Scottish & Southern Electricity Networks

TRANSMISSION

Annex I - Forestry

September 2022

Woodland Report

September 2022

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1. Introduction

This Woodland Report has been prepared to identify potential impacts on the woodland and wider landscape as a result of the proposed An Suidhe Substation and accompanying infrastructure located within the Red Line Boundary (RLB) (hereby referred to as 'the Proposed Development') and the associated Inveraray to Crossaig overhead line (OHL) tie-in (hereby referred to as 'the Associated Development'). The RLB site is located north-east of Claonairigh at national grid reference point 'NN047055' on Forestry and Land Scotland (FLS)-managed ground, within a commercial conifer plantation underforestry management.

The Environmental Appraisal (EA – to which this report forms part of Annex I) has been carried out to determine the potential impacts on the woodland and natural resource as a result of the Proposed and Associated Developments (collectively referred to as 'the Project'). The EA sets out mitigation measures and offsetting for any loss of woodland and ecologically important habitats. This will involve proposals for long-term retention of certain areas and compensatory planting.

The objectives of this report are to:

- Describe the woodland baseline conditions on-site and in the immediate surrounding areas;
- Identify the potential windthrow risk in connection with the Proposed and Associated Developments and their components, including tree felling within the substation site, adjacent to the access tracks, and for the OHL alignment
- Identify the short and long-term potential impacts to the commercial woodland;
- Describe any mitigation measures proposed to address likely impacts relating to windthrow risk; and
- Identify the required area quantity for compensatory planting.

This report is supported by:

- **Figure 1:** An Suidhe Forestry Project Felling OS Map
- **Figure 2:** An Suidhe Forestry Project Felling Aerial
- **Figure 3:** An Suidhe Access Track Map (Location and Context)
- **Figure 4:** An Suidhe Access Track Aerial (Location and Context)
- **Figure 5:** An Suidhe Plates

2. Site Location

The site location plan, including the proposed An Suidhe Substation site, the wider RLB (which encompasses additional land to facilitate the build of ancillary works) and the OHL alignment corridor, is shown in **Figures 1** to **4.** In terms of the Proposed Development, the substation site (platform area) covers a total land area of 1.3 ha and the RLB 7.3 ha (including the access track) and a Temporary Works Area of 0.7 ha). The existing Inveraray to Crossaig OHL currently runs 500 m south of the site and will be aligned to connect to the proposed new substation. The Associated Development (the OHL tie-in operational corridor, OC) covers 11.2 ha.

The existing commercial forestry access track runs through the RLB site, starting at the existing bellmouth at the A83 public road (national grid reference point 'NN044041'). The track runs north east from the A83 before turning north at the existing substation towards the Proposed Development. The stretch of existing track which is proposed to service the new substation covers a total length of approximately 1.7 km. Furthermore, the Proposed Development will involve the construction of a new 174 m long permanent access track which will service the substation, whereas the Associated Development will require the construction of a new Y-shaped, 126 m and 154 m permanent access track (for location and context, see **Figures 3** and **4**).

The RLB site, including the entire extent of the substation site, is located within a large commercial conifer plantation, the majority of which has been harvested and restocked with conifers (primarily Sitka spruce, *Picea sitchensis*). The surrounding landscape comprises semi-mature conifer plantations, pre-thicket and recently felled, mounded, and restocked areas. Two watercourses run adjacent to the site: Douglas Water to the north east, and Allt Tom a' Challtuinne to the north west.

3. The Project

The Proposed Development will be subject to an application under the Town and Country Planning (Scotland) Act 1997 (as amended), whilst the Associated Development will be subject of an application under section 37 of the Electricity Act 1989.

