs are required to achieve objectives and to direct the operations required and proposed activities in the SSSI/Natura designated



woodlands, not currently meeting 'favourable' condition and working towards bringing 100 per cent of the feature into 'favourable' condition, will help towards bringing 100 per cent of the feature into 'favourable' condition

C.3 Environmental Impact Assessment and Permitted Development Notifications

Please indicate the total area (hectares) for each project type and provide details as requested by sensitive or non-sensitive area.

Type of Project	Sensitive Area		Non-sensitive Area		Total
	%Con	%BL	%Con	%BL	
Afforestation	%Con	%BL	%Con	%BL	ha
Deforestation	%Con	%BL	%Con	%BL	ha
Forest Roads	ha		ha		ha
Quarries	ha		ha		ha
Provide further details on your project if required.					

C.4 Tolerance Table

	Map Required (Y/N)	Adjustment to felling period*	Adjustment to felling coupe boundaries**	Timing of Restocking	Changes to Restocking species	Changes to road lines	Designed open ground ***	Windblow Clearance* ***
FC Approval normally not required	N	Fell date can be moved within 5-year period where separation or other constraints are met	Up to 10% of coupe area	Up to 2 planting seasons after felling	Change within species group e.g. evergreen conifers or broadleaves		Increase by up to 5% of coupe area	
Approval by exchange of email and map	Y		Up to 15% of coupe area	Between 2 and 5 planting seasons after felling subject to the wider forest and habitat structure not being significantly compromised		Additional felling of trees not agreed in plan Departures of more than 60m in either direction from centre line of road	Increase by up to 10% Any reduction in open ground within coupe area	Up to 5 ha
Approval by formal plan amendment may be required	Y	Felling delayed into second or later 5-year period Advance felling into current or 2 nd 5-year period	More than 15% of coupe area	More than 5 planting seasons after felling subject to the wider forest and habitat structure not being significantly compromised	Change from specified native species Change between species group	As above, depending on sensitivity	More than 10% of coupe area Colonisation of open areas agreed as critical	More than 5 ha

Note

*Felling sequence must not compromise UKFS in particular felling coupe adjacency. Felling progress and impact will be reviewed against UKFS at 5 year review.

** No more than 1 ha, without consultation with FCS, where the location is defined as 'sensitive' within the Environmental Impact Assessment (Forestry) 1999 Regulations (EIA).

*** Tolerance subject to an overriding maximum of 20% designed open ground.

****Where windblow occurs, FCS must be informed of extent prior to clearance and consulted on clearance of any standing trees.

D. Production Forecast

Append your production forecast.

Appendices

Provide a list of appendices:

Item number	Title
Appendix 1	Scoping Papers
Appendix 2	Data Base
Appendix 3	Monitoring
Appendix 4	DMP
Appendix 5	New Woodland Creation
Plan 1	Location Plan
Plan 2	Context Plan
Plan 3a	Ulladail and Tom na Dubh Activity Plan
Plan 3b	Torr Molach and Garden Activity Plan
Plan 3c	East Lochaline Woodlands Activity Plan
Plan 3d	Inninmore Woodland Activity Plan
Plan 3e	Garbh Shlios Activity Plan
Plan 3f	Gleann Geall Activity Plan
Plan 3g	Savaray Activity Plan
Plan 4	Fencing Plan
Plan 5a	Torr Molach and West Lochaline Felling & Thinning Plan
Plan 5 b	Inninmore Felling and Thinning Plan
Plans 6a to 6f	Compartment Plans

Appendix 1

Scoping Report

Scoping Report

Part 1 – General Details

Property Name:	Ardtornish Estate
FGS number:	16FGS13337
Forest Plan area:	967 ha
Property Name:	Andrew Raven Ardtornish Woodland Settlement
FGS number:	15FGS00993
Forest Plan area:	436 ha
Property Name:	Ardtornish Woodland Creation Proposals
FGS number:	N/A
Proposed Forest area:	TBA
Type of scoping:	Written and Meeting

Assessment of local impacts and key issues

See key issues in Part 2 of Scoping Report

Name	Organisation	Response received	Attended Scoping Meeting
Ian Collier	FCS		Yes
Angus Robertson	Ardtornish Estate/ARAWS		Yes
Hugh Raven	Ardtornish Estate		No
Faith Raven	Ardtornish Estate		No
Anna Raven	Ardtornish Estate		Yes
Amanda Raven	ARAWS		Yes
Alan Kennedy	Ardtornish Estate		Yes
Simon Boulton	Ardtornish Estate		Yes
Miller Harris	Kirn Ltd		Yes
Norman O'Neil	RTS		Yes
Veronica Llorente	RTS		Yes
Lorraine Servant	SNH	Yes	Yes
Graeme Taylor	SNH	Yes	No
Grant Stuart	Highland Council Planning	Yes	No
Kirsty Cameron	Highland Council Archaeology	Yes	No
Mark Smith	Highland Council TEC Services	Yes	No
Jon Gibb	LDSFB	No	No
Susan Larson	Kingairloch Estate	Yes	Yes
Iain Thornber	Glensanda Estate	Yes	Yes
Jonathon Turner	Laudale Estate	Yes	No
Neil Roberts	Laudale Estate	Yes	Yes
Jonathon Greenhall	Glencrippesdale	Yes	No



Donald Kennedy	MCW and Neighbour	Yes	Yes
Aden MacCorkell	SEPA	Yes	No
Phil Dowling	RSPB	Yes	No
Christina Tracey	FES	No	Yes
Dr Kevin Grant	HES	Yes	No
Teresa Bolton	Morvern CC	No	No
Jim Bolton	Morvern CC	No	Yes
Alistair Firth	MCW and Rahoy HMC	Yes	Yes
Lilia Dobrokhodova	Morvern CDC	No	No
Michael Humphries	Beach Cottage	No	Yes
Peter Samson	Beach House	No	No
Peter Lawson	Kinloch Estate	Yes	No
Bruce Taylor	SWL/Kinloch Estate	No	No
Bill Rosier	Rahoy Estate	Yes	No
Mark Foxwell	SWT	No	Yes
Matt Wilson	Neighbour	Yes	Yes

Part 2 – Key Issues

Key Issues	Raised by	Detail any likely impact	Action(s) to be taken to address key issues and identify location within Forest Plan	Notes
Designated Sites in unfavourable condition declining	SNH (Lorraine Servant) RSPB	Herbivore impacts. Lack of understorey within woodlands Poor seedling performance and lack of recent successful regeneration Lack of structural diversity and species diversity Threat from non-native species Potential conflict between statutory site objectives and wider sporting objectives of neighbouring estates	Review of management processes with objective of bringing all Designated woodland sites towards favourable condition. Set up collaborative management systems to monitor woodlands and herbivore impacts. Reduction of herbivore impacts through creation and/or maintenance of enclosures. Carry out compensatory culls where there is a loss of deer range. Manage woodland in presence of deer where appropriate. Follow Joint Agency fencing guidelines. Design woodland enclosures to accommodate deer/stock management and to protect non-woodland habitats adjacent or within enclosures. Removal of fences when they become	SNH are a Statutory Consultee. There are several designated woodland sites within the Ardtornish Forest Plan. Site condition monitoring informed that woodland sites were in un-favourable condition declining due several factors including, herbivore impacts and invasive species. Current DMG Deer Management Plan had to be submitted. DMP will be reviewed every 2 years in collaboration with neighbours. Changes will be discussed with neighbours. DMP entered by Estate in good faith and it was not possible to include all the current plans as



Part 2 – Key Issues				
Key Issues	Raised by	Detail any likely impact	Action(s) to be taken to address key issues and identify location within Forest Plan	Notes
			<p>redundant.</p> <p>Regular inspection of fences and maintenance.</p> <p>Mark fences to mitigate potential for bird strikes. Fence design and layout to mitigate impacts on EPS.</p> <p>Amend agricultural management processes.</p> <p>Monitor woodlands and seedling performance. Monitor herbivore impacts.</p> <p>Encourage natural regeneration.</p> <p>Review DMP on regular basis against targets.</p> <p>Deadwood Retention Consider introduction of appropriate high forest trees and shrub species of local seed provenance where species diversity is poor/not present.</p> <p>Control non-native species.</p> <p>Train estate staff to manage and monitor woodlands.</p> <p>Manage woodland habitats to protect/improve invertebrate habitat</p>	<p>they were not developed. Estate will re-engage with DMG on matters arising from woodland plans</p> <p>Acknowledgement Estate has put a lot of work into control of non-native species.</p>
Protected Species	SNH; Matt Wilson, Iain Thornber	<p>Disturbance of protected species.</p> <p>Loss of habitat</p> <p>Damage to habitat</p>	<p>All works to meet UK Forestry Standards and current Forest and Water Guidelines</p> <p>Design of woodlands, timing of operations and design of infrastructure</p>	

Part 2 – Key Issues				
Key Issues	Raised by	Detail any likely impact	Action(s) to be taken to address key issues and identify location within Forest Plan	Notes
			<p>Surveys and monitoring</p> <p>Education and awareness</p>	
Flood Risk	SEPA	<p>Impacts on flow</p> <p>Sediment transport</p> <p>Culvert capacity</p> <p>Increase run-off</p> <p>Woody debris entering watercourses</p> <p>Roads crossing watercourses</p>	<p>All works to meet UK Forestry Standards and current Forest and Water Guidelines</p> <p>Design of forests and operational site management to mitigate potential impacts on water quality</p> <p>Design roads to have minimum impact on natural drainage patterns</p> <p>Design culverts that can deal with exceptional incidents.</p> <p>Design new bridges and culverts to have neutral or better impact on flood risk.</p> <p>Drains at no more than 2 degrees from level and terminate in sumps to intercept silt and debris. Terminate appropriate distance from perennial water courses</p> <p>Regular inspection of culverts and drains</p> <p>All operations to comply with Water Environment (Controlled Activities) (Scotland) Regulations (CAR)</p>	
River Basin Management Planning	SEPA. Matt Wilson	<p>Potential impacts on fisheries</p> <p>All waterbodies within the catchment area of forest plans and planting proposals are at less than good ecological</p>	<p>All works to meet UK Forestry Standards and current Forest and Water Guidelines</p> <p>Design of forests and operational site management to mitigate potential impacts on water quality.</p>	

Part 2 – Key Issues				
Key Issues	Raised by	Detail any likely impact	Action(s) to be taken to address key issues and identify location within Forest Plan	Notes
		<p>condition/potential.</p> <p>Potential to deliver environmental improvement</p> <p>Non-native species</p> <p>Riparian edges</p>	<p>Removal of inappropriately designed or redundant structures such as culverts which restrict fish passage.</p> <p>Design forest riparian zones to minimise impacts and improve water quality</p> <p>Removal of non-native species such as rhododendron, Himalayan Balsam and Japanese knotweed where present.</p> <p>Monitor forest and infrastructure to mitigate risk.</p> <p>All operations to comply with Water Environment (Controlled Activities) (Scotland) Regulations (CAR)</p>	
Felling and replanting proposals	SEPA	Impacts of forest operations on the water environment.	<p>All works to meet UK Forestry Standards and current Forest and Water Guidelines.</p> <p>Design of forests and operational site management to mitigate potential impacts on water quality</p> <p>Consider timing and scale of operations to mitigate impacts on people and wildlife.</p> <p>Felling, restocking and new planting will adhere to good forest design guidance.</p> <p>Monitoring of operations</p> <p>Operator training</p> <p>Pollution control measures on site during operations</p>	

Part 2 – Key Issues				
Key Issues	Raised by	Detail any likely impact	Action(s) to be taken to address key issues and identify location within Forest Plan	Notes
			<p>All operations to comply with Water Environment (Controlled Activities) (Scotland) Regulations (CAR)</p> <p>FCS Guidance Note 35 in respect of marginal sites will be used.</p>	
New supporting infrastructure	SEPA/FES, Iain Thornber, Matt Wilson	<p>Engineering activities in water environment</p> <p>Use of severely constrained public road infrastructure</p> <p>Impact on EPS</p> <p>Access</p>	<p>All operations to comply with Water Environment (Controlled Activities) (Scotland) Regulations (CAR)</p> <p>All works to meet UK Forestry Standards and current Forest and Water Guidelines.</p> <p>Plan to include details of new infrastructure at appropriate scale</p> <p>Potential use of FES internal access (Doire nam Mart)</p> <p>Location and extent of internal road lines and timber transfer points.</p> <p>Interface with public roads</p> <p>EPS survey, appropriate design and protection and monitoring. Operation Licencing if required</p> <p>Follow current forest guidelines</p> <p>Access provision of gates and stiles.</p> <p>Consider all abilities access</p>	
Carbon balance and impacts on peat	SEPA RSPB	Impact on peatland and potential for loss of carbon storage potential and habitat	All works to meet UK Forestry Standards and current Forest and Water Guidelines.	



Part 2 – Key Issues				
Key Issues	Raised by	Detail any likely impact	Action(s) to be taken to address key issues and identify location within Forest Plan	Notes
Peatland habitats			<p>New planting and restocking to comply with Supplementary Guidance to support the FC Forestry and Peatland Habitats Guidance</p> <p>Peat depth surveys to be included in plans/applications.</p> <p>Location and design of planting to be agreed with FCS</p> <p>Forest operations to be designed and planned to ensure that hydrology of any adjacent peatland habitats is not compromised. Consider peatland restoration where re-forestation does not improve carbon balance</p> <p>Design forests which meet Scottish Government carbon sequestration objectives</p> <p>Restocking to maintain carbon sink potential of woodlands</p>	
Impact on Wetlands	SEPA	<p>Sensitivity of downstream waterbodies and wetlands to reduction of water quantity from new woodland.</p> <p>Impacts on GWDTE's</p>	<p>All works to meet UK Forestry Standards and current Forest and Water Guidelines.</p> <p>New planting and restocking to comply with Supplementary Guidance to support the FC Forestry and Peatland Habitats Guidance</p> <p>Peat depth surveys to be included in plans/applications.</p> <p>Location and design of planting to be agreed with FCS</p>	

Part 2 – Key Issues				
Key Issues	Raised by	Detail any likely impact	Action(s) to be taken to address key issues and identify location within Forest Plan	Notes
			<p>Forest operations to be designed and planned to ensure that hydrology of any adjacent peatland habitats is not compromised.</p> <p>Consider planting native broadleaves where this will protect/improve wetland habitats.</p> <p>Avoid planting springs/flushes and bogs. (M6 and M10 habitat sites)</p>	
Use of waste on site including felling waste	SEPA	Felling to waste or felling to abandon sites	<p>Follow SEPA Guidance Management of Forest Waste</p> <p>All works to meet UK Forestry Standards and current Forest and Water Guidelines.</p>	
Pollution prevention and environmental management	SEPA	Pollution due to forest operations	<p>All works to meet UK Forestry Standards and current Forest and Water Guidelines and best practice</p> <p>All works to follow Pollution prevention guidelines</p> <p>Engineering activities in or adjacent to water environment to obtain CAR authorisation.</p> <p>Forest operations to be designed and planned to ensure that any adjacent water environment habitats are not compromised.</p>	
Deer Fencing	SNH, RSPB, Matt Wilson	Bird Strikes	<p>All works to meet UK Forestry Standards and current forest guidelines.</p> <p>Short, medium and long term fencing strategy will be used to identify requirement</p>	



Part 2 – Key Issues				
Key Issues	Raised by	Detail any likely impact	Action(s) to be taken to address key issues and identify location within Forest Plan	Notes
			<p>for new fences and removal of redundant fences</p> <p>Plan fence lines in accordance with Joint Agency guidelines</p> <p>Marking of deer fences over life of fences where there is risk of bird strikes</p> <p>Remove deer fences when redundant/end of life</p> <p>Fence lines to be sensitive to requirements of Black grouse/raptors/deer/stock</p>	
Raptors	SNH, RSPB, M Wilson, FES	Impacts on breeding raptors	<p>All works to meet UK Forestry Standards and current forest guidelines.</p> <p>Liaise with SNH, RSPB and local Raptor Groups and contractors.</p> <p>Restoration of Atlantic oak wood</p> <p>Design woodland to improve potential for prey</p> <p>Maintain network of open space/hunting corridors</p> <p>Cold search for nesting/roosting sites prior to operations</p> <p>Timing of operations to avoid main nesting periods</p>	
Wading Birds	RSPB	Displacement of wading birds due to hard forest edges	<p>All works to meet UK Forestry Standards and current forest guidelines.</p> <p>Avoid hard forest edges.</p> <p>Use of shrub species along forest edges.</p>	

Part 2 – Key Issues				
Key Issues	Raised by	Detail any likely impact	Action(s) to be taken to address key issues and identify location within Forest Plan	Notes
Biosecurity	FCS/FES	Rhododendron host to PR Timber movement Access	All works to meet UK Forestry Standards and current forest guidelines. Remove all rhododendron Follow current FCS Biosecurity guidelines Education and awareness of staff/contractor/public about risk to forests and to promote the “Keep it Clean” guidance Follow PR Guidance Monitoring of threats Improving forest resilience through species diversity and health. Maintain forest vigour. Matching species selection to site. Use of ESC to confirm suitability of species use.	
Archaeology and Historic Environment	HES; HC; Glensanda Estate (Iain Thornber). Jenny Robertson; Ian Collier	Scheduled Monuments Gardens and Designed Landscape	All works to meet UK Forestry Standards and current Forest & Archaeology guidelines. Scheduled Monument Consents where required Pre-operational surveys and report any features found to appropriate authority Appropriate buffers set out and notified to contractors. Follow HES site specific advice. Strategic plan for management	
Deer Management	SNH; RSPB; Kingairloch	DMG DMP and commitment to	All works to meet UK Forestry Standards and	

Part 2 – Key Issues

Key Issues	Raised by	Detail any likely impact	Action(s) to be taken to address key issues and identify location within Forest Plan	Notes
	Estate (Susan Larson); Glensanda Estate (Iain Thornber); Laudale Estate (Neil Roberts); Kinloch Estate (Peter Lawson); SWT (Mark Foxwell) Carnoch Estate (Stephen Fox): MCW (Alisdair Firth & Donald Kennedy); Rahoy Hills SWT (Alisdair Firth) Ardtornish Estate (Alan Kennedy & Simon Boulton)	protection of designated sites Grazing impacts on designated woodland sites Damage to woodlands Road safety Animal welfare Constraints on deer movement Loss of deer range Cumulative impacts (Neighbouring estate operations) Commercial impact on neighbours Scale of proposals	current forest guidelines. Follow SNH Best Practice Bring deer populations in line with carrying capacity of available range Fence designated sites and carry out compensatory culls. Fence design to include adequate open ground to allow control within enclosures Regular fence maintenance Consider rotational fencing to maintain important deer range and wintering grounds. Liaise with DMG in respect of culls and potential impacts on deer populations. Revise Group DMP as required Amend agricultural practices outside woodlands to accommodate loss of range Hold new deer fences back from public roads and design and locate fences with special reference to road safety. Create well designed access routes between woodland blocks to allow migration Remove deer fences when they become redundant Consider leaving areas of commercial woodland unfenced to compensate for	



Part 2 – Key Issues				
Key Issues	Raised by	Detail any likely impact	Action(s) to be taken to address key issues and identify location within Forest Plan	Notes
			loss of range through new planting	
Community Interests	MCC (Jim Bolton); MCW (Alisdair Firth and Donald Kennedy)	Community benefit from woodland management and woodland creation	<p>Consultation on woodland proposals and availability to discuss proposals/actions with stakeholders.</p> <p>Regular stakeholder meetings</p> <p>Access and forest management interactions</p> <p>Support local woodland and processing interests through collaborative projects</p> <p>Plan woodland operations to minimise disruption, in particular timber transport Protect ROW's</p> <p>Interpretation and promotion of woodland resource to benefit wider community tourist interests.</p> <p>Educational projects with local schools</p> <p>Processing and Marketing of non-timber woodland products locally</p>	
Road traffic	Ian Collier, Mark Smith HC TEC Services; Morvern CC	A884 a Consultation Route Road Safety	<p>Liaise with HC prior to proposed timber movements.</p> <p>Follow HTTG guidelines</p> <p>Follow Joint Agency Guidelines in respect of locating and alignment of fences</p>	



Consultee Responses

Ardtornish LTFP

Contract 16FGS13337

Appendix 1

Scoping Report



Scoping Report

Part 1 – General Details

Property Name:	Ardtornish Estate
FGS number:	16FGS13337
Forest Plan area:	967 ha
Property Name:	Andrew Raven Ardtornish Woodland Settlement
FGS number:	15FGS00993
Forest Plan area:	436 ha
Property Name:	Ardtornish Woodland Creation Proposals
FGS number:	N/A
Proposed Forest area:	TBA
Type of scoping:	Written and Meeting

