Appendix 1 Land Management Plan Consultation Record

Consultee/Event	Date contacted	Date response received	Issue raised	Central Region Response
Naturescot	20/03/2023	13/04/2023	Coilhallan is linked to the River Teith SAC. Impacts unlikely. Following UK Forest and Water Guidelines and SEPA GBR is important. Avoid the bird nesting season for felling. Badger, Pine marten and Red squirrel are also present so appropriate protected species surveys should be undertaken pre harvesting. The removal of Larch and the retention of mature mixed conifers was welcomed. Potential for the creation of ponds in Coilhallan.	Appropriate protected species surveys will be carried out prior to harvesting. The retention of mature mixed conifers will retain Red squirrel habitat, nest sites and will compensate to some extent for the loss of large areas of mature Larch.
Scottish Water	20/03/2023	30/03/2023	The Milton Glen Burn is a Drinking Water Protected Area with an intake located within the woodland. A water pipe runs from the intake to the WTW. In addition to meeting the UKFS and Water guidelines, the SW document "Guidance on Forestry Activities Near SW Assets" should be taken into account at Milton. In The Crags a covered reservoir and pumping station is located with a cast iron water main running through the forest. Any works potentially affected SW infrastructure (such as pipeline crossings) must be approved by SW before work commences.	All of the advice and guidance provided by SW will be followed, and FLS will work closely with SW to protect these assets and drinking water quality prior to the commencement of operations.
WoSAS	20/03/2023	21/03/2023	There are no archaeological features recorded within any of the woodland. This may reflect a lack of survey rather than an absence of archaeology. The planning/management of felling, roading and restocking operations should all be	Contractors and the operational management team will be made aware of the potential for unrecorded archaeology to be present, and advised on the

Consultee/Event	Date contacted	Date response received	Issue raised	Central Region Response
			aware of the potential for unrecorded archaeology to be present.	course of action to be adopted should any features come to light. WoSAS will be consulted in the event of any discoveries.
Moray Estates	20/03/2023	12/04/2023	Hydro scheme and infrastructure/access requires consideration during planning and operationally. The legal title for the block doesn't reflect the fenceline, and this should be addressed prior to felling/restocking. Th proposed timber access across Moray Estate ground may be too steep. Further discussion needed.	The SLF operational management /legal team will liaise with the Estate on all these issues prior to work commencing, and will engage with the Estate on the question of access for timber extraction.
Woodland Trust	20/03/2023	20/03/2023	The following were considered important issues: Remove non-native conifers from regenerating areas. Collaborate on march fence and deer management. Consider the Great Trossachs Path. Plan for future public access opportunities. Communicate and consult over extraction across WT land.	The removal of non native conifers is an objective for Milton. The timing of this and the best operational approach are being considered. FLS will work with the WT on fencing and deer issues. The Great Trossachs path has been well landscaped in terms of adjacent forest cover and is currently in good condition. The path is subject to ongoing monitoring. In Milton there is currently little scope for an expansion of the path network, but FLS are happy to discuss

Consultee/Event	Date contacted	Date response received	Issue raised	Central Region Response
				potential actions that might link with neighbouring properties. There are no plans currently to extract timber across WT land.
Meeting with Community Woodland Group	07/03/2023		**Coilhallan:** Beech at east end: Realign access off road to align with path from town and avoid blind corner. Clear windblown timber and remove trees which might blow onto housing along the southern edge. Clear remnant SS along north edge. Footpaths generally. Clear windblow and vegetation management to maintain, no issues with path surface. Many of these are unsurfaced desire lines. Windblown SS and HL on the south edge. Clear to reduce venue for anti-social activity. Arboretum. Remove fences and thin to favour the exotics. Birch area. Thin to favour Oak. Fencing around planted SP etc. could be removed. Central mature MC areas. Retain for ecology, Red squirrel and landscape, particularly as Larch removed across woodland. Remove Larch and WH as part of CCF management. Remnant Larch area with pole stage SS/L/BI. Clearfell Larch at west end. Restock Oak and unrepresented NBL. Deer fencing? Where scattered Larch in dense pole stage regen look at harvesting options. CF Larch and leave, CF Larch and	The LMP can facilitate small scale site specific operations such as path management and removing potentially dangerous trees by obtaining the legal permissions for tree felling/management. A detailed consideration of small scale recreational issues is outwith the scope of the LMP which is a strategic document. One mutually beneficial possibility is for FLS to act as an enabling agent to assist the Community Woodland Group to raise funds for projects. The existence of an approved LMP covering the areas of interest can provide a statement of intent and help support grant applications. Thinning permissions will enable tree management along the march to have legal permissions in place.

Consultee/Event	Date contacted	Date response received	Issue raised	Central Region Response
			extract with removal of SS/L regen at the same time? Could create a massive eyesore. Safety issues for harvesting in dense cover. NBL area across road retain as Beaver food/riparian buffer. Generally native woodland favoured, so SP useful in the mix for Squirrels. Beech considered an honorary native. More diverse BL considered desirable. Element of mature MC should be maintained. **Callander Crags.** Diverse opinions on value of conifer element ranging from remove it all to don't touch a thing. Opening viewpoints along lower path considered important, but establishing if there is actually a desire for this is possibly difficult. Generally positive feedback from questionnaire. **Torrie:** Better access and signage showing that the woods are FLS were considered important. The stile to the new woodland should be replaced with a self closing gate. Wider access links west to Cambusmore land could give good circular cycle routes. Limited demand, but is this because circular routes not there. Much of the woodland is used heavily by local users.	Windblown timber and the SS/HL area south of the powerline will be cleared in the first Phase of the LMP. Oak will be favoured in the NBL areas during any respacing/thinning operations. The arboretum areas will be retained and managed. Mature non Larch Mixed conifers will be retained where possible, with the exception of Western hemlock (WH) which will be thinned out as a priority. Mature BE areas will be retained. Clearfells in The Crags will be limited to dealing with windblow and Larch areas. Torrie is not a priority in terms of recreation, but further discussions required on how to improve the access gate and signposting for the new woodland creation area.
Dropin Event, Callander	04/04/2023		Circa 20 attendees. 1 Coilhallan & Callander Crags: • In Coilhallan the Larch in Phase 2 should be in Phase 1. (2 comments)	The Larch in Coilhallan is now the subject of a SPHN and felling will be in Phase 1.

Consultee/Event	Date contacted	Date response received	Issue raised	Central Region Response
			• Path suggestions will depend on the felling plan and which areas can be cleared. • Maintain woodlands to keep viewpoints open. • In Callander Crags drainage is very important to residents. Manage woodland for flood attenuation (2 comments). • In Callander Crags open up views to clear summit ridge. • Need more circular paths in Coilhallan. Larch needs felling first. • Continue good working relation between Community and FLS. • Look for opportunities to create ponds and wetlands for amphibians. • Save the Oaks on The Crags. • New springs have appeared in the lower Callander Crags woodland since the last clearfelling. • No bike tracks in Coilhallan. Plenty of other places available for biking. • Ponds could be created to manage possible flood risk. • Could the felling areas be reduced with longer phasing (except for Larch areas). • Playing fields by Primary School are frequently waterlogged by runoff from Coilhallan.	In light of drainage/flooding concerns, clearfells within The Crags will be limited to those strictly necessary to deal with windblown timber and Larch. The extensive Larch fellings and windblow clearance in Coilhallan may present the opportunity for improving access. Potential pond sites need to be identified to inform discussions. There are robust areas of pure mature Oak within the Council woodland adjacent to The Crags, with a scattering of Oak across The Crags. Thinning will favour Oak in general. The desire to improve the access nearest to the town in Coilhallan is understood, further discussion needed. Deer control is challenging in the area. All deer control is undertaken by qualified FLS staff. Further discussion with neighbours on a collaborative approach may be beneficial.

Consultee/Event	Date contacted	Date response received	Issue raised	Central Region Response
			• Bridgend road floods via Coilhallan. Permanent water seepage across Invertrossachs road by Holiday Park. • The plan concepts should have included a proposal to zone the woodlands. With Coilhallan being prioritised for quiet recreation and wildlife; more active recreation in Torrie and on Callander Crags the views and cliffs should be opened up to emphasise the Highland Fault Line. • Coilhallan is closest to the town and best suited for active recreation. Torrie is best suited for wildlife and conservation interest. • Consider impact of surface water flows after felling on Crags. Previous felling and road creation had a major impact on the hydrology concentrating flows to the east end of The Crags. • Cut back trees next to current path access to Coilhallan from the A81. Signage to alert road users to pedestrians crossing. Access needs improving with a short path extension through the edge of the wood to the east to connect with existing paths and pavement, and move the access from its current location which has poor sight lines. (3 comments) • Manage the mature trees adjacent to Housing in the East of Coilhallan to reduce the risk of property damage.	

Consultee/Event	Date contacted	Date response received	Issue raised	Central Region Response
			• Fallen trees need clearing off Coilhallan tracks by Hydropathic route and western edge. • Hides for wildlife photography. • What is to be done about increasing deer numbers. • The existing access to Coilhallan from the town off the A81 is very unsafe for school children. Beech area with windblow needs tidying up for the outdoor education element. • More open spaces and views. • Drainage is a big issue in both woods. • Interpretation panels. • Does the LMP take account of the recent work by Stirling Council on surface water management in Callander in relation to both woods. • In Coilhallan the ditches on the uphill side of the main track need clearing near the A81 to avoid path erosion. • In Callander Crags were there any changes in the proposals for vehicular access. *Coilhallan & Callander Crags Summary*: Drainage, water management and the impact of felling were concerns in both areas. Opening up views in Callander Crags and clearing paths in Coilhallan. Manage trees adjacent to houses along the SE boundary of Coilhallan. Deer number concerns. Various enhancements to enable people to enjoy the wildlife more and to enhance habitats, for instance with	Torrie is not currently a priority in terms of recreational investment. Improvements to the entrance to the new woodland will be considered. Car parking may become an issue if use increases.

Consultee/Event	Date contacted	Date response received	Issue raised	Central Region Response
			more ponds for amphibians. Larch felling should be prioritised. Improve the access onto the A81 as a priority. 2 Torrie • Potential for good path links with Cambusmore by relatively short path extensions/upgrades to create longer distance circular routes. (3 comments) • The new planting at Torrie should have better access at the roadside and signage to welcome users. • Torrie should be zoned, marketed and managed for active recreation. *Torrie Summary:* Improve access links to neighbouring properties to create more circular routes and improve access point into new woodland with a pedestrian gate. 3 Milton • What was being done about the conifer regeneration. Could Woodland Trust volunteers clear this for FLS. *Milton Summary: as above.*	The removal of non native conifer regeneration is recognised as an important issue. The timing and scope of operations requires operational planning and resource assessment. Volunteers working in FLS woodlands may create H&S issues.

Consultee/Event	Date contacted	Date response received	Issue raised	Central Region Response
Cambusmore Estate	29/01/2024	23/02/2024	In relation to EIA SOR for deforestation and peatland restoration... *"We don't have any concerns about this programme. We may be keen to get a site visit when work is going on, as we may be interested in some re wetting areas of our own if that's possible."*	Noted

VP1: Invertrossachs Road Loch Vanachar. GRN: 259224/705605

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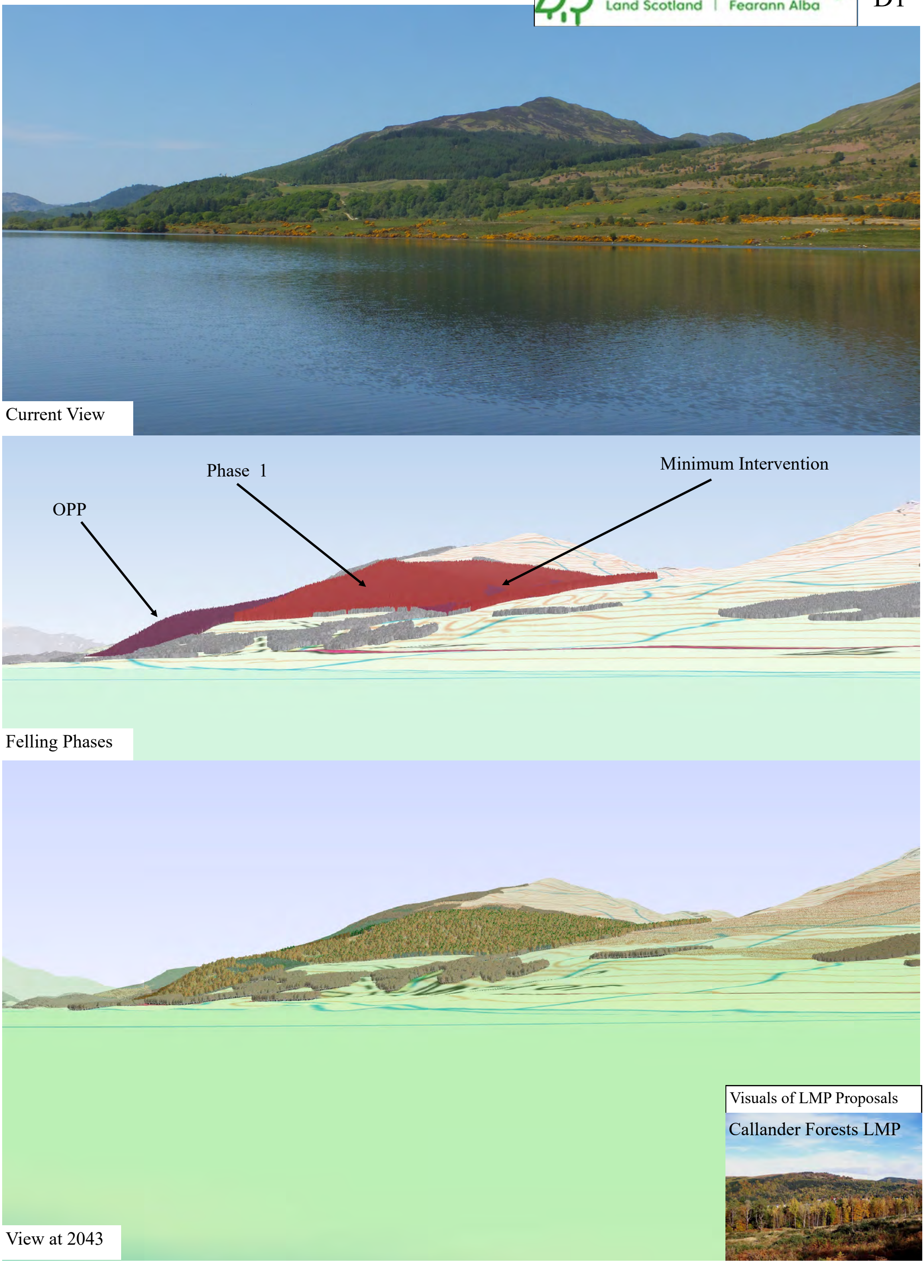
D1



