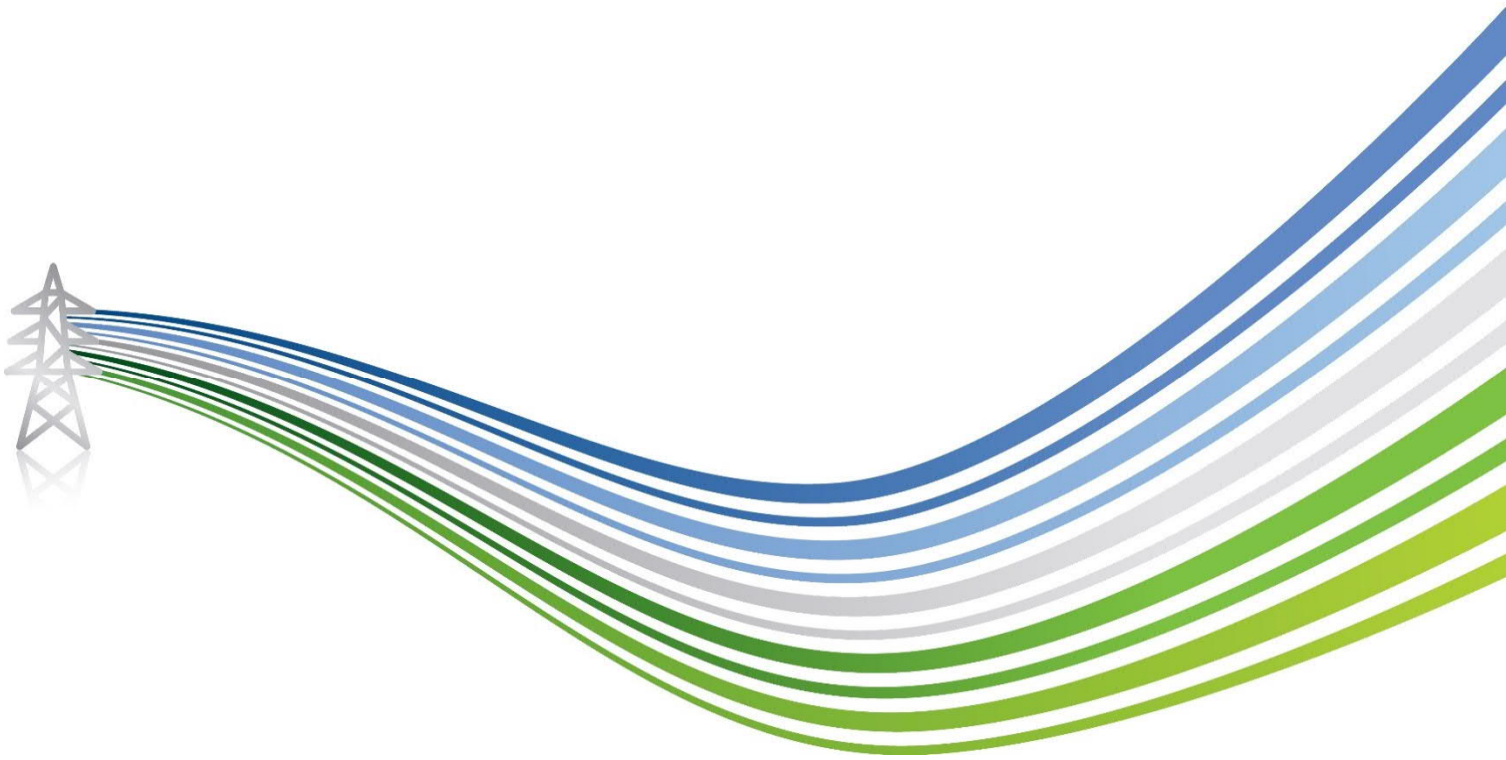
Scottish & Southern Electricity Networks

TRANSMISSION

Dunoon to Loch Long 132 kV OHL Rebuild Environmental Impact Assessment Report Volume 4 | Technical Appendix

Appendix 12.1 - Overhead Line (OHL) Woodland Report

Section 3: Forestry & Land Scotland (Benmore Forest), Scottish Water, Land Adjacent to the River Eachaig (Towers 44 to 52)



Scottish & Southern Electricity Networks

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Contents:

1 Introduction

This Technical Appendix (TA) presents information relevant to the Dunoon to Loch Long 132 kV Overhead Line (OHL) Rebuild (hereafter referred to as the 'Proposed Development'), which is being constructed to replace an existing 132 kV OHL between the same points ("the Existing Line"). It should be read in conjunction with the **Volume 2 – Environmental Impact Assessment (EIA) Report** specifically **Chapter 3: Description of the Proposed Development** and **Chapter 12: Forestry** for full details of the Proposed Development.

