

**Creag Dhubh to Inveraray 275 kV OHL
Connection Environmental Impact
Assessment
Volume 4 | Technical Appendix 14.1
Woodland Reports**

May 2022



Creag Dhubh to Inveraray 275 kV OHL Connection

Environmental Impact Assessment

Volume 4 | Technical Appendix 14.1

Overhead Line (OHL) Woodland Report

Property: STRONMAGACHAN

May 2022



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1. Introduction

This Technical Appendix (TA) presents information relevant to the Creag Dhubh to Inveraray 275 kV overhead line (OHL) Connection. It should be read in conjunction with the **Volume 2 – EIA Report** specifically **Chapter 14: Forestry**, for full details of the Proposed Development.

Scottish and Southern Electricity Networks (SSEN) Transmission, hereafter referred to as ‘the Applicant’, owns and maintains the electricity transmission network across the north of Scotland. Due to the growth in renewable electricity generation in the north and north-east of Scotland, upgrade of the transmission network is required in order to provide the necessary increase in transmission capacity.

The Applicant is proposing to apply for consent under Section 37 of the Electricity Act 1989 to construct and operate a 9 kilometre (km) double circuit 275 kV OHL, supported by lattice steel towers between a proposed substation at Creag Dhubh and a connection point on the recently constructed Inveraray to Crossaig 275 kV OHL circuit and associated temporary diversions. The location of the Proposed Development is shown in **Figure 14.1 (EIAR Volume 3a)**.

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 landholdings. The landholding property boundaries are identified in **Figure 14.1 (EIAR Volume 3a)**.

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

The Stronmagachan woodland under private ownership of Argyll Estates, this property is currently occupied by Mr Ruairidh Mackay. It is located approximately 6.2 km north west of the village of Inveraray as shown on **Figure 14.1 (EIAR Volume 3a)**. The woodland property affected by this development is part of a larger Woodland Creation Plan under the SFGS scheme. It has no existing infrastructure and is on the hillside (NN075142) west of the A819 public road.

4. Development Requirements

4.1 275 kV Overhead Line

With reference to **Figure 14.1 (EIAR Volume 3a)**, the sections of OHL applicable to the Stronmagachan woodland property are from Tower 20 just outside of the property to boundary to Tower 26.

The 275 kV OHL standard tower dimensions for the Proposed Development have a width of 17 m at the widest part (crossarm) of the tower i.e., from outside conductor to outside conductor, in addition to this the safety vicinity zone from each conductor is a 4m radius around the conductor.

The OHL infrastructure and minimum safety clearance distance is therefore 25 m (12.5 m either side of the OHL centreline) and this has been utilised to calculate the area of the operational corridor (OC) 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 OC. The Applicant defines the area in which it has rights to remove woodland for the purposes of creation of new 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 outage¹. 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. Standard falling distance for a mature conifer tree considered to be 30 m. 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 14.2, EIAR Volume 3a** has been based on the likely height of the woodland and therefore, varies in width according to the woodland type present.

The future plans of landowner woodland restructuring (clearfell and replant) have been reviewed.

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 85 m (42.5 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.

4.2 Access Track Route Design

As mentioned above currently there are no existing road infrastructure in or near the woodland. Sections of both temporary and permanent road will be constructed, within and out with the OC. These roads will form part of the main vehicle access route for the Proposed Development **Figure 14.2, EIAR Volume 3a**, and will be subject to maintenance and upgrade works as part of the construction work scope.

Sections of new access track **Figure 14.2, EIAR Volume 3a**, are required to be built as part of the construction work scope, to service the Towers 20 to 26.

The access track new build corridor width required to be cleared through woodland is 20 m wide (10 m either side of centreline) as shown on **Figure 14.2, EIAR Volume 3a**, but will be assessed in situ for further tree retention suitability. This will increase the impact of woodland removal along new build access track routes that are outside the OHL OC. This entails singular mature or semi mature riparian trees, amongst them alder, birch and willow.

Stump removal and residue mulching 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.

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)

5. Woodland Characteristics

The property is situated on the hillside (NN075142), west side of the A819 public road, as shown on **Figure 14.2, EIAR Volume 3a**. The woodland area is impacted by the Proposed Development from Tower 20 to Tower 26, as shown on **Figure 14.2, EIAR Volume 3a**.

The woodland ground conditions are peaty podzols with peaty gleys with blanket peat².

Although the landowner's LTFP felling phase and restock maps are due for review, the restructuring proposals have been reviewed during the OHL forestry landscape assessment as shown on **Figures 14.1 and 14.2, EIAR Volume 3a**.

A desk-based study of the woodland areas was conducted, utilising web based data provided by Scottish Forestry³ and referencing the Scottish Government's Ancient Woodland Inventory, to identify current woodland environmental designations and classifications.