Current View

Felling Phases

View at 2043

Visuals of LMP Proposals

Callander Forests LMP

VP2: Dunmore Fort. GRN: 260410/707830

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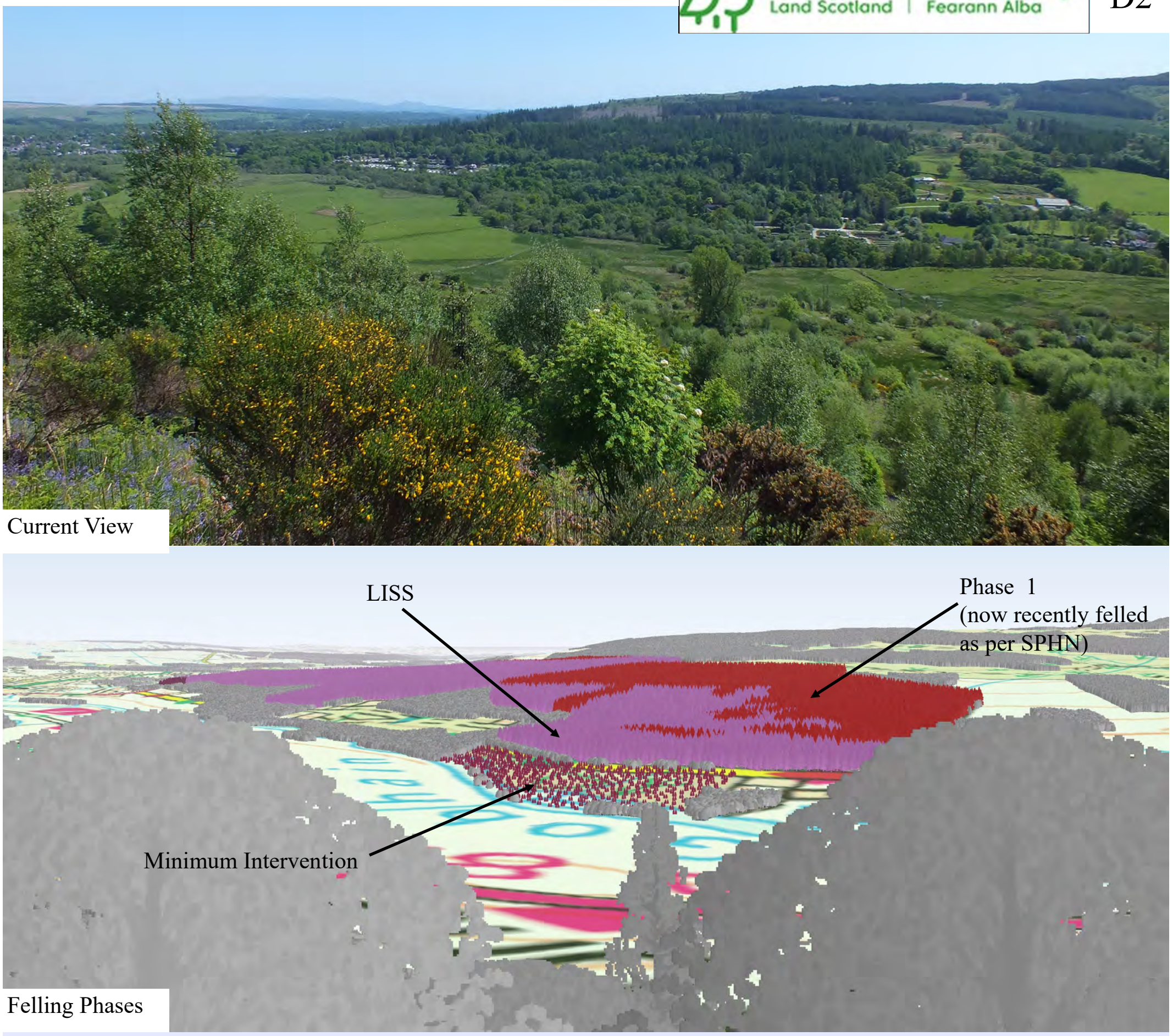
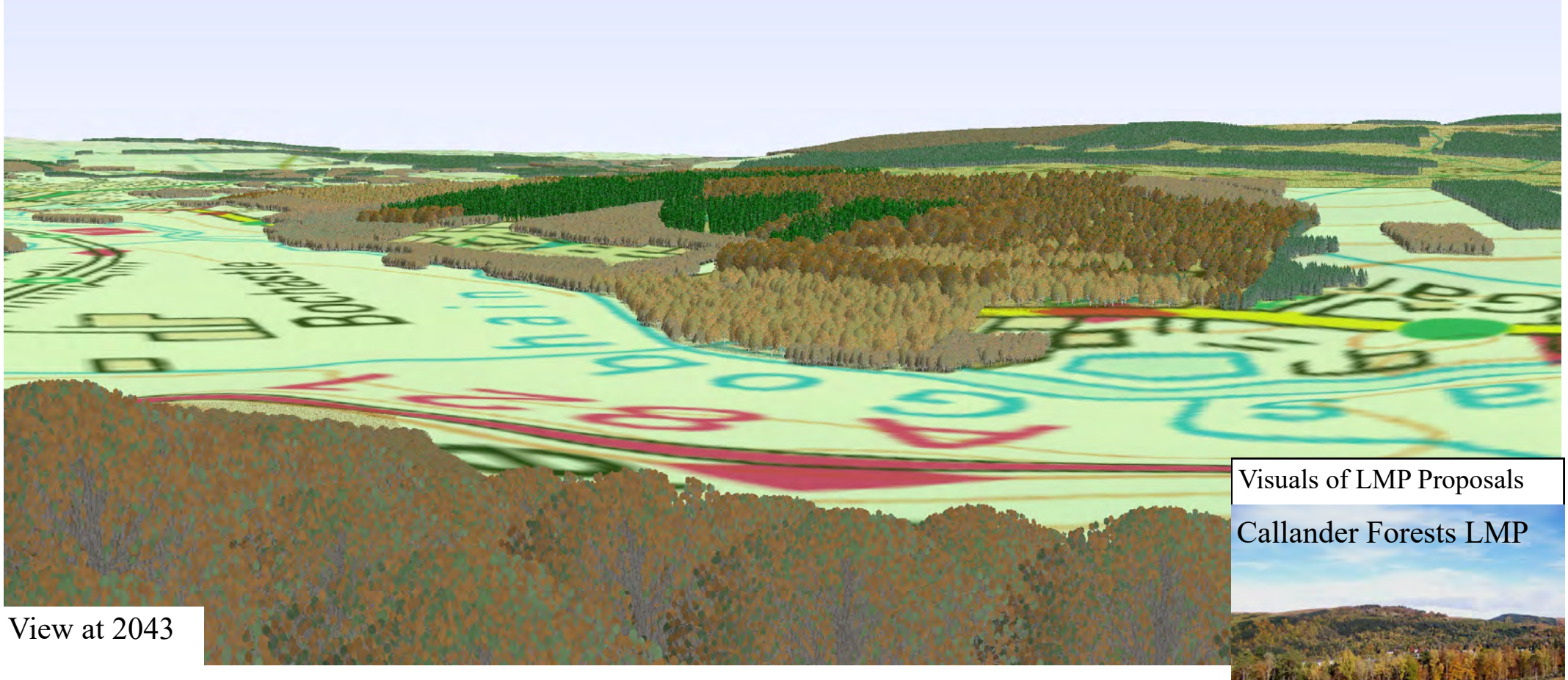
D2



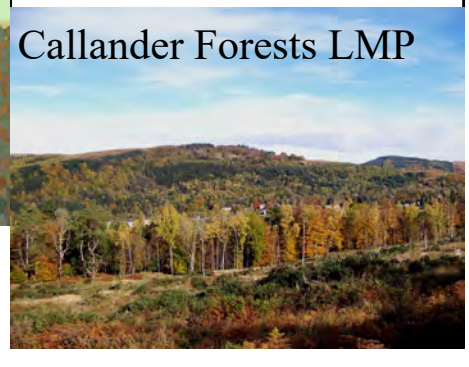
Current View

Felling Phases



View at 2043

Visuals of LMP Proposals



VP3: Callander Crags. GRN: 262753/708632

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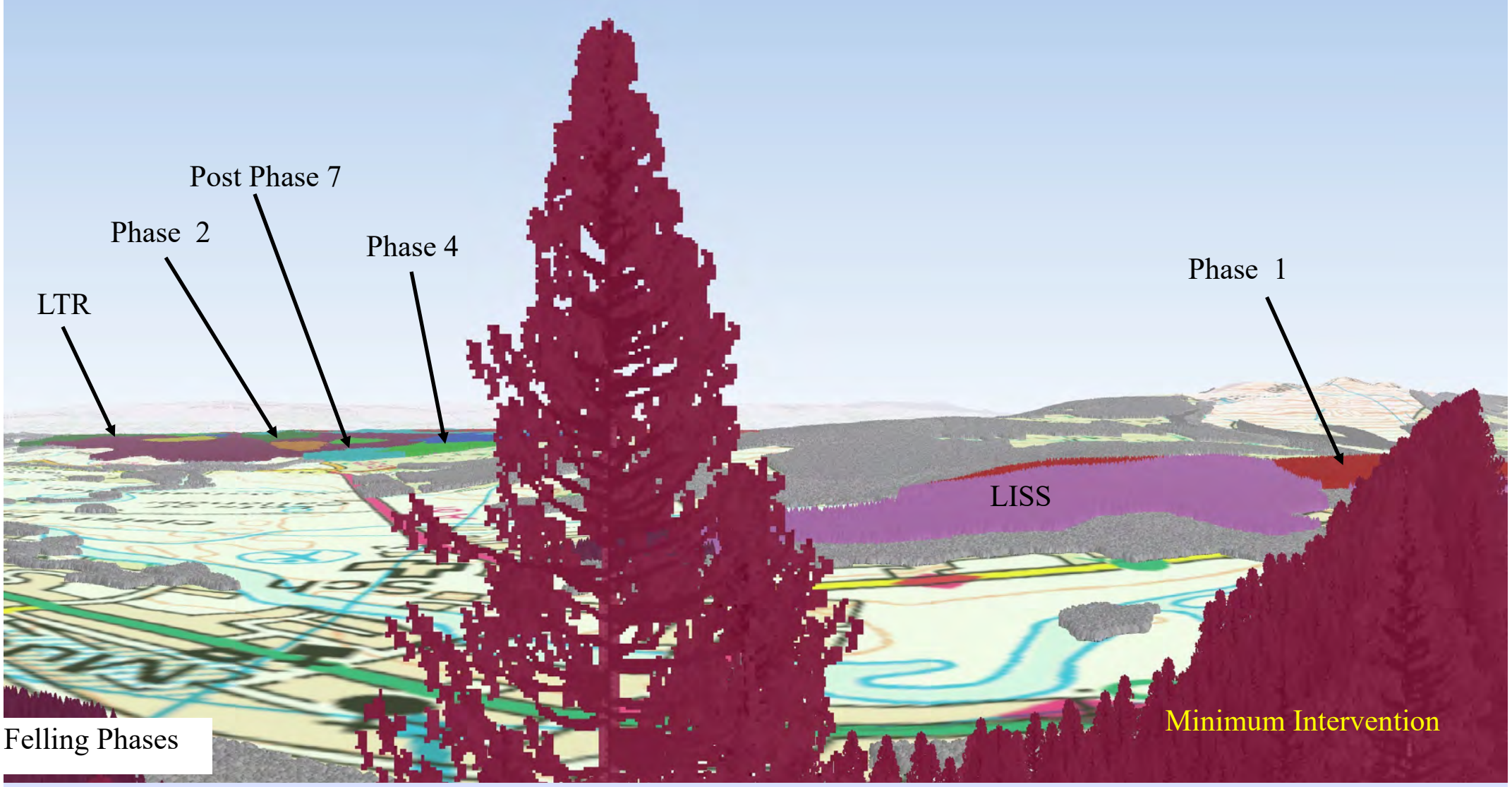
D3