3.1 Proposed Development

The Proposed Development layout is shown in **Figures 1** to **4** and comprises the following:

- A substation platform approximately 1.3 ha at a height of 176 AOD;
- Gas insulated Switchgear (GIS) building, maximum height 22 m and single storey control building annex;
- 275/132 kV super grid transformer (SGT), rated at 480 MVA located in a ventilated building of maximum height 16 m;
- Two gantries and electrical equipment/downleads to connect the OHL and the proposed substation;
- A Temporary Works Area (TWA) adjacent to the Proposed Development site, of approximately 0.69 ha.;
- Diesel generator housed in a building;
- Borehole for water;
- Turning and parking areas;
- Use of existing forestry access track with some upgrades, approximately 1.7 km in length;
- Construction of a new access track, approximately 174 m long;
- A 2.4 m high security fence of palisade construction around the substation platform perimeter;
- Deer fence around new areas of woodland planting;
- Landscape planting to screen the Proposed Development and provide biodiversity enhancement; and
- Foul and surface water drainage.

3.2 Associated Development

The Associated Development layout is shown in **Figures 1** to **4** and comprises the following:

- Construction of six new steel lattice towers to support the realigned overhead line which will connect into the new substation;

- Two downleads from the realigned overhead line into the substation;
- Tree and vegetation clearance where required;
- Construction of three new permanent access tracks leading to the three northern most towers:
- One of approximately 164 m;
- One of approximately 109 m; and
- One of approximately 14 m.
- Temporary overhead line diversions during construction; and
- Dismantling of the existing overhead line section connecting the existing 132kV substation which comprises seven redundant towers and associated cabling.

4. Woodland Characteristics

4.1 Substation Site /Project Design Layout Area

The RLB site (comprising the Proposed Development) covers a total of 7.3 ha (of which 0.7 ha comprises the Temporary Works Area) of mainly harvested and restocked commercial conifer plantation with integrated open ground. Age classes vary throughout, with 2-3-year-old Sitka spruce and 5-8-year-old Sitka spruce and pine mix mound restock within, and directly south of, the development site. Immediately south east of the OHL /tie-in OC, bordering the existing access track, is an area of pre-thicket of approximately 6-8 years. Within this area, the principal tree species is Sitka spruce of variable age class and growth rates. The wet boggy ground conditions in areas across the RLB site has impacted tree growth rates and created 'checked' Sitka spruce (areas of poor quality/stunted growth timber).

To the north east of the RLB, encompassing the north eastern part of the Associated Development tie-in OC, is a deer fenced plantation of 10-year-old Douglas fir *Pseudotsuga menziesii* and Scots pine *Pinus sylvestris,* with silver birch *Betula pendula*, willow *Salix sp.* and rowan *Sorbus aucuparia* regeneration present. This crop is of fairly poor quality due to wet ground conditions and exposure to browsing. On the drier, elevated sloped ground to the west and southwest of the RLB, encompassing the south eastern part of the Associated Development tie-in OC, lies a semi-mature (30-35-year-old), un-thinned Sitka spruce plantation of approximately 13 ha. This area is connected to and forms part of a larger Sitka spruce woodland block. Wet, peaty pockets are evident and as a result timber quality varies throughout. An estimate of harvestable tree volume was carried out during the site walkover survey, identifying a standing tree volume of around 450 m^3 per hectare in the semi-mature Sitka spruce crop. A more in-depth mensuration measure will be conducted at a later stage.

The Inveraray to Crossaig Reinforcement OHL currently connects to the existing An Suidhe substation approximately 500 m south of the Proposed Development, and will, as part of the Associated Development, be aligned to tie-in to the new substation. An 85 m operational corridor will be cut through the 10-year old Douglas fir and Scots pine plantation and the 30-35-year-old Sitka spruce plantation as described above. The middle section of the corridor is partly encompassed by the RLB and runs through pre-thicket Sitka spruce and young Sitka and pine restock, part of which will be clear-felled for the Proposed Development and part of which will be clear-felled for the Associated Development.

The RLB encompasses part of the riparian woodland corridor established on the banks of Allt Tom a' Challtuinne, the watercourse running north west of the Proposed Development. Prior to construction works a further assessment of these trees will be undertaken to identify if greater retention can be achieved through selective felling. The assessment will be based on retaining broadleaved trees that aren't impacting the safe working and operations of the Project.