The Scottish Forestry Map Viewer provides spatial data on the Native Woodland Survey of Scotland and classifies the woodland types into four categories⁴:

1. Native woodland
2. Nearly-native woodland
3. Open land habitat
4. Plantations on Ancient Woodland Sites (PAWS)

Although not identified on either the Native or Ancient Woodland Inventories, it was assessed as native upland birchwood, established around 2006. The area impacted by the development is 0.14 ha.

Plates 3.1 and 3.2 show the immature age (around 16 year old) woodland, with large heather section throughout. The dominating tree species is birch.

The terrain is uneven with several knolls, with some steeper hilltops averaging around 240 m elevation. It is surrounded by steep and narrow gullies, as well as drainage systems.

² Scottish Government's Scotland's soils website <https://soils.environment.gov.scot/>

³ Scottish Forestry Land Information Search URL: https://map.environment.gov.scot/LIS_Agri/Agri.html

Scottish Forestry Map Viewer

URL: <https://scottishforestry.maps.arcgis.com/apps/webappviewer/index.html?id=0d6125cfe892439ab0e5d0b74d9acc18>

⁴ Scottish Forestry Native Woodland Survey of Scotland: Glossary of Terms; URL: Main Title (forestry.gov.scot)

Native Woodland – woods where the canopy cover is composed mainly of native species (i.e., over 50%).

Nearly Native Woodland - where native species make up between 40% and 50% of the canopy. These are woods that could have potential to be converted into native woodlands by altering their species mix.

Open Land Habitat – areas with <20% canopy cover of trees and shrubs adjoining a native woodland.

PAWS - Plantations on Ancient Woodland Sites. These are surveyed in the NWSS where they are recorded in the Scottish ancient woodland inventory (SAWI). These woodlands appear to have originated through natural regeneration sometime before the mid-19th century, but were later converted to planted woods.



Plate 3.2 shows the immature birch trees surrounded by deer fence and lack of any existing access. There is no harvestable timber in this woodland.



No management felling is needed in this instance due to the immaturity of the crop.

6. Windthrow Risk Impact

The site lies on soils classified as peaty podzols with peaty gleys with blanket peat.

The woodland site affected by the Proposed Development has a 'Detailed Aspect Method of Scoring' (DAMS)⁵ windthrow hazard class score around 12-14, classified as low. The site has a cool and wet climate. The soils are slightly dry and nutrient status is very poor.

No impact of windthrow risk will be created by the removal of the young conifer plantation areas within the OHL OC and access track corridors.

7. Woodland Management Impact

The OHL alignment will create additional challenges for the future management of the forest as it dissects existing management coupes and introduces an electrical hazard. The constraint associated with the electrical hazard will be reduced by regular maintenance of the operational corridor, which will avoid the incidences of "Red Zone" trees.⁶

⁵ Detailed Aspect method of Scoring (DAMS) Ref. Forest Research, "Forest Gales software programme" and Forestry Commission Leaflet 85 "Windthrow Hazard Classification"

⁶ 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 OHL alignment will cross the woodland road network at either approximately 45 or 90 degrees and will be built to the regulatory safe height clearances above forest roads/access tracks, which will reduce the hazard in respect of future timber haulage.

The OHL alignment may be restrictive to future in-forest machinery access. The requirement for dedicated forestry machine OHL crossing points will be discussed with the Landowner 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 permanently remove the two small sections of the woodland from the OC. This will reduce the forestry restructuring/planting land available within the woodland property area, as the operational corridor will be maintained clear of trees.

During the construction phase, a level of disruption will be created for the undertaking of routine forestry management activities by the Landowner on the woodland property. This will be project managed through communication and agreement with the affected stakeholders.

8. Mitigation Opportunities

A reduced OC width of 60 m has been assessed for the areas of native broadleaf woodland. Prior to the construction phase these as well as the access track areas will be assessed for further selective felling to identify if greater tree retention can be achieved. This will be dependent on the requirements of the development project and in particular the safety of OHL wiring operations.

The OC woodland removal area is required for the construction and functioning of the new OHL infrastructure. Opportunities will be assessed for woodland replanting within the OC, the identification of suitable areas cannot be guaranteed due to the requirement of maintaining the safe energisation of the OHL. Reference to **Section 9** below, will fully mitigate the OC woodland removal area by replanting the area quantity (hectares) of woodland removed.