The location of the Proposed Development is shown in **Volume 3, Figure 1.1 Site Location.**

2 Purpose of this Woodland Report

As part of the Environmental Impact Assessment (EIA) process, it was identified that the OHL construction and the access tracks required to construct the Proposed Development would cross a number of woodland areas within private or state-owned landholdings. The landholding property boundaries are identified in **Figure 12.1.3 Forestry Project Felling Map**.

This document provides a conceptual assessment of the woodland areas that are affected by the Proposed Development, including the requirement of woodland removal and management recommendations to mitigate the impact of the woodland removal.

Field surveys of the woodland areas have been undertaken and have been used to determine the various woodland characteristics in order to identify the woodland removal required and recommended. This document also sets out the area quantity (ha) to be compensatory planted to ensure no net loss of woodland is achieved.

3 Woodland Property

This section (known for the purposes of the forestry assessment as Section 3) of the Proposed Development primarily comprises land owned by Forestry and Land Scotland (FLS) together with three smaller land holdings, namely a covered reservoir owned by Scottish Water, the two privately owned properties adjacent to the River Eachaig.

The area is located some five kilometres north of Dunoon within the Argyll Forest Park. The FLS managed Benmore Forest is situated close to three of the most popular outdoor attractions in the region with Benmore Botanic Gardens and Puck's Glen Gorge Trail just the north and Kilmun Arboretum a few kilometres further south. The Benmore Forest forms part of a substantial complex of commercial forestry stretching from Strath Eachaig to Holy Loch and north along Loch Long to Ardentinny and Lochgoilhead.

In this section, the Proposed Development enters Benmore Forest at an altitude of approximately 300m above sea level and closely follows the existing overhead alignment, briefly over-sailing a Scottish Water covered reservoir before crossing the A815 public road on an alignment some 50m further north. Beyond the public road, proposed overhead line over-sails a residential property, before crossing the river and narrow section of bank under separate private ownership.

Benmore Forest is serviced by a well maintained hard metalled forest road network accessible from the A815 Strath Eachaig public road. The main vehicle access point is located on the A815 at Inverchapel at national grid reference 'NS 144 865'.

4 Development Requirements

4.1 132 kV Overhead Line

With reference to **Figure 12.1.3 Forestry Project Felling Map**, this section of the Proposed Development enters FLS owned Benmore Forest from the open hill near Tower 44 located at some 300m above sea level (asl), crossing the road 70m west of Tower 54 located at approximately 40m asl. The proposed OHL over-sails

the Scottish Water covered reservoir between Towers 49 and 50. Between Tower 54 and the River Eachaig, the Proposed Development over-sails two privately owned properties.

The 132 kV OHL standard tower dimensions for the project have a width of 10m cross-arm to cross-arm, i.e. from outside conductor to outside conductor. In addition to this, the safety Vicinity Zone from each conductor is a 3.5 m radius around the conductor.

The OHL infrastructure and minimum safety clearance distance is therefore 17 m (8.5 m either side of the OHL centreline) and this has been utilised to calculate the area of the operational corridor occupied by infrastructure. In some cases, such as angle towers the requirement may be slightly in excess of this distance, however the average minimum distance has been used in this assessment.

The study area for this assessment is based around the Operational Corridor (OC). The Applicant defines the area in which it has rights to remove woodland for the purposes of creation of new overhead lines (OHLs), resilience and maintenance of OHLs, or protection of electrical plant as required by the Electricity Safety, Quality and Continuity Regulations (ESQCR) 2002 regulations and The Electricity Act 1989. The OC is defined with reference to the distance at which a tree could fall and cause damage to the overhead line, resulting in a supply outage[1]. As a result, the final corridor width would be based on the safety distance required to allow for a mature tree falling towards the OHL at the mid-point on an OHL span between two towers, taking account of topography and tree height at maturity. Where the OC passes through areas of native woodland, it is noted that the width of woodland removal is likely to be reduced due to the lower height of the tree species present. The proposed OC illustrated in **Figure 12.1.3 Forestry Project Felling Map** has been based on the likely height of the woodland at maturity and therefore, varies in width according to the woodland type present.

The forestry property primarily impacted by the development is the section of Benmore Forest to the south of Puck's Glen. Forestry and Land Scotland's restructuring plans have been partially reviewed; however, the recently approved Forest Design Plan was not available at the time of writing.