Assessment of local impacts and key issues

See key issues in Part 2 of Scoping Report

Name	Organisation	Response received	Attended Scoping Meeting
Ian Collier	FCS		Yes
Angus Robertson	Ardtornish Estate/ARAWS		Yes
Hugh Raven	Ardtornish Estate		No
Faith Raven	Ardtornish Estate		No
Anna Raven	Ardtornish Estate		Yes
Amanda Raven	ARAWS		Yes
Alan Kennedy	Ardtornish Estate		Yes
Simon Boulton	Ardtornish Estate		Yes
Miller Harris	Kirn Ltd		Yes
Norman O'Neil	RTS		Yes
Veronica Llorente	RTS		Yes
Lorraine Servant	SNH	Yes	Yes
Graeme Taylor	SNH	Yes	No
Grant Stuart	Highland Council Planning	Yes	No
Kirsty Cameron	Highland Council Archaeology	Yes	No
Mark Smith	Highland Council TEC Services	Yes	No
Jon Gibb	LDSFB	No	No
Susan Larson	Kingairloch Estate	Yes	Yes
Iain Thornber	Glensanda Estate	Yes	Yes



Jonathon Turner	Laudale Estate	Yes	No
Neil Roberts	Laudale Estate	Yes	Yes
Jonathon Greenhall	Glencrippesdale	Yes	No
Donald Kennedy	MCW and Neighbour	Yes	Yes
Aden MacCorkell	SEPA	Yes	No
Phil Dowling	RSPB	Yes	No
Christina Tracey	FES	No	Yes
Dr Kevin Grant	HES	Yes	No
Teresa Bolton	Morvern CC	No	No
Jim Bolton	Morvern CC	No	Yes
Alistair Firth	MCW and Rahoy HMC	Yes	Yes
Lilia Dobrokhodova	Morvern CDC	No	No
Michael Humphries	Beach Cottage	No	Yes
Peter Samson	Beach House	No	No
Peter Lawson	Kinloch Estate	Yes	No
Bruce Taylor	SWL/Kinloch Estate	No	No
Bill Rosier	Rahoy Estate	Yes	No
Mark Foxwell	SWT	No	Yes
Matt Wilson	Neighbour	Yes	Yes

Part 2 – Key Issues				
Key Issues	Raised by	Detail any likely impact	Action(s) to be taken to address key issues and identify location within Forest Plan	Notes
Designated Sites in unfavourable condition declining	SNH (Lorraine Servant) RSPB	<p>Herbivore impacts.</p> <p>Lack of understorey within woodlands</p> <p>Poor seedling performance and lack of recent successful regeneration</p> <p>Lack of structural diversity and species diversity</p> <p>Threat from non-native species</p> <p>Potential conflict between statutory site objectives and wider sporting objectives of neighbouring estates</p>	<p>Review of management processes with objective of bringing all Designated woodland sites towards favourable condition.</p> <p>Set up collaborative management systems to monitor woodlands and herbivore impacts.</p> <p>Reduction of herbivore impacts through creation and/or maintenance of enclosures.</p> <p>Carry out compensatory culls where there is a loss of deer range. Manage woodland in presence of deer where appropriate.</p> <p>Follow Joint Agency fencing guidelines. Design woodland enclosures to accommodate deer/stock management and to protect non-woodland habitats adjacent or within enclosures. Removal of fences when they become redundant.</p> <p>Regular inspection of fences and maintenance.</p> <p>Mark fences to mitigate potential for bird strikes. Fence design and layout to mitigate impacts on EPS.</p> <p>Amend agricultural management processes.</p>	<p>SNH are a Statutory Consultee.</p> <p>There are several designated woodland sites within the Ardtornish Forest Plan. Site condition monitoring informed that woodland sites were in unfavourable condition declining due several factors including, herbivore impacts and invasive species.</p> <p>Current DMG Deer Management Plan had to be submitted. DMP will be reviewed every 2 years in collaboration with neighbours. Changes will be discussed with neighbours.</p> <p>DMP entered by Estate in good faith and it was not possible to include all the current plans as they were not developed. Estate will re-engage with DMG on</p>



Part 2 – Key Issues				
Key Issues	Raised by	Detail any likely impact	Action(s) to be taken to address key issues and identify location within Forest Plan	Notes
			<p>Monitor woodlands and seedling performance. Monitor herbivore impacts.</p> <p>Encourage natural regeneration.</p> <p>Review DMP on regular basis against targets.</p> <p>Deadwood Retention Consider introduction of appropriate high forest trees and shrub species of local seed provenance where species diversity is poor/not present.</p> <p>Control non-native species.</p> <p>Train estate staff to manage and monitor woodlands.</p> <p>Manage woodland habitats to protect/improve invertebrate habitat</p>	<p>matters arising from woodland plans</p> <p>Acknowledgement Estate has put a lot of work into control of non-native species.</p>
Protected Species	SNH; Matt Wilson, Iain Thornber	<p>Disturbance of protected species.</p> <p>Loss of habitat</p> <p>Damage to habitat</p>	<p>All works to meet UK Forestry Standards and current Forest and Water Guidelines</p> <p>Design of woodlands, timing of operations and design of infrastructure</p> <p>Surveys and monitoring</p> <p>Education and awareness</p>	

Part 2 – Key Issues				
Key Issues	Raised by	Detail any likely impact	Action(s) to be taken to address key issues and identify location within Forest Plan	Notes
Flood Risk	SEPA	<p>Impacts on flow</p> <p>Sediment transport</p> <p>Culvert capacity</p> <p>Increase run-off</p> <p>Woody debris entering watercourses</p> <p>Roads crossing watercourses</p>	<p>All works to meet UK Forestry Standards and current Forest and Water Guidelines</p> <p>Design of forests and operational site management to mitigate potential impacts on water quality</p> <p>Design roads to have minimum impact on natural drainage patterns</p> <p>Design culverts that can deal with exceptional incidents.</p> <p>Design new bridges and culverts to have neutral or better impact on flood risk.</p> <p>Drains at no more than 2 degrees from level and terminate in sumps to intercept silt and debris. Terminate appropriate distance from perennial water courses</p> <p>Regular inspection of culverts and drains</p> <p>All operations to comply with Water Environment (Controlled Activities) (Scotland) Regulations (CAR)</p>	
River Basin Management Planning	SEPA. Matt Wilson	<p>Potential impacts on fisheries</p> <p>All waterbodies within the catchment area of forest plans</p>	<p>All works to meet UK Forestry Standards and current Forest and Water Guidelines</p>	



Part 2 – Key Issues				
Key Issues	Raised by	Detail any likely impact	Action(s) to be taken to address key issues and identify location within Forest Plan	Notes
		<p>and planting proposals are at less than good ecological condition/potential.</p> <p>Potential to deliver environmental improvement</p> <p>Non-native species</p> <p>Riparian edges</p>	<p>Design of forests and operational site management to mitigate potential impacts on water quality.</p> <p>Removal of inappropriately designed or redundant structures such as culverts which restrict fish passage.</p> <p>Design forest riparian zones to minimise impacts and improve water quality</p> <p>Removal of non-native species such as rhododendron, Himalayan Balsam and Japanese knotweed where present.</p> <p>Monitor forest and infrastructure to mitigate risk.</p> <p>All operations to comply with Water Environment (Controlled Activities) (Scotland) Regulations (CAR)</p>	
Felling and replanting proposals	SEPA	Impacts of forest operations on the water environment.	<p>All works to meet UK Forestry Standards and current Forest and Water Guidelines.</p> <p>Design of forests and operational site management to mitigate potential impacts on water quality</p> <p>Consider timing and scale of operations to mitigate impacts on people and wildlife.</p>	



Part 2 – Key Issues				
Key Issues	Raised by	Detail any likely impact	Action(s) to be taken to address key issues and identify location within Forest Plan	Notes
			<p>Felling, restocking and new planting will adhere to good forest design guidance.</p> <p>Monitoring of operations</p> <p>Operator training</p> <p>Pollution control measures on site during operations</p> <p>All operations to comply with Water Environment (Controlled Activities) (Scotland) Regulations (CAR)</p> <p>FCS Guidance Note 35 in respect of marginal sites will be used.</p>	
New supporting infrastructure	SEPA/FES, Iain Thornber, Matt Wilson	<p>Engineering activities in water environment</p> <p>Use of severely constrained public road infrastructure</p>	<p>All operations to comply with Water Environment (Controlled Activities) (Scotland) Regulations (CAR)</p> <p>All works to meet UK Forestry Standards and current Forest and Water Guidelines.</p> <p>Plan to include details of new infrastructure at appropriate scale</p> <p>Potential use of FES internal access (Doire nam Mart)</p>	



Part 2 – Key Issues				
Key Issues	Raised by	Detail any likely impact	Action(s) to be taken to address key issues and identify location within Forest Plan	Notes
		Impact on EPS Access	Location and extent of internal road lines and timber transfer points. Interface with public roads EPS survey, appropriate design and protection and monitoring. Operation Licencing if required Follow current forest guidelines Access provision of gates and stiles. Consider all abilities access	
Carbon balance and impacts on peat Peatland habitats	SEPA RSPB	Impact on peatland and potential for loss of carbon storage potential and habitat	All works to meet UK Forestry Standards and current Forest and Water Guidelines. New planting and restocking to comply with Supplementary Guidance to support the FC Forestry and Peatland Habitats Guidance Peat depth surveys to be included in plans/applications. Location and design of planting to be agreed with FCS Forest operations to be designed and planned to ensure that hydrology of any adjacent peatland habitats is not compromised.	



Part 2 – Key Issues				
Key Issues	Raised by	Detail any likely impact	Action(s) to be taken to address key issues and identify location within Forest Plan	Notes
			<p>Consider peatland restoration where re-forestation does not improve carbon balance</p> <p>Design forests which meet Scottish Government carbon sequestration objectives</p> <p>Restocking to maintain carbon sink potential of woodlands</p>	
Impact on Wetlands	SEPA	<p>Sensitivity of downstream waterbodies and wetlands to reduction of water quantity from new woodland.</p> <p>Impacts on GWDTE's</p>	<p>All works to meet UK Forestry Standards and current Forest and Water Guidelines.</p> <p>New planting and restocking to comply with Supplementary Guidance to support the FC Forestry and Peatland Habitats Guidance</p> <p>Peat depth surveys to be included in plans/applications.</p> <p>Location and design of planting to be agreed with FCS</p> <p>Forest operations to be designed and planned to ensure that hydrology of any adjacent peatland habitats is not compromised.</p> <p>Consider planting native broadleaves where this will protect/improve wetland habitats.</p>	



Part 2 – Key Issues				
Key Issues	Raised by	Detail any likely impact	Action(s) to be taken to address key issues and identify location within Forest Plan	Notes
			Avoid planting springs/flushes and bogs. (M6 and M10 habitat sites)	
Use of waste on site including felling waste	SEPA	Felling to waste or felling to abandon sites	Follow SEPA Guidance Management of Forest Waste All works to meet UK Forestry Standards and current Forest and Water Guidelines.	
Pollution prevention and environmental management	SEPA	Pollution due to forest operations	All works to meet UK Forestry Standards and current Forest and Water Guidelines and best practice All works to follow Pollution prevention guidelines Engineering activities in or adjacent to water environment to obtain CAR authorisation. Forest operations to be designed and planned to ensure that any adjacent water environment habitats are not compromised.	
Deer Fencing	SNH, RSPB, Matt Wilson	Bird Strikes	All works to meet UK Forestry Standards and current forest guidelines. Short, medium and long term fencing strategy will be used to identify requirement for new fences and removal of redundant fences Plan fence lines in accordance with Joint Agency guidelines	

Part 2 – Key Issues				
Key Issues	Raised by	Detail any likely impact	Action(s) to be taken to address key issues and identify location within Forest Plan	Notes
			<p>Marking of deer fences over life of fences where there is risk of bird strikes</p> <p>Remove deer fences when redundant/end of life</p> <p>Fence lines to be sensitive to requirements of Black grouse/raptors/deer/stock</p>	
Raptors	SNH, RSPB, M Wilson, FES	Impacts on breeding raptors	<p>All works to meet UK Forestry Standards and current forest guidelines.</p> <p>Liaise with SNH, RSPB and local Raptor Groups and contractors.</p> <p>Restoration of Atlantic oak wood</p> <p>Design woodland to improve potential for prey</p> <p>Maintain network of open space/hunting corridors</p> <p>Cold search for nesting/roosting sites prior to operations</p> <p>Timing of operations to avoid main nesting periods</p>	
Wading Birds	RSPB	Displacement of wading birds due to hard forest edges	<p>All works to meet UK Forestry Standards and current forest guidelines.</p> <p>Avoid hard forest edges.</p>	



Part 2 – Key Issues				
Key Issues	Raised by	Detail any likely impact	Action(s) to be taken to address key issues and identify location within Forest Plan	Notes
			Use of shrub species along forest edges.	
Biosecurity	FCS/FES	Rhododendron host to PR Timber movement Access	All works to meet UK Forestry Standards and current forest guidelines. Remove all rhododendron Follow current FCS Biosecurity guidelines Education and awareness of staff/contractor/public about risk to forests and to promote the “Keep it Clean” guidance Follow PR Guidance Monitoring of threats Improving forest resilience through species diversity and health. Maintain forest vigour. Matching species selection to site. Use of ESC to confirm suitability of species use.	
Archaeology and Historic Environment	HES; HC; Glensanda Estate (Iain Thornber). Jenny Robertson; Ian Collier	Scheduled Monuments Gardens and Designed Landscape	All works to meet UK Forestry Standards and current Forest & Archaeology guidelines. Scheduled Monument Consents where required Pre-operational surveys and report any features found to appropriate authority	



Part 2 – Key Issues				
Key Issues	Raised by	Detail any likely impact	Action(s) to be taken to address key issues and identify location within Forest Plan	Notes
			<p>Appropriate buffers set out and notified to contractors.</p> <p>Follow HES site specific advice.</p> <p>Strategic plan for management</p>	
Deer Management	SNH; RSPB; Kingairloch Estate (Susan Larson); Glensanda Estate (Iain Thornber); Laudale Estate (Neil Roberts); Kinloch Estate (Peter Lawson); SWT (Mark Foxwell) Carnoch Estate (Stephen Fox); MCW (Alisdair Firth & Donald Kennedy); Rahoy Hills SWT (Alisdair Firth) Ardtornish Estate (Alan Kennedy & Simon Boulton)	<p>DMG DMP and commitment to protection of designated sites</p> <p>Grazing impacts on designated woodland sites</p> <p>Damage to woodlands</p> <p>Road safety</p> <p>Animal welfare</p> <p>Constraints on deer movement</p> <p>Loss of deer range</p> <p>Cumulative impacts (Neighbouring estate operations)</p> <p>Commercial impact on neighbours</p>	<p>All works to meet UK Forestry Standards and current forest guidelines.</p> <p>Follow SNH Best Practice</p> <p>Bring deer populations in line with carrying capacity of available range</p> <p>Fence designated sites and carry out compensatory culls.</p> <p>Fence design to include adequate open ground to allow control within enclosures</p> <p>Regular fence maintenance</p> <p>Consider rotational fencing to maintain important deer range and wintering grounds.</p> <p>Liaise with DMG in respect of culls and potential impacts on deer populations.</p>	



Part 2 – Key Issues				
Key Issues	Raised by	Detail any likely impact	Action(s) to be taken to address key issues and identify location within Forest Plan	Notes
		Scale of proposals	<p>Revise Group DMP as required</p> <p>Amend agricultural practices outside woodlands to accommodate loss of range</p> <p>Hold new deer fences back from public roads and design and locate fences with special reference to road safety.</p> <p>Create well designed access routes between woodland blocks to allow migration</p> <p>Remove deer fences when they become redundant</p> <p>Consider leaving areas of commercial woodland unfenced to compensate for loss of range through new planting</p>	
Community Interests	MCC (Jim Bolton); MCW (Alisdair Firth and Donald Kennedy)	Community benefit from woodland management and woodland creation	<p>Consultation on woodland proposals and availability to discuss proposals/actions with stakeholders.</p> <p>Regular stakeholder meetings</p> <p>Access and forest management interactions</p> <p>Support local woodland and processing interests through collaborative projects</p> <p>Plan woodland operations to minimise disruption, in particular timber transport</p>	



Part 2 – Key Issues				
Key Issues	Raised by	Detail any likely impact	Action(s) to be taken to address key issues and identify location within Forest Plan	Notes
			<p>Protect ROW's</p> <p>Interpretation and promotion of woodland resource to benefit wider community tourist interests.</p> <p>Educational projects with local schools</p> <p>Processing and Marketing of non-timber woodland products locally</p>	
Road traffic	Ian Collier, Mark Smith HC TEC Services; Morvern CC	A884 a Consultation Route Road Safety	<p>Liaise with HC prior to proposed timber movements.</p> <p>Follow HTTG guidelines</p> <p>Follow Joint Agency Guidelines in respect of locating and alignment of fences</p>	

Data Field				Woodland Type											Total	
LPID ID	Compt Number	Woodland Name	Gross LPID Area	LPID	Sitka spruce	NBL New Planting	Mixed Conifer/Broadleaf	Non Native Broadleaf	Mixed Native Broadleaf	Designed Open Ground	Mixed Conifer	Scots pine	Native Broadleaf/N	Other land/Way-leaves		Potential Regen Areas
11	9	Andrews Wood	9.85	NM/68767/44467		5.02			2.62	1.31			0.65	0.11		9.71
62	9	Andrews Wood	21.42	NM/68911/43989		16.36				3.01	2.07			0.83		22.27
98	9	Andrews Wood	14.51	NM/69195/44003		6.87				2.1						8.97
6	6	Arianas & Glean Dhu (west)	2274.04	NM/69848/53558					21.05							21.05
83	83	Arianas & Glean Dhu (west)	10.77	NM/69983/50588					0.1							0.1
100	100	Arianas & Glean Dhu (west)	24.04	NM/69474/51035					3.71							3.71
87	5	Clac Mhor	6274.45	NM/75618/48517					22.86							22.86
1016	5	Clac Mhor	0.86				0.86									0.86
1029	5	Clac Mhor	0.23				0.23									0.23
1017	5	Clac Mhor	0.35						0.35							0.35
1028	5	Clac Mhor	0.13						0.13							0.13
43	42	Clounlaid 1 NP	12.59	NM/74735/51839	7.1	2.82				2.68						12.6
42	43	Clounlaid 2 NP	7.68	NM/74860/52356	2.52	3.23				1.93						7.68
59	59	Clounlaid 3 NP	21.29	NM/75617/53669	9.75	4.54				2.9						17.19
1023	6	East Lochaline	0.02						0.02							0.02
36	6	East Lochaline	107.14	NM/69564/45831					57.86	44.78			1.18			103.82
46	6	East Lochaline	1429.25	NM/71399/44776					1.59	10.78						12.37
53	6	East Lochaline	1.51	NM/69923/46764						0.35						0.35
104	8	Garbh Shlios	1000.34	NM/76072/42356					100.8	8.37			212.29	555.66	215.95	1093.07
35	11	Garden and Achrannich	2.04	NM/70440/47139					0.06							0.06
52	11	Garden and Achrannich	1.69	NM/70413/47262					0.37							0.37
1015	11	Garden and Achrannich	7.97				7.97									7.97
1018	11	Garden and Achrannich	0.69				0.69									0.69
1019	11	Garden and Achrannich	2.8				2.8									2.8
1027	11	Garden and Achrannich	0.64				0.64									0.64
1020	11	Garden and Achrannich	0.9						0.9							0.9
1022	11	Garden and Achrannich	0.31						0.31							0.31
1024	11	Garden and Achrannich	0.37						0.37							0.37
1021	11	Garden and Achrannich	0.02							0.02						0.02
17	10	Larach Beag	18.62	NM/69653/48590			2.85									2.85
28	28	Gleann Geall RDP NP	3.14	NM/76656/50258		2.05				1.2						3.25
56	56	Gleann Geall RDP NP	17.95	NM/75139/51276		10.02				7.94						17.96
68	68	Gleann Geall RDP NP	24.40	NM/77229/53148		15.75			2.06	5.09			1.57			24.47
85	85	Gleann Geall RDP NP	16.88	NM/76114/50649				14.54					2.34			16.88
86	86	Gleann Geall RDP NP	0.45	NM/75011/50528		14.54				2.81						17.35
94	94	Gleann Geall RDP NP	13.90	NM/74194/49986		10.25			0.38	2.34						12.97
113	113	Gleann Geall RDP NP	11.62	NM/76346/53064		7.83			0.03	3.79						11.65
121	121	Gleann Geall RDP NP	0.87	NM/74931/50452		0.77				0.09						0.86
27	7	Inninmore	181.76	NM/69411/43463					67.88	13.9			56.81	43.89	13.11	195.59
77	13c	Old Ardnish	2.36	NM/69070/43011					0.13							0.13
25	13c	Am Moidar	18.62	NM/68448/44495					5.01							5.01
27a	13c	Old Ardnish	21.11	NM/69411/43463				2.93	0.09							3.02
61	13c	Pier	4.03	NM/68225/44494					1.16							1.16
1001	13b	Savaray	6.51						6.51							6.51
1002	13b	Savaray	0.16						0.16							0.16
1003	13b	Savaray	0.58						0.58							0.58
38	13b	Savary	23.85	NM/65943/44852						0.31						0.31
95	13b	Savary	4.55	NM/65395/45229					0.54	3.69						4.23
108	13b	Savary	3.55	NM/64504/45361					0.53							0.53
111	13b	Savary	13.98	NM/64242/45968					0.34							0.34
112	13b	Savary	14.10	NM/64981/45169					2.81							2.81
120	13b	Savary	50.13	NM/67064/44607					1.46							1.46
15	13b	Savary	10.96	NM/65699/45124					0.7							0.7
48	13a	Strath Shuardail	13.99	NM/68690/46812					1.35							1.35
1025	13a	Strath Shuardail	1.59						1.59							1.59
8	2	Tom na Dubh	10.95	NM/70891/47066					0.78							0.78
60	2	Tom na Dubh	93.70	NM/70855/50086		30.68			22.74				27.18	12.12		92.72
72	2	Tom na Dubh	11.04	NM/69986/50053					2.66							2.66
																0

Woodland Type												Total
Sitka spruce	NBL New Planting	Mixed Conifer/Broadleaf	Non Native Broadleaf	Mixed Native Broadleaf	Designed Open Ground	Mixed Conifer	Scots pine	Native Broadleaf /NN	Other land/Way-leaves	Potential Regen Areas		
0	28.25	0	0	2.62	6.42	2.07	0	0.65	0.94	0	40.95	
0	0	0	0	24.86	0	0	0	0	0	0	24.86	
0	0	1.09	0	23.34	0	0	0	0	0	0	24.43	
19.37	10.59	0	0	0	7.51	0	0	0	0	0	37.47	
0	0	0	0	59.47	55.91	0	0	0	1.18	0	116.56	
0	0	0	0	100.8	8.37	0	0	212.29	555.66	215.95	1093.07	
0	0	12.1	0	2.01	0	0.02	0	0	0	0	14.13	
0	0	2.85	0	0	0	0	0	0	0	0	2.85	
0	61.21	0	14.54	2.47	23.26	0	0	2.34	1.57	0	105.39	
0	0	0	0	67.88	13.9	0	0	56.81	43.89	13.11	195.59	
0	0	0	2.93	6.39	0	0	0	0	0	0	9.32	
0	0	0	0	12.93	3.69	0.31	0	0	0	0	16.93	
0	0	0	0	2.94	0	0	0	0	0	0	2.94	
0	30.68	0	0	26.18	0	0	0	27.18	12.12	0	96.16	

Ardtornish LTFP

Contract 16FGS13337

Appendix 3

Monitoring

Assessing Herbivore Impact in Woodlands: A Subjective Method

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28 October 2014

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How to use this guide

All the information needed to carry out an assessment is contained in this guide however, within the guide, there are links to online documents, web pages and photo galleries that provide supporting information. To go to the document, page, or photo gallery position your mouse over the highlighted text, hold down the Ctrl key and click. We suggest that you read the whole document then copy and paste the Field Guide and Field Sheet ([pages 5-9](#)) into a separate document that you can then tailor to your specific needs.