9. Woodland Removal Impact

Item	Woodland Type	Area
	Native broadleaf woodland	0.14 ha
Access Track Corridor	Broadleaf woodland	0.05 ha

Compensatory Planting Area	Mixed conifer or mixed broadleaves	0.19 ha
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Total Loss of Woodland Area		0.19 ha
Total Compensatory Planting Area		0.19 ha
Total Net Loss of Woodland Area		0 ha

Table 9.4 Woodland Removal for Management Felling		
Item	Woodland Type	Area
Management Felling	N/A	0 ha
Replanting/Restocking	N/A	0 h
Net Loss of Woodland Area		0 ha
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 OC area and will be in accordance with the Scottish Government's Control of Woodland Removal Policy of no net loss of woodland.

Creag Dhubh to Inveraray 275 kV OHL Connection

Environmental Impact Assessment

Volume 4 | Technical Appendix 14.1

Overhead Line (OHL) Woodland Report

Property: Keppochan East & Tullich Forest

May 2022



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1. Introduction

This Technical Appendix (TA) presents information relevant to the Creag Dhubh to Inveraray 275kV Overhead line (OHL) Connection. It should be read in conjunction with the **Volume 2 – EIA Report** specifically **Chapter 11: Forestry**, for full details of the Proposed Development.

Scottish and Southern Electricity Networks (SSEN) Transmission, hereafter referred to as ‘the Applicant’, owns and maintains the electricity transmission network across the north of Scotland. Due to the growth in renewable electricity generation in the north and north-east of Scotland, upgrade of the transmission network is required in order to provide the necessary increase in transmission capacity.

The Applicant is proposing to apply for consent under Section 37 of the Electricity Act 1989 to construct and operate a 9 kilometre (km) double circuit 275 kV OHL supported by lattice steel towers between a proposed substation at Creag Dhubh and a connection point on the recently constructed Inveraray to Crossaig 275 kV OHL circuit and associated temporary diversions. The location of the Proposed Development is shown in **Figure 14.1 (EIAR Volume 3a)**.

2. Purpose of this Woodland Report

As part of the Environmental Impact Assessment (EIA) process, it was identified that the overhead line construction and the access tracks required to construct the Proposed Development would cross a number of woodland areas within private landholdings. The landholding property boundaries are identified in **Figure 14.1 (EIAR Volume 3a)**.

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

Keppochan East & Tullich forest is under private ownership and is located approximately 11km south west of the village of Dalmally as shown on **Figure 14.1 (EIAR Volume 3a)**. The woodland property is a large area of commercial conifer woodland, with an existing forest road infrastructure. The property area straddles the A819 public road east and west, with the larger woodland area located on the west side.

The property is well serviced by hard metalled forest roads from the A819 public road through the main commercial conifer woodland areas. A substantial area of mixed broadleaves is situated at the north end of the property on the east side of the A819 public road, with no provision for vehicle access.

The main vehicle access point is located at national grid reference ‘NN 100 199’.

4. Development Requirements

4.1 275 kV Overhead Line

With reference to **Figure 14.1 (EIAR Volume 3a)**, the sections of OHL applicable to the Keppochan East & Tullich East property are from Tower 1 to just outside of the property boundary on the south side of Tower 6.

The 275 kV OHL standard tower dimensions for the Proposed Development have a width of 17 m at the widest part (crossarm) of the tower i.e., from outside conductor to outside conductor, in addition to this the safety vicinity zone from each conductor is a 4 m radius around the conductor.

The OHL infrastructure and minimum safety clearance distance is therefore 25 m (12.5 m either side of the OHL centreline) and this has been utilised to calculate the area of the OC 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 OC. The Applicant defines the area in which it has rights to remove woodland for the purposes of creation of new 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 outage¹. 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. Standard falling distance for a mature conifer tree considered to be 30 m. 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 14.2 (EIAR Volume 3a)**, has been based on the likely height of the woodland at maturity and therefore, varies in width according to the woodland type present.

The future plans of landowner woodland restructuring (clearfell and replant) have been reviewed.

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 85 m (42.5 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.

4.2 Access Track Route Design

The Keppochan East & Tullich East commercial conifer forest is serviced from the A819 public road by well-constructed hard metalled forest roads, regularly used for timber haulage. These forest roads will form part of the main vehicle access route for the Proposed Development as shown on **Figure 14.2 (EIAR Volume 3a)**, and will be subject to maintenance and upgrade works as part of the construction work scope. The existing forest roads will be utilised during the forestry works.

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

Sections of new access track as shown on **Figure 14.2 (EIAR Volume 3a)** are required to be built as part of the construction work scope, to service the OHL section Towers 1 to 6. Additional track to the most southerly Sitka Spruce (SS) compartment is also needed to allow machinery for mulching or timber extraction. The new temporary access tracks are located outside the OHL operational corridor to link to the existing forest road/access track and Towers 1, 3, 5 and 6.