The OC width that has been assessed and identified for the safe build and energisation of the new OHL through the areas of commercial conifer woodland is 81 m (40.5 m either side of the OHL centreline).

The OC width that has been assessed and identified for the safe build and energisation of the new OHL through the areas of native broadleaved woodland is 60 m (30 m either side of the OHL centreline). This has been assessed as a maximum OC width required at these woodland locations, with the potential of further narrowing of the OC prior to construction to allow greater tree retention.

Additionally, this assessment takes account of tree removal associated with temporary powerline diversions required where it is deemed necessary for the route of the Proposed Development to cross or follow as closely as possible the existing alignment. Under these circumstances, the width of the temporary powerline corridor through areas of both mature conifer and native broadleaved woodland is 60 m (30 m either side of the temporary OHL centreline). Due to the fact that this part of the Proposed Development is only in place to facilitate construction and is removed when construction is finished, woodland removal in this area is temporary.

4.2 Access Track Route Design

Benmore Forest is serviced from the A815 public road by a network of hard metalled forest roads that are regularly used for commercial timber haulage. These forest roads will form part of the main vehicle access

[1] As specified by the 'Red Zone' set out in paragraph 41 of the Forest Industry Safety Accord. (2020) Safety Guide 804 Electricity at Work: Forestry. [pdf] Available at: FISA 804 (ukfisa.com)

route for the Proposed Development including associated forestry works **Figure 12.1.3 Forestry Project Felling Map** and will be subject to maintenance and upgrade works as part of the construction work scope.

General access track tree maintenance work may be required along the existing forest road in preparation for the civil engineering access track upgrade works.

Access tracks to individual tower sites will be confined to the OHL operational corridor were possible. However, in areas where the nature of the terrain or ground conditions dictate the requirement to build new access track routes that falls outside the OHL operational corridor, the width required to be cleared is 20 m wide (10 m either side of centreline) **Figure 12.1.3 Forestry Project Felling Maps**, thus increasing the impact of woodland removal in that area.

Stump removal and mulching of young trees and forest residue will be required for the installation of new access tracks and at each tower location for the formation of a construction compound and temporary crane pad.

5 Woodland Characteristics

Benmore Forest is managed by Forestry and Land Scotland primarily as a commercial conifer forest, but the area also has significant value as one of the premier tourism and outdoor recreation destinations in the Argyll Forest Park region. Benmore Estate was gifted to the nation in 1928 and although the current commercial forest dates from this period, the area also contains many big conifer specimens including giant sequoia, Douglas fir and western hemlock planted in the 19th century. Puck's Glen Gorge Trail just to the north of the Proposed Development is a well-known walking route through a dramatic rocky gorge and other walks link up with Benmore Botanic Garden across the A815, operated by Royal Botanic Garden Edinburgh and reputed to contain one of the richest plant collections in the world.

The extensive commercial conifer plantation of Benmore are diverse in terms of species and age, including Scots pine *Pinus sylvestris*, Douglas fir Pseudotsuga menziesai, Norway spruce, *Picea abies*, larch *Larix ssp*., western hemlock *Tsuga heterphylla* and Sitka spruce *Picea sitchensis*. Stands planted in the late 19th century sit alongside crops planted in the 1950's and later rotations planted from the 1970's onwards. Woodland management is carried out through a regime of clear felling and replanting, the dominant commercial conifer species being Sitka spruce.

Long-term forest management must routinely contend with the challenges of *Phytophthora ramorum,* a high infectious tree disease that mainly affects larches, and the spread of invasive non-native species within the forest, specifically, *Rhododendron ponticum* and western hemlock, both of which regenerate freely in the warm, wet climate.

Benmore and the wider FLS forest estate is impacted by numerous Statutory Plant Health Notices (SPHN) intended to control the spread of *P. ramorum*. Felling permission for such area is secured by FLS through the recently approved Forest Landscape Design Plan or by formal amendments to this and previous plans. Due to the sheer number of sites affected by SPHN's, the key operational issue associated with the clearance of these sites is the availability of suitable harvesting contractors equipped to work the steep slopes that characterise the region.

The Proposed Development is situated on steep to very steep, moderately rocky slopes, the lower sections coinciding with predominantly brown earth soils with humus-iron podzols and giving way to peaty gleyed podzols at higher elevations.[2]

[2] Scottish Government Scotland's Soil website https://map.environment.gov.scot/Soil_maps

A desk-based study of the woodland areas was conducted utilising open-source data from NatureScot's Ancient Woodland Inventory and Scottish Forestry's Native Woodland Survey of Scotland, to identify native woodland and environmental classifications.