Background

The Woodland Herbivore Impact Assessment Method is a method of assessing and monitoring the impact of large herbivores (cattle, sheep, deer, goats, pigs, horses) on habitats that are already wooded or may develop woodland. The method is subjective in that it is based on observations, not detailed measurements. Instead it depends on the observer paying close attention to the overall appearance of the habitat as well as to particular indicators within the habitat. The method is suitable for land managers wishing to monitor herbivore impacts on a regular basis with the aim of adjusting herbivore pressure, either by deer culling, or by adjusting the stock grazing regime, to achieve a particular woodland condition target.

Overview

The method described here involves looking at:

1. **woodland structure**
2. **current herbivore impacts**

Both of these indicators need to be determined whether or not the woodland is currently in an acceptable condition since, as well as helping to assess current condition, they will help to gauge how it might change in the future under current grazing /browsing levels.

Woodland structure reflects current and past impacts on the woodland, including those of large herbivores, and is a good indicator of current habitat condition. Table 1 provides definitions of the ten woodland and open ground structure classes used in the [Woodland Grazing Toolbox](#). Structure classes 1 and 2 are [open ground habitats](#), classes 3 to 8 are [native woodland habitats](#) and classes 9 and 10 are [wood pasture and parkland habitats](#). These definitions can be used to determine the structure class of any woodland or open ground area. Past herbivore impacts probably played a major role in determining current structure class. For example, classes 2 and 3 suggest low past herbivore impact whereas class 6, and especially class 8, suggest high to very high past herbivore impact.

Current herbivore impacts play a major role in determining how the woodland is going to change in the future. Table 2 describes the impact of browsing and /or grazing, at a number of levels from absent to very high, on seven indicators:

1. Basal shoots
2. Epicormic /lower shoots
3. Bark stripping and stem breakage
4. Seedlings /saplings.
5. Preferentially browsed field layer species
6. Sward
7. Ground disturbance

The indicators relate to grazing /browsing by large herbivores. If it is not known which grazing species are present on the site [field signs](#) can be used (see also bullet point 5 under 'Optional Extras', [p 10 below](#)). For information on how to distinguish between the effects of different damaging agents (animal, microbial and environmental) on young trees see:

- [Distinguishing mammal damage to young trees from damage by other factors](#)
- [Distinguishing between browsing by different mammal species](#)
- [Woodland damage: Recognition of cause \(1\)](#)
- [Woodland damage: Recognition of cause \(2\)](#)

When to carry out an assessment

Current impact is normally, and most easily, assessed on the most recent season's plant growth. Assessing impact at the end of winter, before new growth starts in spring, provides an assessment of the impact over the previous 12 months. Assessing impact at the end of summer provides an assessment of summer only impact. The best time of year to carry out an assessment therefore depends on the objectives. For example:

1. If grazing (by domestic stock and /or deer) is occurring all year round, and the objective is to assess the overall grazing pressure, then the assessment should be carried out at the end of winter before new spring growth has started.
2. If domestic stock are grazed seasonally, and the objective is to assess the impact of the stock, then an assessment should be carried out at both the start and end of the grazing period.
3. If domestic stock are grazed seasonally in the presence of wild deer and the objective is to assess the impact of the stock and deer over the grazing period and of the deer at other times of the year then the assessment should be carried out at the start and end of the stock grazing period as well as at the end of winter.

Although it is possible to carry out a summer impact assessment and record current impact on the previous season's growth (rather than the current season's growth) this is not straightforward since new growth often obscures the previous season's growth. This is therefore only recommended for experienced surveyors who are confident that they can distinguish current season's growth and impacts from the previous season's.

How to carry out an assessment

1. Mark on a map the boundary of each woodland /open ground habitat type for which you want a separate habitat impact assessment. Individual habitats may be composed of one, or more, separate patches. There is no need to attempt to map the elements of mosaic habitats. See the Woodland Grazing Toolbox For more guidance on [identifying habitat types](#) .
2. Print out the Herbivore Impact Field Guide ([pages 5-9 below](#)) to take into the field with you. It may be helpful to use waterproof paper. You will need a separate copy of the Herbivore Impact Assessment field sheet ([page 9 below](#)) for each of the woodland and open ground habitats identified on your habitat map.

Within each habitat type:

3. Make 10 stops. Stops do not need to be a set distance apart however they should be fairly evenly spread out so that they provide a good representation of the habitat. The stops do not have to be at the same locations as those of any previous assessment.

At each stop:

4. Visualise a circular plot with a radius of 25 m with yourself at the centre.
5. Record the grid reference in **Box 1** of your **field sheet** (page 9 below).
6. Use **Table 1: Woodland Structure Class** (Page 5 below) to help you decide which structure class best describes the habitat. Enter the results in **Box 1**. It may be helpful to look at the photos in the Woodland Grazing Toolbox of the different [Woodland Structure Classes](#). Scroll to the end of the photo gallery to find the photos of Woodland Structure Classes.
7. Use **Table 2: Current Herbivore Impacts table** (pages 6 & 7 below) to help you decide on one current herbivore impact level (on a scale from 'no impact' to 'very high') for each of the seven indicators. You should only record the impact of large herbivores on the most recent season's plant growth. Definitions of browsing intensity and more information on relative palatability of different plant species are given on page 8 below. It may be helpful to look at the photos in the Woodland Grazing Toolbox of different impact levels on each of the [current herbivore impact indicators](#).
8. Write the number of the stop in the appropriate cell in **Box 2**. If the indicator falls between two levels, write the number of the stop in both cells.
9. Use the "Not applicable" column in **Box 2** where the feature is not present at the stop. For example, there may be no basal shoots because the stand is composed only of tree species that do not produce basal shoots, e.g. Scots pine; there may be no bark stripping because all the trees are mature and rough barked and so are not susceptible to bark stripping; or there may be no ground disturbance because the site is composed of boulders, where ground disturbance would be unlikely to occur. 'Basal shoots', 'Epicormic /lower shoots' and 'Bark stripping' will all be recorded as 'Not applicable' for open ground habitats.
10. Use the "No impact" column in **Box 2** where the feature is present and could be impacted but where there is no sign of an impact, for example where seedlings /saplings are present but show no sign of browsing, where older rowan or ash are present but have not been bark stripped or frayed or where soil and vegetation could be disturbed by trampling but where there is no obvious ground disturbance.

Once you have completed all 10 stops within a habitat:

11. Record the most common structure class in **Box 1**.
12. Add up the total number of records for each current impact level and enter the results in the bottom row of **Box 2** on the field sheet. Enter the most common impact, on the scale of 'No impact' to 'very high', in the right hand column. If the result is inconclusive, e.g. you have five 'Highs' and five 'Lows', you will need to judge which impact is most representative, in this case it may be 'Medium'; or you may feel an intermediate category is more appropriate, e.g. a result of five 'Mediums' and five 'Lows' may lead to you to rate the most common impact as 'Low/Medium'.
13. Mark the location of each stop on your habitat map. Look to see how woodland structure class and /or current impact level differ between the 10 stops. Some woods will be very uniform, others varied and, in some cases, one or two stops may differ from the rest. If there is a spatial pattern to the variation with, for example, stops in one part of the habitat type differing from those in another, then you may want to go back and assess each part separately. Make a note of any obvious reason for differences between stops. For example, a stop may be particularly heavily impacted because it is near a feeding site. Where there is not much variation between stops, you should find that the impact levels of each of the seven browsing indicators are broadly similar. If one, or a few, indicator(s) have been recorded at a very different level to the others, you should make a note of this since it may give you useful

information about the nature of the browsing /grazing impact and the way in which animals are using the habitat.

Once you have completed all habitats:

If this is not the first assessment to be carried out at the site, compare the results with previous impact assessments as well as with any targets for current impact and /or structure class. Changes to structure class are likely to be long-term processes though, for some structure classes e.g. open ground or woodland regeneration, change can take place within a few years if grazing /browsing pressures have changed significantly.

Notes on summarizing overall impact

The overall result, as assessed above, will give you an indication of the level of impact of herbivores on the habitat. This can be compared between habitats as well as, for each habitat, to past and subsequent results. Summarizing the current impact level as one overall result giving equal weight to all indicators can, however, mask important information and occasionally give a misleading result. On the field sheet there is space to summarize each current indicator separately. You may find that not all the indicators give the same result. There are a number of factors that may account for this. For example:

- Roe deer are browsers rather than grazers. They also do not create much ground disturbance nor do they bark strip (though they will fray young trees). If roe deer are the main herbivore species present then you may find that the indicators relating to preferentially grazed species, seedlings, saplings, epicormic and basal shoots indicate heavy impact whereas those relating to ground disturbance, sward and bark stripping indicate a low impact.
- Cattle and pigs are more likely than other large herbivores to create ground disturbance, especially around feeding areas or pig shelters. If cattle and /or pigs are the main herbivores then the ground disturbance indicator may be relatively high whilst the other indicators are relatively low.

When summarizing the overall current impact level it may be appropriate to take these differences into account as well as to consider the objectives for the habitat. If, for example, the site is grazed by roe deer and the objective is to increase the number of seedlings and /or saplings and these are being heavily browsed then the overall current impact should be assessed as 'high' even if the ground layer and bark stripping impacts are 'low'. Alternatively, retain the information for each indicator separately and compare these with subsequent assessments for the same indicator.

Herbivore Impact Assessment Field Guide

Photos that illustrate the Woodland Structure Classes in Table 1 and the Current Herbivore Impact levels in Table 2 can be found [here](#).

Table 1. Woodland Structure Class

Woodland Structure Class	Description
Class 1: Open ground, simple	Any open ground vegetation with a simple structure. May be open because of high herbivore impacts, because seed trees are absent or because the ground is very wet, very poor or rocky.
Class 2: Open ground, complex	Any open ground vegetation progressing towards woodland. Includes sparse tree regeneration and a low shrub layer that includes very palatable species (e.g. bramble) – suggests a period of low herbivore impacts within the last decade.
Class 3: Dense regeneration, on previously open ground	Clumped patches of regeneration up to 3 m in height – suggests recent herbivore impacts low or absent.
Class 4: Young, dense woodland in the stem exclusion, thicket or early maturity stage	Young woodland with a closed canopy >3 m in height and too dense to allow new saplings to grow into it. Contains dead suppressed stems and may contain small seedlings but normally these die due to a lack of light. Current herbivore impacts may vary. Recent or historic impacts low or absent.
Class 5: Mature woodland, understorey regeneration	Older woodland with small canopy gaps or where competition between canopy trees is minimal. The field layer is likely to be rank i.e. tall and dense. A woody shrub layer, understorey and /or tree seedlings and saplings becoming established. Suggests a period of low herbivore impacts within the last decade.
Class 6: Mature woodland, no understorey regeneration	Older woodland with small canopy gaps or where competition between canopy trees is minimal. A single storey of mature trees with a sparse or absent understorey and a short field layer or a rank field layer of unpalatable species such as bracken or purple moor-grass. Few or no woody species. Suggests historically moderate to heavy herbivore impacts.
Class 7: Post-mature woodland, dead canopy trees, complex	Open canopy with senescent and dead canopy trees. A woody shrub layer and understorey are present, including tree seedlings and saplings. Suggests a period of low herbivore impacts within the last decade.
Class 8: Post-mature woodland, dead canopy trees, simple	Open woodland with senescent and dead canopy trees, no understorey and a lack of woody growth in the field layer. Suggests heavy current or recent herbivore impacts and a decline in woodland cover.
Class 9: Open canopy, open-grown trees, complex	Wood pasture. Scattered, open-grown trees that are mature or post-mature, with tree regeneration and a rank field layer that includes palatable species. Suggests a period of low herbivore impacts within the last decade.
Class 10: Open canopy, open-grown trees, simple	Wood pasture. Scattered, open-grown trees that are mature or post-mature, with a short field layer or a rank field layer of unpalatable species such as bracken or purple moor-grass. Little or no tree regeneration. Suggests ongoing herbivore impacts and the potential for long-term decline in the woodland component.

Table 2. Current Herbivore Impacts (current /recent = since the start of the last growing season)

Indicator	Very High	High	Medium	Low	No impact
<p>Basal shoots Includes all accessible shoots sprouting from tree bases.</p> <p>Score as “Not applicable” if there are no trees with basal shoots.</p>	<p>All species very heavily browsed. NB. Where large herbivores have been rare or absent in previous years there may be basal shoots that are now too large to browse.</p>	<p>Palatable species very heavily browsed. Unpalatable species heavily browsed.</p>	<p>Palatable species heavily browsed. Unpalatable species lightly to moderately browsed.</p>	<p>Palatable species lightly to moderately browsed. Unpalatable species generally unbrowsed, some lightly browsed.</p>	<p>All species unbrowsed.</p>
<p>Epicormic & lower shoots Includes all shoots on tree trunks (epicormic), lower branches or fallen trees that are within reach of herbivores.</p> <p>Score as ‘Not applicable’ if there are not trees with epicormic or lower shoots.</p>	<p>A very obvious and well maintained browse-line on all trees, with plenty of evidence of recent browsing to shoot tips. Shoots below the browse-line difficult to find on palatable tree species because they are browsed close to the trunk. Even woody shoots of less palatable species are moderately to heavily browsed.</p>	<p>An obvious browse-line on all trees that have live lower branches with most or all shoot tips browsed. All but the most unpalatable shoots below the browse-line (e.g. old woody birch shoots) moderately to heavily browsed.</p>	<p>A browse-line starting to develop (i.e. evidence of some recent browsing to shoot tips) on most or all tree species. The presence of some unbrowsed lower branches may interrupt the horizontal browse-line. Most shoots below the browse-line lightly browsed with a few browsed moderately to heavily.</p>	<p>Shoot tips within the reach of large herbivores unbrowsed on all but the most palatable tree species.</p>	<p>No sign of <i>recent</i> browsing on any live shoots within reach of large herbivores.</p>
<p>Bark stripping & stem breakage dbh = diameter at breast height (1.3 m above ground)</p> <p>Score as “Not applicable” if there are no trees susceptible to bark stripping or stem damage.</p>	<p>>50% of live stems, and recently fallen branches, showing recent bark stripping that may be severe. One tree species (e.g. rowan) can have all accessible live stems stripped by deer. >50% of live stems of saplings <5 cm dbh may be snapped by cattle and /or red deer.</p>	<p>20-50% of live stems, and recently fallen branches, showing recent bark stripping. One tree species (e.g. rowan) can have all accessible live stems stripped by deer. 20-50% of live stems of saplings <5cm dbh may be snapped by cattle and /or red deer</p>	<p><20% of live stems, and recently fallen branches, showing signs of recent bark stripping. Sometimes one individual tree is badly bark stripped. <20% live stems of saplings <5 cm dbh may be snapped by cattle and /or red deer. One tree species (e.g. rowan) may be heavily targeted.</p>	<p>Recent bark stripping generally hard to find. There may be one stripped or frayed tree. Occasional stem snapping by cattle and /or red deer.</p>	<p>No recent bark stripping or stems snapped by large herbivores.</p>
<p>Seedlings & saplings Seedlings = <50 cm tall. Saplings = 50-200 cm tall. “Old seedlings” = trees < 50 cm tall that may be many years old but adverse conditions, usually browsing pressure, prevent them from growing upwards</p> <p>Score as ‘Not applicable’ if seedlings and saplings are absent. N.B. a lack of seedlings and saplings may be due to a cause other than browsing pressure</p>	<p>“Old seedlings” very heavily browsed into a topiaried form. Other seedlings, of all species, will only be present if in their first growing season. All will be browsed the following winter. Saplings battered by very heavy browsing, with many woody side shoots browsed back or snapped. Leaders of saplings undamaged only if they cannot be reached by herbivores.</p>	<p>Seedlings of unpalatable species and all “old seedlings” moderately or heavily browsed. Seedlings of palatable and browse-sensitive species are likely to be absent (apart from possibly first year seedlings in the growing season). If they are present, they will be very heavily browsed. Saplings of all species heavily browsed. Leaders of saplings undamaged only if they cannot be reached by herbivores.</p>	<p>Seedlings of unpalatable species unbrowsed or lightly browsed. Those of palatable species moderately or heavily browsed Saplings of unpalatable species lightly to moderately browsed. Those of palatable species moderately to heavily browsed. Groups of birch, alder and willow saplings may have some unbrowsed leaders. Otherwise, leaders undamaged only if they cannot be reached by herbivores.</p>	<p>Seedlings of unpalatable species generally unbrowsed but some may be lightly browsed. Seedlings of palatable species generally lightly browsed but some may be moderately browsed. Most saplings of palatable species lightly browsed. Most saplings of unpalatable species unbrowsed.</p>	<p>Numerous seedlings present provided that there is an adequate seed source, suitable ground conditions, and an absence of very dense shading. These will be unbrowsed by large herbivores. Saplings of all species (if present) unbrowsed.</p>

Table 2. Current Herbivore Impacts (continued) (current /recent = since the start of the last growing season)