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)

The access track new build corridor width required to be cleared through woodland is 20 m wide (10 m either side of centreline) as shown on **Figure 14.2 (EIAR Volume 3a)**, but will be assessed in situ for further tree retention suitability. This will increase the impact of woodland removal along new build access track routes that are outside the OHL operational corridor.

Stump removal and residue mulching 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

The property is situated on both sides of the A819 public road, east and west as shown on **Figure 14.1 (EIAR Volume 3a)**. The larger woodland area is on the west side, impacted by the Proposed Development from Tower 1 to Tower 6 as shown on **Figure 14.2 (EIAR Volume 3a)**.

The western woodland area impacted by the Proposed Development is an area of commercial conifer woodland with a small area of mixed riparian broadleaf woodland. The woodland is broken up by areas of open ground integrated throughout. The conifer area has undergone significant woodland restructuring in recent years, which is continuing by the landowner through approved felling licence. Long Term Forest Plan (LTFP) maps have been drafted by the landowner, as part of the woodland restructuring management strategy for the property. The woodland management regime is clearfell and replant, with the predominant tree species being Sitka spruce *Picea sitchensis*. The conifer age class ranges from young restock plantation (circa. 12 years) to mature woodland (circa. 40 years) and all of plantation origin. Pockets of tree windblow are evident within the mature conifer woodland areas.

The woodland ground conditions are variable on mostly peaty gley soil, with pockets of peat present sporadically around the site².

Although the landowner's Long Term Forest Plan felling phase and restock maps are in draft form, the restructuring proposals have been reviewed during the OHL forestry landscape assessment as shown on **Figure 14.1 to 14.2 (EIAR Volume 3a)**.

A desk based study of the woodland areas was conducted, utilising web based data provided by Scottish Forestry³ and referencing the Scottish Government's Ancient Woodland Inventory, to identify current woodland environmental designations and classifications.

The Scottish Forestry Map Viewer provides spatial data on the Native Woodland Survey of Scotland and classifies the woodland types into four categories⁴:

² Scottish Government's Scotland's soils website <https://soils.environment.gov.scot/>

³ Scottish Forestry Land Information Search URL: https://map.environment.gov.scot/LIS_Agri/Agri.html

Scottish Forestry Map Viewer URL:

<https://scottishforestry.maps.arcgis.com/apps/webappviewer/index.html?id=0d6125cfe892439ab0e5d0b74d9acc18>

⁴ Scottish Forestry Native Woodland Survey of Scotland: Glossary of Terms; URL: [Main Title \(forestry.gov.scot\)](https://www.forestry.gov.scot/)

Native Woodland – woods where the canopy cover is composed mainly of native species (i.e., over 50%).

Nearly Native Woodland - where native species make up between 40% and 50% of the canopy. These are woods that could have potential to be converted into native woodlands by altering their species mix.

Open Land Habitat – areas with <20% canopy cover of trees and shrubs adjoining a native woodland.

1. Native woodland
2. Nearly-native woodland
3. Open land habitat
4. Plantations on Ancient Woodland Sites (PAWS)

An area of 0.08 ha of broadleaved located between Towers 5 to 6 as shown on **Figure 14.2 (EIAR Volume 3a)** has been identified as native woodland classification.

There are no formal environmental woodland designations present for the conifer woodland area.

The **Plates 3.1 to 3.5** show the variable woodland condition impacted by the OHL OC between Tower locations 1 and 6. The predominant tree species is Sitka spruce of variable age class as a result of recent woodland restructuring management by the landowner.

The Sitka spruce has been planted as commercial tree crop and varies from semi-mature (circa. 25 years old) to young plantation (circa. 12 years old), with integrated open ground.

The terrain ranges from a mild incline to steep edge boulders and deep depressions. The semi-mature tree crop areas have been assessed as being tree retentions from the previous clearfell crop rotation. There is minimal harvestable timber within this section of OC.

PAWS - Plantations on Ancient Woodland Sites. These are surveyed in the NWSS where they are recorded in the Scottish ancient woodland inventory (SAWI). These woodlands appear to have originated through natural regeneration sometime before the mid-19th century, but were later converted to planted woods.



Plate 3.1: Coordinates: 208863.7, 719263.5 south facing.



Plate 3.2: Coordinates: 208092, 718248 facing east.

Plate 3.3 shows the mature SS compartment (on left) between Towers 5 and 6. The predominant tree species is Sitka spruce at a mature age, surrounded by the river Array and its contributors. There is some windblow within this compartment. The terrain is generally uneven, with wet ground conditions throughout and areas of wet bog.

Timber production is limited due to the variable tree crop between Towers 1 and 6, with only small areas of harvestable timber. The measured standing timber volume ranges from approximately 100 m³ to 450 m³ per hectare⁵. There is an area of open ground and some clusters of mixed riparian broadleaves, species include birch, alder and willow. The OC will be narrowed to a width 60 m or less where possible for the greater retention of the broadleaf trees.