Current View



Felling Phases

View at 2043

Visuals of LMP Proposals

VP4: Invertrossachs Road by Callandale. GRN: 262237/707479

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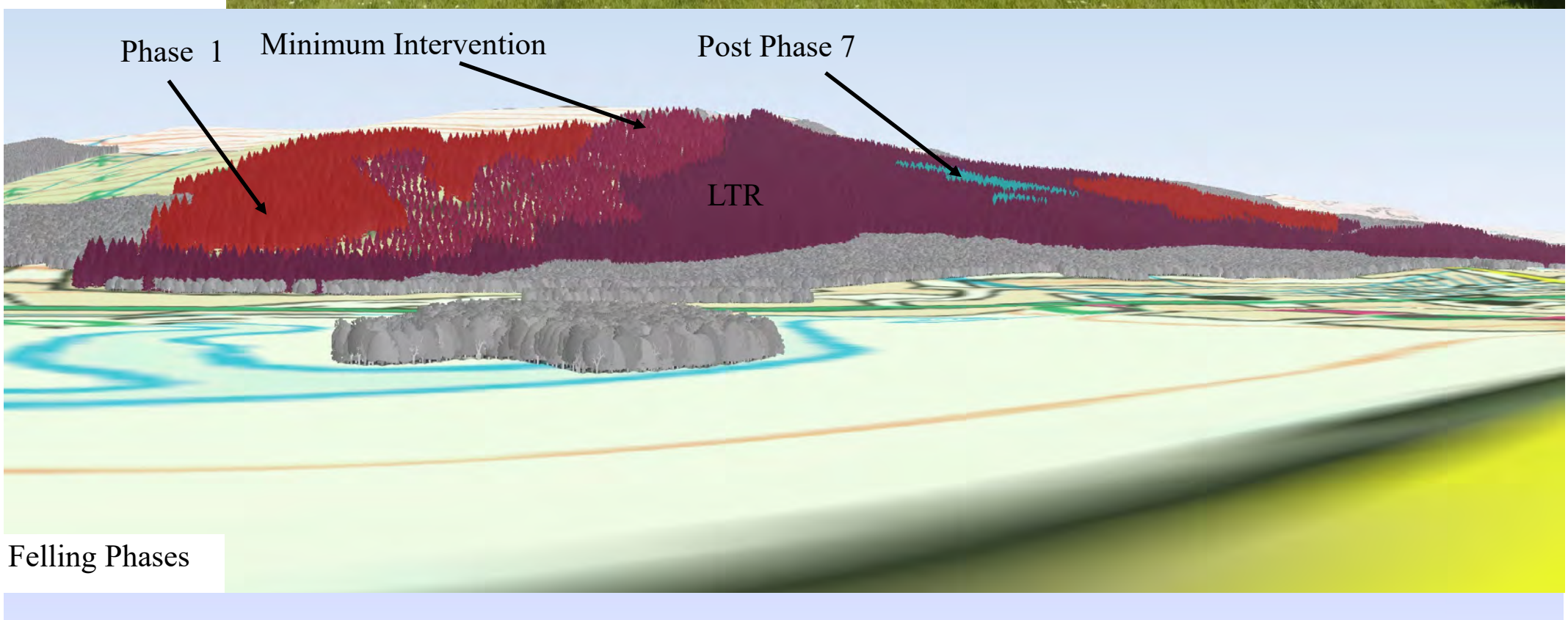
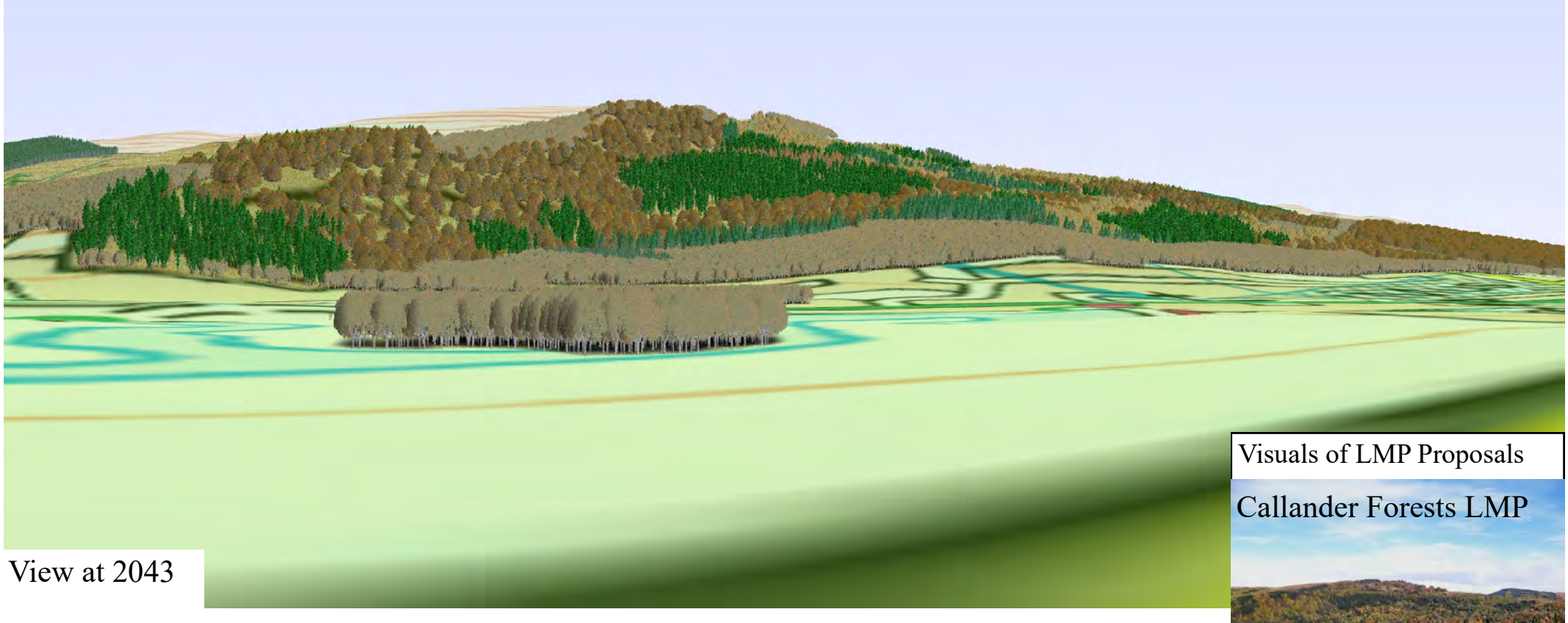
D4

Current View

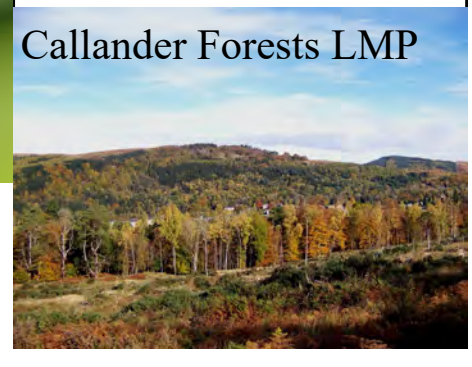


Felling Phases



View at 2043

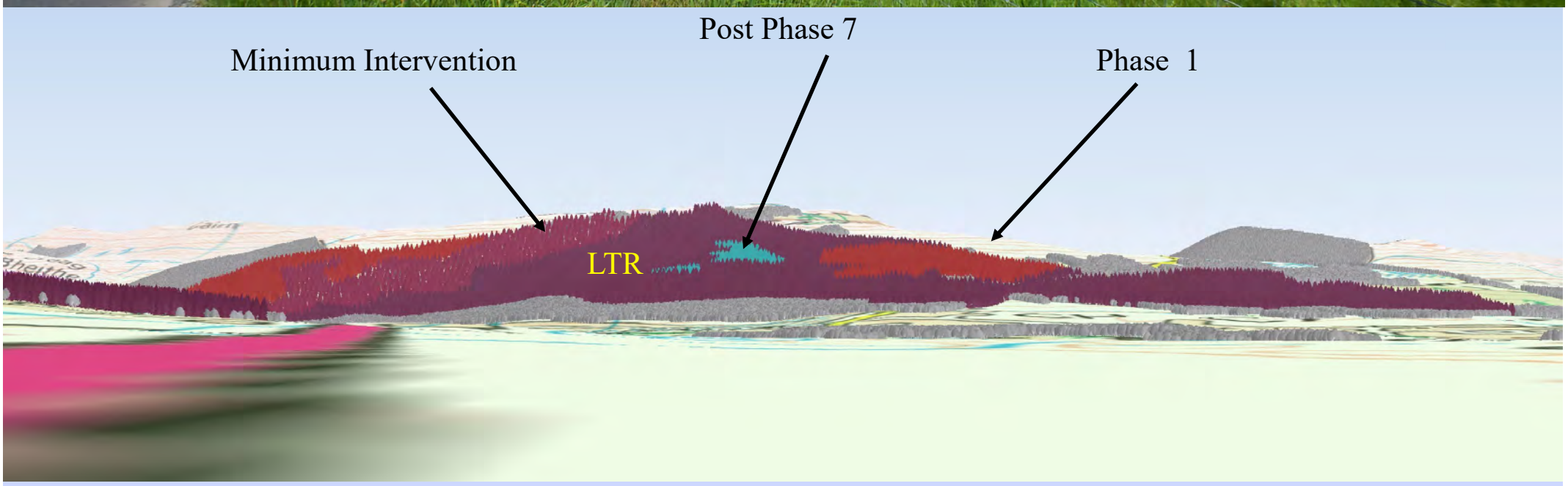
Visuals of LMP Proposals



VP5: A81 by Claish Farm. GRN: 263190/706578

D5

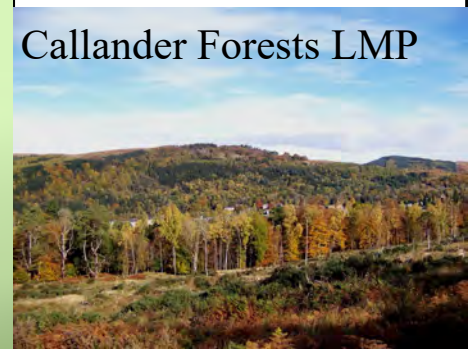
Current View



Felling Phases

View at 2043

Visuals of LMP Proposals



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Appendix 3

Deer Management Plan (DMP) – Callander Forests

(Torrie, Coilehellan, Callander Crags and Milton)

Background

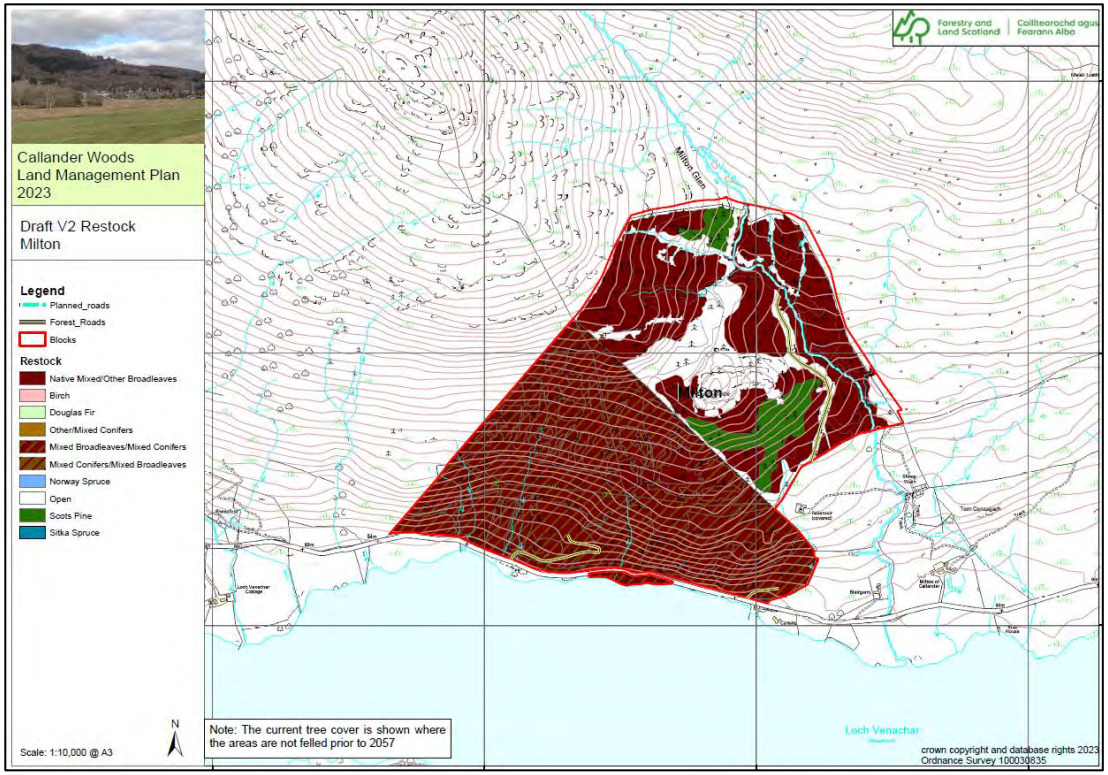
- This DMP should be used as a supporting document/annex for the Land Management Plan (LMP). The DMP should also relate/be used in conjunction with FLS Deer Management Strategy.

National & Local objectives

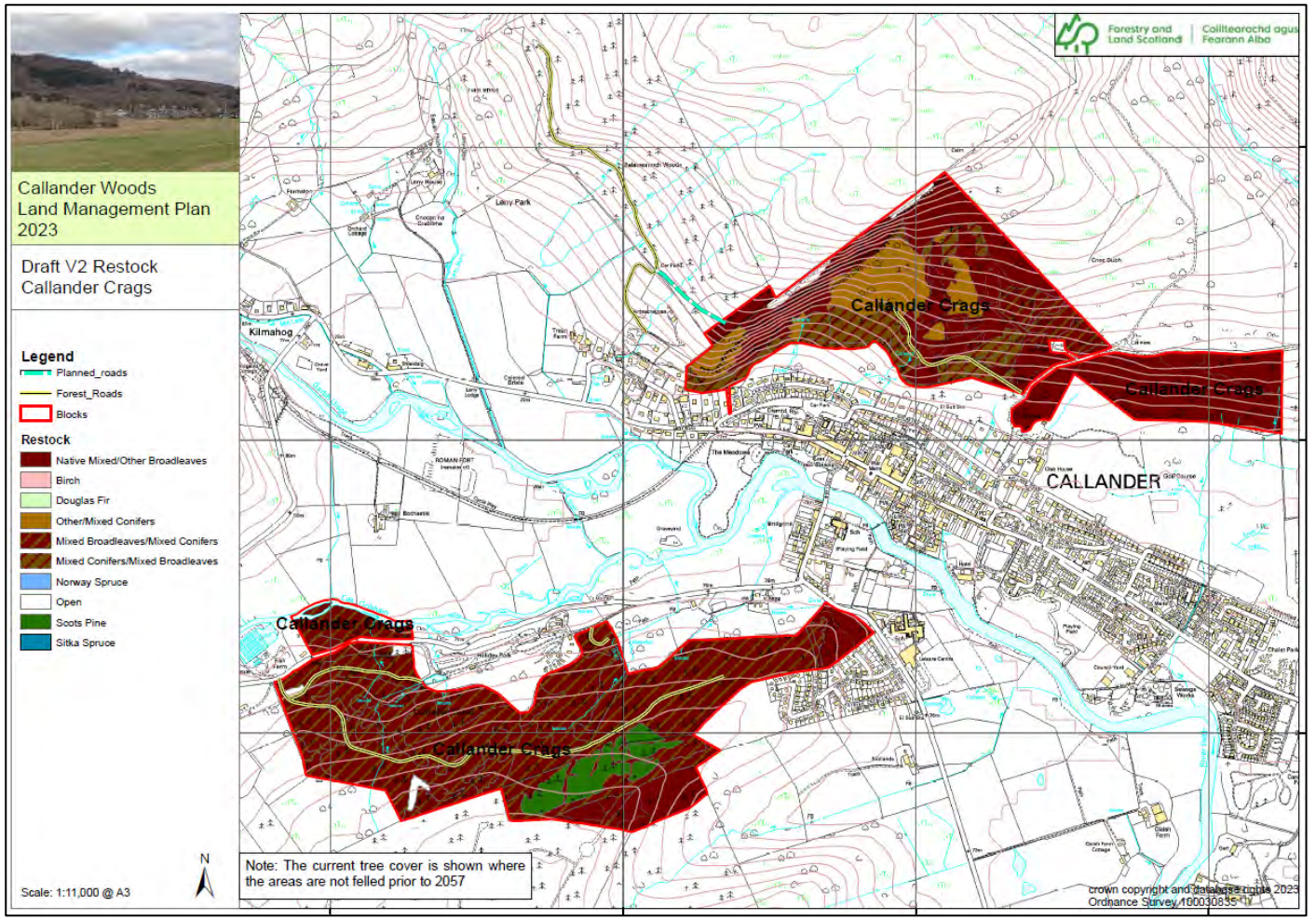
- National
  - Contributing to Scottish Forestry - Forestry Strategy (also includes Climate Change)
  - Deer Management Strategy Deer management strategy - Forestry and Land Scotland
  - Scottish Biodiversity Strategy Biodiversity strategy: consultation - gov.scot (www.gov.scot)
- Local
  - Central Region DMP 2022 .docx

What are we going to protect?