NatureScot's AWI revealed a broad area of Ancient Woodland (of semi-natural origin) extending up Puck's Glen and meeting the Proposed Development around Towers 46 and 48.

The Scottish Forestry NWSS classifies native woodland types in four categories, native woodland, nearly-native woodland, open land habitat and Plantations on Ancient Woodland Sites (PAWS). The NWSS identifies the substantial areas of native woodland present within this section of the Proposed Development between Towers 46 and 52.

The total area of Ancient Woodland (of semi-natural origin) is 1.25 ha. There are no PAWS sites.

Large sections of the OC have been reduced to a width of 60 m for broadleaved woodland to increase opportunities for retention.

5.1 Benmore Forest

The upper part of the Proposed Development enters the forest just west of the existing OHL alignment near Tower 44. The section from Tower 44 to just north of Tower 46 coincides with a felled area, formerly of mature hybrid larch *Larix x eurolepis*, removed earlier this year as part of a larger sanitation felling in response to a Statutory Plant Health Notice (FLS felling coupe reference 10037).

Plate 1 – View from forest road looking NE towards Tower 47. Scheduled sanitation felling can be seen in progress on the hillside.

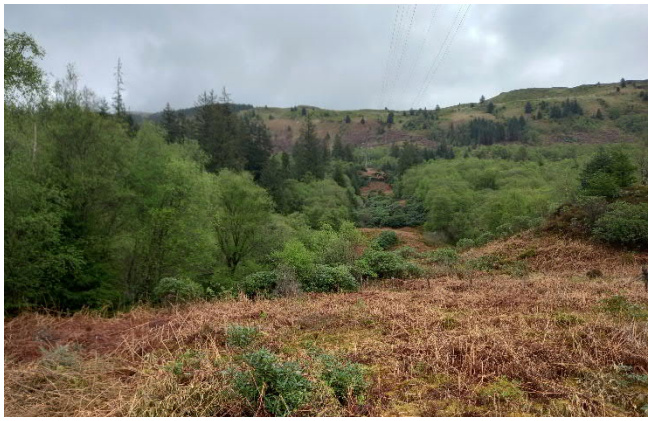

Plate 2 – View from Tower 48 to looking towards Tower 47. Birch and scattered conifers to be removed from proposed operational corridor.

As detailed in **Figure 12.1.3 Forestry Project Felling Map**, much of the remaining length of the operational corridor from Towers 46 to 52 comprises native woodland, predominantly of birch with minor species including willow, rowan and rarely holly. Small groups and individual conifers, mainly spruce, are also occasionally present. These birch dominated areas are mainly mature with elements of younger tree regeneration. The structure varies from dense thicket to a more open canopy, interspersed with open ground containing scattered or occasional tree regeneration and frequent dense *R. ponticum*. The width of the operational corridor in this birch dominated section has been reduced to 60 m to minimise the impact of tree removal. However, any scattered conifers present within the 81m operational corridor will also require selective removal. The hardwood timber within these areas limited commercial value and in many cases tree diameter will be insufficient or marginal for firewood.