Plate 3.3: Coordinates: 208986.1, 718246.4 Facing south east.

⁵ Forestry Commission (Scottish Forestry) Forest Mensuration; A handbook for practitioners (2006)

Reference to the OHL forestry landscape assessment documents as shown on **Figures 14.1 and 14.2 (EIAR Volume 3a)**, identifies the woodland exposure to windthrow and includes proposed management felling coupes to achieve suitable woodland windfirm boundaries of least impact to the forest landscape.

The total area of management felling proposed is 3.29 ha of commercial conifer woodland. The felling of these areas is subject to Landowner agreement and by method of Scottish Forestry felling licence approval or Long-Term Forest Plan formal amendment ⁶.



Plate 3.4: 209100, 718094. Facing north.

6. Windthrow Risk Impact

Most of the site lies on soil classified as peaty gleys, with some pockets of peat present sporadically around the site.

⁶ This felling is not included within the scope of the Proposed Development (for the purpose of the application for consent under S37 of the Electricity Act 1989). This additional 'management felling' would be subject to a requirement for separate felling licence approval from Scottish Forestry

The woodland site affected by the Proposed Development has a 'Detailed Aspect Method of Scoring' (DAMS)⁷ windthrow hazard class score ranging between 13 and 19, classified as moderately to highly exposed. The local climate is classified as cool and wet.

These factors suggest that a moderate range of tree species can be grown on site.

As detailed in **Section 3** of this report and shown on **Figures 14.1-14.2 (EIAR Volume 3a)**, the management felling coupes of the mature conifer woodland have been proposed to achieve suitable woodland windfirm boundaries.

No impact of windthrow risk will be created by the removal of the young conifer plantation areas within the OHL OC and access track corridors.

A minimal impact of windthrow has been assessed for the native broadleaf woodland areas, due to their location, size and structure.

7. Woodland Management Impact

The OHL alignment will create additional challenges for the future management of the forest as it dissects existing management coupes and introduces an electrical hazard. The constraint associated with the electrical hazard will be reduced by regular maintenance of the OC, which will avoid the incidences of "Red Zone" trees⁸.

The OHL alignment crosses the forest road network at either approximately 45 or 90 degrees and will be built to the regulatory safe height clearances above forest roads/access tracks, which will reduce the hazard in respect of future timber haulage.

The OHL alignment may be restrictive to future in-forest machinery access. The requirement for dedicated forestry machine OHL crossing points will be discussed with the Landowner 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 permanently remove existing mature and young conifer woodland with an area of broadleaf woodland from the OC. This will reduce the forestry restructuring/planting land available within the woodland property area, as the OC will be maintained clear of trees.

During the construction phase, a level of disruption will be created for the undertaking of routine forestry management activities by the Landowner on the woodland property. This will be project managed through communication and agreement with the affected stakeholders.

8. Mitigation Opportunities

A reduced OC width of 60 m has been assessed for the areas of native broadleaf woodland. Prior to the construction phase these as well as the access track areas will be assessed for further selective felling to identify if greater tree retention can be achieved. This will be dependent on the requirements of the development project and in particular the safety of OHL wiring operations.

⁷ Detailed Aspect method of Scoring (DAMS) Ref. Forest Research, "Forest Gales software programme" and Forestry Commission Leaflet 85 "Windthrow Hazard Classification"

⁸ 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 functioning of the new OHL infrastructure. Opportunities will be assessed for woodland replanting within the operational corridor, the identification of suitable areas cannot be guaranteed due to the requirement of maintaining the safe energisation of the OHL. Reference to **Section 9** below will fully mitigate the operational corridor woodland removal area by replanting the area quantity (hectares) of woodland removed.

The management felling areas will be replanted by the Landowner, in-line with the Scottish Forestry felling licence regulations of the area felled must be replanted.

9. Woodland Removal Impact

Item	Woodland Type	Area
OHL	Mixed age conifer plantation	8.38 ha
	Mature conifer tree crop	0.38 ha
	Native broadleaf woodland	0.18 ha
Access Track Corridor	Young conifer plantation	0.94 ha

Compensatory Planting Area	Mixed conifer or mixed broadleaves	9.88 ha
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Total Loss of Woodland Area		9.88ha
Total Compensatory Planting Area		9.88 ha
Total Net Loss of Woodland Area		0 ha

Item	Woodland Type	Area
Management Felling	Mature conifer tree crop	3.29 ha
Replanting/Restocking	Predominantly conifer	3.29 ha
Net Loss of Woodland Area		0.0 ha

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 OC area and will be in accordance with the Scottish Government's Control of Woodland Removal Policy of no net loss of woodland.