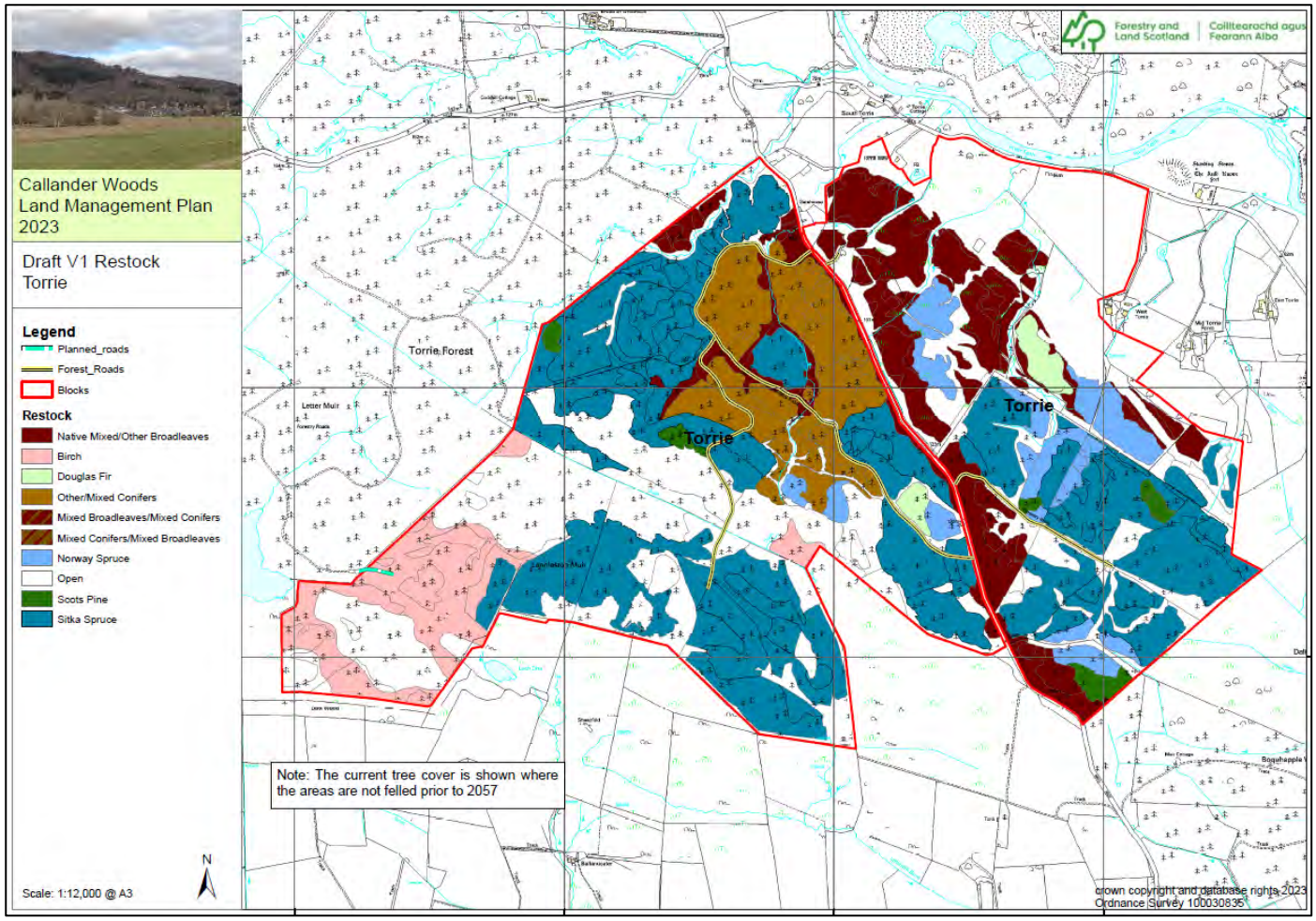
- **Milton**. Currently Milton is split into two parts. The southern part is deer fenced, planted in **Mixed Broadleaves and Scots Pine** with large open areas. Natural regeneration of birch and other native species are seen. The northern part currently consists of an unfenced mature Sitka Spruce and Larch forest. Future plans include harvesting the northern part of the block and planting it in Mixed Broadleaves and Mixed Conifer, in line with the southern part and our neighbours, The Woodland Trust.



- **Coillehellan**. This forest is very diverse in tree species with the most abundant being **Mixed Broadleaves** and Larch. The Larch has seen large areas of windblow and is scheduled for removal within the next LMP. Future plans indicate a diverse forest of Mixed Broadleaves, **Mixed Conifers and Scots Pine**.
- **Callander Crags**. Like Coillehellan this block is also very diverse with the most abundant tree species being **Mixed Broadleaves and Mixed Conifers**. Future plans indicate a forest of Mixed Broadleaves and Mixed Conifers with the remaining Larch and Sitka Spruce being removed.



- **Western Torrie.** Large area of commercial Sitka Spruce taking up about 50% of the block. The other half of the block is deer fenced and planted with **Mixed broadleaves, Norway Spruce, Douglas Fir**, and a 38Ha area in the west left open for regeneration and grazing.
- **Eastern Torrie.** Most of the block is commercial Sitka Spruce, however large areas of **Mixed Conifers** have been planted in the West. Smaller patches of **Scots Pine and Mixed broadleaves** planted within the center of the block. Some areas of Sitka Spruce felled recently left unplanted due to deep peat and future plans for peatland restoration. Future harvesting of Sitka Spruce will open a restock area for **Birch**.



Deer Species (and other herbivores/feral pigs)

- Red and Roe deer are found within the DMP area.

What have we done to date?

- Within the last 5 year a total of 166 deer has been culled from the DMP area. Both Out of Season (OOS) and night shooting authorities have been utilized.
- **Torrie** is showing deer damage of 10-20% based on NN reports. Most of the damage is caused during the months of September and October. This is caused by the neighbouring deer farm attracting deer into Torrie. Deer numbers can be up to 4 times as high within Torrie during this period. Focused deer stalking during these months have been implemented in 2022 and seem to have made a difference in deer densities. Torrie is currently being managed by a FLS Wildlife Ranger along with the assistance of three other rangers during September and October. A small area Douglas Fir and Norway Spruce has been fenced in 2022 due to the are being unprotectable due to no safe backstop and it being next to a busy road.
- **Callander Crags** is showing damage of 30-100%. These two blocks sees high visitor numbers and are located within the town of Callander. This leads to an increased danger to public safety during deer stalking operations. The blocks are currently managed by a FLS Wildlife Ranger, however the Wildlife Team is looking at options to include night-time stalking by a Deer Management Contractor, however this is a difficult ask due to small road network and high visitor activity even at night.
- There is no herbivore damage data for **Milton**. Milton was included in deer damage impact assessment and dung count study for 2022. We are awaiting results. The deer fence in the southern part of the block seems effective and only small numbers of deer seem to make ingress into the area.

Geography

- The terrain in Milton and Callander Craigs are mountainous and steep in places. Coilehellan and Torrie are less steep.
- The Callander blocks and Torrie sees high public activity.
- The FLS Wildilfe Ranger in the Callander blocks have raised concerns due to high public access and no safe backstops for shooting. Due to this he is unlikely to shoot these blocks during daytime hours and nighttime access is limited due to the small road network.
- No recent H&S concerns raised for Milton or Torrie.

Protection Options – cull/fence/tubes

- **Milton.** Collaborative working with our neighbour the Woodland Trust will be paramount to deer management success in this block. Improved access both for 4x4's and ATVs will be critical. Alternatively, a marsh deer fence would be required, which can be connected to the already existing Woodland Trust fencing.
- **Coillehellan.** Smaller enclosures around the Mixed Broadleaves will be paramount to the success in this blocks due to the lack of vehicular access and the high level of public use. Areas left as open ground or deer glades will be needed to increase deer culling opportunities with safe backstops.
- **Callander Crags**. Night shooting will be the best and safest option for deer management in this block. Smaller enclosures or tubes might have to be used to establish Mixed Broadleaves.
- **Torrie**. Culling in this block seems effective, however focus on September and October months are paramount to deer management success here. Smaller enclosures or tubes might need to be used to establish Mixed Broadleaves.

Have an evidence based approach

FLS use an information based decision making process to set its deer management operations with the data received from varies internal and external reports and include;

- Thermal drone counts
- Herbivore dung counts
- Historical cull data
- Near neighbour cull and sighting data
- Ranger daily/monthly reports
- Deer Management Contractor daily/monthly reports
- Helicopter counts
- WRM surveys
- Survey data are independently obtained – i.e. Deer density figure, impacts - NN/HIA, SDA, etc.
- All data obtained are then combined as best possible and applied to a population model which is used to set culls.

Link to Deer Dashboard

- Most of data is used to create this DMP can be found in the Deer Dashboard, please see a link below. Currently only available to FLS staff, however to be made public soon.
- https://fls.maps.arcgis.com/apps/MapSeries/index.html?appid=19d7887f055f469e9e472b5fec0d0630

Population Modeling and Future Culls

- The cull for Torrie is set at 50 deer for 2023/24 and this is based on professional judgment and historic culls.
- The cull for Milton is set at 10 deer for 2023/24 due to the southern area being deer fenced and the northern are having little/none access and being mature Sitka and Larch forests.
- The culls for Callander Crags and Coilehellan are 15 and 10 respectively due to the H&S concerns already discussed.

How will objectives be met? Staff, contractor?

- All the blocks within the DMP is managed by FLS Wildlife Rangers. 3 Rangers each manage a block within the DMP. Steven Marshall manages Milton, Adrian Wilbert Manages Callander Craigs and Torrie is managed by Richard Eadington. Additionally, Torrie is also managed by other wildlife management staff periodically to increase pressure on the deer population especially during the months of September and October.
- There are no Recreational Deer Management Permissions within the DMP area.
- FLS maintains a highly skilled Wildlife Ranger team. All our Wildlife Rangers are qualified to Deer Stalking Certificate levels 1 & 2. In addition the rangers are required to carry out an annual firearms skills test, ensuring the highest levels of safety and competency when undertaking their duties. Wildlife Rangers also complete additional self-checklists and training at set intervals that are part of the resumption system. FLS Wildlife Rangers are supported by a Wildlife Ranger Manager and Area Wildlife Manager.
- Wildlife Contractors are a vital resource in FLS's deer management tool box. Wildlife Contractors are selected after satisfying FLS of their competence via a competitive tender. This work is arduous and critical to the success of the impact reduction strategy and only very experienced and appropriately qualified contractors are considered. All Wildlife Contractors have the same qualifications as FLS Wildlife Rangers and compliance and H&S are continually monitored by the Wildlife Ranger Manager.
- Out of season shooting is an essential tool in the protection of vulnerable tree crops and natural habitats. This is conducted either under the General License issued by NatureScot for enclosed woodland or by 5(6) authorisation on application to NatureScot for un-enclosed woodland. Male deer of all species will be shot year round on FLS land following permission, the shooting of females out of season will be limited to the periods 1st of September to 20th October and from the 16th February to the 31st March. When early out of season shooting of females is carried out any dependent young will be shot first.
- Night shooting is permitted by the Deer (Scotland) Act 1996 as amended by the Wildlife and Natural Environment Act 2011 (WANE Act), under section 18(2) authorisations granted by NatureScot. Applications for night shooting will only be made where unacceptable levels of damage would occur, and where the use of all other legal means of control, including

out of season shooting have been considered. Operational dates for night shooting will be kept under review and can be changed should circumstances dictate. All operations will conform to current Best Practice Guidance and a copy of the guides will be held at the district office and issued to Wildlife Rangers as necessary. Night shooting is a valuable tool in areas of high deer management pressure where the population has become wise to deer management practices.

Infrastructure? Roads/ATV tracks/glades/larders/equipment

- Access into **Milton** is very limited. The northern area which will be harvested within the next LMP **will require both 4x4 and ATV access to allow for effective deer management**.
- Access into Callander Crags is very much limited to on-foot stalking and due to the high public usage of the walking paths any further ATV/4x4 access would not increase the deer cull within the block.
- Coilehellan and Torrie has sufficient access currently. However following proposed harvesting in these blocks more ATV access will be required for effective deer management.
- All FLS Wildlife Rangers have to following kit as standard:
    - 4 x 4 vehicle with either a winch or loading crane attached to the back to aid in loading carcasses safely.
    - Capstan which and rope to aid in extraction when far away from roads.
    - 4 x 4 ATV with winch.
    - Trailer to transport ATV.
    - Slee Sledge/hill trailer to aid in extraction using the ATV.
    - .270 caliber rifle with high magnification scope. Some rangers have smart scopes where applicable.
    - Binoculars.
    - Handheld thermal imager to increase herbivore detection.
    - Various knives, saws and PPE.
    - Access to thermal drone and pilot.
- Two larders are within the DMP area with a total capacity of 115 deer.

Collaborative working opportunities

- We are currently in talks with the Woodland Trust, our neighbour at Milton to create a cross-boundary agreement to aid both parties with their annual deer cull. This will involve our Wildlife Rangers entering the Woodland Trust's land to pursue deer on the move, in turn the Woodland Trust ranger will have the same benefits onto FLS land.
- The Woodland Trust is already using our FLS larder at Strathyre to facilitate an increase in their annual cull.
- No other collaborative working is currently being discussed, however FLS is actively seeking collaborative working with our neighbours.

DMG present

- Milton falls within the Balquidder Deer Management Group and FLS is an active member.
- The other blocks within the DMP area does not fall within any DMG.

Venison

- FLS subscribe to the Scottish Quality Wild Venison (SQWV) scheme. This sent the standards for our larders and actions of our staff to ensure we provide a safe food item to market.
- All venison is quality assured and sold to Highland Game where it is further processed.
- The Trossachs has 2 deer larders with a capacity of 115 Red deer.
- All waste from the larders are removed by a licensed waste disposal contractor.
- All animal by-products are sold to Highland Game along with the venison.
- Venison are also sold privately from the Aberfoyle larder under our Venison Dealer's license.

Scottish Forestry
Coilltearachd na h-Alba

Environmental Impact Assessment
Screening Opinion Request Form

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

Proposed Work

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

Proposed Work	select	Area in hectares	% Conifer	% Broad-leaves	Proposed work	select	Area in hectares
Afforestation	☐				Forest roads	☐	
Deforestation	☒	65.01			Forest quarry	☐	
Location of work		Torrie, Callander Forests, NN 6309 0365					

Description of Forestry Project and Location

Provide details of the forestry project (size, design, use of natural resources such as soil, and the cumulative effect if relevant).
Please attach map(s) showing the boundary of the proposed work and other known details.