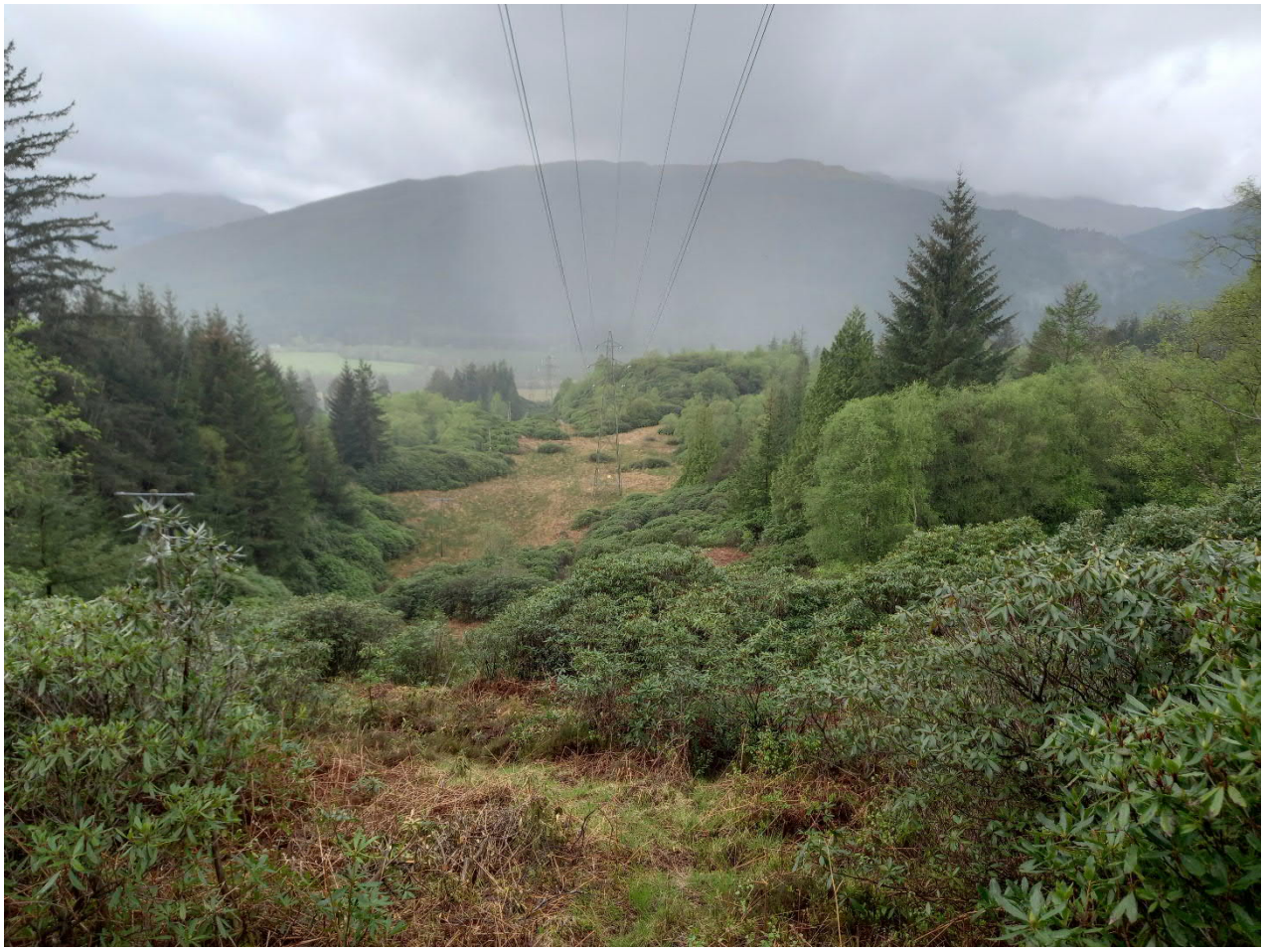

Plate 3 – View from Tower 49 to Tower 50. Birch to be removed from 60m operational corridor. Scattered conifers to be selectively removed within 81m operational corridor.

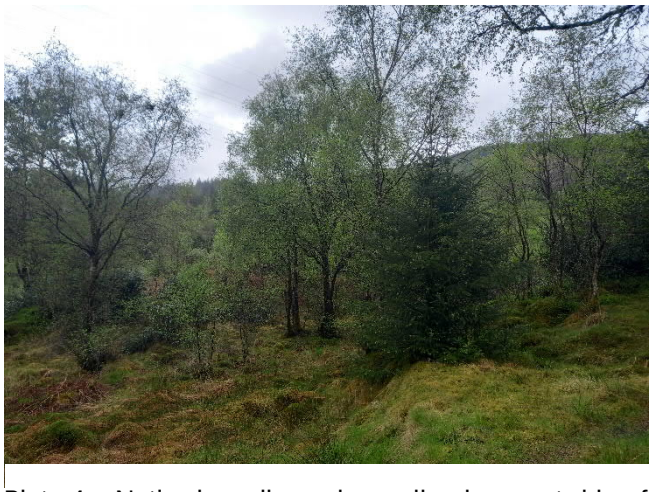

Plate 4 – Native broadleaved woodland on east side of forest road impacted by temporary OHL diversion

Plate 5 – Thinned stand of mature spruce on west side of forest road impacted by temporary OHL diversion.