Creag Dhubh to Inveraray 275kV Connection

Environmental Impact Assessment

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Overhead Line (OHL) Woodland Report

Property: Three Bridges Forest

May 2022



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1. Introduction

This Technical Appendix (TA) presents information relevant to the Creag Dhubh to Inveraray 275 kV overhead line (OHL) Connection. It should be read in conjunction with the **Volume 2 – EIA Report** specifically **Chapter 11: Forestry**, for full details of the Proposed Development.

Scottish and Southern Electricity Networks (SSEN) Transmission, hereafter referred to as ‘the Applicant’, owns and maintains the electricity transmission network across the north of Scotland. Due to the growth in renewable electricity generation in the north and north-east of Scotland, upgrade of the transmission network is required in order to provide the necessary increase in transmission capacity.

The Applicant is proposing to apply for consent under Section 37 of the Electricity Act 1989 to construct and operate a 9 kilometre (km) double circuit 275 kV OHL, supported by lattice steel towers between a proposed substation at Creag Dhubh and a connection point on the recently constructed Inveraray to Crossaig 275 kV circuit and associated temporary diversions. The location of the Proposed Development is shown in **Figure 14.1 (EIAR Volume 3a)**.

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 landholdings. The landholding property boundaries are identified in **Figure 14.1 (EIAR Volume 3a)**.

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

The Three Bridges forest is under private ownership and is located approximately 5 km north west of the village of Inveraray **Figure 14.1 (EIAR Volume 3a)**. The woodland property is a large area of commercial conifer woodland, with an existing forest road infrastructure. The property area is located west of the A819 public road.

The property is well serviced by hard metalled forest roads from the A819 public road through the main commercial conifer woodland areas.

The main vehicle access point is located at national grid reference ‘NN 088 124’. There is a timber bridge over one of the contributors to river Array, it is suitable for timber lorries and recent bridge inspection report is available.

4. Development Requirements

4.1 275kV Overhead Line

With reference to **Figure 14.1 (EIAR Volume 3a)**, the sections of OHL applicable to the Three Bridges Forest property are from Tower 34 just outside of the property to boundary on the south to Tower 26 north of the property boundary.

The 275kV OHL standard tower dimensions for the project have a width of 17 m at the widest part (crossarm) of the tower i.e., from outside conductor to outside conductor, in addition to this the safety vicinity zone from each conductor is a 4 m radius around the conductor.

The OHL infrastructure and minimum safety clearance distance is therefore 25 m (12.5 m either side of the OHL centreline) and this has been utilised to calculate the area of the operational corridor (OC) 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 OC. The Applicant defines the area in which it has rights to remove woodland for the purposes of creation of new 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 OHL, resulting in a supply outage¹. 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. Standard falling distance for a mature conifer tree considered to be 30 m. 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 14.2 (EIAR Volume 3a)** has been based on the likely height of the woodland at maturity and therefore, varies in width according to the woodland type present.

The future plans of landowner woodland restructuring (clearfell and replant) have been reviewed.

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 85 m (42.5 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.

4.2 Access Track Route Design

The Three Bridges commercial conifer forest is serviced from the A819 public road by well-constructed hard metalled forest roads, regularly used for timber haulage. These forest roads will form part of the main vehicle access route for the Proposed Development as shown on **Figure 14.2 (EIAR Volume 3a)**, and will be subject to maintenance and upgrade works as part of the construction work scope. The existing forest roads will be utilised during the forestry works.

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

Sections of new access track **Figure 14.2 (EIAR Volume 3a)** are required to be built as part of the construction work scope, to service the OHL section Towers 1 to 6. Additional tracks to the 5e1 compartment of mature oaks in the gully to allow rigging and extraction each side of the gully. Temporary access tracks are required outside the OHL operational corridor.

The access track new build corridor width required to be cleared through woodland is 20 m wide (10 m either side of centreline) **Figure 14.2 (EIAR Volume 3a)**, but will be assessed in situ for further tree retention

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) FISA 804 (ukfisa.com)

suitability. This will increase the impact of woodland removal along new build access track routes that are outside the OHL OC.

Stump removal and residue mulching 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

The property is situated on the west side of the A819 public road as shown on **Figure 14.2 (EIAR Volume 3a)**. The woodland area is impacted by the Proposed Development from Tower 34 just south of the boundary to Tower 26 just north west of the boundary as shown on **Figure 14.2 (EIAR Volume 3a)**.