Indicator	Very High	High	Medium	Low	No impact
<p>Preferentially browsed or grazed plants</p> <p>Vegetation other than trees; primarily species listed as “very palatable” in Table 4.</p> <p>Score as “Not applicable” if there are no accessible preferentially browsed or grazed plants can be identified.</p>	<p>All accessible shoots heavily to very heavily browsed /grazed.</p> <p>No unbrowsed accessible runners of palatable species e.g. honeysuckle, bramble.</p> <p>There may be some growth of the current year’s shoots in the growing season.</p>	<p>Accessible shoots generally heavily browsed /grazed but some of the most preferred species may be very heavily browsed /grazed.</p> <p>No unbrowsed accessible runners of palatable species e.g. honeysuckle, bramble.</p>	<p>Accessible shoots moderately to heavily browsed /grazed. Some, more preferred, species may be heavily browsed while others are unbrowsed e.g. bramble browsed but blaeberry unbrowsed.</p> <p>No unbrowsed accessible runners of palatable species e.g. honeysuckle, bramble.</p>	<p>Accessible shoots generally lightly browsed /grazed but there may be some shoots or individual species moderately browsed /grazed or unbrowsed /ungrazed. There may be some unbrowsed runners of palatable species e.g. honeysuckle, bramble.</p>	<p>No browsing /grazing on accessible shoots.</p> <p>Depending on the time since large herbivores have been present, there may be long unbrowsed runners /climbers or a dense tangled field layer obscuring views through the wood.</p>
<p>Sward</p> <p>Ground cover vegetation. This may include preferentially grazed species</p> <p>Rank = tall, dense vegetation, sometimes with a well-developed understorey of mosses or herbs.</p> <p>Score as ‘Not applicable’ if the ground cover is < 5%.</p>	<p>Unpalatable species such as rushes and tussock-forming grasses (e.g. tufted hair-grass, purple moor-grass) heavily grazed. If grazing limited to autumn/winter, unpalatable species may be only lightly grazed.</p> <p>Palatable species very heavily grazed. Flowering herbs of palatable species hug the ground, flower stalks difficult to find.</p> <p>N.B. In the growing season, spring flowering herbs may be ungrazed even where winter impacts were very high.</p>	<p>Unpalatable species moderately grazed. If grazing limited to autumn/winter, unpalatable species may be only lightly grazed.</p> <p>Palatable species heavily grazed. Flowering herbs of palatable species hug the ground, flower stalks difficult to find.</p> <p>In the growing season, spring flowering herbs may be ungrazed even where winter impacts were high.</p>	<p>If palatable species are abundant, unpalatable species will be ungrazed. If palatable species are rare or absent, unpalatable species will be lightly grazed, except where livestock have been put into the wood at the start of the spring, At this time many unpalatable species are relatively palatable and they may be heavily grazed.</p> <p>Palatable species moderately grazed.</p>	<p>Unpalatable species ungrazed. They may form a rank field layer more than 10 cm tall that shades the ground layer vegetation beneath.</p> <p>Palatable species rarely or lightly grazed.</p>	<p>All sward species ungrazed. There may be a rank and tussocky sward with abundant leaf litter, and /or a high proportion of woody herbs (e.g. bramble) or heathy species in the sward, depending on site characteristics such as soil, exposure and light availability.</p>
<p>Ground disturbance</p> <p>Animal disturbance = trampling, pathways or wallows.</p> <p>Score as “Not applicable” if the ground is composed of boulders or scree.</p> <p>N.B. plant litter is very quickly mineralised in moist, very rich woodlands and soil may be bare in spring. The lack of vegetation in these cases is not due to animal disturbance.</p>	<p>Wet ground >75% devoid of vegetation due to animal disturbance.</p> <p>Dry ground: > 50% devoid of vegetation due to animal disturbance.</p> <p>Where deer are the main herbivore, disturbance may take the form of frequent wide, heavily used pathways and /or, on wet, open ground, there may be kicked out clods of turf and <i>Sphagnum</i> and well-defined deer wallows.</p>	<p>Wet ground: >50% devoid of vegetation due to animal disturbance</p> <p>Dry ground: 20-50% devoid of vegetation due to animal disturbance.</p> <p>There may be heavier disturbance around feeding areas and pig shelters. .</p> <p>Where deer are the main herbivore, disturbance may take the form of frequent pathways that are partially or wholly unvegetated.</p>	<p>Wet ground: 10-50% devoid of vegetation due to animal disturbance..</p> <p>Dry ground: 10-20% devoid of vegetation due to animal disturbance.</p> <p>There may be heavier disturbance around feeding areas and pig shelters.</p> <p>Where deer are the main herbivore, disturbance may take the form of occasional pathways.</p>	<p>Occasional areas of ground devoid of vegetation due to animal disturbance. There may be heavier disturbance around feeding areas and pig shelters.</p> <p>Where deer are the main herbivore, disturbance may take the form of occasional pathways.</p>	<p>No areas of ground devoid of vegetation due to animal disturbance.</p>

Table 3. Browsing rates

	Very Heavy	Heavy	Moderate	Light
Browsing on tree basal shoots Estimate % of current shoot growth removed based on the ratio of shoot diameter to length.	> 90% of the current year's growth removed. Short stubby stems, difficult to see on some species. Most older, woody shoots browsed.	50% -90% of the current year's growth removed. Some older, woody shoots browsed.	10% -50% of the current year's growth removed. No older, woody shoots browsed.	<10% of the current year's growth (only shoot tips) removed.
Browsing on other tree shoots i.e. seedlings/saplings, epicormics, lower branches.	All outer shoots removed (including many old, woody shoots) and remaining growth old and woody with short internodes.	>80% of the current year's growth removed. Older, woody growth removed from some shoots	30-80% of the current year's growth removed. Older, woody growth removed from some shoots	<30% of the current year's growth removed
Browsing /grazing on preferred plants and sward	All of leading shoots browsed or leaves grazed.	>75% of leading shoots browsed or leaves grazed	25-75% of leading shoots browsed or leaves grazed	<25% of leading shoots browsed or leaves grazed.

Table 4. Relative palatability of non-tree plant species*

Season	Very palatable	Moderately palatable	Unpalatable
All year	Bramble, Honeysuckle, Ivy, Blaeberry, Greater woodrush , Common Bent, Red Fescue, Yorkshire fog	<i>Hard fern</i> , Bog myrtle, Heather (Ling), Bell heather, Sheep's fescue	Hard fern, Greater woodrush, Purple moor-grass, Mat grass, Tufted hair-grass, Soft and Sharp-flowered rush, Cross-leaved heath
Spring - Summer	As above. In addition: Valerian, Meadowsweet, Angelica, Dog's mercury, Raspberry, <i>Buckler ferns</i>	Devil's-bit scabious, Purple moor-grass , Soft and Sharp-flowered rush , <i>Lemon-scented fern</i> , <i>Lady fern</i>	Buckler ferns, Lemon-scented fern, Lady fern, Primrose

***bold = cattle only**, *italics = deer only*, Normal font = all other large herbivore species. More detailed information can be found [here](#).

Table 5. Relative palatability of different tree species

Palatability (Innate attraction of the species to being browsed)		Resilience (ability to survive being browsed & continue to grow)	
1 – Most palatable	Aspen, Willow, Rowan	1 – Most resilient	Eared Willow, Birch, Alder
2	Ash, Holly	2	Holly, Juniper
3	Hazel, Oak, Douglas Fir, Larches	3	Hazel, Oak, Rowan, Ash
4	Scots Pine, Western Hemlock	4 – Least resilient	Scots pine and non-native conifers
5	Birch, Hawthorn, Lodgepole Pine	More detailed information can be found here .	
6	Beech, Juniper		
7 – Least palatable	Alder, Rhododendron, Sitka Spruce		

Herbivore Impact Assessment - Field Sheet

Woodland name:

Habitat type:

Date:

Surveyor:

Box 1: Woodland structure class

Stop	1	2	3	4	5	6	7	8	9	10	Most common structure class
Structure class											
Grid reference											

Box 2: Current herbivore Impact

Impact Indicator	Not applicable	Very high	High	Medium	Low	No Impact	Overall impact	Notes:
Basal shoots								
Epicormic/lower shoots								
Bark stripping								
Seedlings/Saplings								
Preferentially browsed species								
Sward								
Ground disturbance								
Total for each impact level								Overall habitat impact

Complete this field sheet for each habitat type in your wood for which you need to assess impact. For each of 10 stops within the habitat type:

1. Enter the structure class (1-10) and grid reference of the stop in **Box 1: Woodland Structure Class**.
2. For each of the seven browsing indicators listed in the left hand column of **Box 2: Current Herbivore Impact**, rate the current herbivore impact on a scale between 'No impact' and 'Very high'. Enter the number of the stop in the appropriate cell of the box.

When all stops have been completed:

1. In **Box 1** enter the most common structure class in the right hand column.
2. In **Box 2**, ignoring the 'Not applicable' column, enter the most representative impact for each indicator in the right hand column and the most representative overall impact in the bottom right hand box.

Optional extras

Sometimes there is a benefit in recording additional information along with the basic herbivore impact assessment. Some optional additions that you may find useful are given below. You will need to modify the basic field sheet ([page 9 above](#)), or produce an additional field sheet, to record your results.

1. **Spatial pattern of impacts.** To look in a bit more detail at the spatial pattern of impacts, you might consider marking the structure class and /or the impact level of each current impact indicator at each stop on the habitat map. This can be done by hand or using a GIS. This may make it clear if, for example, there are particularly favoured browsing /grazing areas or if there are areas where one indicator is being heavily impacted but others are not.
2. **Summer impact assessments – assessing browsing impact on the previous season’s woody shoot growth.** If you can only carry out a current impact assessment in summer, but want to gauge browsing impact on the previous season’s growth, this can be done by careful observation of epicormic and basal shoots, seedlings and saplings. The previous season’s shoots will be more woody than the current season’s growth and it should still be possible to assess rates of browsing on these older, woody, shoots. Browsing impact can then be recorded separately for both the previous, and current, season’s growth.
3. **Historic herbivore impacts.** Sometimes the browsing /grazing pressure has been high for so long that most of the indicators of current herbivore impacts have been eliminated. In this case, it may be informative to assess longer term impacts (over the last 10 years or more) using different indicators. Since these indicators include the presence, absence or condition of particular ground and shrub layer species, the indicators differ between woodland types. You can assess historic herbivore impacts on five [native woodland types](#) using the information provided in Table 6 ([pages 12-14 below](#)).
4. **Impacts on bracken.** Cattle are sometimes used to reduce the density and rate of spread of bracken. When this is the case it can be useful to assess both the current and historic impacts of the cattle on the bracken. The indicators described in Table 7 ([page 15 below](#)) can be used to assess impacts of cattle and other large herbivores on bracken growing on favourable sites i.e. fairly sheltered sites where soils are deep, reasonably fertile and dry to moist. For reasons other than disturbance by large herbivores, bracken on less favourable sites will have sparser stem density and height, sparser litter cover and a greater understorey cover of grasses, herbs, mosses and/or heath species. In the spring, areas of dense bracken on reasonably fertile soils may have a well-developed seasonal cover of bluebells or wood sorrel that becomes hard to detect at other times of year. Note that there is a distinction made in Table 7 between the most recent growth of bracken stems that have died and collapsed over winter and the ground cover of litter that is made up of several years’ worth of dead bracken fronds.
5. **Signs of the presence of different grazing animals.** If you do not know which species are present at your site, you may find it useful to note signs of the presence of a particular grazing species at each stop. Use the “Notes” box on the field sheet. See [Indicators of the presence of different grazing species](#) and [Distinguishing between browsing by different mammal species](#) for more help.
6. **Seedling and sapling density.** To predict the future density of mature trees and shrubs, it can be useful to know the current density of seedlings and saplings. Use the table below to determine a density class (D, A, F, O or R) for seedlings and saplings of each tree and shrub species of interest at each stop. Note that the density values in the table are point values. Observed densities may therefore fall between the density classes given.

Density Class	Seedlings (<50 cm tall)			Saplings (50 – 200 cm tall)		
	Average space between trees (m)	Density (Number /ha)	Number in a 20 m radius plot	Average space between trees (m)	Density (Number /ha)	Number in a 20 m radius plot
Dominant (D)	≤ 1	≥ 10,000	≥ 1,250	≤ 1.5	≥ 5,000	≥ 620
Abundant (A)	2	2,500	310	3	1,100	140
Frequent (F)	3	1,100	140	5	400	50
Occasional (O)	10	80	10	16	40	5
Rare (R)	>20	>25	>3	>35	>8	>1

7. **Cover of dominant plant species.** Sometimes the reason for changing the grazing regime is to achieve a change in the cover of a dominant plant species such as bracken, purple moor grass or bog myrtle. A simple means of recording the cover of these species at each might be to use the categories 'sparse', 'open stand' and 'dense stand'. Alternatively, different categories could be used depending on objectives.

Table 6. Historic Herbivore Impacts (historic = over the last 10 or more years)

Woodland Type	High	Moderate	Low	Absent for 20 years plus
Acidic dry (relatively well-drained oak, birch and/or pine woodland on acid soils)	Open canopy with senescent and dead canopy trees and fallen large diameter deadwood. Dominated by herbs and grasses such as tormentil, tufted hair-grass, sweet vernal-grass, common bent and/or bryophytes. A low sward, rocky areas bare apart from bryophytes. No or very limited understorey. Preferentially browsed species (predominantly dwarf shrubs) restricted to inaccessible crevices. A very prominent browseline on the sparse understorey where broadleaves or juniper are present and where overstorey trees have abundant epicormic shoots.	Greater diversity including a little blaeberry (and cowberry in pinewoods) and low-growing honeysuckle. Height of vegetation still low. In oakwoods and birchwoods, there may be a sparse understorey with browseline. Generally a full canopy cover or a canopy with few gaps.	Dense and tall blaeberry and, where the canopy is more open, rank heather. In oak/birchwoods, there can be frequent but not abundant honeysuckle and bramble (the latter typically limited to rocky areas). Understorey trees can include holly, some hazel and juniper. Understorey trees with low growing branches. Canopy trees (oak /birch) with abundant basal shoots <1 m in length.	Where dense tree regeneration has occurred (e.g. in a deer fenced enclosure), light levels can be reduced considerably and field layer – ground layer vegetation reduced to sparse blaeberry/cowberry and bryophytes. Where the canopy is less dense (e.g. on very poor soils), light underwood of birch and rowan with very tall blaeberry. Occasional well-developed, climbing honeysuckle.
Acidic wet (wet birch woodland)	Open canopy with senescent and dead canopy trees. Fallen large-diameter deadwood may be present but birch and willow rot quickly. Purple moor-grass grazed too heavily to be tussock forming, similarly, trampling inhibits the development of Sphagnum mounds. Eared willows have sparse and heavily browsed back canopies.	Very limited understorey. Overstorey birch with no basal shoots or shoots browsed down to the bole and prominent browse line to lower branches. Purple moor-grass in well-defined clumps though not tussocky. Sphagnum moss shows signs of trampling damage.	Willow may have well-browsed lower branches. Purple moor-grass grows rank and in obvious clumps with abundant leaf litter, maybe tussocky. Well-developed cushions of mosses, mainly Sphagnum mosses.	Tall purple moor-grass tussocks with Sphagnum mounds. Drier communities contain occasional bramble, forming localised thickets with long runners, also frequent broad buckler ferns. Birch have abundant basal shoots, although they are never long or thick. Willows can form thickets with branches down to ground level.

Table 6. Historic Herbivore Impacts (continued) (historic = cumulative impacts over the last 10 or more years)

Woodland Type	High	Moderate	Low	Absent for 20 years plus
<p>Base Rich Dry (upland mixed ashwoods, Atlantic hazelwoods, lowland mixed broadleaved woodland)</p>	<p>Open canopy with senescent and dead canopy trees and fallen large-diameter deadwood.</p> <p>There may be evidence of past heavy bark stripping.</p> <p>Ground flora dominated by a rich, probably productive, grass sward, with evidence of more graze-sensitive species such as meadowsweet restricted to low vegetative growth. Absent or very sparse understorey (hazel or bird cherry) with prominent browseline. In Atlantic hazelwoods, single stemmed hazel survive with very sparse crowns and no vegetative reproduction.</p> <p>Where deer are abundant, buckler ferns restricted to crevices. There may be nettle patches where grazing animals lie up, e.g. under open grown tree canopies. Disturbed sites at the wetter end of this category can have frequent to abundant tufted hair-grass [non-tussock forming].</p> <p>Boles of mature trees often with basal swelling, (particularly ash).</p> <p>Long-established topiaried trees</p>	<p>Thorny understorey (especially in lowland woods) of holly, blackthorn and hawthorn, with weak browseline. Other, more palatable, species e.g. hazel, with more obvious browseline and heavily browsed basal shoots.</p> <p>Diverse range of ground flora, including dog's mercury, wood or water avens, occasional wood cranesbill.</p> <p>Field layer includes buckler ferns and meadowsweet. [All or many of the above showing signs of grazing]. Where only deer present, woodrush may be abundant with deep litter layers. Bramble occasional to frequent (but browsed). Tufted hair-grass may be abundant (but in tall, ungrazed tussocks).</p>	<p>Tall herb and fern community (particularly buckler ferns and meadow-sweet), well developed where there is sufficient light. Bramble may be abundant, forming a dense underscrub with honeysuckle.</p> <p>Shrub layer and understorey trees frequent with branches down to the ground</p>	<p>Complex woodland structure, even where there is a full overstorey, with shade-tolerant tree and shrub species present. Hazel capable of producing abundant basal shoots that grow into canopy despite low light levels. NB enclosure of herbivores of 5 years or more causes death of large diameter single stemmed hazel and abundant regrowth of basal shoots.</p> <p>Very difficult to see far through the wood. Herbs such as water avens or wood avens and meadowsweet still frequent despite dense canopy. Long, trailing runners of bramble, developing into thickets in any canopy gaps. Where there is an open canopy, ash has very large basal stems (>5cm diameter and exceeding 2m in length). In lowland woods there may be a ground cover of ivy.</p>

Table 6. Historic Herbivore Impacts (continued) (historic = cumulative impacts over the last 10 or more years)

Woodland Type	High	Moderate	Low	Absent for 20 years plus
Neutral dry (oakwood, birchwood and lowland mixed broadleaved woodland)	<p>Open canopy with senescent and dead canopy trees pls fallen, large-diameter deadwood.</p> <p>Very species poor ground flora dominated by grasses such as sweet vernal-grass, common bent, cocksfoot and <i>Holcus</i> species. Can be dominated by bracken. Otherwise, no field layer or shrub layer. In NVC: W11b sub community, primrose may be the only obvious herb as it is unpalatable.</p> <p>A very prominent browseline on the sparse understorey and where overstorey trees have abundant epicormic shoots.</p>	<p>Sparse to moderate understorey with prominent browseline.</p> <p>Preferentially browsed species present but largely restricted to rock-outcrops.</p> <p>The field layer may be dominated by bracken with abundant wood hyacinth (bluebell) in the spring, otherwise a short, grassy sward or a sparse to moderate field layer depending on herbivore species present (i.e. no deer, buckler ferns may be occasional to frequent – no livestock and woodrush may be frequent)</p> <p>In old coppiced woodland, there may be widely spaced stools with a grassy sward or bracken stands in-between.</p>	<p>Tall field layer including abundant ferns (typically broad buckler fern) and honeysuckle. Can be dominated by rank woodrush with deep litter layers. Frequent preferentially browsed species including bramble, ivy and honeysuckle.</p> <p>Understorey trees (e.g. hazel and holly) with branches down to the ground</p>	<p>Dense understorey of hazel or holly is possible, branches to ground, very low light levels and very limited ground flora.</p> <p>In woods where grazing has been absent for longer, canopy gaps are occupied by saplings and a rank field layer</p>
Neutral to base rich wet (alder woodland including slope alderwoods, and willow carr)	<p>Unpoached parts of drier communities have a short sward, dominated by grazed tufted hair-grass and rushes. Woodland structure can range from topiared stands of eared willow to open alder woodland. In the latter case, tree bases are often broad, with closely browsed basal shoots. Swards with repeated winter poaching contain thistles, dock and cocksfoot in the summer.</p> <p>Wood pasture often have phoenix trees and air trees, although with sustained heavy grazing these can be bark stripped and roots eroded.</p>	<p>Drier communities may have abundant, grazed broad buckler fern and male fern. Air trees and phoenix trees not restricted to extremely inaccessible sites</p>	<p>Alder and/or sycamore saplings may be frequent as an understorey. Where present, ferns and tall herbs will be well-developed. Opposite-leaved golden saxifrage may be widespread.</p>	<p>A variable woodland structure. Also a variable field layer, depending on light availability and the degree of wetness. Species may include angelica, opposite-leaved golden saxifrage, remote sedge, common valerian, iris, meadowsweet, marsh thistle and marsh hawksbeard. Patches of dense nettle may occur.</p> <p>Impenetrable willow carr may be present.</p>

Table 7a. Current Herbivore Impacts on Bracken¹ (current = within the last 12 months)

Very High	High	Medium	Low	Absent
Frequent pathways and obvious poached ground. 30% or more of the bracken stand disturbed by large herbivores. In summer growing bracken fronds will be broken and trampled and, in winter, the collapsed stems and litter will be disturbed. If wild boar or pigs are present there may be localised patches of much higher disturbance. If present, palatable climbers, (e.g. honeysuckle, bramble) and seedlings /saplings very heavily browsed.	Frequent pathways with some poached ground likely. 10-30% of the bracken stand disturbed by large herbivores. In summer growing bracken fronds will be broken and trampled and, in winter, the collapsed stems and litter will be disturbed. If wild boar or pigs are present there may be localised patches of much higher disturbance. If present, palatable climbers (e.g. honeysuckle, bramble) and seedlings /saplings heavily browsed.	Occasional pathways through otherwise intact bracken stands. No poached ground. <10% of the growing bracken fronds broken and trampled by large herbivores in summer. In winter, there may be little evidence of disturbance other than the pathways. If present, palatable climbers (e.g. honeysuckle, bramble) and seedlings /saplings moderately browsed.	Pathways through otherwise intact bracken stands rare or absent. If present, palatable climbers (e.g. honeysuckle, bramble) and seedlings /saplings occasionally browsed.	No large herbivore pathways. Intact bracken stands with no obvious signs of disturbance by herbivores. If present, palatable climbers (e.g. honeysuckle, bramble) and seedlings /saplings unbrowsed. Winter only: Trailing, unbrowsed stems of palatable climbers and procumbent saplings, if present, flattened by collapsed stems.