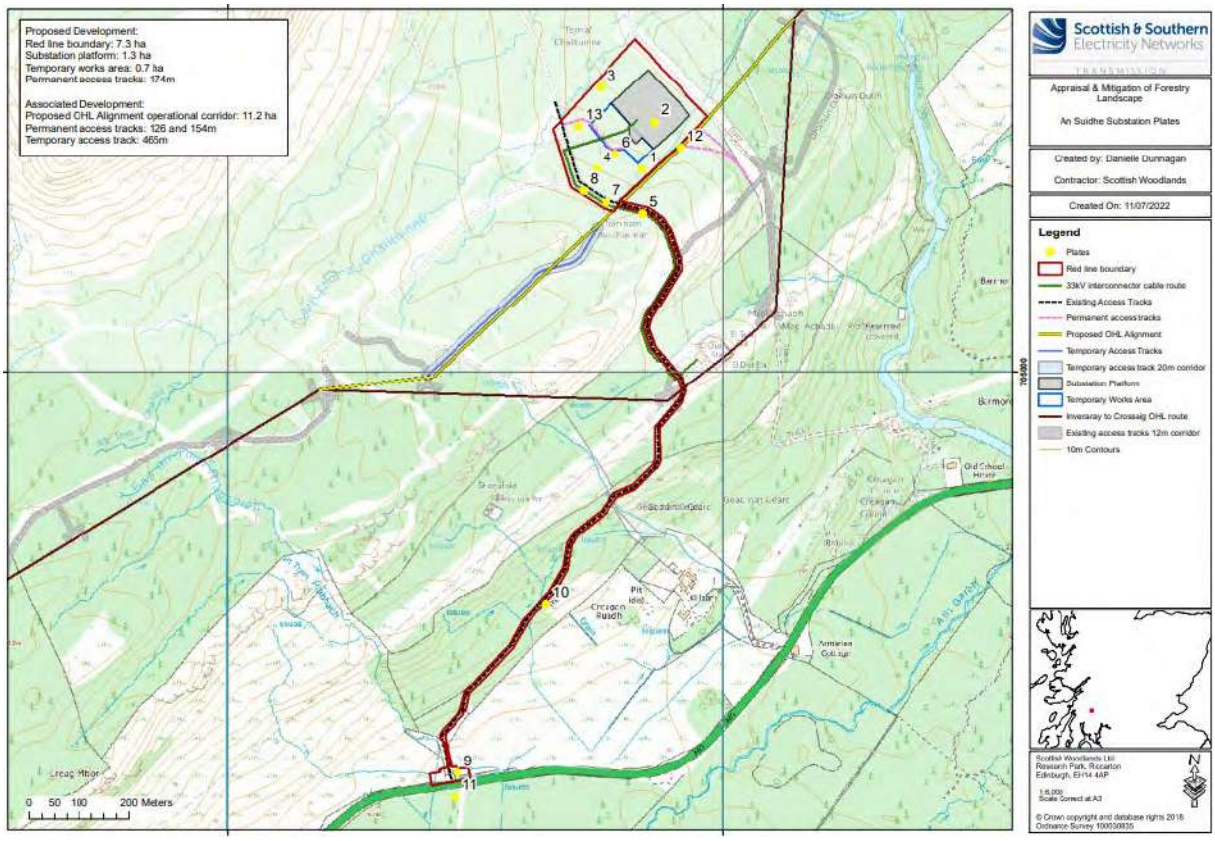

Figure 5 illustrates the location of the plates.

Plates 1 to **6** below illustrate the different woodland characteristics of the Project.

Plate 1 – View to the south east of Sitka spruce pre-thicket.

Plate 2 – View to the north east showing Douglas fir and Scots pine restock in deer enclosure.

Plate 3 – View to the north showing the riparian corridor.

Plate 4 – View to the south west shows semi mature Sitka spruce varying in growth rates.

Plate 5 – View to the north west shows semi mature Sitka spruce varying in growth rates.

Plate 6 – View to the north within proposed substation layout shows restock of varying ages classes (2-3-year-old to 5-6-year-old).