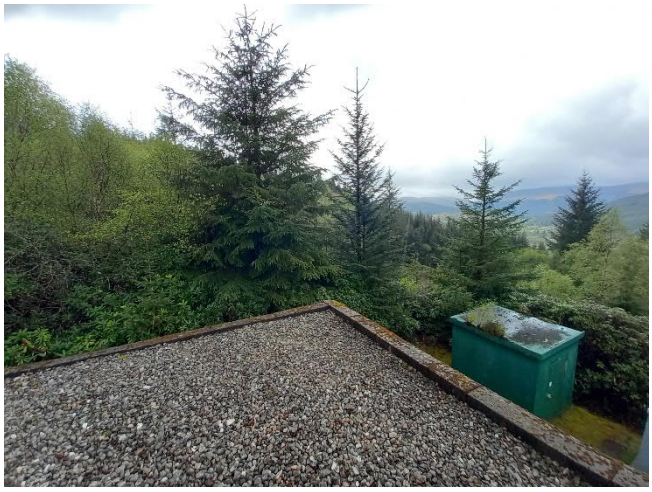

Plate 6 – From Scottish Water covered reservoir looking south. Clearance of birch and conifer regeneration required for track construction.

The western end, the section from Tower 52 to the A815 public road, contains old growth mixed conifers including Scots pine and European larch *Larix decidua* planted in the late 19th century mixed with mature birch, part of a larger stand that extends north to the Puck's Glen public carpark. The total volume of these trees is approximately 120 m^3, however, they are over-sized and of uncertain commercial value.

Between Towers 46 and 51, the Proposed Development includes a temporary overhead line diversion allowing the proposed OHL alignment to cross the existing alignment and ensure that the new operational corridor does not encroachment onto a Scottish Water covered reservoir located north-west of Tower 49. The temporary OHL corridor is 60m wide and runs roughly parallel with the proposed 81m OC, impacting a section of mature birch dominated native woodland and two sections of mature Sitka spruce. These areas can be replanted or naturally regenerated once construction is complete and the temporary diversion is removed.

The process of woodland impact assessment includes appraisal of woodland exposure to windblow resulting from the removal of mature trees within the operation corridor or to facilitate the construction of new tracks or temporary OHL diversions. **Figure 12.1.3 Forestry Project Felling Maps** identifies proposed tree felling in these areas to achieve suitable wind-firm felling boundaries and reduce impacts on forest management and forest landscape.

5.2 Scottish Water (Covered Reservoir)

Scottish Water operate a covered reservoir located 50m north-west of Tower 49. This infrastructure is enclosed within a stock fenced compound and the semi-mature birch and occasional conifer regeneration within the compound will be impacted by the proposed OHL alignment. These trees have no commercial value.

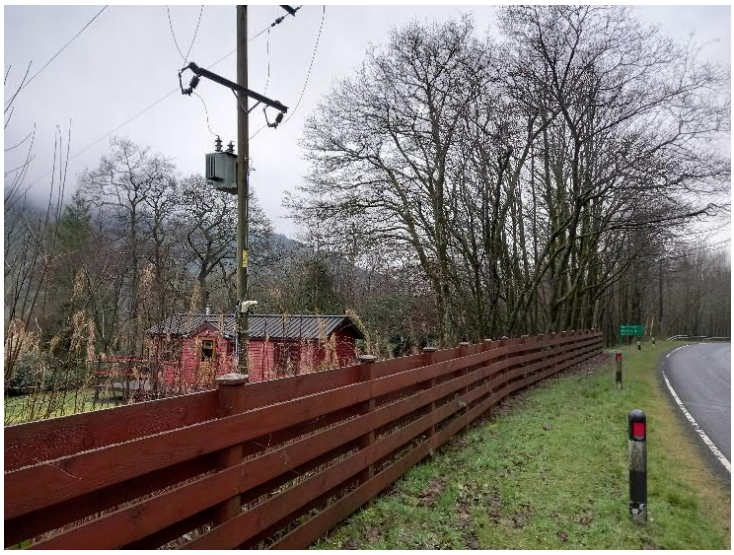

Plate 7 – The property (Owner 1) from the A815 looking north. Roadside sycamores and native woodland behind lodge will require removal.