Table 7b. Historic Herbivore Impacts on Bracken¹ (historic = cumulative impacts over the last 10 or more years)

Very High	High	Medium	Low	Absent
No palatable climbers or tree saplings. Bracken cover <50%. Reduced bracken height.. Bracken litter sparse. Winter only: Collapsed bracken stems present over up to 60% of the ground	No palatable climbers or tree saplings. Bracken cover 50-80%. Reduced bracken height. Bracken litter sparse to moderately dense. Winter only: Collapsed bracken stems present over 60-80% of the ground.	No palatable climbers or tree saplings. Bracken cover 80-100%. Reduced bracken height. Bracken litter moderately dense. Winter only: Collapsed bracken stems present over >80% of the ground.	Occasional palatable climbers and tree saplings. Bracken cover 100%. Bracken attaining full potential height. Dense bracken litter. Winter only: Collapsed bracken stems present over >90% of the ground.	Abundant palatable climbers growing over the top of bracken stands and occasional established tree saplings on the edges of bracken stands. Bracken cover 100%. Bracken attaining full potential height. Dense bracken litter. Winter only: Collapsed bracken stems present over 90-100% of the ground.

¹ Tables 7a and b apply only to sites that are favourable for bracken i.e. where soils are deep, reasonably fertile and dry to moist, since bracken on less favourable sites will have lower cover, stem density and height for reasons other than disturbance by cattle.

Acknowledgements

We are grateful to:

- Scottish Natural Heritage and Forestry Commission Scotland for funding the development of this method over several years.
- a number of people who provided advice and assistance over the years. These include: Nick Mainprize, Meg Pollock, Mike Smith, Lucy Sumsion.
- the many people who have tried the method in the field and provided us with invaluable feedback.

Ardtornish LTFP

16FGS13337

Appendix 4

Deer Management Plan

General Details

You can use this Deer Management Plan (DMP) template if you are applying for direct entry into the [Sustainable Management of Forests \(SMF\) – Reducing Deer Impact](#) option or the SMF – [Low Impact Silvicultural Systems \(LISS\)](#) or [Native Woodland](#) options. You will also need to complete the supporting information template for each option, and for the SMF – Reducing Deer Impact option you will need to include details on recent damage assessments.

When complete, save this document to your computer and then upload it to your online application.

FGS Scheme Details

BRN:	114582		
Application name:	Ardtornish Long Term Forest Plan		
Application ref:	16FGS13337	Long Term Forest Plan / Management Plan number:	16FGS13337
DMP Author:	Alan Kennedy/Miller Harris	Application Area (ha):	1440
Date (dd/mm/yyyy):	06/05/2018	Main Grid Reference (e.g. NH 234 567):	NM695 461
Woodland type:	Native Woodland		
Deer species present:	Red Deer		

Summary

Please provide a summary of the proposed work within the application area. Include a description of the current deer control methods, clarify what sensitive areas and habitats are vulnerable and briefly describe what needs to be carried out during the five year duration of the DMP. Please be specific as FC Scotland will assess to what extent these plans have been achieved.

The intention is to exclude deer from the existing native woodland and regeneration areas by creating an enclosures in addition to managing outwith enclosures. The Red deer population within the Ardtornish catchment area is considered to be at a level at which woodland establishment through natural regeneration is not being achieved without fencing. It is proposed that deer management will be carried out by the existing estate staff. Appropriate integration of monitoring of the deer, regeneration monitoring and browsing impacts will inform of any cull levels. Cull levels will be established through liaison with FC and SNH with regards to monitoring and impacts.

Monitoring will be carried out annually with more detailed monitoring of seedling performance to be carried out in years 2 and 4 of the any SMF contract and

annual monitoring will be carried out as in form of HIAs. The monitoring will record seedling performance and success; data recording and damage assessment within the woodland enclosures. Monitoring will be carried out in accordance with HIA process set out in Appendix 3

Estate staff will check all deer fences on a regular basis and carry out any minor repairs required. Enclosures will be checked for deer incursions and any break-ins will be culled as soon as recorded.

Please attach a map(s) which clearly delineates the application area, adjacent land uses, the location of vulnerable species or habitats, and any intended monitoring areas.

Deer Management Plan Objectives

Please list your objectives for your woodland and deer management. Include a statement of the intended outcomes and target deer density.

1. To enhance and expand the existing woodlands within and outwith the Designated woodlands through a combination of approaches, combining short, medium and long term measures.
2. To adopt a collaborative approach with FCS and SNH to protect the designated woodland and associated habitats.
3. To manage the woodlands with objective of bringing towards favourable condition
4. To retain the sporting enterprise to sustain local employment.

Woodland Objectives

- 1 Decrease browsing pressure to enable existing and new seedling establishment and subsequent increase in age class structure
- 2 Remove and contain the spread of the non-native species currently found within the wood.
- 3 Increase the percentage cover of woodland through natural regeneration, enrichment planting and bracken control
- 4 Protect sites of archaeological importance existing within the woodland.
- 5 To integrate management of the woodland into the economic and social operation of the wider estate creating local employment where possible.

Key Management Operations

1. To enclose the woodland areas with a deer fences to exclude browsing animals from the woodlands
2. Diversify age class structure through natural regeneration and enrichment planting
3. Remove and contain the presence of non-native species
4. Use bracken control to increase potential for natural regeneration if required
5. Deadwood management

6. Deer management
7. Enrichment Planting if required
Please see accompanying Long Term Forest Plan for detail of the above.

Collaboration

Are you in an active Deer Management Group or a local equivalent? Yes

Have you discussed your management proposals with your neighbours? Yes

Are your neighbours actively managing deer? Yes

Please provide further details on your answers to the above questions.

See above

Provide details on adjacent land use and how these may impact on the DMP. Detail how deer control is considered across the landscape.

Existing Woodland	The objective of the Estate is to manage all Designated woodlands in line with the objectives above. Some woodlands are already enclosed and some may be managed without fences.
Mixture of Woodland / Arable Land	Not applicable
Unimproved Pasture / Open Hill	The vast majority of the land outside the woodland is unimproved agricultural land. The open hill impacted by the proposal is all with ownership of the Estate. A compensatory cull has already been started to mitigate for potential loss of deer range due to fencing.
Other (Specify):	

Supporting Information

Provide details on the habitats types within your application area as listed. Include the name and condition of the habitat as appropriate.

Habitat	Area	Vulnerable to deer pressure?	Comments
SAC / SPA		Yes	The SSSI's are assessed as having failed targets of non, native species due to- lack of regeneration of canopy species; inadequate range of age classes

			of canopy species and high grazing impacts. This will apply to the section of woodland within the Morvern Woods SAC; presence of non native species
SSSI (geology, flora, fauna)		Yes	The SSSIs is assessed as having failed targets of non, native species; lack of regeneration of canopy species; inadequate range of age classes of canopy species and high grazing impacts. This will apply to the section of woodland within the Morvern Woods SAC
Internal Open Ground		Yes	
Native Woodland		Yes	
Broadleaves		Yes	
Conifers		Yes	
Other		N/A	
Please tell us any other relevant information to support the area applied for.			

Indicate if the factors below might influence deer use in your woodland and provide details. This information will help inform of likely fluctuations in populations as well as the variable need of control resources at different time of the year.

Is the site part of a red deer wintering area?	Yes
--	-----

Provide information on any immigration and/or emigration of deer in your woodland.
The unenclosed woodlands are currently used as shelter and wintering ground for the resident deer population. Due to location of the woodlands immigration and emigration from other adjacent estate deer populations will be ongoing

Give evidence of historical / existing damage. Include information on damage to the woodland and habitats and also damage to natural heritage interests. Detail the presence of other herbivores (e.g. sheep, rabbits, hares). State the method of assessment used (e.g. transects, fixed plots, fixed point photography) and include a map of monitored areas if appropriate.
Many of the original deer fences are no longer effective and deer and stock have access to the woodlands and this has led to increase in impact to seedling performance and recruitment as well as some damage through bark stripping to canopy trees. Once enclosed monitoring will be carried out annually to assess seedling performance and recruitment. This will be done through establishment of fixed

plots. Once fencing is completed, a cull of deer within the enclosure will be carried out and regular inspection of fences and enclosure will be carried out to ensure marauding deer are removed.

Provide information relating to current deer densities. In many cases there will be useful information on local deer populations (for example: estate counts, dung counts, or helicopter count information from SNH). Other information such as the deer density indicators below can be used to inform the DMP. Ideally we need to know the population densities both within and adjacent to your woodland, including the open hill.

	Present	Density in woodland per 100ha	Density on open hill per 100ha	Source of count		Dung count info	Year of count
				DCS	Estate		
Red	Yes	8	8	1101			2016
Roe	No						
Sika	No						
Fallow	No						

Comments / Additional Information:

The above figures are based on the whole estate count. The objective of the Estate is to reduce the overall deer density from around 8 deer per 100h down to a target density of 3.9 deer/100ha. This will be partly achieved through targeted culls on the sothern end of the estate where the majority of sensitive and designated sites being impacted by the deer are located.

Please mark the relevant boxes in each of the Woodland Deer Density Indicators. Tracks evidence is not expected if only Roe deer are present. These indicators should be observed over the winter months (i.e. January – March).

Evidence	4 – 8 Low density	8 – 15 Medium density	15+ High density
Tracks (for Red, Fallow, Sika)	Difficult to find deer slot marks or defined paths.	Defined paths slot marks easy to find in areas of soft ground.	Many well defined tracks and paths often black with constant use.
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Dung	Difficult to find with just the odd isolated pellet group.	Pellet groups relatively easy to find, particularly on woodland edges and good feeding areas.	Pellet groups very easy to find. Highly concentrated on favoured feed areas.
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Browsing of Vegetation	Natural regeneration of broad-leaved trees taking place with	Broadleaved saplings present but showing significant	No seedlings growing above dominant vegetation height.

	no or little damage to current year's incremental growth.	damage.	Often well-defined browse lines on established shrubs and plants.
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Historical Cull – Please provide details of any previous cull data relating to the application area.

Year	Male				Female				Juveniles				Totals
	Red	Roe	Sika	Fallow	Red	Roe	Sika	Fallow	Red	Roe	Sika	Fallow	
2017/18	42				103				41				186
2016/17	64				97				48				209
2015/16	45				65				23				133
2014/15	46				79				36				161
2013/14	51				24				10				85
2012/13	42				27				8				77
2011/12	38				16				7				61
2010/09	32				22				13				67
2009/08	23				25				7				55

Comments / Additional Information

Deer culls have taken place across the whole estate and no specific records for the application area are known.

Protection Method

If deer fencing is proposed give reasons for this decision.

There are areas of woodland currently open to access by both deer and farm stock. The browsing impacts are one reason why the designated sites are failing to meet targets and deemed to be in unfavourable condition. Due to the population of deer on outside of the woodland it would be impossible to manage deer impacts within the woodland to a level where it could be expected to achieve the necessary seedling performance and recruitment across all species without fencing. Monitoring will direct whether objectives are not being met and whether deer fencing is required.

Explain what measures will be taken if you are required to compensate for the loss of deer range due to deer fencing effectiveness. Also highlight whether a risk assessment has been carried out to mitigate against bird strikes.

Compensatory deer culls have already been implemented. Fences will be checked regularly and if bird strikes occur then appropriate enhancement could be considered subject to agreement with FCS and SNH

Cull Targets

Target Cull – Provide your proposed cull target. This may need to be adjusted if annual damage/habitat impact assessments do not demonstrate the effectiveness of your proposals.

Year	Male				Female				Juveniles				Totals
	Red	Roe	Sika	Fallow	Red	Roe	Sika	Fallow	Red	Roe	Sika	Fallow	
2018/ 19	40				190				65				295
22019 /20	30				185				62				277
2021/ 20	30				185				62				277

Comments / Additional Information

This is the overall Estate cull where target is to bring density down from circa 8/100ha down to circa 4/100ha. The cull within the applicatin area will depend on deer at time of completing the enclosure and after that only marauding deer will be culled.

Nominated Controllers

Notify FCS if any changes occur.

	Nominated controller	Owner	Estate Employee*	Contract Stalker	Shooting Tenant	Place of Residence	Firearms Certificate Number
1	Simon Boulton	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Ardtornish	4385
2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

*Section 26(i) of the deer act clarifies definition of "employee".

State the Controller's relevant experience and if they have DSC1 or 2, and the calibre of rifles authorised.

1	Over 30 years deer management experience
2	Holds both DC1 and DC2
3	Rifle calibres authorised include .222, .25-06 and .300
4	

Monitoring and Record Keeping

You must retain cull records as per [Best Practice Guidance](#). These must include date killed, species, sex, estimated age, body weight, and female reproductive status.

Describe the method(s) you will use to assess deer damage within your woodland. It is important that sample plot information, browsing levels, and factual evidence of deer damage is monitored prior to the commencement of the plan (as a baseline) and then annually to ensure there is a formal record of what is taking place and that culling is effective.

You must agree what method of monitoring will be used with FCS. This should be based on the [Best Practice Guidance](#) which defines suitable options.

The estate has embarked on a process of deer management which will ultimately reduce the deer density outside enclosures to below 3 and 4 deer per 100ha. Active management of deer is being carried out within enclosures with a focus on areas of woodlands within designated sites.

Habitat Impact Assessments (HIA) are being carried out across the whole estate and there will be extended into all woodland areas to inform on deer management requirements to achieve specific objectives of each woodland area/compartment.

A monitoring regime using the Heribvore Impact Assessment techniques will be established to measure the success of proposed operations and to allow early intervention and action to remedy any threat to achieving movement towards favourable condition. Monitoring by estate staff will take place using simplified methodology as per App 3 over locations to be agreed by FCS and SNH before survey commences.

Fence-lines will be checked regularly, at least once per month or after severe weather, by Estate staff to ensure break-ins are dealt with at the earliest possible time. More exposed fences will be checked more frequently as will those at risk from rock fall and windthrow. Minor repairs will be carried out by Estate staff or external fencing contractors if too large for staff to deal with.

Strategic deer fencing will be considered to create larger enclosures and offering opportunity to remove internal fencing when they become redundant. See Plan 4.

Consideration will be given to the formation of a steering group consisting of the Estate, FCS and SNH which would meet annually to consider the monitoring results and HIA assessments and to decide whether additional management inputs are required to achieve objectives and to direct the operations required and proposed activities in the SSSI/Natura designated woodlands, not currently meeting 'favourable' condition and working towards bringing 100 per cent of the feature into 'favourable' condition, will help towards bringing 100 per cent of the feature into 'favourable' condition

Monitoring must be done annually and submitted with a supporting map to FCS to enable grant payment.

Give a brief description of the method you will use to evaluate and review the progress of your Deer Management Plan.

The progress will be assessed against base line data gathered at start of process.

Information Checklist

Please list the maps or any other documents that you will be uploading with your DMP:

Location Plan 1 with extent of woodland area; location of existing and proposed woodland enclosures.

We suggest that you use the following format for saving all of your related documents so that they are easily identifiable, for example:

[Your Application name] DMP Map [name or number].jpeg



Ardtornish LTFP

16FGS13337

Appendix 5

New Woodland Creations Plans

THE FIRM OF ARDTORNISH FARMS

Ardtornish Estate- New woodlands

Appendix 5 to Ardtornish Long Term Forest Plan

APPENDIX TO THE LONG TERM FOREST PLAN

Ardtornish Estate- New woodlands 2018

1. Introduction

Ardtornish Estate current wooded area extends to 13.5% of the total Estate's land. These are of a varied mix of young and mature native / broadleaf woodlands, policy woodlands and commercial conifer blocks.

Some of those native woodland areas lie within designated sites being an important national resource. During recent surveys it has been identified that some of those designated woodland sites are in unfavourable conditions with the need to bring them into a more formal management regime. The main issue to address is the level of deer browsing within these sites.

In the past, new woodlands across the Estate the Estate were designed and planted within the design constraints of the Forestry Commission scheme at that time including WGS, SFGS and RDC-RP, creating predominately native broadleaf woodlands.

Following to the Estate's passion and interest for Native woodlands and in line with the multiple objectives, the Estate is looking to further expand their woodland cover over the next five years.

The landscape, farming practices, peaty soils and other constraints from various factors such as deer and sheep grazing make finding available and suitable planting land, a special challenge to the Estate.

A future programme for new woodland creation in the Estate is yet to be developed fully.

However, the first stage of a wider woodland creation proposal is under development at the time of writing this chapter.

2. New woodland creation Phase 1

In 2017, Ardtornish Estate received approval for a new woodland creation scheme from the Forestry Commission. This new scheme for woodland creation on the Estate consists of four Native woodland blocks (Block 1, block 2, block 3 and block 4) located in different areas of the Estate which will connect with existing adjoining woodlands, expanding and enhancing the woodland landscape and the woodland network of the Estate. *Map 1. Appendix to LTFP New woodlands Phase 1 location.*

Areas for the new planting within this Phase 1 were subjected to different assessments in the early stage of the design. This included peat depth surveys, vegetation and soil pits assessments and landscape analysis amongst other surveys and consultation in which different organizations and neighbours were consulted. A request for an EIA determination (Environmental Impact Assessment) was submitted as part of the application but the full assessment was not required for the project, primarily due to the high level of detail provided at the initial application stage.

Main issues to this first phase are deep peat areas, archaeological features, protected species such as Black grouse or White tail Eagles, watercourses, patches of existing native woodland and landscape

visual impact. The proposal was designed to minimize the potential impacts upon the identified constraints on site.

New blocks of native woodlands will be protected from grazing by new deer exclusion fences. Every block is fenced to be sheep and deer proof. A sensible approach to fencing was taken with regards to some bird strikes and consequently, some fences have been marked following Forest Fencing guidelines against bird strikes. Within the fenced areas there are enclosed patches of existing mature native trees encouraging natural regeneration to be successfully established within the protected area in addition to those planted native tree species.

There will be a strategic plan for deer fencing on a rotational system enclosing some new woodland areas and existing mature woodlands while others are left open once they have been established /regenerated, providing shelter for stock and deer.

The new woodland ground was prepared prior planting by undertaking a combination of mechanical inverted and hinge mounding increasing in the areas where machines were capable of working. On those areas where machines could not reach, manual hand mounding was undertaken in order to achieve the desired density throughout the planting area of 1,600 mounds per ha average.

The new woodlands include minimum of 85% of Native tree species and a maximum of 15% of designed open ground.

Planting areas on the new woodland creation blocks can be seen in the attached map. *Map 2. Appendix to LTFP New woodlands Phase 1 Planting area.*

Careful approach was taken on those areas previously identified as deep peat, leaving them out of forestry operations.

Species used for the new planting are considered as suitable or very-suitable to the site, using FC classification methods. Those selected species to be planted on the new native woodlands are from the National Vegetation Classification types W4, W6, W11 and W17.

NVC Classification	Woodland Type
W4	Birch woodland with purple moor grass
W6	Alder-ash woodland with yellow pimpernel
W11	Upland oak-birch woodland with bluebell/wild hyacinth.
W17	Upland oak-birch woodland with bilberry/blaeberry

Sourcing of local species provenances is of a high importance and they have been chosen from Scottish seed zones 105, 104 and 106 with a preference to Ardtornish own vegetation sources whenever those are available. Percentages of individual species vary slightly on every block based on the site soils types.

Native broadleaves species selection in the Phase 1 of the woodland creation scheme is Downy birch (38%), Silver birch (6%), Alder (10%), Rowan (10%), Sessile oak (15%), Hazel (3%), Aspen (4%), Hawthorn (5%), Holly (4%) and Willow (5%).

Slow release fertilizer granules were applied to the root system of every tree at the time of planting. The addition of Potassium and Phosphates to the soils will help on the better growth and quickly establishment of the new tree.

A brief description of each block on the Phase 1 for new woodland creation is as follows:

Block 1- This is located adjoining Be-Ach, a commercial conifer woodland at the Northern side of the Estate. This compartment encloses the largest area of the four new blocks within the new woodland creation scheme. An ATV access track was created along the Eastern side of the compartment in order to help in the future management of the woodland. The deer fence here encloses a total of 110.90 ha with a planting net area is just 78.90 ha. Fence design came under close scrutiny before being approved given its proximity to the main road A884 and the potential visual landscape impact associated to the route of this fence.

Block 2- This block is located next to Uilean, commercial conifer woodland to the centre of the Estate's land. This block encloses a total area of 44.80 ha, 21.60 ha of which are net planting area.

A small burn runs crossing this compartment from East to West and enclosing a patch of mature native trees on the riparian buffer.

As per the block 1, deer fence in this block was assessed for visual impact in the landscape and routed accordingly.

Block 3- is located almost directly opposed to Block 2 at the other side of the main road A 884. Total fenced area here is 25.30 ha with 18.10 ha subjected to a planting works. Allt Tioram and Allt a'Bhodaich burns run through this block 3 from North to South and on the East. A second larger burn, Allt na Mucaireachd, is sitting outside on the Western side of the block boundary.