4.2 Existing Access Track Upgrade and Widening

Figures 3 and **4** show the approximate 1.7 km long access track upgrade route design from the existing bellmouth off the main road, to the start point of the access track new build section into the substation site. This track has been recently upgraded as part of the Inveraray to Crossaig OHL Reinforcement Project, however any regeneration (willow, birch) will be cleared (felled-to-waste or target pruned) to 10 m either side of the track centre line, as well as to 6 m height, to facilitate the construction phase of the Project. Approximately 30 m from the bellmouth sits a large, mature willow tree that will be retained but target pruned. There is also an area of approximately 0.06 ha of semi-mature to mature broadleaves present in the widened bellmouth (within the RLB). In a worst-case scenario this would all be felled; however, this area will be assessed further, and it is anticipated that some trees can be retained.

Plates 7 to **11** below show the woodland characteristics of the existing access track.

Plate 7 – View to the north west shows the block of semi-mature Sitka spruce by the existing access track at chainage 1.4 km from the bellmouth.

Plate 8 – View to the south west shows the block of semi-mature Sitka spruce by the existing accesstrack at chainage 1.5 km from the bellmouth.

Plate 9 – Shows view of mature willow circa 30 m from the bellmouth by the existing access track.

Plate 10 – View of broadleaves along the existing access track, looking south towards the A83 road.

Plate 11 – Existing bellmouth off the A83 road (also showing some of the broadleaves present here).

4.3 Access Track Construction (New Build Section)

Two sections of permanent new access tracks are proposed: a 126 m and 154 m of Y-shaped design to the south east of the substation site (to service the Associated Development), and a 174 m of Z-shaped track design to the west (to service the Proposed Development), connecting into the substation platform. The Y-shaped track transects through the Sitka spruce pre-thicket, on which tree cutting will have minimal windthrow effect, while the Z-shaped track transects through the 2-3year-old Sitka spruce restock encompassed by the RLB. As highlighted in **Figures 1** and **2**, a width of 20 m will be cleared to facilitate the construction of the new tracks (10 m either side of the track centre line). This applies to new tracks across the Project (i.e., both the Proposed and the Associated Developments). Approximately 0.33 ha of young spruce restock will be cleared for the Proposed Development track, and 0.12 ha of pre-thicket Sitka spruce for the Associated Development track.

Further, a 465 m long section of temporary access track will be constructed to service the Associated Development. This track is fully encompassed by the OHL tie-in OC, and no further tree felling/vegetation clearance is therefore required.

Plates 12 and **13** below show the current woodland characteristics of these two sections of new permanent access track.

Plate 12 – View to the south east shows the sections of pre-thicket Sitka spruce to be removed for the proposed new Y-shaped permanent access track which will service the Associated Development (126m and 154 m).

Plate 13 – View to the east shows the ground conditions where the proposed new S-shaped permanent access track (174 m) to service the Proposed Development will run through 2-3 year old Sitka spruce restock.

5. Windthrow Risk Impact Assessment

Most of the site lies on peaty gley soil, with wet pockets of peat and a high water table present throughout the site, affecting the growth rates of the crop and causing large areas of 'check'/failed growth. The ground conditions improve on the south western RLB boundary where a semi-mature Sitka spruce crop lies on sloped ground with more effective drainage. However, areas of wet and open ground are evident, again causing 'check'. Wetground in combination with a semi-mature crop could result in shallow rooting, which further highlights the need to management fell the semi-mature Sitka spruce crop to mitigate windthrow.

The woodland site to be removed for the Project has a 'Detailed Aspect Method of Scoring' (DAMS)[1] windthrow hazard score of 14 (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.

5.1 Substation Site / Project Design Layout Area

The windthrow risk impact of the main area of woodland removal for the Proposed Development is generally low, due to the woodland characteristics of young conifer plantation with areas of open ground. As the 2-3; 5-8; and 10-year-old spruce, fir and pine plantations are not yet susceptible to windthrow, no additional felling will be required to mitigate

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

windthrow in these areas.

In regard to the Associated Development, the semi-mature conifer woodland to be removed for the 85 m tie-in OC to the west/south west of the Proposed Development is classified as moderately to highly exposed. Accordingly, its removal would create an increased windthrow risk of moderate to high ofthe retained conifer woodland block. As no windfirm edges could be established within this crop, a wider management felling coupe has been identified (see **Figures 1** and **2**) with the aim of achieving a windfirm boundary to mitigate the windthrow risk. It is recommended that this full compartment is clear-felled (i.e. an additional 9.41 ha to the 3.56 ha requiring clear-felling as part of the Associated Development).