Please refer to 'Callander Forests LMP - EIA Screening Opinion Request' and associated appended maps.

Provide details on the existing land use and the environmental sensitivity of the area that is likely to be affected by the forestry project.

Please refer to 'Callander Forests LMP - EIA Screening Opinion Request'

Description of Likely Significant Effects

Provide details on any likely significant effects that the project will have on the environment (resulting from the project itself or the use of natural resources) and the extent of the information available to assist you with this assessment.

Please refer to the issues log in 'Callander Forests LMP - EIA Screening Opinion Request'

Include details of any consultees or stakeholders that you have contacted in order to make this assessment. Please include any relevant correspondence you have received from them.

Please refer to 'Callander Forests LMP - EIA Screening Opinion Request'

Mitigation of Likely Significant Effects

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

Please refer to the issues log in 'Callander Forests LMP - EIA Screening Opinion Request'

Sensitive Areas	
Please indicate if any of the proposed forestry project is within a sensitive area. Choose the sensitive area from the drop down below and give the area of the proposal within it.	
Sensitive Area	Area
Deep peat soil	65.01
Select...	
Select...	
Select...	
Select...	

Property Details			
Property Name:	Torrie Forest		
Business Reference Number:		Main Location Code:	FK17 8JJ
Grid Reference: (e.g. NH 234 567)	NN 6309 0365	Nearest town or locality:	Callander
Local Authority:		Stirling Council	

Owner's Details				
Title:	Mr	Forename:	Stewart	
Surname:	Towers			
Organisation:	Forestry and Land Scotland	Position:	Planning and Projects Manager	
Primary Contact Number:	07867353108	Alternative Contact Number:	N/A	
Email:	stewart.towers@forestryandland.gov.scot			
Address:	Ballanton Office, Aberfoyle, Stirling			
Postcode:	FK8 3UX	Country:	Scotland	
Is this the correspondence address?		Yes		

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

Office Use Only	
GLS Ref number:	

Forestry and Land Scotland
Coilltearachd agus Fearann Alba

Callander Forests 2023-2033 Land Management Plan: *EIA Screening Opinion Request*

Deforestation to restore peatland habitats

Context:

This is a request for an EIA determination for deforestation/ land use change at the Torrie Block in the Callander Forests LMP area.

The Scottish Government has set a target of net zero carbon emissions by 2045. Peatlands will play an important role in achieving this net zero target due to their natural ability to store and sequester carbon: it is estimated that UK peatlands store 2,300 Mt of carbon (Billett et al. 2010).

Restoration of blanket and lowland raised bog is a key action from the Scottish Biodiversity Strategy. Both habitats are EC Habitats Directive Annex I, are included in the UK Biodiversity Action Plan (UK BAP) as a Priority Habitat and are included on the Scottish Biodiversity List.

As a Scottish Government agency, FLS's objectives and legislative framework has an added 'Biodiversity Duty' as stated in the Nature Conservation Scotland Act (2004). Protection of conservation values is also mentioned in UKWAS and the principles of sustainability are outlined in the UKFS. FLS proposes to restore deep peats in this LMP area in line with targets agreed with Scottish Government as part of the wider PeatlandACTION delivery programme of which FLS is a delivery partner. Habitat restoration here aims to contribute positively to the biodiversity crisis and the climate emergency.
*Please refer to appended *'LMP supporting document - main text'*

Site description & rationale:

The peatland macrotype in the proposed restoration area is classified on the National soil map of Scotland as *'5.1.0 Undifferentiated basin peats'* and forms a distinct interconnected hydrological unit within the glacially influenced topography of the area.

A detailed peat depth and soil survey of Torrie forest was undertaken between 2 September to 8 October 2020 by James Hutton Institute recording Forestry Commission soil classification types (Pyatt & Brown 1982). Within the proposed restoration area the main areas of sphagnum bog were classified as Lowland Raised Bog (10a Type). This category occurred in close association with Unflushed Blanket Bog indicated as *Calluna*, *Eriophorum vaginatum* Blanket Bog (11b Type) and some areas of *Molinia* Bog -Flushed Blanket Bogs (Group 9) exhibiting different intensities of flushing. Recorded depths of peat were 45 cm to >100 cm.

Using the identification criteria set out in *'The identification of soils for forest management' (Kennedy 2002),* the proposed restoration area can be categorised as Scenario A (10a/ 10b; presumption to restore peats and hydrologically connected assessed peatlands). It is clear using criteria set out in Scottish Forestry's *'Deciding future management options for afforested deep peatland'* that the most appropriate future option for this site is to restore it to an open ground peatland habitat.

The LMP proposes a proportion of assessed peat on the edge of the restoration area for restocking with low density broadleaves; This native woodland will include priority wet woodland habitat identified within the UK Biodiversity Action Plan and EU Habitats Directive. The presence in the locality of many light seeded broadleaves would suggest that the proposed stocking of DBI would have limited impacts in terms of increasing the potential for natural regeneration across the restored peat areas. Within this plan period FLS will monitor and manage any non-native conifer regen within the restoration area. Any native woodland regeneration on raised mineral knolls within the mire complex will be tolerated.

Table 1 – Summary peatland assessment

Peat categories in Torrie Forest Block	Net Area (Hectares)	Assessment Details
Peat Assessment Torrie		
Total area of deep peats	180.12	Total estimated area (Ha) of deep peat within the forest block based on the soils survey data[1] and recent on-site peat depth plots.
Total area of afforested deep peats	168.99	Total area of afforested peatlands based on sub-compartment database (SCDB) information. Note: this includes small areas of open space within forest crops such as forest rides.
Existing open habitat on deep peats	11.13	Total area of open peatland (Ha) from SCDB. This area (NN 6330 0373) is currently managed as successional open ground with up to 10% mixed conifer/broadleaved natural regeneration.
Total area of 'Presumption to Restore' deep peats	53.88	Scenario A afforested soil types (10a) with high potential for restoration, plus other deep peat types surrounding or adjacent to 10a soils and forming part of the hydrological unit, as per the SF

[1] Detailed soil survey of Torrie forest completed between 2 September to 8 October 2020 by James Hutton Institute.

Peat categories in Torrie Forest Block	Net Area (Hectares)	Assessment Details
		Practice Guide. The total proposed mire restoration unit, including existing open habitat on deep peat will be 65.01 hectares (53.88ha +11.13ha).
'Assessed Peatland' total area (anything that isn't a presumption to restore)	115.11	Remaining area of afforested peatlands not currently proposed for restoration. These areas may be restored in the future following an assessment of crop performance and related carbon sequestration potential. Each hydrological unit will be assessed separately and, for those sites with a net carbon loss under trees, peat restoration will be proposed through a land management plan amendment request or at the next LMP 10 year renewal.
Management over next 10 years		
Deep peats to remain afforested and under continued growth assessment.	**115.11**	These areas will continue to be reviewed as tree crops develop and as new restoration techniques arise. They also include areas of 'presumption to restore peats' that fringe the mire restoration area (proposed below) and will be planted as low density wet woodland.
Deep peats to be restored to Mire.	**65.01**	Include afforested 'presumption to restore' deep peats and existing open ground within the proposed hydrological unit. The aim is to restore these peats by raising the water table to levels compatible with restoring near-natural peatland hydrological dynamics and encouraging the re-establishment of priority peatland vegetation communities (NVC M17-19).

Peat categories in Torrie Forest Block	Net Area (Hectares)	Assessment Details
		These areas have been assessed as the most viable 'presumption to restore' peats where project success will not conflict with other management objectives or adjacent land uses. They also have good morphological characteristics for raised mire. A proportion of peats in this category (included in 115.11 ha above) will be re-planted as native wet woodland fringing the restored mire. This is to provide a buffer along peat fringes and avoid a hard conifer edge. It will also diversify habitat structure and improve native woodland connectivity in the west of the forest.

Appendices:

- *LMP supporting document - main text*
- *LMP supporting document - appendix ii LMP table template*
- *LMP supporting document - appendix iii NVC summary table*
- *LMP supporting document - appendix iv map templates*
- *LMP supporting document - appendix vi methods*
- *Peat proposal map soils*
- *Peat proposal map restock plan*
- *Peat depth plot map*

Proposed peatland restoration operations:

All work will be undertaken using low ground pressure excavators. The proposed restoration operation will deploy a range of techniques in accordance with the PeatlandACTION Technical Compendium to raise the water table to levels compatible with restoring near-natural peatland hydrological dynamics.

*Please refer to appended '*LMP supporting document - appendix vi methods*'

FLS will carry out a peat slide risk assessment in order to identify if a risk of peat instability may exist.

External stakeholders consulted:

Cambusmore Estate - Steve Dunion, Forest Manager

Issues log

Environmental Asset	Specific sensitivity	Potential Impacts & Significance of Impact[2]	Applicants considerations, Rationale, Mitigation	SF Comments	Agreed Mitigation
Population & Human Health	Water quality: Private Water Supply at Little Torrie in downstream catchment OS Grid Ref: NN 6427 0504	Potential impacts – Elevated levels of dissolved organic carbon (DOC), suspended solids, phosphates or nitrates entering watercourses	Drain-blocking is expected to have positive effects on water quality by reducing the concentration of suspended solids and (DOC) downstream. As the little Torrie PWS is >2km downstream of the proposed restoration area and the majority of the drainage from the restoration area runs south; following the *'FLS Water Supplies Route map'* and using the *'FLS precautionary approach to protecting water supplies'* the risk is assessed as negligible and it has been deemed unnecessary to consult with the owners of the property.		
Cultural Heritage	No recorded heritage features within restoration areas.	No foreseeable impact	Pre-operational surveys will identify any new cultural heritage features to ensure suitable mitigation is in place to avoid any disturbance. Checks have been made against the heritage layer in the FLS GIS system which contains all of the unscheduled monuments as recorded by HES and local archaeology organisations. If possible archaeological material is unearthed during the operation then		

[2] Expected nature, intensity and probability of impacts. Expected frequency and duration of impact. Cumulative effect of adjacent projects. Information available to assist with assessment including contact with stakeholders.

Environmental Asset	Specific sensitivity	Potential Impacts & Significance of Impact[2]	Applicants considerations, Rationale, Mitigation	SF Comments	Agreed Mitigation
			steps will be taken in line with the guidance documents; - *Historic Environment Resource Guide (2017)* - *FLS Practice Guide to Archaeology and the Historic Environment (2022)*		
Soil	Deep peat soils	Positive impact; The proposed peatland restoration operation will restore a more natural hydrology and limit erosion/further modification of the habitat	The Peatland Condition Category of the proposed area is 'Modified; Previously forested'. The drainage modifications to the soils here will continue to have a negative impact unless intervention to restore a more natural peatland hydrology occurs. Using criteria set out in Scottish Forestry's *'Deciding future management options for afforested deep peatland'* it is evident that the most appropriate future option for this site is to restore it to an open ground peatland habitat.		
Biodiversity	Potential habitat for sensitive species e.g short eared owl, otter, badger	Negative impacts; Not expected to be significant with mitigation measures in place. Positive impact; Restoring a more resilient and diverse peatland	An environmental survey will be carried out prior to any operations and any impacts upon sensitive species will be duly mitigated. Due to the seasonal constraints around the timing of operations we do not		

Environmental Asset	Specific sensitivity	Potential Impacts & Significance of Impact[2]	Applicants considerations, Rationale, Mitigation	SF Comments	Agreed Mitigation
		habitat to support a wide range of species.	envisage any significant effects on these species.		
Landscape	Landscape character	No significant impact	The restoration area is in the NatureScot Landscape Character Assessment; *Plateau Moor and Forest* and the proposed restoration is in keeping with the 'Gently rounded or undulating upland landscapes lying on the edge of the higher and more distinctive Parallel Ridges' The restoration area is not visible from the A81 to the west. The proposed wet woodland fringe buffering the south of the restoration area will result in a contiguous but diverse woodland edge when viewed form the A873.		
Material Assets	No significant impact				
Water	Hydrology; Flow dynamics in catchment.	Positive impact - Effect on catchment hydrology; reducing peak flow in associated watercourses. Natural Flood Management (NFM)	In terms of NFM; 'While the effects of modifying drainage systems are inherently complex, there is increasing evidence that upland drainage blocking can, when targeted and delivered appropriately,		

Environmental Asset	Specific sensitivity	Potential Impacts & Significance of Impact[2]	Applicants considerations, Rationale, Mitigation	SF Comments	Agreed Mitigation
	Water quality in catchment and specifically the River Teith Special Area of Conservation to the North of the restoration area.	Potential impact - Elevated levels of dissolved organic carbon (DOC), suspended solids, phosphates or nitrates entering watercourses As the River Teith SAC is >2km from the proposed restoration area and the majority of the drainage runs south, the potential impact is deemed negligible.	create more stable water tables that are better able to respond to extreme events and achieve reasonable reductions in flows.' sepa-natural-flood-management-handbook1.pdf Drain-blocking is expected to have positive effects on water quality by reducing the concentration of suspended solids and dissolved organic carbon (DOC) downstream. All operations will comply with Forest and Water Guidelines (5th edition) and UK Forestry Standard and use appropriate low ground pressure machinery deploying approved techniques in accordance with the PeatlandACTION Technical Compendium. *Please refer to appended *'LMP supporting document - appendix vi peatland restoration methods'.* 10m exclusion buffers will be maintained along all water courses as per PeatlandACTION guidelines.		

Environmental Asset	Specific sensitivity	Potential Impacts & Significance of Impact[2]	Applicants considerations, Rationale, Mitigation	SF Comments	Agreed Mitigation
Climate	Carbon cycle	No negative impacts expected Restoration of degraded peatlands is expected to increase their resilience to drought, wildfire and other effects of climate change.	Restoration operations are likely to lead to protection of the peat carbon store and hopefully net carbon accumulation over the long term. Assessment using Scottish Forestry's *"Deciding future management options for afforested deep peatland"* shows that wet sites which have yielded very poor tree growth have the greatest potential for successful restoration of peatland into a net carbon sink.		
Land Use	No significant impact				

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Supporting document for Land Management Plan or amendments involving restoration of afforested and open peatlands proposals

Overview of supporting documents

This document is the main document to support Peatland restoration proposals in LMPs or amendments. Its structure, and the accompanying appendices are:

- Introduction
- Afforested deep peatland restoration and restock decisions
- Peatland restoration
- Appendix I – intentionally blank
- Appendix II – LMP table template
- Appendix III – Peat type/NVC summary translator table
- Appendix IV – Peatland map templates
- Appendix Vi – Peatland restoration methods

These documents form a package to support Land Management Plans with proposals of restoration or restocking of afforested deep peatlands.

1. Introduction

The supporting documents are to append Land Management Plan (LMP) submissions and LMP amendments which contain proposals for restocking or restoring areas of afforested peatlands.