The woodland area impacted by the Proposed Development is an area of commercial conifer woodland with a small area of mixed riparian broadleaf woodland. The woodland is broken up by areas of open ground integrated throughout. The conifer area has undergone significant woodland restructuring in recent years, which is continuing by the landowner through the Long-Term Forest Plan (LTFP). LTFP maps have been drafted by the landowner, as part of the woodland restructuring management strategy for the property. The woodland management regime is clear fell and replant, with the predominant tree species being Sitka spruce *Picea sitchensis*. The conifer age class ranges from young restock plantation (circa. 4 years) to mature woodland (circa. 72 years) and all of plantation origin.

The woodland ground conditions are variable on podzol and peaty gley soils, with pockets of peat present sporadically around the site².

Although the landowner's LTFP felling phase and restock maps are due for review, the restructuring proposals have been reviewed during the OHL forestry landscape assessment as shown on **Figures 14.1 and 14.2 (EIAR Volume 3a)**.

A desk-based study of the woodland areas was conducted, utilising web based data provided by Scottish Forestry³ and referencing the Scottish Government's Ancient Woodland Inventory, to identify current woodland environmental designations and classifications.

The Scottish Forestry Map Viewer provides spatial data on the Native Woodland Survey of Scotland and classifies the woodland types into four categories⁴:

² Scottish Government's Scotland's soils website <https://soils.environment.gov.scot/>

³ Scottish Forestry Land Information Search URL: https://map.environment.gov.scot/LIS_Agri/Agri.html

Scottish Forestry Map Viewer URL:

<https://scottishforestry.maps.arcgis.com/apps/webappviewer/index.html?id=0d6125cfe892439ab0e5d0b74d9acc18>

⁴ Scottish Forestry Native Woodland Survey of Scotland: Glossary of Terms; URL: Main Title (forestry.gov.scot)

Native Woodland – woods where the canopy cover is composed mainly of native species (i.e., over 50%).

Nearly Native Woodland - where native species make up between 40% and 50% of the canopy. These are woods that could have potential to be converted into native woodlands by altering their species mix.

Open Land Habitat – areas with <20% canopy cover of trees and shrubs adjoining a native woodland.

PAWS - Plantations on Ancient Woodland Sites. These are surveyed in the NWSS where they are recorded in the Scottish ancient woodland inventory (SAWI). These woodlands appear to have originated through natural regeneration sometime before the mid-19th century, but were later converted to planted woods.

1. Native woodland
2. Nearly-native woodland
3. Open land habitat
4. Plantations on Ancient Woodland Sites (PAWS)

An area of 1.43 ha of broadleaved located between towers Tower 34 and Tower 30 as shown on **Figure 14.2 (EIAR Volume 3a)** has been identified as native woodland classification.

A section between Towers 31 and 32 is on the Ancient Woodland Inventory identified as ancient woodland, however to be classed as ancient woodland oak woodland needs to be around 400 years old, but the trees in this section appear around 100 years old, this also supported by the analysis of historical maps and as a result will be considered hereafter as Native Woodland instead.

The **Plates 3.1 to 3.8** show the variable woodland condition impacted by the OHL OC between Tower locations Tower 34 and Tower 26. The predominant tree species is Sitka spruce of around 39 years old.

The Sitka spruce has been planted as commercial tree crop and varies from young (circa. 4 years old) to mature plantation (circa. 40 years old), with integrated open ground and some checked areas due to ground conditions.

The terrain is uneven with a series of knolls, with some steeper hilltops averaging around 270m elevation. The pockets of mature tree crop areas within the recent clear fell have been assessed as being Long Term Retention (LTR). There is minimal harvestable timber within this section of OC.



Plate 3.1 shows the mature Sitka Spruce (SS) compartment between Towers 28 and 27. The predominant tree species is Sitka spruce at a mature age, all compartments are fairly uniform, see **Plate 3.2**. There is some windblow within these compartments. The terrain is generally uneven, with wet ground conditions throughout and areas of wet bog. The measured standing timber volume is approximately 340 tons per hectare⁵.

⁵ Forestry Commission (Scottish Forestry) Forest Mensuration; A handbook for practitioners (2006)



The section of New Woodland Creation compartments, planted under the FGS grant scheme, Ref No: 18FGS31919, which includes a Native Broadleaf Scheme. **Plate 3.4** also shows the section under Ancient Woodland Inventory (AWI).



Plate 3.4: Coordinates: 208089, 712113 facing north.

The upland oakwood, although identified in the AWI as ancient is only around 100 years old this supported by the historical maps. This riparian woodland consist mostly of mature oak, on extremeley steep banking. A large number of standing deadwood is present in the compartment. The OC will be removing an area of 0.03 ha.



Plate 3.5: Coordinates: 208127.8, 712363.8 facing south.

The compartment between the Towers 32 and 33 is a largely SS compartment, 35 years old. Tree height slightly varies in height, but an estimated 300t/ha volume are expected to be produced from felling. There is a large area (0.84ha) of wet boggy ground with checked SS on it as well as pockets of broadleaves (Alder and Birch) throughout.