5.2 Existing Access Track Upgrade and Widening

The felling-to-recycle of broadleaf and conifer regeneration and target pruning or felling of larger trees required for the existing track upgrade has no windthrow risk impact.

5.3 Access Track Construction (New Build Section)

As previously mentioned, the new section of temporary access track which will service the Associated Development is fully encompassed by the 85 m-wide OHL tie-in OC which will be clear-felled. No windthrow risk has therefore been identified as a result of the clearance works for the temporary access track.

In terms of the new permanent access tracks to service the Project, the removal of areas of the thicket-stage conifer plantation for the proposed Y-shaped track would result in a low windthrow risk impact on any surrounding retained trees. Similarly, no windthrow risk would result from the removal of young conifer restock for the Z-shaped track.

6. Woodland Management and Landscape Impact

The required woodland removal (by clear-felling) areas of the Project, within the RLB and OHL tie-in OC would be permanently lost for future forestry restructuring/planting within the woodland property area, as it would become under the ownership and management of the Applicant. The long term impact of the Project on future forestry felling operations would be minimal, as a safe tree clearance from the sub-station and OHL infrastructure would be established. Also, the key forestry management access routes will not be restricted as a result of the Project.

The existing access track upgrade works and the construction of the new permanent access tracks will result in some woodland removal, however, the long-term impact would be beneficial creating an upgraded and new forest road infrastructure to service the wider woodland property for the future.

The wider landscape impact of the woodland removal for the Project has been considered. The site is positioned in a fairly shielded location and it has been identified that the required woodland removal in association with the recommended management felling area will have an improved effect on the visible landscape. This will be achieved by the removal of the isolated semi-mature commercial conifer woodland block on the hillside with the management felling area being replanted by the landowner in the future.

Plates 14 and **15** below show the views of the site from the A83 road and dwellings just north of the site.

Woodland replanting within the RLB area will provide further landscape mitigation, as referenced in Section7 of this report.

Plate 14 – View of the site from the A83 road.

Plate 15 – View of the site from nearby dwellings.

7. Mitigation Opportunities

The removal of woodland is required to facilitate the Project (construction, installation, and operation) and any ancillary works. Opportunities have been assessed for woodland replanting within the RLB site in the form of a tree planting design plan and as not to affect the functioning of the Project (see **Annex E Figure E4: Landscape Mitigation Plan**). The OHL tie-in OC will be left open or designated as improved grassland/wildflower meadow/low-growing shrubland as appropriate to ensure safe operation of the OHL.

Also, the felling areas and compensatory planting areas referenced in Section 10 of this report, would fully mitigate the potential impacts of woodland removal by achieving no net loss of woodland area.

The management felling area would be replanted by the Landowner, in-line with the Scottish Forestry felling licence regulations.

8. Woodland Removal Impact

8.1 Woodland Removal for Infrastructure

	Item	Woodland Type	Area (ha)
Proposed Development	RLB (including the substation platform, Temporary Works Area, new permanent and existing access track 20m corridor, , bellmouth, and 33 kV inter-connector cable 30m corridor	Mixed broadleaves at north west of the substation platform and at the bellmouth	0.15
		2-3- and 5-6-year-old Sitka spruce and pine mix plantation	3.6
Associated Development	OHL alignment corridor	Semi-mature Sitka spruce plantation	3.56
		10-year-old conifer mix plantation	1.62
		6-8-year-old Sitka spruce pre-thicket	0.61
		2-3- and 5-6-year-old Sitka spruce and pine mix plantation	0.76
	Permanent access track outwith Proposed OHL Alignment	6-8-year-old Sitka spruce pre-thicket	0.12

8.2 Compensatory Planting

	Compensating	Planting Proposal	Area (ha)
Proposed Development	RLB (including the substation platform, Temporary Works Area, new permanent access track 20m corridor, existing access track, bellmouth, and 33 kV inter-connector cable 30m corridor	Mixed broadleaves; mixed non-commercial conifers; commercial conifer plantation	3.75
Associated Development	OHL alignment corridor	Mixed broadleaves; mixed non-commercial conifers; commercial conifer plantation	6.55
	Permanent access track outwith Associated OHL Alignment corridor	Mixed broadleaves; mixed non-commercial conifers; commercial conifer plantation	0.12