The purpose of these supporting documents are to:

- outline the implementation of the principles and suggested approach as set out in the Scottish Forestry (SF) Practice Guide 'Deciding future management options for afforested deep peatland'.
- state the format of the supporting information for the proposals.

The supporting documents must be read along with the SF Practice Guide to fully understand the decision making process.

An interpretation of the Practice Guide, which has formed the context of these LMP supporting documents, is included in Appendix I.

Context

The Scottish Government has set a target of net zero carbon emissions by 2045. In order to help meet this target, Forestry and Land Scotland (FLS) are currently in the process of preparing a Peatland Strategy. The strategy will set out the best way to manage its peatlands, and to determine which afforested peatlands will be restored or restocked on Scotland's public forests and land.

Peatlands will play an important part in achieving this net zero target, due to their natural ability to store and sequester carbon. It is estimated that UK peatlands store 2,300 Mt of carbon (Billett et al. 2010). Peatlands in the UK are naturally treeless due to the wet oceanic climate (Sloan et al., 2018). This differs from European continental peatlands which naturally support a tree cover due to the drier, and generally warmer, summer climate. In their natural state, UK peatlands are too wet and nutrient poor to sustain tree cover, except in exceptional circumstances, such as pine or oak bog woodland. In general, afforestation of unmodified peatlands in the UK is unnatural.

The purpose of the SF practice guide is to ensure that the principles of sustainable forest management are applied specifically in the context of the management of the peatland asset. This is a shared objective of both FLS and SF, and takes account of the valuable ecosystem services provided by peatlands. Specifically:

- The importance of peatlands in relation to climate change. Afforested peatlands have the potential to act as significant sources of carbon, depending on the levels of modifications imposed at establishment and the impact these have had on the peatland condition since that time. (Evans et al., 2017) estimated an average carbon emission rate of 9.9 tCO_2e/ha/yr. The growth rate of a stand of trees on a particular peatland must capture enough carbon to compensate for the loss of carbon from the modified peatland, if a net carbon capture outcome is to be realised.
- The contribution towards enhancing biodiversity. Article 8(f) of the Convention of Biological Diversity, signed by the UK Government on 12th June 1992, encourages the repair of damaged ecosystems. As a result, restoration of priority habitats is a key component of the Scottish Biodiversity Strategy.
- The potential ability of peatlands to grow trees to capture carbon, although the re are unknown risks to the security of the carbon store, and the ability of restoring peatlands, after the end of subsequent rotations.

Since 2014 FLS has undertaken peatland restoration on a number of peatland types, including the restoration of unproductive plantations on peatlands. FLS restored 2,786 Ha of 'forest to bog' peatland restoration between 2014/15 and 2019/20 inclusive, across 60 project areas. In the same period, FLS restored 3,786 Ha of existing open peatland habitat, across 29 project areas.

FLS anticipates the need to carry out restoration of 35,000-60,000 Ha of afforested peatlands before 2035. This will ensure that no peatland is acting as a net carbon source by 2045. Peatlands are found in an estimated 75% of public forests, and there will be approximately 2,000 peatland areas within those forests that will need to be assessed using the principles set out in the SF Practice Guide.

The approach outlined in this document aims to ensure that a consistent approach is adopted across all Regions for presenting information to SF, as part of the LMP review process and submission. This should make gathering information, presenting and reviewing it easier and quicker for both agencies.

2. Afforested deep peatland restoration and restock decisions

The step by step decision flow process is based on the SF Practice Guide 'Deciding future management options for afforested deep peatland'. An interpretation of this practice guide can be found in Appendix I, and notes are given to clarify questions that have been commonly asked by FLS staff in the past.

Restoration categories, terminology, definitions

The supporting documents uses the terminology as per the definitions within the SF Practice Guide. This is to avoid confusion and allow good understanding in subsequent discussions amongst FLS staff, SF, and external stakeholders. The only term that has been introduced, and not previously used within the SF Practice Guide, is "Assessed peatlands". This term has been used to clearly mark the fact that the "presumption to restore" sites are *identified* using features and the hydrological relationship to them, whilst the "assessed peatlands" and the proposed outcomes result from an *assessment or analysis* and consideration of many factors, within a *decision* flow process.

Please note that all peatlands are assessed based on their entire hydrological unit and the soil types within those. This is not emphasised very strongly in the SF Practice Guide, but has proved to be an essential and practical approach. The Practice Guide does state the decisions are made on a site by site basis, and since ESC, peatland characteristics and potential tree growth is governed very strongly by peat type, it is sensible to define 'site' as a soil polygon on the 1:10,000 soil mapping layer. For further definitions and clarification regarding peatland hydrological unit, see 'Box 1 - Understanding the functional connectivity (hydrology) of adjacent peatland' in the SF Practice Guide.

Afforested peatland type definitions:

Restoration sites for which there is a 'presumption to restore'.

These are currently afforested deep peat sites that are:

- Likely to negatively impact on habitats designated as qualifying features in the UK Biodiversity Action Plan (UKBAP), or on Natura sites, Ramsar sites, Sites of Special Scientific Interest (SSSIs) or National Nature Reserves (NNRs);
- Sites or parts of sites where restocking is likely to adversely affect the functional connectivity (especially hydrology) of an adjacent Annex 1 peatland habitat (as defined in the EU Habitats Directive), or a habitat associated with one (priority habitats);
- Sites where deforestation would prevent the significant net release of greenhouse gases (Scenario A peat type). These are peat types that are known to be edaphically unsuited for growing plantation trees.

Assessed peatland sites which will be either restored or restocked.

Afforested deep peat sites (Scenario B and Scenario C peat categories) which, after assessment, are found to be:

- Sites for which there is clear evidence that they can grow a commercial crop the equivalent of Sitka spruce yield class 8 or more, despite being managed with minimal inputs, and on peatlands which are not acting as a significant carbon source. These sites will be **restocked**.
- The remaining sites will be **restored**, unless it is not feasible to do on an ecological basis.

Establishment of Peatland Edge Woodland (PEW)

Afforested deep peat sites (Scenario B and C categories) which cannot grow a commercial crop the equivalent of Sitka spruce yield class 8 or more, and where restoration is not thought to be possible.

This will be under constant review. Restoration progress has been impressive on most sites, but direction of travel is not yet clear on sites with a very specific set of characteristics (for example, Lodgepole pine plantations on an unflushed blanket bog where the peat depth is less than 1.0 metres and on a slope of more than 5 to 10%). If it decided these sites are not restorable, then PEW may be the only alternative sustainable land use option. However, past attempts at establishing native trees on deep peatlands, even with excessive drainage and ground preparation have not been encouraging. Also, a partial restoration of the hydrology may be required on cracked peats to ensure they are not releasing an excessive amount of carbon dioxide.

3. Decision verification

The information sources and verification that have been used in the decision making process for restoration or restocking of a deep peatland site are provided in this section.

As much information is provided spatially in maps as possible, though some of the information is provided in a table (see the last part of appendix IV).

Appendix II is the LMP summary table used to provide context and a summary of:

- Total area of deep peat soils,
- Total area of afforested peatland,
- Total area of existing open peatland,
- Total area proposed of 'presumption to restore',
- Total area of proposed restoration after assessment,
- Total area of deep peat to be restocked.

No deep peatland should be planted as part of a new woodland creation. Note, that the 1:10k soil survey uses the Forestry Commission Soils Classification. Within this classification, a peat depth range is described which is typical for that peat type (see Appendix III – NVC summary table for peat depths). In most cases, this negates the need for a peat depth survey where 1:10k soils data is available. The soil survey will help inform areas of deep peat and the wider boundaries of the hydrological unit. A description of the map templates supplied are found in Appendix IV.

Restoration decisions

1. Sites for which there is a **presumption to restore**:
    - Spatial assessment based on boundaries of Designated Sites and existing priority habitats.
    - Soil survey with 1:10k mapping accuracy. Soils have been classified according to the FC Field Guide 'The identification of soils for forest management'. Soil maps will have been verified and confirmed fit for purpose by ground truthing of FLS staff on a sample and methodical basis.
    - Sites without 1:10k soils maps will have been verified by FLS staff field surveys using botany, topography/landscape, soil knowledge and extrapolation based on survey and experience. Peat depth survey may also be provided.

2. Afforested deep peat sites which require an assessment of crop performance – **assessed peatlands** (Scenario B and Scenario C peat types):
    - Soil survey with 1:10k mapping accuracy.
    - ESC prediction
    - First crop rotation yield class (if measured)
    - Harvesting data (if available)
    - Description of historic site modifications

- Current crop deficiencies
- Predicted yield class for second rotation

Restock decisions

3. Afforested deep peat sites which require an assessment of crop performance – **assessed peatlands** (Scenario B and Scenario C peat types):

- Soil survey with 1:10k mapping accuracy.
- ESC prediction for species chosen
- First crop rotation yield class (if measured)
- Harvesting data (if available)
- Description of historic site modifications
- Current crop deficiencies (should be none)
- Predicted yield class for second rotation and proposed establishment methods.
- Intention to rewet the site (i.e. drain blocking and back fill trenching) may need to be undertaken if historic modifications exceeds current UKFS limits, or the site's hydrological function is significantly altered, to ensure that the plantations do not act as a carbon source.

4. Afforested deep peat sites which cannot grow a commercial crop the equivalent of Sitka spruce yield class 8 or more and cannot be restored.

- Establish low density native woodland (500 stems/Ha) and block drains where possible.
- Fell to waste non-native trees if they are likely or have exceeded making up 49% cover of the canopy (see SF Practice Guide for details).

Table 1 Overview of information that will be provided within the LMP for each peatland category. The template for provided this information can be found in Appendix II.

CATEGORY OF RESTORATION/ RESTOCKING BEING PROPOSED	INFORMATION PROVIDED
Presumption to restore	Essential: • Location of restoration proposal • Designated Sites (if present) • Existing priority habitats (if present) • Location of all Scenario A peat types and their hydrological units • Annotation of any features of note Not required: Crop data (the objective is to ensure the existing sites hydrological unit is intact, regardless of modifications and tree size).
***Assessed Peatlands* – where deforestation**	Essential: • 1:10k soil maps, or map illustrating peat soil types drawn from survey

would prevent a significant net release of greenhouse gases	• ESC statement • Peatland modifications • Statement confirming any deficiencies in 1st rotation • Comment on correction factors • Predicted YC for 2nd rotation If available: 1st Rotation YC (if measured) and actual outputs (if available)
Suitable for *Restocking*	Essential: • 1:10k soil maps, or map illustrating peat soil types drawn from survey • ESC statement • Peatland modifications • Statement confirming there were no deficiencies in 1st rotation • Comment on correction factors • Predicted YC for 2nd rotation • Statement of actions required to limit carbon loss from modifications to minimal levels that do not negate the carbon captured by trees If available: • 1st Rotation YC (if measured) and actual outputs (if available)
Not suitable for *restocking*	Essential: • 1:10k soil maps, or map illustrating peat soil types drawn from survey • ESC statement • Peatland modifications • Predicted YC for 2nd rotation • 1st rotation statement of deficiencies present • Justification of correction factors used to adjust ESC prediction. If available: • 1st Rotation YC (if measured) and actual outputs (if available)
Peatland Edge Woodland	Essential: • Confirmation that peatland restoration is not possible. • Confirmation that establishing natives is possible with a minimally modified peatland. • Statement of actions required to limit carbon loss from modifications to minimal levels that do not negate the carbon captured by trees.

4. References

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APPENDIX II – Future management of afforested peatlands

SUMMARY AREAS	Hectares (Ha) 1:10k soils map	Hectares (Ha) JHI map	Comments
Current management of peatlands in LMP			
Afforested deep peatlands			Total area size (Ha) of afforested peatlands based on SCDB information.
Existing open habitat on deep peat			Total area of open peatland (Ha) from SCDB.
TOTAL - All deep peat soils			Total area size (Ha) of deep peat soils within the forest block/LMP area based on the soils data. Deep peat soils are defined as per the SF Practice Guide: Scenario A, B and C soils.
Future management of afforested peatlands			
'Presumption to restore' peatlands Forest-to-bog restoration of afforested peatlands including the hydrological catchment			Only includes afforested peatlands which lie next to open existing peatlands, or Scenario A peatland types, as per the SF Practice Guide. The area of their hydrological units is also included.
'Assessed' peatlands Forest-to-bog restoration to secure carbon store and sequestration, and maximize ecosystem services.			Total area of afforested peatlands that will be restored following an assessment of predicted growth (YC). Restoration of assessed peatlands are concluded where no evidence is found to support that the next rotation stand would grow Sitka spruce YC8 or more with minimal disturbance and low level of peatland modifications. Assessed peatlands includes the hydrological catchment.
Peatlands to be restocked			Total area of afforested peatlands that will be restocked because evidence was found to support the conclusion that the second rotation will clearly be YC8 or more with minimal disturbance and with a low level of peatland modifications.

Presumption to restore table

The table below is only relevant for Presumption to Restore peatlands (Scenario A peat types) where deforestation would preve nt the significant net release of greenhouse gases.

	Description	Location of described attribute (peat types, part of the forest)
Description of any designated sites, priority peatland habitats which require protection and enhancement.	Illustrated on map 1.	
Description of peat types present in the LMP forest block(s), and any characteristics of interest	Illustrated on map 1.	
Description of hydrological units, extent, relation to peatlands to be restored, and the topography.	Illustrated on map 2.	
State any points of note from survey		

Assessed peatlands table

The table below is only relevant for Assessed Peatlands (Scenario B and C peat types) where there needs to be clear evidence that restocking on peat soils will produce a yield class equivalent to Sitka spruce 8 or more.

Attribute described	Description	Location of described attribute (peat types, part of the forest)
ESC statement (range) State range respective to peat types	Illustrated on map 2	
Accumulated Annual Temperature (range)		
DAMs score (range)		
Crop deficiencies (needles, colour, leader length)		
Location and extent, proportion of healthy crops (no signs of deficiencies) and reason		
Statement of correction factors used to predict of next rotation from ESC outputs (drainage, fertilising, flushing, heather control, peat compaction, and the combination of all of these per peat type)		
Statement of actions required to limit carbon loss from peatland soil. For example, partial re-wetting, referencing average water table height and density of drains.		
Where PEW is proposed, confirm and explain why restoration of deep peat is not possible		

Restoration proposals

The table below is to state and describe the restoration techniques to be applied to the proposed restoration areas.

Attribute described	Description	Location of described attribute (peat types, part of the forest)
Treatments used to restore the hydrology	**Please see standard approach (appendix IV)** State any site specific specifications or alterations of the approach:	
Treatments used to restore the topography (remove afforestation modifications, and previously hagged sites)	**Please see standard approach (appendix IV)** State any site specific specifications or alterations of the approach:	
Treatments used to counter-act peat cracking or other modifications caused by the afforestation of the peatland	**Is peat cracking present?**	

EIA risk assessment

Forest-to-bog peatland restoration is classified as a forestry project under the Forestry (Environmental Impact Assessment) (Scotland) Regulations 2017. To obtain consent from Scottish Forestry, an assessment of potential environmental risks as a result ofthe proposed forestry project is required to allow the determination of whether it is likely to have significant effects on the environment.