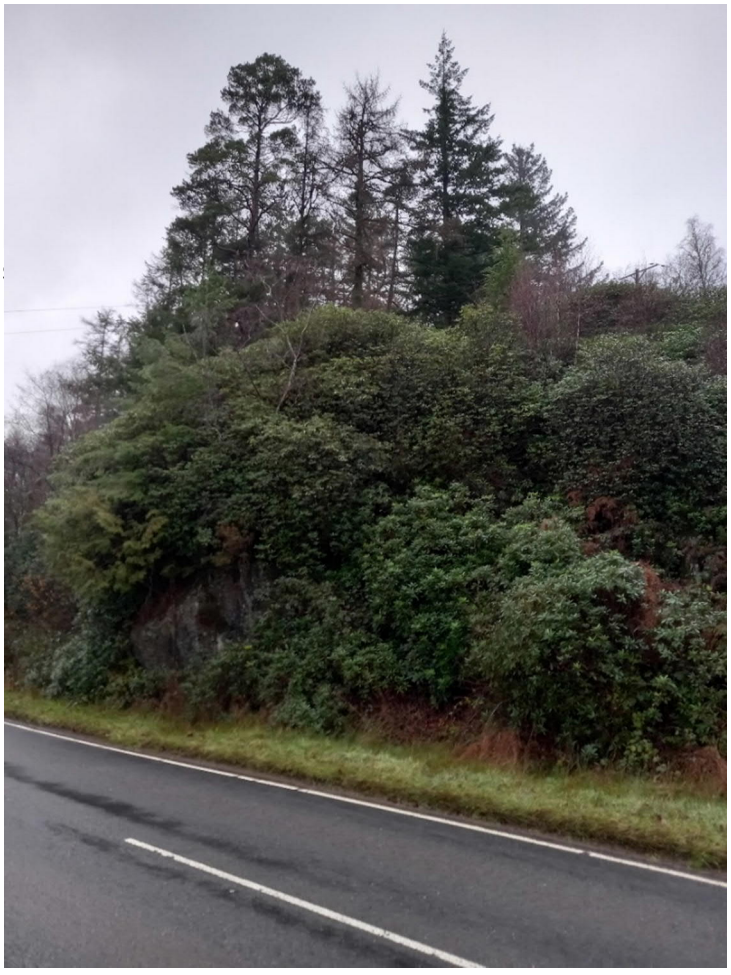

Plate 8 – Old growth conifers including Scots pine and Japanese larch above the A815 near Tower 52.

5.3 Land Adjacent to River Eachaig (Owner 1)

Land adjacent to the River Eachaig (Owner 1) is a residential property. The area to the north of the property within the 60m operational corridor contains mature broadleaved woodland consisting predominantly of native species such as birch *Betula ssp*., oak *Quercus ssp.* and rowan *Sorbus aucuparia* with sycamore *Acer psuedoplatanus* which provides amenity value and shelter from the noise of passing traffic. These trees will be impacted by the proposed OHL alignment. This hardwood timber has a volume of approximately 30 m^3 and is marketable as firewood.

5.4 Land Adjacent to River Eachaig (Owner 2)

Land adjacent to the River Eachaig (Owner 2) occupies a narrow section of bank containing approximately a dozen mature broadleaved trees, including sycamore and oak. These trees will be impacted by the proposed OHL alignment and effectively have no commercial value.

6 Windthrow Risk Impact

The Proposed Development occupies strong to steep, moderately rocky slopes and coincides with generally free-draining brown earth soils or predominantly mineral podzols between Towers 47 and 52. Wetter soils are more typical above Tower 47.

In relation to wind hazard, the area affected by the proposed OHL alignment is classified as sheltered in lower areas below Tower 49 and moderately exposed above. The local climate is classified as warm and moist.

These factors suggest site conditions with moderate flexibility for the management and growth of trees crops.

Additionally, conifer crops in sheltered areas have been thinned in the past and/or contain broadleaves likely to promote stability.

Therefore, increased windthrow risk is unlikely to result from limited removal of mature conifers associated with the temporary overhead line diversion or provision of new tracks. Additionally, the impact of wind-throw on native broadleaves is likely to be minimal due to their size, structure and generally sheltered locations.

7 Woodland Management Impact

The proposed OHL alignment will follow close to the existing alignment and continue to present challenges for the future management of the forest as it dissects management coupes. The constraint associated with the OHL will be reduced by regular maintenance of the OC, which will avoid the incidences of "Red Zone" trees.[3]

The OHL alignment crosses the forest road network and will be built to comply with statutory clearances above forest roads/access tracks, which will reduce the potential hazard in respect of future timber haulage.

The Existing Line is already an established feature of the forest and unlikely to significantly restrict future in-forest machinery access. However, the requirement for dedicated forestry machine OHL crossing points will be discussed with FLS and if required will be identified once the OHL has been constructed, thus providing a safe OHL crossing point(s) for future working within the woodland.

The Proposed Development will require the permanent removal of broadleaved woodland from the OC, which will require to be kept clear of trees. However, this loss of ground will to some extent be ameliorated in the future as the operational corridor the Existing Line is incorporated back into the forest area following it's de-commissioning. Additionally, the tree removal required to create the temporary OHL diversion will not be permanent and can also be incorporated back into the forest area once commissioning of the new OHL is complete.