8.3 Woodland Removal Impact of Infrastructure

	Total Loss of Woodland Area	Total On-site Compensatory Planting Area	Total Off-site Compensatory Planting Area	Total Net Loss of Woodland Area
Proposed Development	3.75	2.14	1.61	0.00
Associated Development	6.67	0.00	6.67	0.00
			Total Net Loss of Woodland Area	0.0 ha

8.4 Woodland Removal for Management Felling

	Item	Woodland Type	Area
Associated Development	Management Felling	Semi-mature Sitka spruce plantation	9.41 ha
	Replanting/Restocking On-Site	Commercial conifer plantation	9.41ha
		Total Net Loss of Woodland Area	0.0 ha

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

9. Compensatory Planting

A combination of on-site and off-site compensatory planting is to be undertaken to replace the total area of woodland removal for the Project. This will be carried out in accordance with the Scottish Government's Control of Woodland RemovalPolicy[2] to achieve no net loss of woodland. The on-site planting will fall within the RLB site on land to be acquired by the Applicant and the required off-site planting will be agreed with a third party at a suitable planting site. The compensatory planting will be undertaken in-line with the construction work programme and following completion of the Project. For more information see the **Compensatory Planting Management Strategy** which also forms part of **Annex I**.

[2] Scottish Government Publication, provides policy direction for decisions on woodland removal in Scotland; URL: The Scottish Government's Policy on Control of Woodland Removal (forestry.gov.scot)

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Proposed Development:
Red line boundary: 7.3 ha
Substation platform: 1.3 ha
Temporary works area: 0.7 ha
Permanent access tracks: 174m

Associated Development:
Proposed OHL Alignment operational corridor: 11.2 ha
Permanent access tracks: 280m
Temporary access track: 465m

Deer fenced 10-year-old Douglas fir &Scots pine within Proposed OHL Alignment 85m operational corridor

Open ground within the Red Line Boundary, including the exisiting access track is 1.79 ha

Semi mature and mature mixed broadleaves adjacent to the watercourse (willow, alder, birch)

Sitka spruce and pine mix plantation of 2-3 and 5-6-years-old within the Red Line Boundary

Sitka spruce and pine mix plantation of 2-3 and 5-6-years-old within the Proposed Development permanent access track 20m corridor

Sitka spruce and pine mix plantation of 2-3 and 5-6-years-old within the Proposed OHL Alignment 85m operational corridor

Semi-mature 30-35-year-old Sitka spuce as part of management felling outwith the Proposed OHL Alignment 85m operational corridor

Open ground within the Proposed OHL Alignment operational corridor is 4.65 ha

Semi-mature 30-35-year-old Sitka spuce within the Proposed OHL Alignment 85m operational corridor

Block of woodlands has been cleared as part of the Inveraray to Crossaig OHL Reinforcement

Pre-thicket Sitka spruce of 6-8-years-old within Proposed OHL Alignment 85m operational corridor

Pre-thicket Sitka spruce of 6-8-years-old within the Associated Development permanent access track 20m corridor

1.62 ha
0.09 ha
3.27 ha
0.33 ha
0.76 ha
0.12 ha
0.61 ha
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3.56 ha

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Appraisal & Mitigation of Forestry Landscape