Main risks to assess	Impact assessment
Population and Human Health	**No impact.** Core paths/private water supplies.
Biodiversity (habitats, species)	**Positive.** Restoration of a degraded peatland will restore a priority open habitat, benefitting both habitat and its associated species. Pre-operational surveys will identify any protected or breeding species to ensure suitable mitigation is in place to avoid any disturbance.
Land	**No impact.** Where the restoration project is adjacent to agricultural land, boundary drains will not be blocked to ensure neighbouring land is not compromised by re-wetting and increased potential to flooding.
Soil – and geology, geomorphology	**Positive.** Re-wetting the site will benefit the peat soils as forestry modifications will be reversed to stop oxidisation and further degradation and erosion of the peat.
Water	**Positive.** Re-wetting techniques have shown to have no significant adverse effect on water quality. Ultimately, the water quality of the local area will be improved by reducing run-off from the exposed peat and degraded peatland.
Air	**No impact.**
Climate	**Positive**. Afforested peatlands have the potential to emit more GHG emissions than can be absorbed by a growing woodland. Restoration of afforested peatlands, especially Presumption to restore peatlands, will prevent the significant net release of greenhouse gases, ultimately benefitting the local climate.
Material Assets	**No impact.**
Cultural Heritage	**No impact.** Pre-operational surveys will identify any cultural heritage features to ensure suitable mitigation is in place to avoid any disturbance.
Landscape	**Positive.** Peatland restoration will create more open space within the LMP forest blocks and their local area. This will add more diversity to the forest structure by creating open and associated native woodland habitats.

Control of Woodland Removal Policy: Peatland restoration projects meet the requirements of the Scottish Government's Control of Woodland Removal Policy as the deforestation and subsequent restoration will enhance a priority habitat and its (hydrological) connectivity.

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APPENDIX III – Peat type/NVC summary table

Overview of the FC Soil Classification and related peat types, legislative EU Habitats Directive – Annex 1, UKBAP Priority Habitats, and NVC type. For each peat type, the range of likely peat depths are given. These are based on Pyatt's FC Soil Classification (1982) of peat types, terrain, and local experience. Where soil survey information is available (at 1:10,000 accuracy), it eliminates the need for site-specific peat depth surveys.

FC Soil Group		Peat type	FC Soil Code	Peat depth (Pyatt 1982)	EU Habitats Directive Annex 1	UKBAP Priority Habitats	NVC type
Flushed peatlands	8 *Juncus* or basin bogs	*Phragmites* (or fen) bog	8a	0.5 – 4 m	Can include H7140	Lowland Fen + Upland Flush, Fen & Swamp	Various neutral or slightlybase-enrichedwetland types including M5, M9, M23, M25c, M27, M28, S25, S27, S28 and(non-NVC) MX
		Juncus articulatus or *J. acutiflorus* bog	8b				Descriptionreads most like M6d, but *Juncus articulatus* is scarce in M6dandmore common in its neutral counterpart M23a
		Juncus effusus bog	8c				M6c
		Carex bog	8d				M4 and M6a/b
	9 *Molinia* or flushed blanket bog	*Molinia*, *Myrica*, *Salix* bog	9a	0.5 – 4 m	H7130 (alloccurrences) and H7150 (occurrences on blanket (not raised) bogs in unenclosed uplandsituations)	Purple Moor-Grass & Rush Pasture if in lowlands	M25a co-dominated by *Molinia* and *Myrica*
		Tussocky *Molinia* bog, *Molinia*, *Calluna* bog	9b			Lowland M25 = Purple Moor-Grass & Rush Pasture; M15/16 = Upland+ Lowland Heaths	M25a andexamples of M15b/M16 co-dominated by *Calluna* and *Molinia*

		Tussocky *Molinia*, *Eriophorumvaginatum* bog	9c			Blanket Bog	M25a on deep peat, and M20-M25 intermediate (but abundant *Eriophorum vaginatum* suggests a lack of flushing)
		Non-tussocky *Molinia*, *Eriophorumvaginatum*, *Trichophorum* bog	9d				M17 (but abundant *Eriophorumvaginatum* suggests a lack of flushing)
		Trichophorum, *Calluna*, *Eriophorum*, *Molinia* bog (weakly flushed)	9e				M17 (but abundant *Eriophorumvaginatum* suggests a lack of flushing)
Unflushed peatlands	10 *Sphagnum* (or flat or raised) bogs	Lowland Sphagnum bog	10a	0.5 – 12 m	H7110, H7120 (all occurrences) and H7150 (occurrences on raised peat surfaces in agricultural lowlands).	Lowland Raised Bog	Mostly M18 but can include some M17, M19, M20 and small M1/2/3 bog pools
		Upland *Sphagnum* bog	10b			Blanket Bog	Mostly M17 but can include smaller areas of M18 and small M1/2/3 bog pools in the wetter parts
	11 *Calluna*, *Eriophorum*, *Trichophorum* (or unflushed blanket) bog	*Calluna* blanket bog	11a	0.5 – 4 m	H7130 (alloccurrences) and H7150 (occurrences on blanket (not raised) bogs in unenclosed uplandsituations)	Blanket Bog	M19 (relatively dryandstrongly *Calluna*-dominated forms)
		Calluna, *Eriophorum vaginatum* blanket bog	11b				M19
		Trichophorum, *Calluna* blanket bog	11c				M17 and, where blanket bog surface has dried out to some degree as a result of draining and/or burning (and *Eriophorumvaginatum* very sparse or absent), M15/M16
		Eriophorum blanket bog	11d				M20
	14 Hagged / eroded bog	Shallow haggederoded bog	14	0.5 – 4 m	H7130 (alloccurrences) and H7150 (occurrences on blanket (not raised) bogs in unenclosed uplandsituations)	Blanket Bog	Hag tops mainly M19 but canalso include M17 and, where more dried-out, M15/16 and (driest) H12. Bare peat, M3, M6, M17, M19 or M20 in depressions between hags.
		Deeply hagged eroded bog	14h				Hag tops mainly M19 but canalso include M17 and, where more dried-out, M15/16 and (driest) H12. Bare peat, M3, M6, M17, M19 or M20 in depressions between hags.
		Pooled eroded bog	14w				M1/2/3/17, pools with *Menyanthestrifoliata* (no NVC type) and deeper unvegetated poolsof open water

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APPENDIX IV – Peatland Map Template

All layers mentioned are within Forester Web. Depending on the amounts and distribution of the peatland areas, it may be possible to combine (merge) some of the maps below. However, it is recommended to keep the first map separate, which is a presentation of physical features/ assets separate from the management decision maps.

There are four maps recommended, detailed below.

Layer/ information	To Illustrate	Legend/ symbology
Map title	"Peatlands and habitats"	
Soils data using 3 soils layers each filtered to select Scenario A peats, Scenario B and C peats, and only soil largest polygon labelled as text. This is available as a public map on Forester Web.	Peat soil types coloured, other soils not, based on largest component	Using default colours, 50% transparent (because the soils layer should cover many of the features presented below
Designated features	Designations for peatland habitats	Default colours and symbology
Habitat survey **Filtered for peatland habitats only**	All peatland priority open habitats surveyed using FLS priority habitat survey methodology.	Default colour, and largest component labelled. Free text showing any other components that are peatland types OR Polygons hatched red outline 4 points thick.
Annotations (text boxes)	Specific points of note, illustrating any exceptions to usual approach	Text box. Black text, appropriate font size (12)

Layer/ information	To Illustrate	Legend/ symbology
Map title	"Presumption to restore sites"	
Base map	Ordnance Survey with SCDB shown as default symbology	Default symbology
Areas to restore (presumption to restore, but not the hydrological units)	Including: • Scenario A peat types • areas of Priority peatland habitats • designated features	Light blue solid but 50% transparent polygons
	• areas already undergoing peatland restoration	Yellow hatched polygons
Hydrological units (presumption to restore) **With arrows to show the drainage direction within the units**	Extent of hydrological units around 'presumption to restore' areas	Blue hatched polygon Arrows in red

Layer/ information	To Illustrate	Legend/ symbology
Map title	"Assessed restore and restock sites" (may need to split out)	
Basemaps	Ordnance Survey with SCDB shown as default symbology	Default symbology
Areas to restock (assessed peatlands) for years 1 to 10	Area that can be clearly demonstrated to act as net carbon sinks	Green red polygon
Areas to restore (assessed peatlands)	Assessed outcomes including landscape, logistical reasons, habitat connectivity, Water quality, water regulation	Greensolid polygons
Yield Class prediction	Growth rate, a proxy for the rate of carbon capture by the trees	Text box with number
Hydrological unit (assessed restoration)	Extent of hydrological units around 'assessed restoration' areas	Blue outline, no fill
Specifications to repair hydrological function	Whether partial re-wetting is required to reduce high	Arrows and text boxes showing where drain blocking and trench bunding is required.

	carbon emissions from the peat	
Annotations (text boxes)	Specific points of note, illustrating any exceptions to usual approach	Text box

Layer/ information	To Illustrate	Legend/ symbology
Map title	"Peat depth survey map"	
Please note, this is only required in two circumstances: **1. When 1:10k soil mapping is available, but only where any soil polygons are made of two or more components, and one or more is a non-deep peat soil type, or** **2. When only JHI maps at 1:250k resolution are available.**		
Basemaps	Ordnance Survey (or Aerials) with SCDB shown as default symbology	User defined labelling, showing 'Peat depth' as font size 12.

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APPENDIX Vi – Peatland Restoration: Forest-to-Bog methods

Restoration treatment method descriptions and specifications have been produced by several organisations over the years.

FLS values advice from Peatland Action NatureScot, and follows the terms and conditions set out in the terms and conditions of this grant funding.

This document serves to distil any advice and information published by NatureScot, and it should be noted that NatureScot will be publishing information notes on the various restoration treatment methods, and indeed is preparing a Restoration method compendium. Please read this document in conjunction with other sources of information.

FLS uses the FC soils classification system to categorise the various peat types. This is useful because these give us an indication of the peatland vegetation we would expect and indeed are aiming to restore in many cases. It is also useful because when considering 'forest to bog' sites when specifying restoration specifications, because the layout and density of drains is strongly correlated to peat type, and the foresters at time of woodland creation seem to have approached the drainage specifications in the same way.

Forestry Commission Soils Classification

The FC Field Guide 'The identification of soils for forest management' identifies and describes several different peat types. Within the FC classification, the peat types are classified according to dominant species found in the vegetation communities. This is governed or described by the same factors as that used by the Ecological Site Classification system, the Ellenberg values. The main environment factors that govern the vegetational community of peatlands are their nutritional status and their wetness (hydrological behaviour). Their nutritional status is strongly influenced by how peatlands receive water, such as from higher or surrounding ground (flushed peats) or through precipitation only (rain fed only, or unflushed peats).

Each peat type corresponds with a National Vegetation Classification type and UKBAP priority habitat, which is outlined in a summary table in Appendix III. Therefore, each peat type directly translates to a priority habitat for the purposes of assessment under The Environmental Impact

Assessment (Forestry) (Scotland) Regulations 1999' (as amended) and the Scottish Government's policy on Control of Woodland Removal.

Outlined in Table 1 below are several types of peatland that FLS will aim to restore. This will be on three scales:

1. Large peat catchment scale – notable iconic projects like Dalchork, Flanders and Lochar mosses
2. Medium, whole coupes and package of coupes within a block
3. Small, 'parts of coupes' scale.

Table 1 FC Soil Classification - overview of peat types

PRIORITY HABITAT TYPE	FC SOIL TYPES (PEAT TYPES)	TYPICAL FORESTRY MODIFICATIONS	SCALE OF PEAT TYPE WITHIN NFE	ESTIMATED AREA OF PEAT TYPE ON THE NFE
Blanket bog (BB)	**Flushed blanket bogs (9)**	Deep ploughed ridges and furrows, intensively ploughed drains	Can cover large areas, especially on long slopes leading into riparian zones. Also found locally within unflushed peats.	40,400 Ha Likely that just under half of this will be restored.
	Unflushed blanket bogs (11)	Medium ploughed ridges and furrows, with a low to medium intensity of ploughed drains	Probably the greatest extent of peatland on the NFE	91,800 Ha Likely that just under half of this will be restored.
	Upland or intermediate bogs (10b)	Deep ploughed ridges and furrows and ploughed drains. Very similar to LRBs	More than is mapped. Many areas mapped as included within 11 and 9 peat types. Resolution and preciseness issue.	5,000 Ha – often under-represented on JHI maps. All of this will be restored.

Lowland raised bog (LRB)	**Lowland Raised bogs (10a)**	Medium to deep ploughed ridges and furrows. Large hand and machine dug drainage channels sometimes, some predating afforestation.	Many sites, some large, but many small (<30 Ha). Found in Lowlands, Carse of Stirling, and South. Also Drumfern in Lochaber. Amounts total between 2000-3000 Ha.	2,400 Ha – under-represented due to JHI maps covering a large proportion of this type, and incorrectly categorising it as an 8. All of this will be restored.
Upland flushes, fens and swamps	**Parts of blanket bogs (9), and Basin bogs (8)**	Intensive drainage. Usually grew very large trees but only because of the drainage density.	Usually a small component of a larger peat catchment.	Incorporated above.
Hagged peatland	**14**	Deep ploughed, often unevenly and in small patches. Drainage low intensity but effective, along with the hagged nature of these areas.	Usually a small component within a larger peat catchment. Usually only smaller areas were planted, larger areas avoided. Largest expanses are on upland sites on the upper reached of what was regarded plantable.	5,400 Ha. Mostly on open ground, but likely that all of this will be restored. Hags on open ground are thought to act as very high emitters of carbon dioxide.

Forest-to-bog restoration methods

Afforested peatland restoration, known more commonly as 'forest-to-bog' restoration, is thought to take a least 10 years (after re-wetting) to change from acting as a carbon source to a carbon sink. Therefore, there is an inherent urgency to begin restoration as soon as possible after felling, with respect to the Scottish Government target of net zero carbon emissions by 2045.

Restoration will be achieved through the use of a number of re-wetting techniques. The most common techniques used in forest-to-bog restoration are listed below. These methods are usually employed together, across a site in a sequence, beginning at the upper areas and working downslope towards main water courses, or where water leaves the site. Note, these methods are under constant development.