During the construction phase, there will be a level of disruption to the undertaking of routine forestry management activities by FLS on the woodland property. This will be project managed through communication and agreement with them and other affected stakeholders.

8 Mitigation Opportunities

A reduced OC width of 60m has been assessed for the areas of native broadleaved woodland. Prior to the construction phase these areas will be assessed for further selective felling to identify if greater tree retention can be achieved. This will be dependent on the scope of construction activities and in particular the requirement to safety install the electrical conductor (cable).

[3] As specified by the 'Red Zone' set out in paragraph 41 of the Forest Industry Safety Accord (FISA) Safety Guide 804 Electricity at Work: Forestry (2020) FISA 804 (ukfisa.com)

The operational corridor woodland removal area is required for the construction and operation of the new OHL infrastructure. Opportunities will be assessed for woodland replanting within the OC, although the identification of suitable areas cannot be guaranteed due to the requirement of maintaining the safe energisation of the OHL. Reference to **Appendix 12.5 Compensatory Planting Strategy**, will fully mitigate the operational corridor woodland removal area by replanting the area quantity (hectares) of woodland removed.

Given the height of the conductors and absence of tower infrastructure at River Eachaig (Owner 1), for example, there may be an opportunity to establish trees and shrubs of small stature (ideally <15 m when mature) within the operational corridor to minimise local biodiversity and amenity impact.

The management felling (those areas outwith the OC that require to be felled) areas will be replanted by FLS in accordance with the usual legal obligations associated with Scottish Forestry Felling Permissions.

9 Woodland Removal Impact

Table 9.1 Woodland Removal for Infrastructure

Item	Woodland Type	Area
OHL	Mature conifer tree crop	0.53
	Young conifer plantation	0
	Native broadleaved woodland	5.88
Access Track Corridor	Mature conifer plantation	0.38
	Young conifer plantation	0
	Native broadleaved woodland	0.72
Temporary OHL Diversion Corridor	Mature conifer plantation	1.23
	Young conifer plantation	0
	Native broadleaved woodland	2.83
Total Woodland Removal		**11.57**

Table 9.2 Compensatory Planting		
Compensatory Planting Area	Mixed conifer or native broadleaves	7.13

Table 9.3 Woodland Removal Impact of Infrastructure		
Total Loss of Woodland Area		11.57
Total Replanting/Restocking		4.06
Total Compensatory Planting Area		7.51
Total Net Loss of Woodland Area		**0.00**

Table 9.4 Woodland Removal for Management Felling		
Item	**Woodland Type**	**Area**
Management Felling	Mature conifer tree crop	0
Replanting/Restocking	Mixed conifer or native broadleaves	0
Net Loss of Woodland Area		**0.00**

Note. Felling approval is via Scottish Forestry Felling Licence application process or Long Term Forest Plan application or amendment process.

10 Compensatory Planting

Compensatory planting to achieve the area quantity (hectares) of woodland removal will be provided for the OHL and access track operational corridor area and will be in accordance with the Scottish Government's CoWRP[4] objective of no net loss of woodland.

[4] The Scottish Government's policy on Control of Woodland Removal, Forestry Commission (2009)

11 List of Appendices

Figure 12.1.3 - Forestry Project Felling Map

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Dunoon to Loch Long 132kV OHL Rebuild

Figure 12.1.3
Forestry and Land Scotland (Benmore Forest), Scottish Water and River Eachaig Forestry Project Felling Map

Towers 46 to 47
Native broadleaves to be removed within 60m OC, scattered conifers to be selectively removed within 81m OC.

Towers 49 to 52
Native broadleaves to be removed within 60m OC, scattered conifers to be selectively removed within 81m OC.

Key

- Property Boundary
- Proposed OHL Alignment
- Proposed Tower Position
- Operational Corridor
- Temporary Diversion
- Temporary Diversion Structure
- 60m Temporary Diversion Corridor

Proposed Powerline Tree Removal

- Mature Conifer - 81m Operational Corridor, 20m Track and 60m Temporary Diversion Corridors
- Native Woodland - 60m Operational Corridor, 20m Track Corridor and 60m Temporary Diversion Corridor
- Native (AWI) - 60m Operational Corridor
- Felled
- Open Ground or Other Land
- Existing Track
- Proposed Retained Access Track
- Proposed Access - Temporary

Galbraith

N	Scale	1:5000		
	Size	A3	CRS	EPSG 27700 / British National Grid