Plate 3.6: Coordinates: 208012.9, 711685.8 facing north.



There is a section of riparian woodland, primarily consisting of a singular row of mature trees, mostly oak. The OC will be removing an area of 0.14 ha.

Reference to the OHL forestry landscape assessment documents **Figures 14.1-14.2 (EIAR Volume 3a)**, identifies the woodland exposure to windthrow and includes proposed management felling coupes to achieve suitable woodland windfirm boundaries of least impact to the forest landscape.

The total area of management felling proposed is 11.77 ha of commercial conifer woodland. The felling of these areas is subject to Landowner agreement and by method of Scottish Forestry felling licence approval or Long Term Forest Plan formal amendment⁶.

6. Windthrow Risk Impact

The site lies on soils classified as podzols or peaty gleys and pockets of peat present sporadically around the site.

⁶ This felling is not included within the scope of the Proposed Development (for the purpose of the application for consent under S37 of the Electricity Act 1989). This additional 'management felling' would be subject to a requirement for separate felling licence approval from Scottish Forestry

The woodland site affected by the Proposed Development has a 'Detailed Aspect Method of Scoring' (DAMS)⁷ windthrow hazard class score around 13-15, classified as moderate. The site has a warm, moderately exposed and moist climate. The soils are very moist moisture status and poor nutrient status

As detailed in **Section 3** and shown on **Figures 14.1-14.2 (EIAR Volume 3a)**, the management felling coupes of the mature conifer woodland have been proposed to achieve suitable woodland windfirm boundaries.

No impact of windthrow risk will be created by the removal of the young conifer plantation areas within the OHL OC and access track corridors.

7. Woodland Management Impact

The OHL alignment will create additional challenges for the future management of the forest as it dissects existing management coupes and introduces an electrical hazard. The constraint associated with the electrical hazard will be reduced by regular maintenance of the OC, which will avoid the incidences of "Red Zone" trees⁸.

The OHL alignment crosses the forest road network at either approximately 45 or 90 degrees and will be built to the regulatory safe height clearances above forest roads/access tracks, which will reduce the hazard in respect of future timber haulage.

The OHL alignment may be restrictive to future in-forest machinery access. The requirement for dedicated forestry machine OHL crossing points will be discussed with the Landowner 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 permanently remove existing mature and young conifer woodland with an area of broadleaf woodland from the OC. This will reduce the forestry restructuring/planting land available within the woodland property area, as the operational corridor will be maintained clear of trees.

During the construction phase, a level of disruption will be created for the undertaking of routine forestry management activities by the Landowner on the woodland property. This will be project managed through communication and agreement with the affected stakeholders.

8. Mitigation Opportunities

A reduced OC width of 60 m has been assessed for the areas of native broadleaf woodland. Prior to the construction phase these areas as well as the access track will be assessed for further selective felling to identify if greater tree retention can be achieved. This will be dependent on the requirements of the development project and in particular the safety of OHL wiring operations.

The OC woodland removal area is required for the construction and functioning of the new OHL infrastructure. Opportunities will be assessed for woodland replanting within the OC, the identification of suitable areas cannot be guaranteed due to the requirement of maintaining the safe energisation of the OHL. Reference to **Section 9** below, will fully mitigate the OC woodland removal area by replanting the area quantity (hectares) of woodland removed.

⁷ Detailed Aspect method of Scoring (DAMS) Ref. Forest Research, "Forest Gales software programme" and Forestry Commission Leaflet 85 "Windthrow Hazard Classification"

⁸ 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 management felling areas will be replanted by the Landowner, in-line with the Scottish Forestry felling licence regulations of the area felled must be replanted.

9. Woodland Removal Impact

Item	Woodland Type	Area
OHL	Mature conifer tree crop	5.28 ha
	Young Conifer	1.44 ha
	Native broadleaf woodland	1.34 ha
Access Track Corridor	Mature conifer plantation	0.66 ha
	Broadleaf woodland	0.25 ha

Compensatory Planting Area	Mixed conifer or mixed broadleaves	8.97 ha
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Total Loss of Woodland Area	Mixed conifer and mixed broadleaves	8.97 ha
Total Compensatory Planting Area	Mixed conifer or mixed broadleaves	8.97 ha
Total Net Loss of Woodland Area		0 ha

Item	Woodland Type	Area
Management Felling	Mature conifer tree crop	11.77 ha
Replanting/Restocking	Predominantly conifer	11.77 ha
Net Loss of Woodland Area		0 ha

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 OC area and will be in accordance with the Scottish Government's Control of Woodland Removal Policy of no net loss of woodland.