Block 4- is the furthest block located to the South of the Estate's land. This block consists of 18.20 ha fenced, 12.60 ha of which were subjected to a planting operation. There is a major burn, Allt na Claise Brice, crossing this compartment from North to South and there is also some existing mature native trees in the riparian buffer within the enclosed area at block 4. Archaeology includes an old settlement with remains of a head dyke and a building which have been left outwith Forestry operations.

Future maintenance operations will be required within the early years of the woodland establishment. Management and monitoring will be carried out by the designated Woodland manager (Veronica Llorente -RTS Ltd). These woodlands will be managed in the future under the concept of low impact silvicultural management systems (LISS), using continuous cover forest management (CCF) to perpetuate the wooded cover. Other long-term management objectives that will be sought in the new woodlands are to protect and enhance natural and wildlife habitats, heritage features, to provide shelter, maintain and improve access to the new woodlands, to provide sporting opportunities, control the invasive non-native species within the new crops and to develop the use of woodland produce for renewable energy option.

Deer control will be undertaken by a designated stalker/s with targets set to monitor deer pressure / damage to trees on behalf of the Estate.

Public access is provided to every woodland block with several gates positioned in each fenced block.

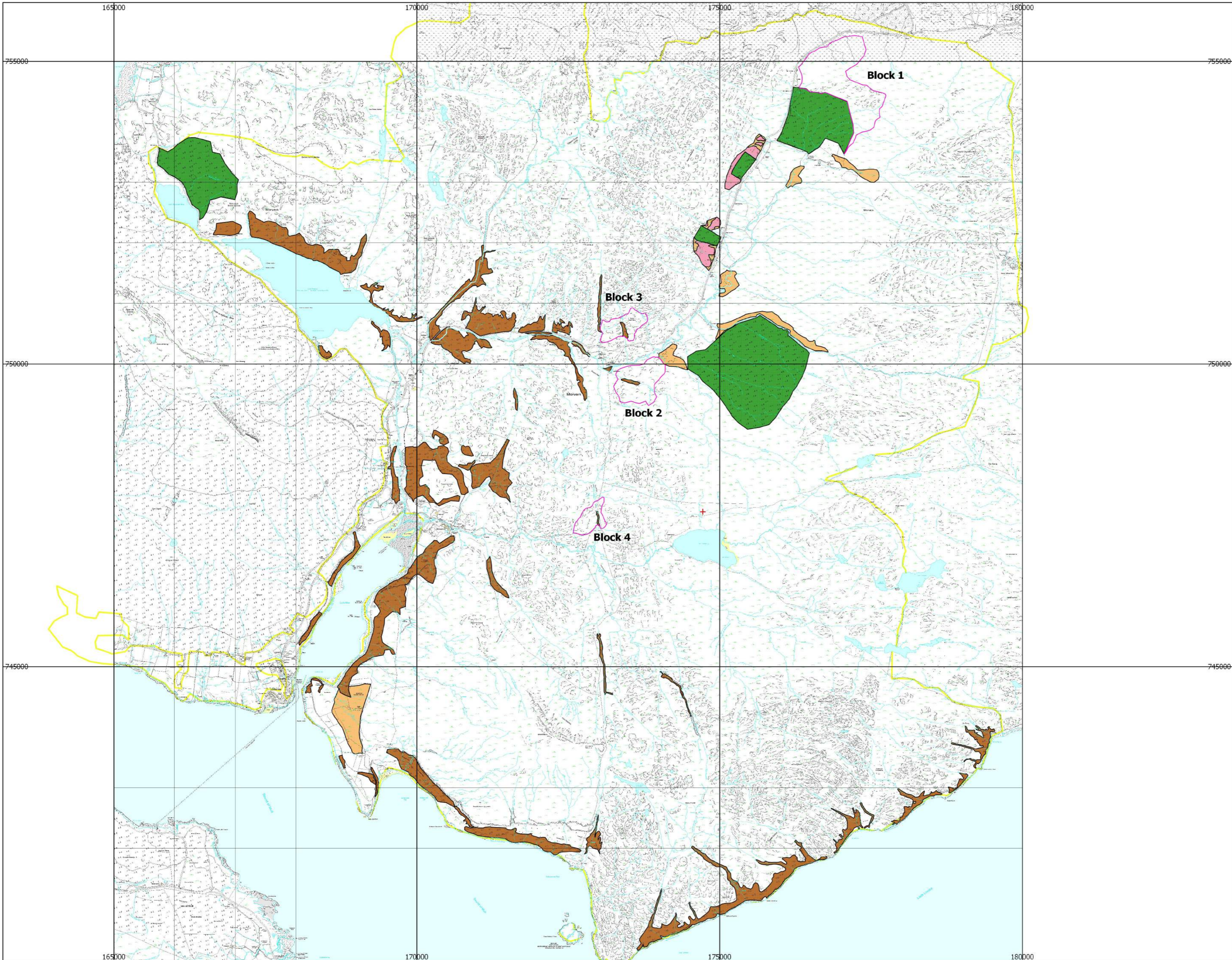
Forestry operations have been and will follow all pertinent guidelines and regulations, adhering to best practice as stated in the UKFS, in accordance with FC Woodland Creation Guidelines, marginal site assessment guidelines and UKFS Forest and Soils and Forest and Water guidelines.

3. Future new woodlands

There is a significant interest from the Estate owners to further enhance existing designated native woodlands and to expand the native woodlands network in the Estate. With the creation of more native woodlands, Ardtornish will also be looking to link those isolated existing woodland blocks and create a more natural continued native habitat.

At this stage, the Estate has now identified further areas where planting can be potentially developed for native woodlands. *Map 3. Future woodland creation proposal.* This proposal is on the early stage of the design.

Further surveys and assessments with relation to fauna, peat depth, vegetation, archaeology and scoping are yet to be undertaken on these areas in order to take the proposal forward to a formal submission stage. Once prepared there will be a period of formal consultation with statutory groups and local interest groups/individuals.



Ardtornish Estate

Map 1.Appendix to
LTFP.New woodlands
Phase 1 Location

Phase 1 new woodland
creation
Blocks 1, 2, 3 and 4.

Ardtornish Estate

- Estate Boundary
- Woodland blocks Phase 1

Existing woodlands estate

- Commercial woodland
- Existing retention Native woodlands
- Native Woodland young plantation
- Productive conifer Low cost

+ NM 74817 47354



1:40,000



RTS Ltd
Woodland Managers
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Ardtornish Estate

Map 2. Appendix to LTFP
New woodland creation
Phase 1 Planting areas

New woodland creation
Phase 1
Blocks 1,2,3 and 4

Ardtornish Estate

- Estate Boundary
- Existing woodlands Estate
- Commercial woodlands
- Existing retention Native woodland
- Native Woodland Young plantation
- Productive conifer low cost
- Deer fence New woodland blocks
- Gateways
- New planting Phase 1
- Native broadleaves

Native broadleaves mixed species of Downy and Silver birch, Alder, Rowan, Sessile Oak, Hazel, Aspen, Hawthorn, Holly and Willow planted at average density of 1,600 trees per ha.

N + NM 74817 47354

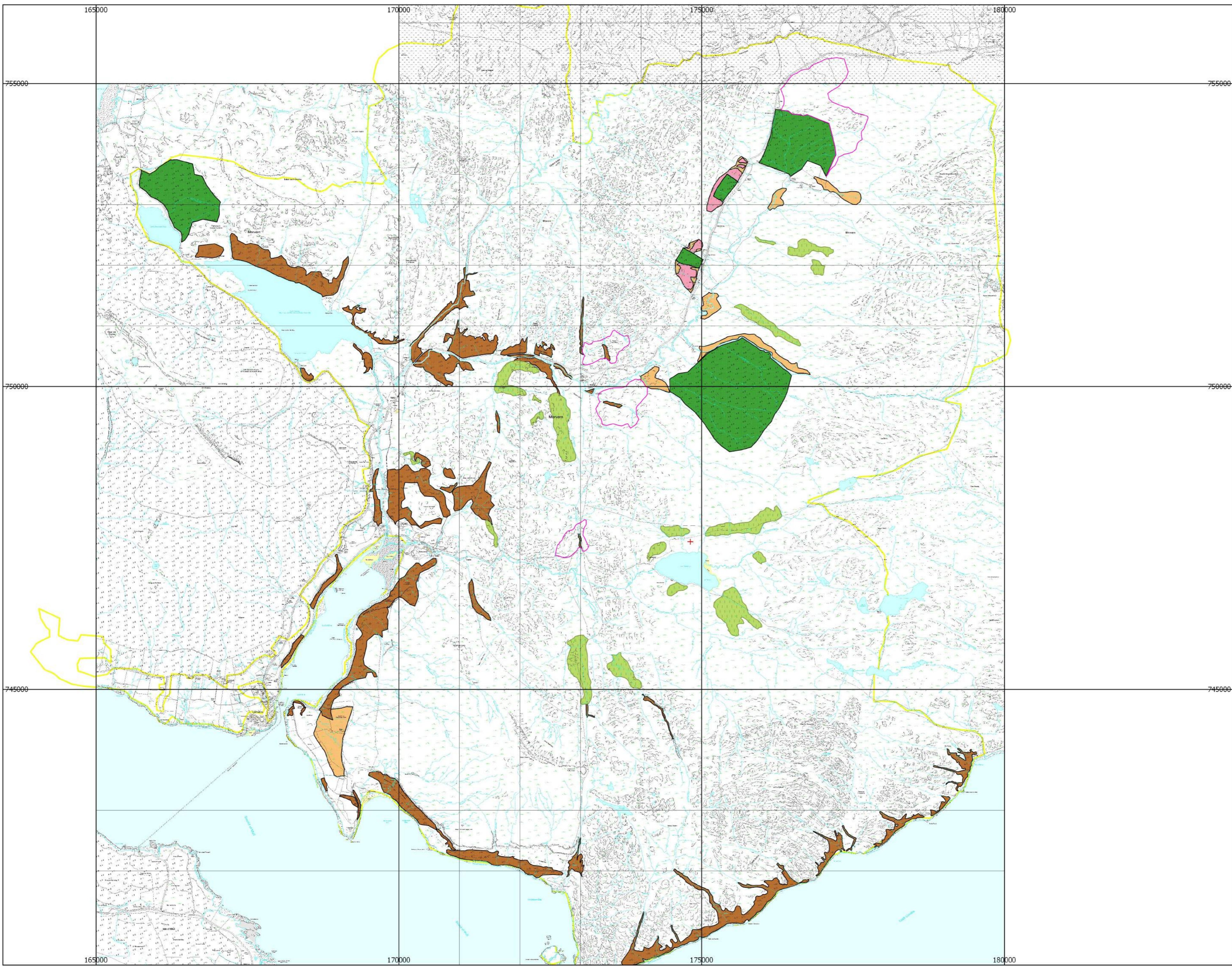
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Ardtornish Estate

Map 3. Future woodland creation proposal

Current woodland cover area.
Commercial conifer and Native woodlands.

Ardtornish Estate

- Estate Boundary
- Woodland blocks Phase 1 Planted 2018/19
- Proposed areas new woodland creation

Existing woodlands estate

- Commercial woodland
- Existing retention Native woodlands
- Native Woodland young plantation
- Productive conifer Low cost

+ NM 74817 47354



1:40,000



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The proposed new compartment A is located to the North of Ardtornish house. Compartments B, C and D are located around the Loch Tearnait, to the North, West and South of this. Compartments F and E are located to the Southern-East side of the Estate's offices complex. All are shown on the attached map for location.

Woodland design

New woodland creation compartments design will follow all best practice, UKFS and current native woodland guidelines.

They will include minimum of 85% of tree planting (all of native tree species) and a maximum of 15% of designed open ground. Planting densities will be at an overall average of 1,600 trees/ha, with higher planting densities located on areas where ground is better and lower density planting on the poorer ground.

Those planted trees will be from local provenance seeds collected in either Ardtornish woodlands or close by in the west coast of Scotland. The native broadleaved component will be made up of the National Vegetation Classification woodland type W9 (Very suitable) including Rowan, and Dog's mercury and others such as W11 Oak-birch with bluebell/wild hyacinth or W17 Oak-birch with bilberry/blueberry.

All trees will be protected by a deer fence erected prior to commencement of the planting works. Access to the enclosures will be provided by wooden gates for pedestrian and for ATV vehicles.

Ground preparation will be undertaken by excavator mounding. The method of mounding selected to this planting design is inverted mounding on those areas with a better water runoff and soils and hinge mounding on those wetter areas. This method of ground preparation provides the young trees with the best opportunity to establish in the local soil conditions.

At planting, a fertilizing application will be undertaken in order to provide the P (Potassium) and K (phosphorus) that these trees require to establish.

Chemical and hand weeding will be undertaken as required in order to control the seasonal/annual weeds until the successful establishment of the plantation and additional fertilizer may be applied after planting to aid tree growing in years 4 or 5. Management and monitoring will be undertaken to ensure the plantations are successfully established by RTS Ltd Forestry as woodland managers to the Estate.

Deer control will be undertaken by a designated stalker/s with targets set to monitor deer pressure / break in which damage trees.

With this postal consultation/scoping exercise we would like to invite all interested organisations and individuals to comment on this new scheme and respond by the 25th November 2018.

All the comments and views identified will be considered within the woodland creation proposal



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Ardtornish Estate- Woodland Creation Scheme- Phase 2

Introduction

Following to the Woodland creation new guidance and as part of the Due diligence stage, stakeholder engagement provides an opportunity to explain the proposal that Ardtornish Estate intends to develop for the phase 2 of new woodland creation on the Estate.

Following the "Phase 1" of new Native woodland creation being undertaken during 2018 and 2019, Ardtornish Estate aims to further increase the native woodland area across the entire Estate and would like to present the new proposal "Phase 2" for the Native Woodland creation.

This second phase of new woodland creation for Native Broadleaf Woodlands will fit well into Ardtornish's local landscape increasing the wooded area and expanding and connecting the existing native woodland network over the entire Estate and in the central area in particular. A plan detailing the location of these areas is attached.

The proposal consists on the creation of six new native woodland compartments proposed to be located on the central area of the Estate's ownership to be undertaken on the Estate during the next three years 2019-2021.

667 hectares of ground would be enclosed by deer fences. Approximately 100 hectares out of the 667 are mature native woodland that will be protected from deer and livestock damage in order to encourage natural regeneration of both trees and ground flora.

The six compartments will include 560 hectares between them of uncultivated available open hill used at present for rough grazing and potentially available for new planting.

Due to the nature of the ground and site conditions, different surveys have been undertaken to assess peat depth, breeding birds' and National Vegetation Classification (NVC) / Ground Water Dependant Terrestrial Ecosystems (GWDTE) .

These surveys have excluded certain areas within the proposal fences from tree planting. The woodland location has also considered current farming practices and the Estate deer management regime.

Having taken all the above into consideration, the proposed planting area within the enclosures would total approximately 196 ha. Although the total area proposed to enclose within deer fence is relatively large compare to the net planting area identified, the enclosures will protect the maximum area of existing native woodland within the designated sites and native broadleaves pockets currently encountered on the burnsidess. The fencing will encourage natural regeneration to develop within the enclosures. Furthermore, other elements that can constrain the woodland design have been also considered such as fenceline visual impact on the landscape and feasibility for the erection of the fenceline, deer passages and public access.



Ardtornish Estate

Ardtornish New woodland creation Phase 2- Concept map

- Ardtornish Estate**
- Estate Boundary
 - Woodland creation Phase 1
 - Existing woodlands**
 - Commercial woodland
 - Existing retention woodlands
 - Native Woodland planting
 - Proposed woodland blocks Phase 2
 - Access tracks



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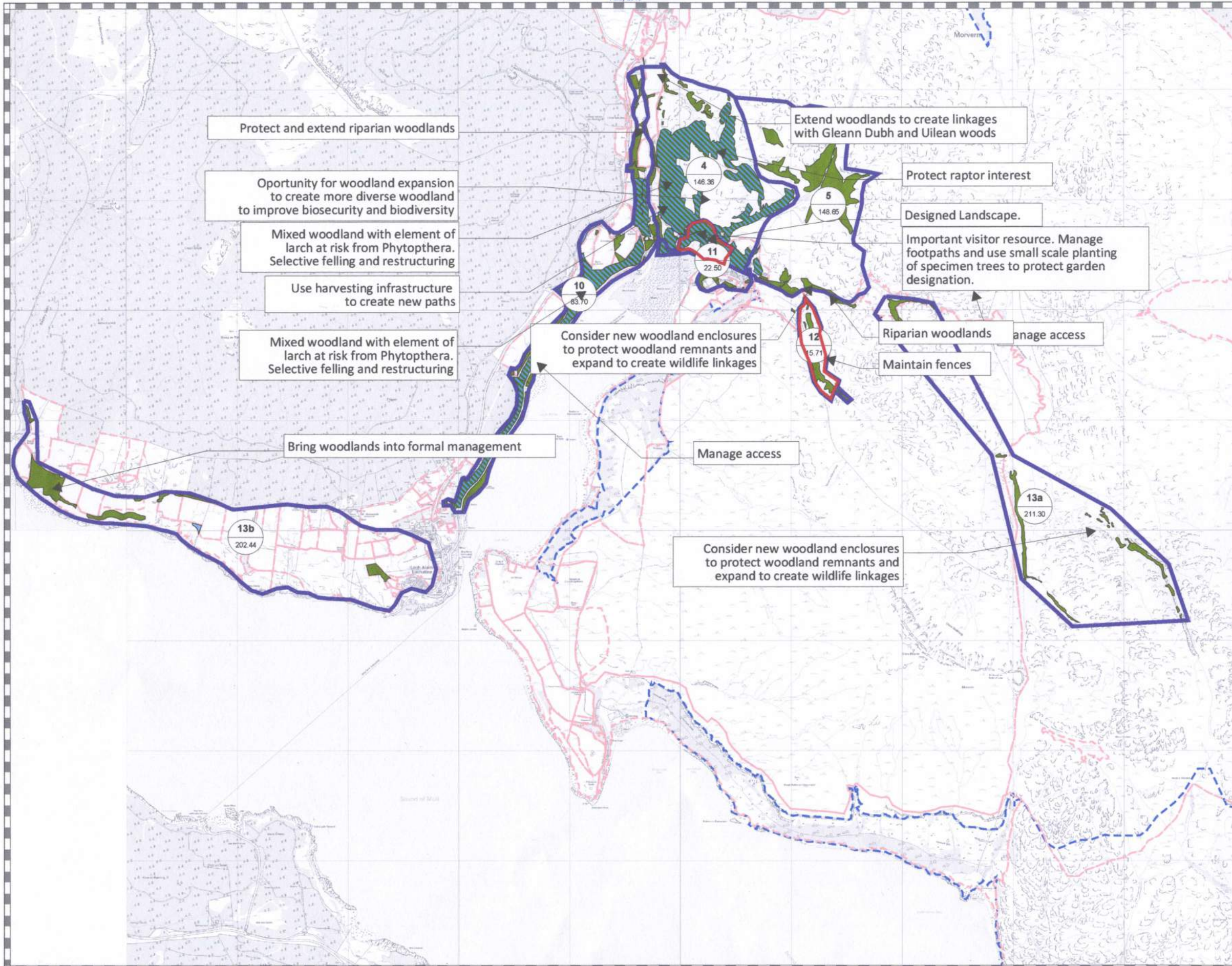


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Ardtornish Estate
 BRN 114582 MLC 68/139/0005
 Long Term Forest Plan
 16FGS13337
 Plan 1
 Location & Compartments
 Scale 1:50000