An Suidhe Substation Proposed and Associated Development Felling

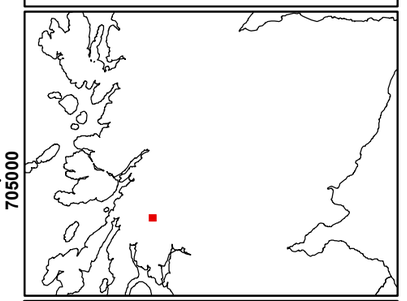
Created by: Danielle Dunnagan

Contractor: Scottish Woodlands

Created On: 11/07/2022

Legend

- Temporary Peat Storage Area
- Mixed broadleaf
- Sitka spruce restock of 2-3 & 5-6 years-old
- Pre-Thicket Sitka Spruce
- Deer fenced Douglas fir & Scots pine restock
- 30-35-year-old Sitka spruce in OC
- Management felling of 30-35 year Sitka spruce
- Red line boundary
- 33kV interconnector cable route
- 33kV interconnector cable route 10m corridor
- Existing Access Tracks
- Permanent access tracks
- Permanent access track 20m corridor
- Proposed OHL Alignment
- Temporary Access Tracks
- Temporary access track 20m corridor
- Substation Platform
- Temporary Works Area
- Proposed 85m operational corridor
- Inveraray to Crossaig OHL route
- Inveraray to Crossaig existing access Ttracks
- Existing access tracks 12m corridor
- Windblow
- 10m Contours



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Edinburgh, EH14 4AP

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Semi mature and mature mixed broadleaves adjacent to the watercourse (willow, alder, birch)

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Sitka spruce and pine mix plantation of 2-3 and 5-6-years-old within the Proposed OHL Alignment 85m operational corridor

Semi-mature 30-35-year-old Sitka spuce as part of management felling outwith the Proposed OHL Alignment 85m operational corridor

Open ground within the Proposed OHL Alignment operational corridor is 4.65 ha

Pre-thicket Sitka spruce of 6-8-years-old within the Associated Development permanent access track 20m corridor

Pre-thicket Sitka spruce of 6-8-years-old within Proposed OHL Alignment 85m operational corridor

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An Suidhe Substation Proposed and Associated Development Felling

Created by: Danielle Dunnagan

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- 30-35-year-old Sitka spruce in OC
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- 33kV interconnector cable route 10m corridor
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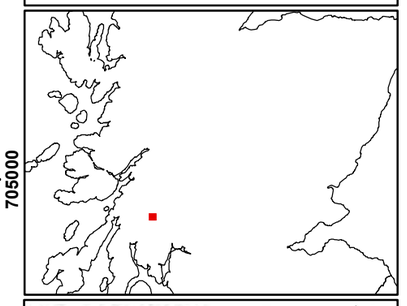

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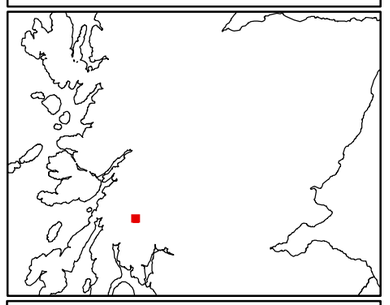

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Proposed Development:
Red line boundary: 7.3 ha
Substation platform: 1.3 ha
Temporary works area: 0.7 ha
Permanent access tracks: 174m

Associated Development:
Proposed OHL Alignment operational corridor: 11.2 ha
Permanent access tracks: 280m

0.09 ha
3.27 ha
0.33 ha
0.76 ha
0.61 ha
1.62 ha
0.12 ha
9.41ha
3.56 ha

Block of woodlands has been cleared as part of the Inveraray to Crossaig OHL Reinforcement

Block of woodlands has been cleared as part of the Inveraray to Crossaig OHL Reinforcement

Block of woodlands has been cleared as part of the Inveraray to Crossaig OHL Reinforcement

0.06 ha

0 45 90 180 Meters

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SCOTTISH WOODLANDS

Appraisal & Mitigation of Forestry Landscape

An Suidhe Substation Proposed and Associated Development Felling

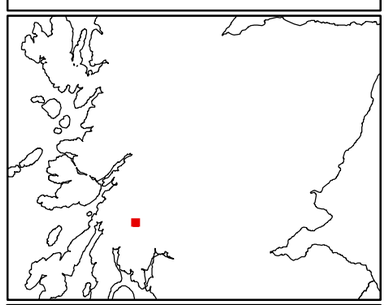
Created by: Danielle Dunnagan

Contractor: Scottish Woodlands

Created On: 04/07/2022

Legend

- Mixed broadleaf
- Sitka spruce restock of 2-3 & 5-6 years-old
- Pre-Thicket Sitka Spruce
- Deer fenced Douglas fir & Scots pine restock
- 30-35-year-old Sitka spruce in OC
- Management felling of 30-35 year Sitka spruce
- Red line boundary
- Temporary peat storage area
- 33kV interconnector cable route
- 33kV interconnector cable route 10m corridor
- Existing Access Tracks
- Permanent access tracks
- Permanent access track 20m corridor
- Proposed OHL Alignment
- Temporary Access Tracks
- Temporary access track 20m corridor
- Substation Platform
- Temporary Works Area
- Proposed 85m operational corridor
- Inveraray to Crossaig OHL route
- Inveraray to Crossaig existing access Ttracks
- Existing access tracks 12m corridor
- Windblow
- 10m Contours