- **Peat dams**: usually the most effective way of blocking drains and furrows, where appropriate, and dispersing water across a peatland, whether on open or a forest-to-bog project. **Re-profiling the drains** is also carried out at the same time as installing peat dams, but only if they do not have high peak or base flows, indicated by the absence of vegetation in and on the sides of the drain.

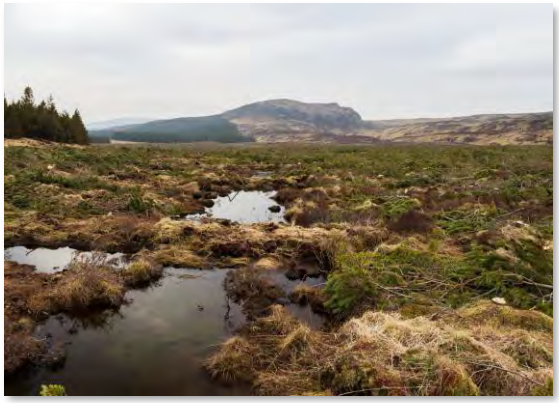

Figure 1a. Peat dams installed at Criadadh More, Isle of Mull on 19/03/2015.

Figure 1b. Site response after almost three growing seasons on 07/09/2017.

Figure 1c. Site response after seven growing seasons on 20/11/2021.

- **Stump flipping and ground smoothing**: this un-modifies the ploughed ridges and furrows which in most cases, if left in situ suppresses the water table and development of peatland vegetation, and promotes regeneration of negative indicators such as too much Calluna or non-peatland species or undesirable non-native and native trees. Care is needed when restoring sites planted with Lodgepole pine, as the root-ball penetrates into the peat much deeper than the flat root plate of Sitka spruce. When flipping LP stumps, it is undesirable to bring catotelmic (deeper) peat to the surface, so a 'light touch' ridge and furrow reprofiling should be carried out if possible, leaving stumps in situ, to smooth most of the surface. This is only possible where stumps were cut low using a shears head (because stumps of standard height will throw the tracks on the machine), or access routes will need to be carefully planned and stump flipped, to allow access to particular parts of the site

Figure 2. Gow moss after clear felling prior to restoration.

Figure 2. Gow moss after site has been treated using stump flipping and ground smoothing techniques.

- **Backfill trenches (trench linear bunding, but without a high bund)**: this counteracts excessive lateral flow of water within the peat, usually promoted by historic events or modifications, such as fire, peat bank cutting, or peat cracking. This can result from the ploughing and draining carried out during afforestation, and the subsequent drying and suppressing effect of the mature trees on the peat and water table.

Figure 3. Example of backfill trenches at Gow moss. Note the positive indicators – the high water table and extent of cotton grass.

- **Peat hag and gully re-profiling**: this is used to repair excessive erosionof peatlands, usually in an upland setting. Gullies can be caused by excessive surface water run-off, or promoted by artificial drains catching water across a natural shedding area, and bringing it to a confluence where erosion begins and continues indefinitely. Hags probably have several triggers, including saturated peats, freezing and unfreezing conditions, over grazing, and perhaps are a legacy of the mini-ice age in the 1700s. Many appear to develop from peat pipes which eventually collapse.

Figure 5a. Extensive peat haggs at Glen Affric prior to restoration.

Figure 5b. Re-profiling of peat hags and the resulting higher water table.

Figure 5. Landscape perspective of Beinn a Mheadhoin before restoration.

Figure 6. Landscape perspective of Beinn a Mheadhoin after restoration.

Deciding upon restoration methods (to be replaced by separate document)

In deciding upon restoration treatments, the methods and specifications used in all forest-to-bog projects are often very similar. Usually, a combination of the techniques described above will be applied. Peat damming and re-profiling of forestry drains is always carried out. Stump flipping and ground smoothing is carried out on a majority of sites, and back fill trenching is usually only carried out where cracking is present or where the water table is lower than can be explained by the drainage network or other modifications. The main aim across all sites is to restore the peatland's hydrology and behaviour by raising the water table.

Details of restoration plans cannot be confirmed until after the trees have been clear felled as the standing trees or windblow obscures a proper view of the site. Access across the site, giving a clear view of the lie of the land, localised undulations, and where the flushed areas are, is needed to determine the exact location of drains, to determine their status in terms of peak flow and base flows, allowing decisions to be made on the positioning of peat dams and spotting if the underlying peat is cracked or not. Some indication of the positions and intensity of drainage may be apparent from studying aerial photographs, but usually only where Sitka spruce plantations are uniformly growing and not windblown.

Despite this, the layout of drains is often fairly predictable, most individual forests were ploughed and drained by the same people using the same machines to the same specifications. The foresters who designed afforestation drainage had a very high technical knowledge of how to drain peatlands in an optimal manner. There is a strong correlation of drainage density and peat

type as described in table 3. In our experience, estimates of the number of peat dams required can be made during the contract procurement stages of the project.

Table 2 Overview of typical drainage intensity or spacing of drainage by peat type.

Peat type	Typical drainage intensity	Typical spacing
8	Very dense, wettest peat of all	5 to 15 metres. Drainage plough often incorporated into ploughed ridges and furrows, if not all
9	High density of drains	10 to 25 metres
10	Very dense	5 to 15 metres. Drainage plough often incorporated into ploughed ridges and furrows, as well as across ridges/ furrows
11	Low density	30 to 50 metres.
14	Low density	20 to none. Very variable depending on topography and layout of hags.

Peat cracking lowers the water table, drying the peat, especially for longer periods and more thoroughly during drought conditions. This increases the amount of oxidisation of the peat, leading to high carbon dioxide emissions. Identifying areas of peat cracking is easier after clearfell as the patches of drier than expected peat are possible to identify inthe context of the topography. Understanding the landscape and terrain helps to find which areas are most likely to contain cracking, such as slightly raised areas and hummocks, or where the plantation trees have grown better. In addition, a thorough survey of the drains and their loading, peak flows, and depth of peat below the base of the drain can only safely and efficiently be done after the trees have been clear felled.

Table 4 (on the next page) is in draft, and will be developed and expanded upon into a decision support tool, appendix Vii.

Table 4 Decision flow approach in deciding upon restoration treatments to be employed.

FACTOR	QUESTION	ANSWER	CONCLUSION
Drainage	Are the drains scoured?	Yes	Do not block, unless base flow and peak flow will be significantly altered by blocking and distributing water out of the feeder drains upstream
		No – the sides are vegetated, showing that peak flows and base flows are consistently low throughout the year	Go to next question
	Are the bases of drains on at least 50cm of peat?	Yes	Block drains using *standard peat dams*, and re-profile drains
		No, and base flow is very low	Block drains using *peat plugs* (similar to peat dams, but without excavating oxidised peat from underneath the drain base) and re-profile drains
Ridges and furrows	Are the furrows filled with sphagnum and the height difference between the top of ridges and sphagnum less than 25cm?	Yes, and the water table appears to be consistently high, and sphagnum is also found growing on the original ground surface and on tops of the ridges.	Do not Stump flip and ground smooth
		No, the plough ridges and furrows are prominent, and sphagnum is confined to the base of the furrows. The water table is low, especially when comparing the impact of the drains	Stump flip and ground smooth
Peat cracking	Is the peat cracked?	Yes	Install back fill trenches no longer than 25m, and across the slope,

			at right angles to the furrow and ridges if possible, but up to 45 degrees to them if not.
Hagged peat	Are there hags present on the site?	Yes	Hag re-profile these areas

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Torrie Forest Block
(part of Callander Forests LMP)

Areas proposed for mire restoration

Author: Central Region Planning Team

Scale @ A1: 1:6,000

Date: 23/01/2024

Legend

- Torrie block boundary
- Deep peats - Mire restoration **65.01 hectares**
- Forest Roads
- 1 [Typical Brown Earth]
- 1u [Upland Brown Earth]
- 4b [Intergrade Ironpan Soil]
- 6 [Typical Peaty Surface-Water Gley]
- 7 [Typical Surface-Water Gley]
- 7b [Brown Surface-Water Gley]
- 8b [Juncus articulatus or acutiflorus Bog]
- 8c [Juncus effusus Bog]
- 8d [Carex Bog]
- 9b [Tussocky Molinia Bog, Molinia, Calluna Bog]
- 9c [Tussocky Molinia, Eriophorum vaginatum Bog]
- 9d [Non-Tussocky Molinia, Eriophorum vaginatum, Trichophorum Bog]
- 10a [Lowland Sphagnum Bog]
- 10b [Upland Sphagnum Bog]
- 11b [Calluna, Eriophorum vaginatum Blanket Bog]
- VC [Valley Complex]

0 50 100 200 300 400 Meters

N W E S

Scotland's National Forest Estate is responsibly managed to the UK Woodland Assurance Standard.

FSC www.fsc.org FSC® C123223 The mark of responsible forestry

PEFC PEFC/16-40-1002 Promoting Sustainable Forest Management www.pefc.org

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Torrie Forest Block
(part of Callander Forest LMP)

Areas proposed for mire restoration

Author: Central Region Planning Team

Scale @ A1: 1:6,000

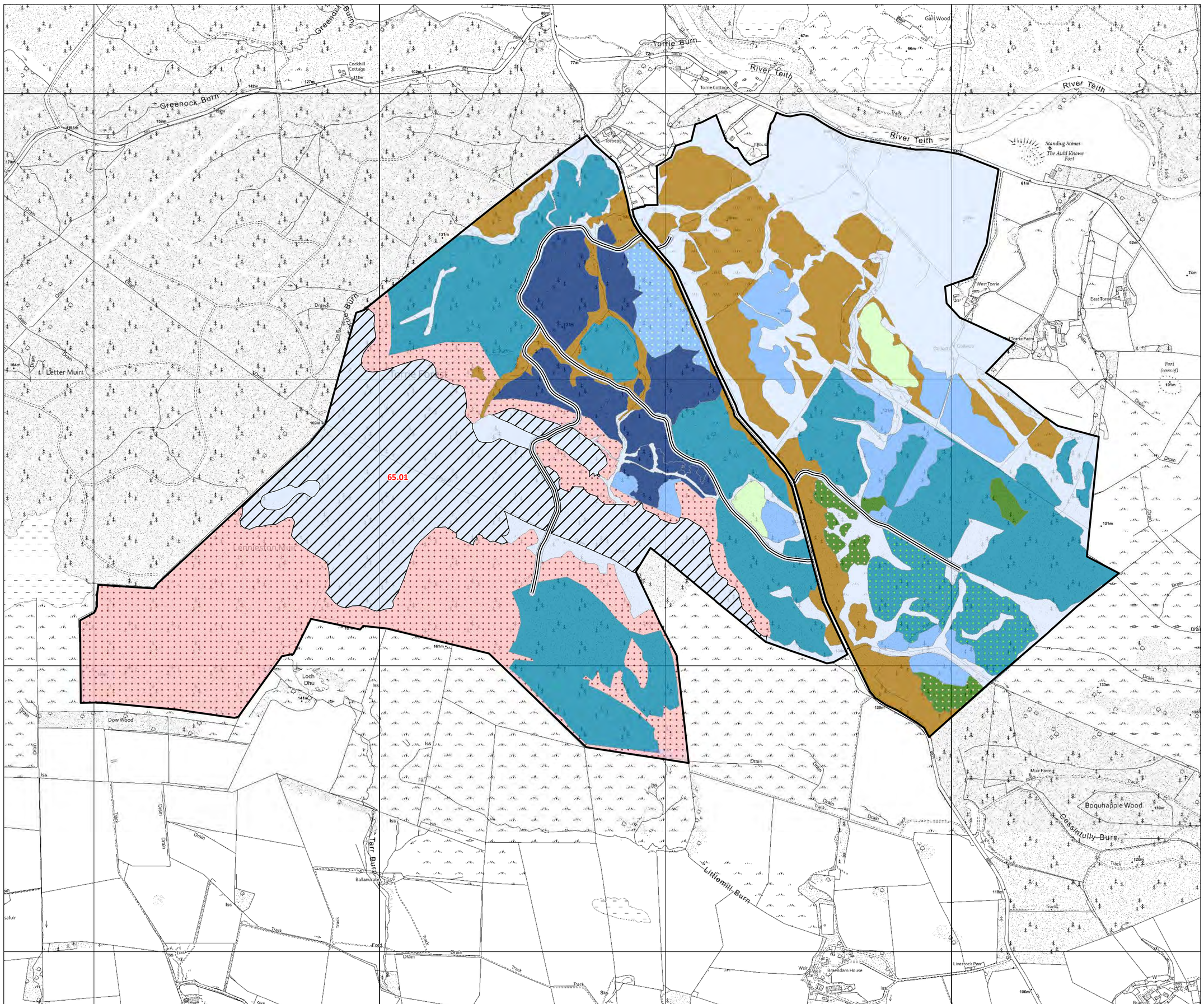
Date: 23/01/2024

Legend

- Torrie block boundary
- Forest Roads
- Deep peats - Mire restoration **65.01 hectares**

Futue species & habitats

- Douglas Fir
- Norway Spruce
- Other/Mixed Broadleaves
- Other/Mixed Conifers
- Scots Pine
- Sitka Spruce
- Birch with any Other Native Mixed Broadleaves
- Norway Spruce with Douglas Fir
- Scots Pine with Birch
- Sitka Spruce with Lodgepole Pine
- Open



0 50 100 200 300 400 Meters

N W E S

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Torrie Forest Block
(part of Callander Forests LMP)

Peat Depth Plots Undertaken

Author: Central Region Planning Team

Scale @ A1: 1:6,000

Date: 29/01/2024

Legend

- Torrie block boundary

Peat depth plots

- 100 + cm
- 90 cm
- 80 cm
- 70 cm
- 60 cm
- 50 cm
- 55 cm

- Deep peats - Mire restoration **65.01 hectares**
- Forest Roads

- 1 [Typical Brown Earth]
- 1u [Upland Brown Earth]
- 4b [Intergrade Ironpan Soil]
- 6 [Typical Peaty Surface-Water Gley]
- 7 [Typical Surface-Water Gley]
- 7b [Brown Surface-Water Gley]
- 8b [Juncus articulatus or acutiflorus Bog]
- 8c [Juncus effusus Bog]
- 8d [Carex Bog]
- 9b [Tussocky Molinia Bog, Molinia, Calluna Bog]
- 9c [Tussocky Molinia, Eriophorum vaginatum Bog]
- 9d [Non-Tussocky Molinia, Eriophorum vaginatum, Trichophorum Bog]
- 10a [Lowland Sphagnum Bog]
- 10b [Upland Sphagnum Bog]
- 11b [Calluna, Eriophorum vaginatum Blanket Bog]
- VC [Valley Complex]

0 50 100 200 300 400 Meters

N W E S

Scotland's National Forest Estate is responsibly managed to the UK Woodland Assurance Standard.

FSC www.fsc.org FSC® C123223 The mark of responsible forestry

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