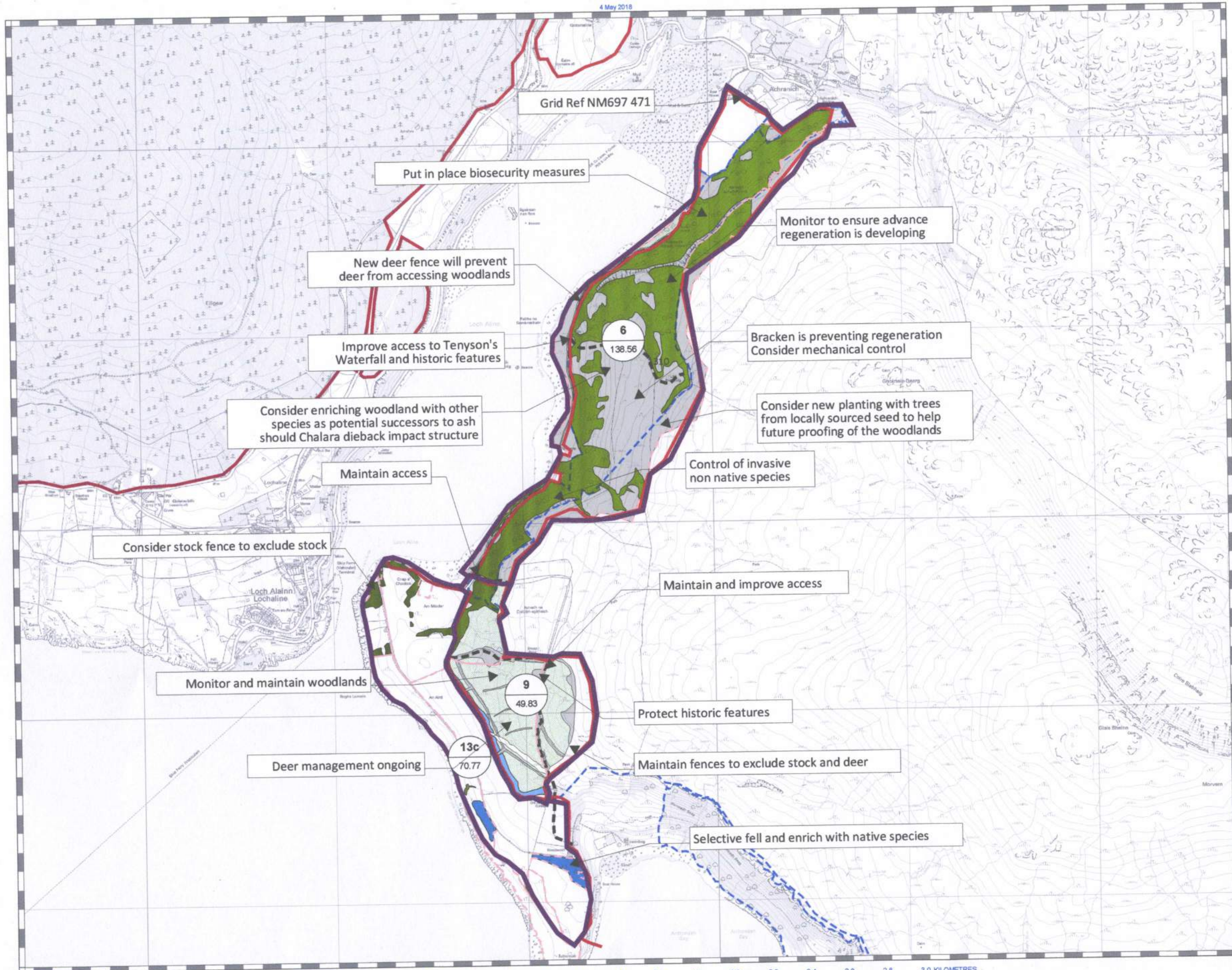




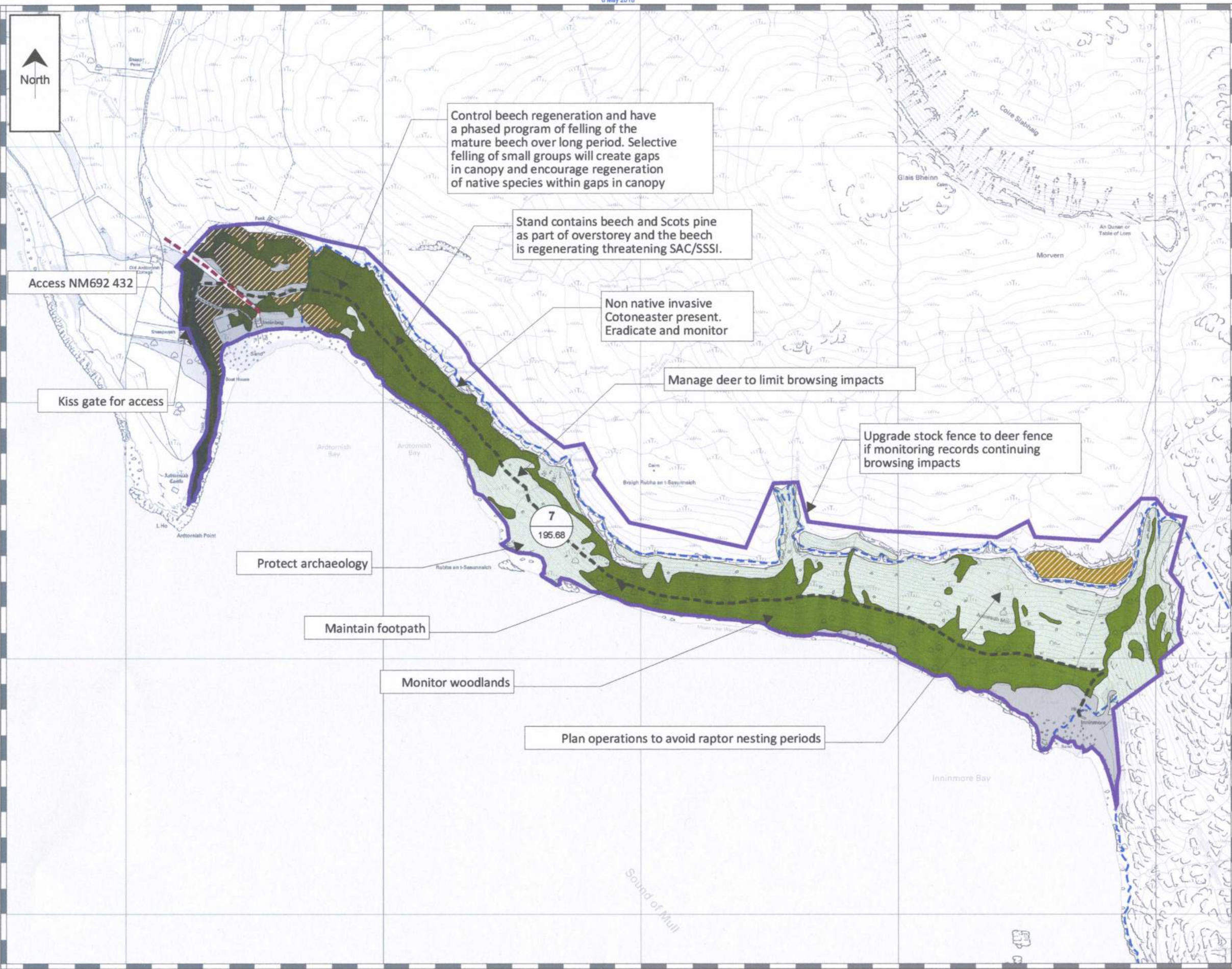
Aardtornish Estate
 BRN 114582 MLC 68/139/0005
 Long Term Forest Plan
 16FGS13337
 Plan 3b
 Garden, Torr Molach, West
 Lochaline
 Activity Plan
 Scale 1:35000
 apr 2018

- Compartment boundaries
- Mixed native broadleaf
- Mixed woodland
- Non native broadleaf
- Sitka spruce
- Native broadleaf natural regeneration <20 years old
- Native woodland new planting <20 years old
- Designed open ground
- Other land /wayleaves
- Deer fences
- SAC/SSSI
- LPID boundaries







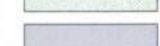


Ardtornish Estate
 BRN114582 MLC 68/139/0005
 Long Term Forest Plan
 16FGS13337
 Plan 3c
 East Lochaline Woods
 Activity Plan
 Scale 1:20000
 Apr 2018



- Compartment boundaries
- Mixed broadleaf (original woodland)
- Non native broadleaf
- Native broadleaf NP < 10 years old
- Mixed conifer < 10 years old
- Designed open ground
- Other land/wayleaves
- SAC/SSSI
- Footpaths
- Deer fences
- Stock fences

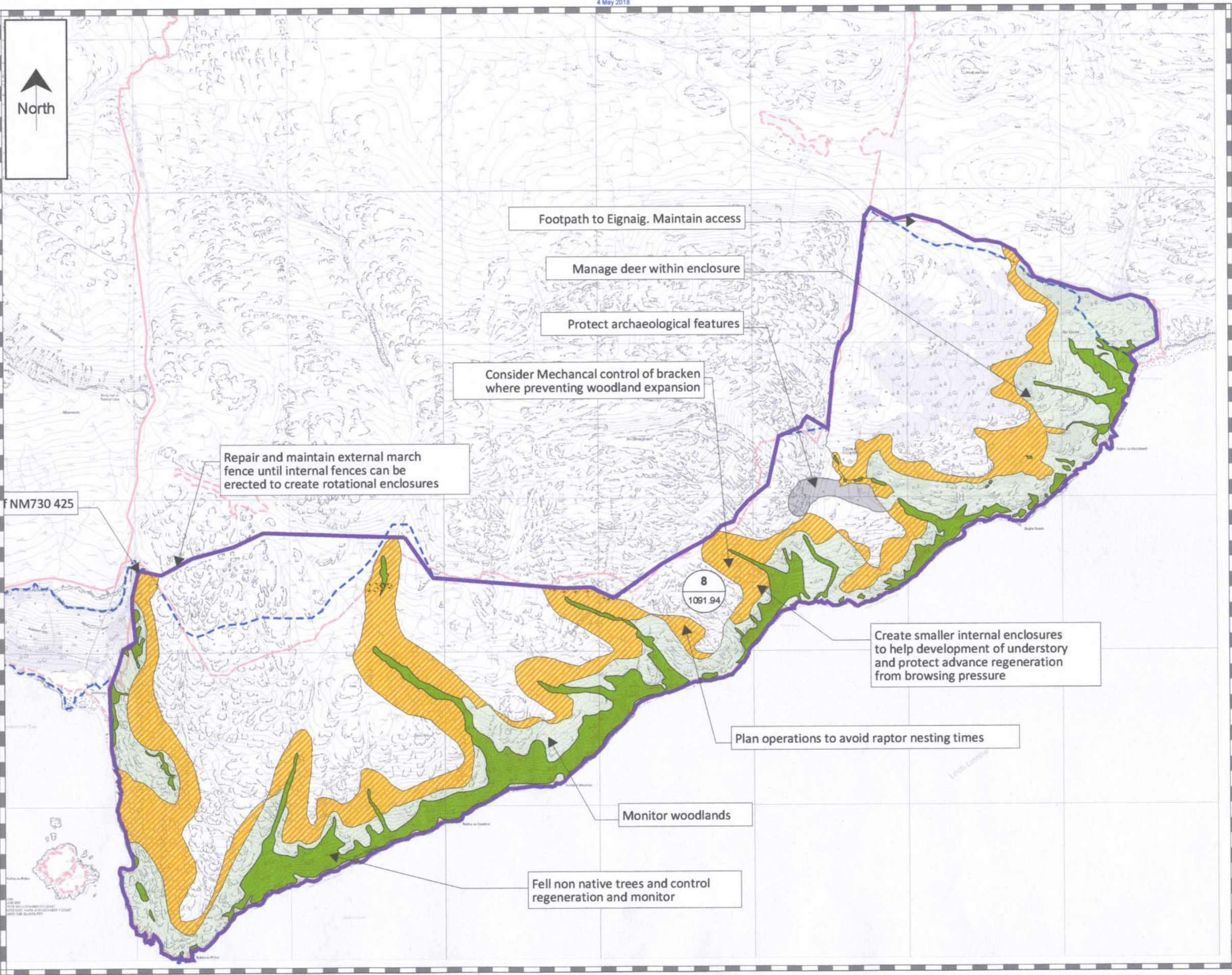



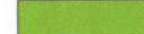





Ardtornish Estate
 BRN 114582 MLC 68/139/0005
 Long Term Forest Plan
 16FGS13337
 Plan 3d
 Inninmore Woodlands
 Activity Plan
 Scale 1:15000
 April 2018

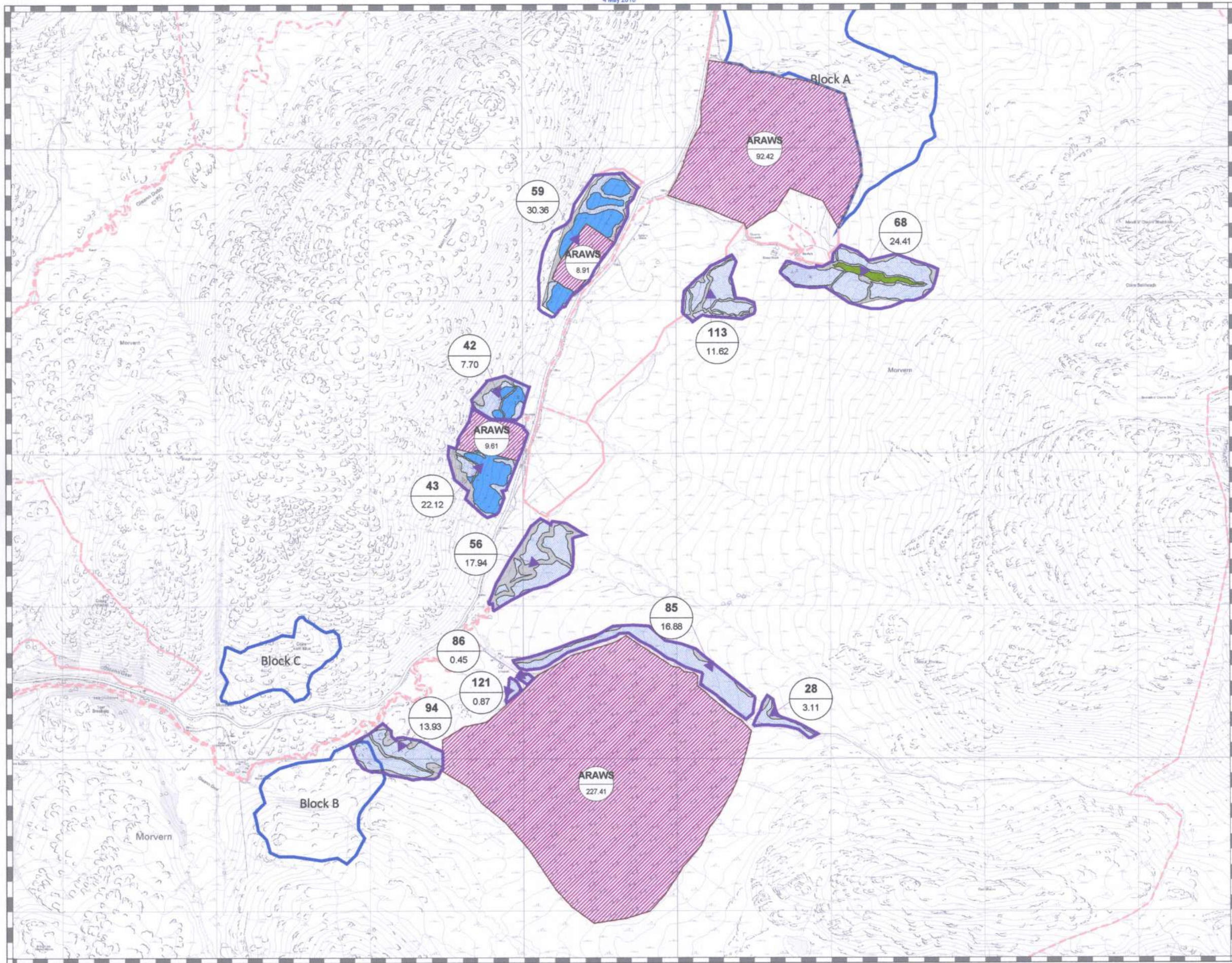
-  Compartment boundary
-  Mixed broadleaf (original woodland)
-  Native woodland NN <10 years old
-  Low density natural regeneration with potential for woodland expansion
-  SAC/SSSI
-  Designed open ground
-  Other land /wayleaves
-  Footpaths
-  Powerline












Ardtornish Estate
 BRN 114582 MLC 38/139/0005
 Long Term Forest Plan
 16 FGS13337
 Plan 3e
 Garbh Shliios
 Activity Plan
 Scale 1:25000
 Apr 2018



-  Compartment boundary
-  Mixed native broadleaf
-  Native broadleaf natural regeneration <20 years old
-  Potential woodland expansion
-  Designed open ground
-  Other land /wayleaves
-  SAC/SSSI



Ardtornish Estate
 BRN 114582 MLC 68/139/0005
 Long Term Forest Plan
 16FGS13337
 Plan 3f
 Gleann Geall Woods
 Activity Plan
 Scale 1:25000
 Apr 2018

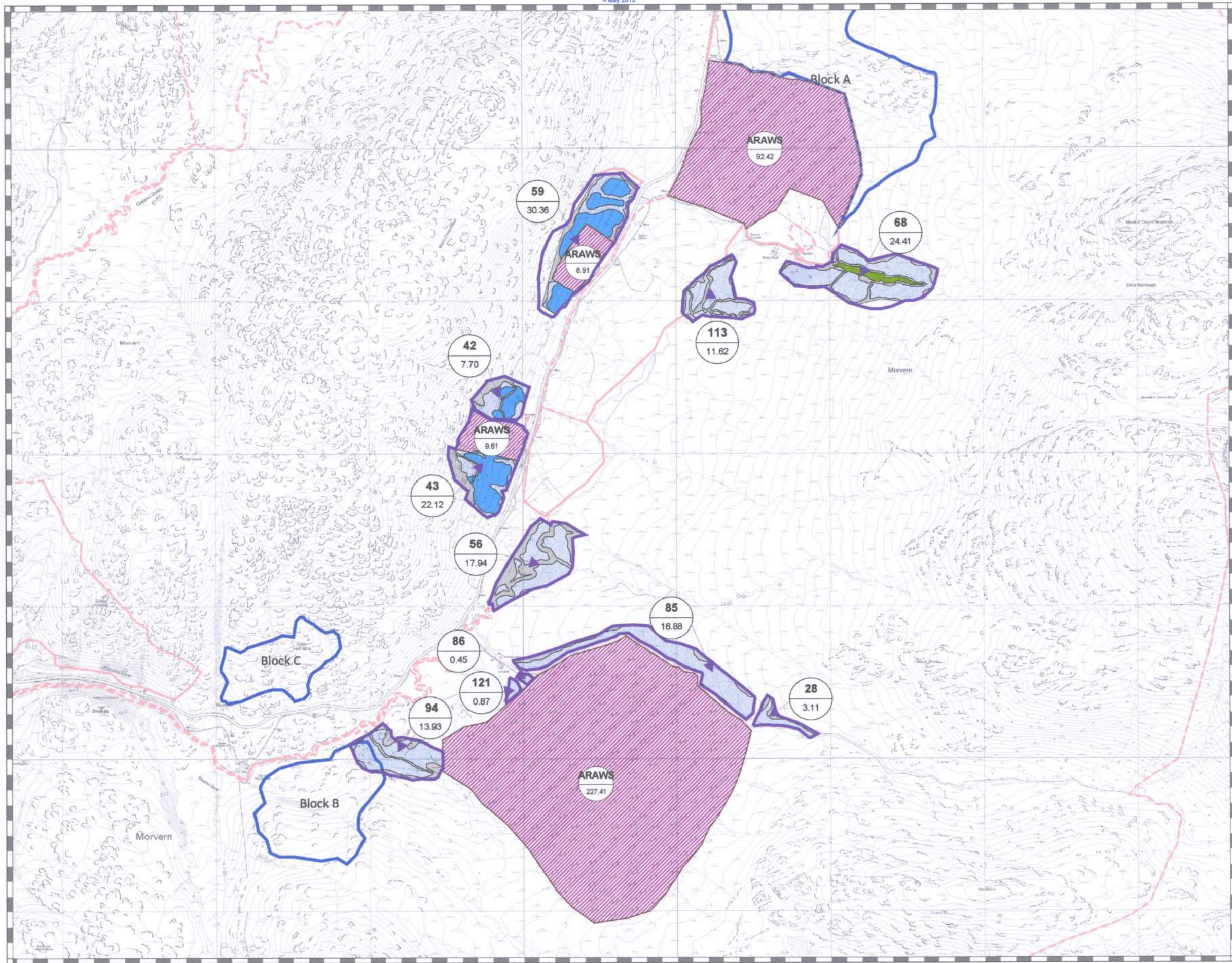
-  Compartment boundaries & deer fences
-  Mixed native broadleaf
-  Sitka spruce
-  Native woodland new planting <20 years old
-  Native broadleaf natural regeneration <20 years old
-  Designed open ground
-  New native woodland FGS 2018/19
-  ARAWS Woodlands (Commercial)
-  LPID boundaries

Ardtornish LTFP










Contract 16FGS13337

Appendix 2

Database



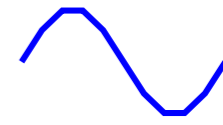



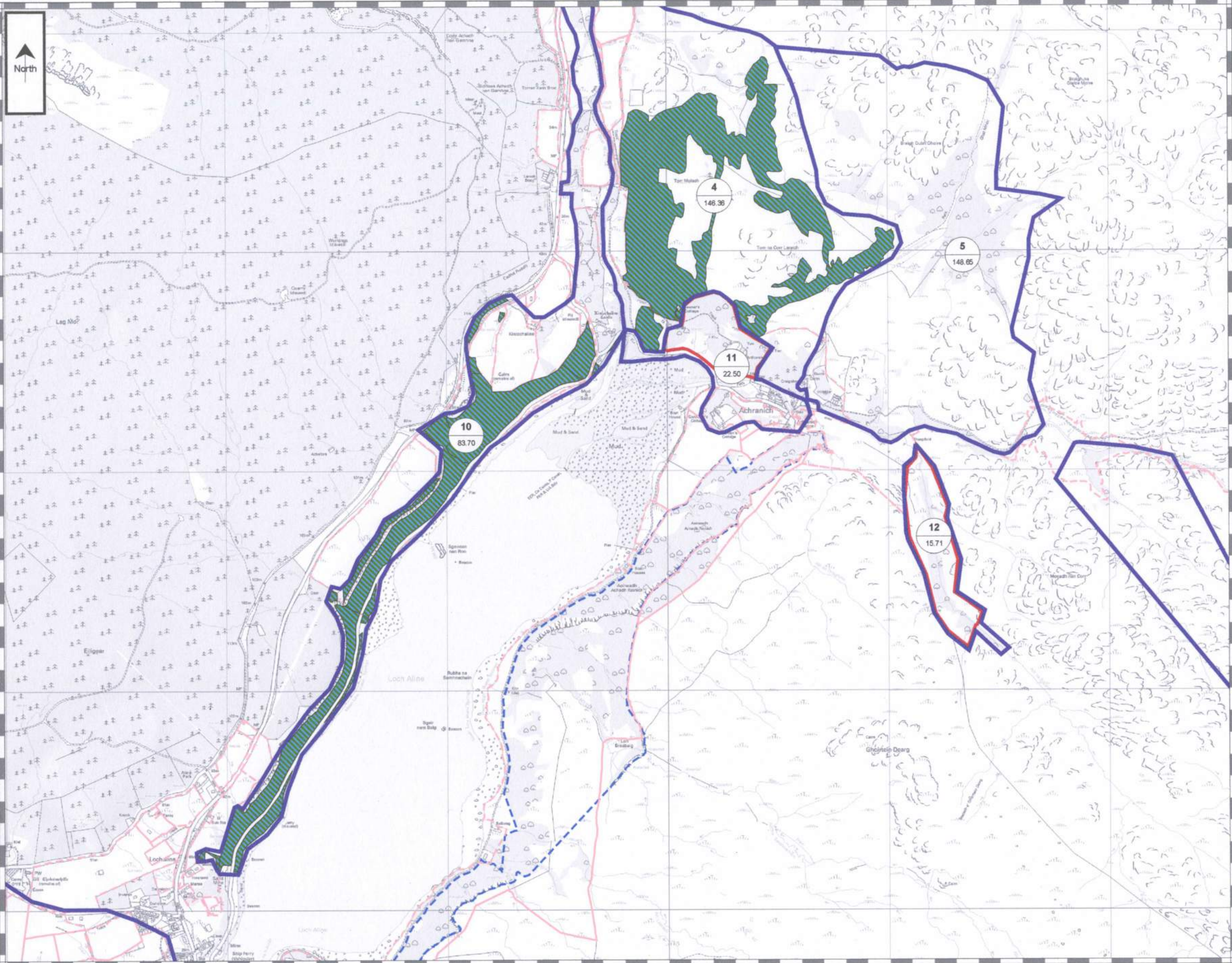
Ardtornish Estate
 BRN 114582 MLC 68/139/0005
 Long Term Forest Plan
 16FGS13337
 Plan 3f
 Gleann Geall Woods
 Activity Plan
 Scale 1:25000
 Apr 2018

-  Compartment boundaries & deer fences
-  Mixed native broadleaf
-  Sitka spruce
-  Native woodland new planting <20 years old
-  Native broadleaf natural regeneration <20 years old
-  Designed open ground
-  New native woodland FGS 2018/19
-  ARAWS Woodlands (Commercial)
-  LPID boundaries






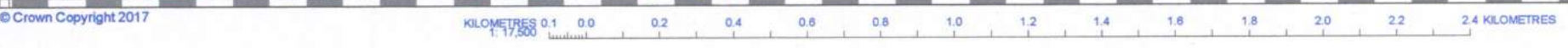
Ardtornish Estate
 BRN 114582 MLC 68/139/0005
 Long Term Forest Plan
 16FGS13337
 Plan 4
 Fencing Plan
 Scale 1:70000
 Nov 2018

- Ardtornish LTFP Fence Plan
-  Deer fences
 -  Stock fences within FP area
 -  New woodland deer fences erected under FGS
 -  Potential Internal deer fences



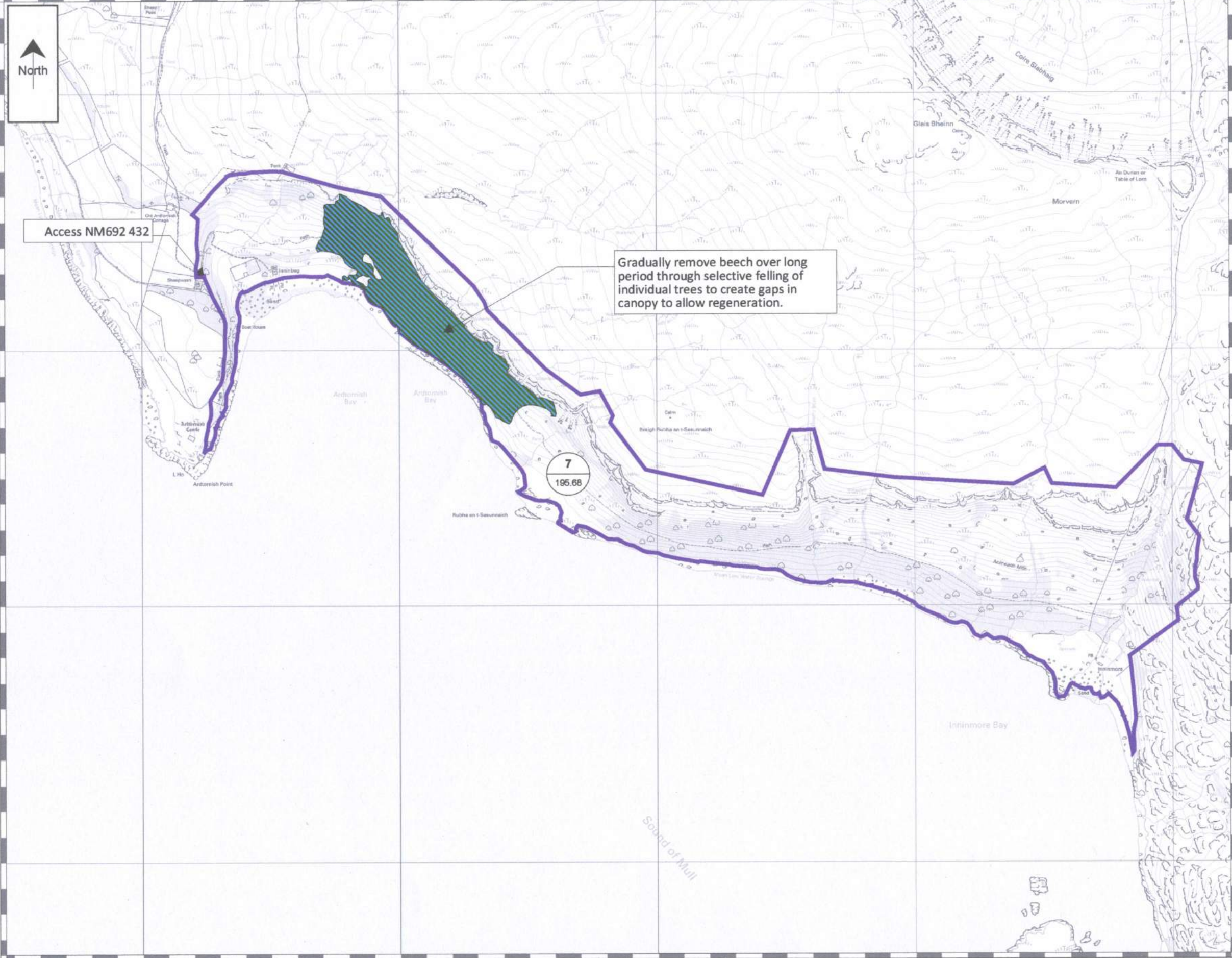
Ardtornish Estate
 BRN 114582MLC 68/139/0005
 Long Term Forest Plan
 16FGS13337
 Plan 5a
 Torr Molach & West Lochaline
 Thinning and Selective Felling
 Scale 1:17500
 apr 2018

-  Compartment boundaries
-  Areas to be thinned/selective felled
-  Deer fences



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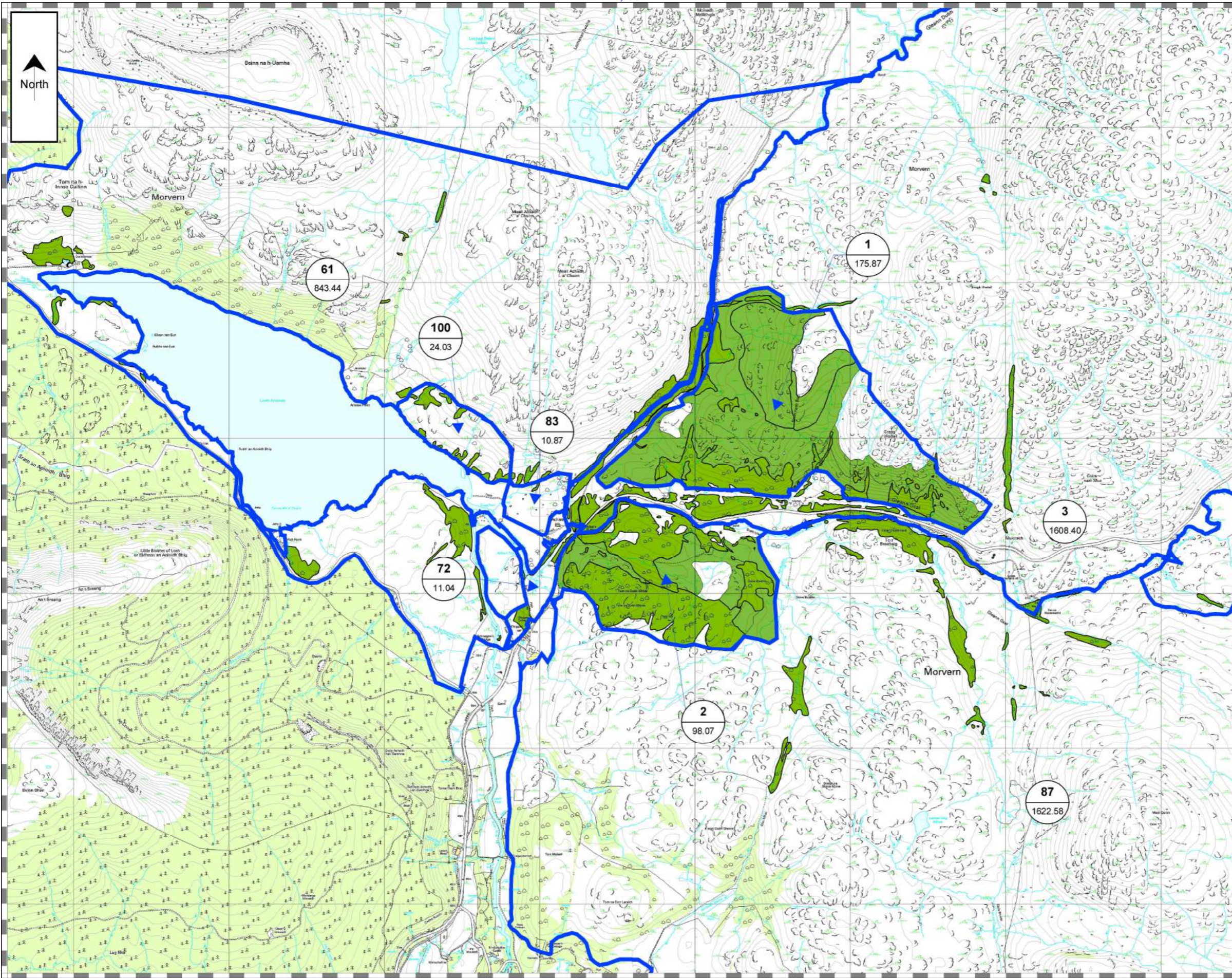
6 May 2018



Ardtornish Estate
 BRN 114582 MLC 68/139/0005
 Long Term Forest Plan
 16FGS13337
 Plan 5b
 Inninmore Woodlands
 Selective Felling Plan
 Scale 1:15000
 April 2018

-  Compartment boundary
-  Area of selective felling

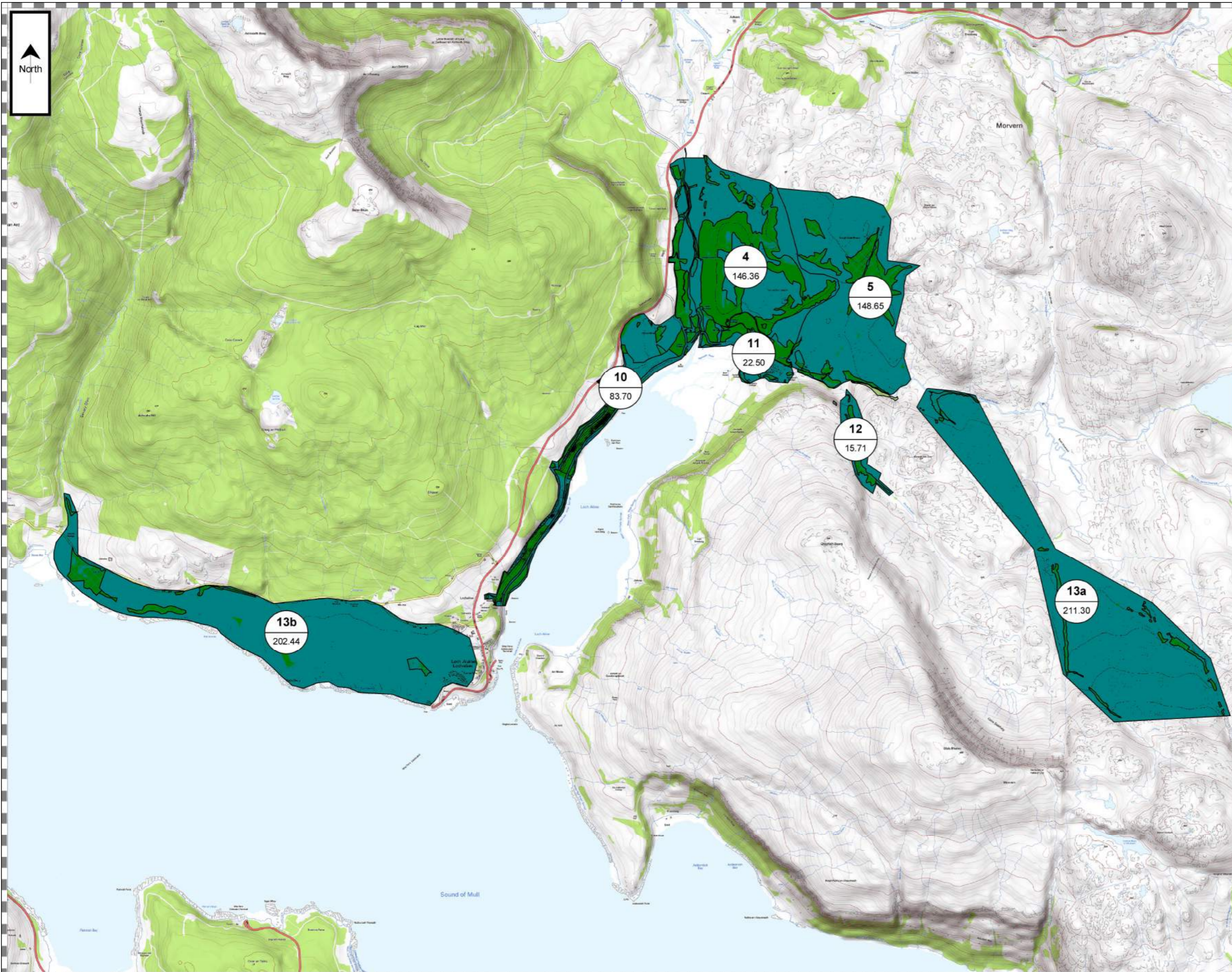
Kirn Ltd 1 Galloway Place FortWilliam PH33 6UH
 Tel: 01397702244 Mob:07917126053
 Email: miller.harris@btconnect.com



Ardtornish Estate
 BRN 114582 MLC 68/139/0005
 Long Term Forest Plan
 16FGS13337

-  Compartment boundaries and deer fences
-  Native broadleaf woodland (PPG area)

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 Email: miller.harris@btconnect.com



Ardtornish Estate
 BRN 114582MLC 68/139/0005
 Long Term Forest Plan
 16FGS13337
 Compartment Plan 6b
 Scale 1:40000
 Nov 2018

- Compartment boundaries
- PPG Area



Ardtornish Estate MLC
 68/139/0005
 Long Term Forest Plan
 16FGS13337
 Compartment Plan 6c
 Scale 1:20000
 Nov 2018

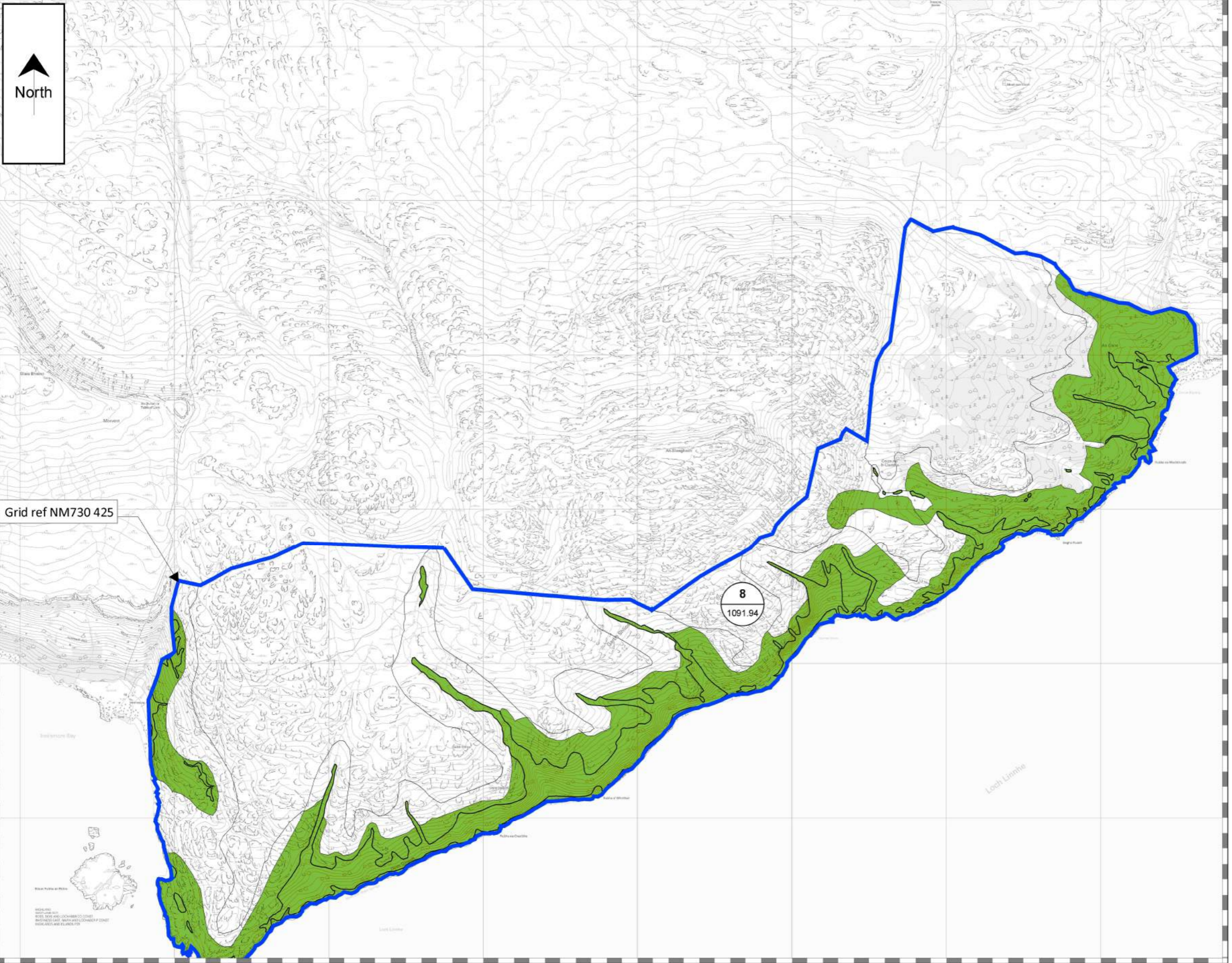
- Compartment Boundaries
- PPG Area



Ardtornish Estate MLC
 68/139/0005
 Long Term Forest Plan
 16FGS13337
 Compartment Plan 6d
 Scale 1:15000
 Nov 2018

- Compartment Boundaries
- PPG Area



27
195.68



Grid ref NM730 425

8
1091.94

Ardtornish Estate
 BRN 114582 MLC 38/139/0005
 Long Term Forest Plan
 16 FGS13337
 Compartment Plan 6e
 Scale 1:25000
 Nov 2018

-  Compartment boundary
-  Mixed native broadleaf (PPG Area)

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 Tel: 01397702244 Mob 07917126053
 Email: miller.harris@btconnect.com