Scottish Woodlands Ltd
Research Park, Riccarton
Edinburgh, EH14 4AP

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Scale Correct at A3

N

204000

205000

705000

705000

Proposed Development:
Red line boundary: 7.3 ha
Substation platform: 1.3 ha
Temporary works area: 0.7 ha
Permanent access tracks: 174m

Associated Development:
Proposed OHL Alignment operational corridor: 11.2 ha
Permanent access tracks: 126 and 154m
Temporary access track: 465m

3
13
2
12
6
4
1
8
7
5
10
9
11

0 50 100 200 Meters

204000

205000

SCOTTISH WOODLANDS

Appraisal & Mitigation of Forestry Landscape

An Suidhe Substation Plates

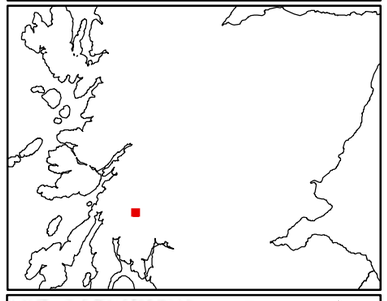
Created by: Danielle Dunnagan

Contractor: Scottish Woodlands

Created On: 11/07/2022

Legend

- Plates
- Red line boundary
- 33kV interconnector cable route
- Existing Access Tracks
- Permanent access tracks
- Proposed OHL Alignment
- Temporary Access Tracks
- Temporary access track 20m corridor
- Substation Platform
- Temporary Works Area
- Inveraray to Crossaig OHL route
- Existing access tracks 12m corridor
- 10m Contours



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Scottish & Southern Electricity Networks

An Suidhe Proposed Substation Development

Woodland Planting Management Strategy

August 2022

Contents:

1 Introduction

This Technical Appendix (TA) presents information relevant to the proposed An Suidhe Substation and associated connection to the existing Inveraray to Crossaig 275kV overhead line (OHL). It should be read in conjunction with the **EA Report** specifically **Chapter 5 Forestry** and **Chapter 2 Project Description,** for full details of the Project.

Scottish Hydro Electric Transmission plc ("the Applicant") who, operating and known as Scottish and Southern Electricity Networks Transmission ("SSEN Transmission"), own, operate and develop the high voltage electricity transmission system in the north of Scotland and remote islands.

The Applicant proposes to construct a new 275 kV electricity substation (hereby referred to as 'the Proposed Development'), with associated overhead line works (hereby referred to as 'the Associated Development') in the vicinity of the existing An Suidhe substation. The two developments are hereby collectively referred to as 'the Project'. The new substation will connect into the recently completed overhead line between Inveraray and Crossaig which is capable of operation at 275kV but at present is routed into the existing substation, so the overhead line requires to be realigned to connect into the new substation. The project will support the export of renewable energy generated within the Argyll area. The substation planform would cover an area of 1.3ha within a wider Proposed Development boundary of 7.3ha.

As detailed in **Chapter 5 Forestry,** the Project impacts a total area of 10.42 ha of woodland. Within this there is a small area of riparian woodland habitat that could potentially be retained for environmental benefits. The riparian corridor covers an area of approximately 0.77 ha, of which 0.09 ha is within the RLB area.

In-line with the Applicant's commitment to achieve no net loss of woodland for new Development Projects, the total area of woodland removal being 10.42 ha (with the potential to be reduced by 0.09 ha) for the Project will be replanted through the application of this Compensatory Planting Management Strategy.

2 Purpose of the Strategy

This report explains the management strategy that will be undertaken by the Applicant prior to and during the Project construction phase, to implement the replanting of the total area of woodland removed.

3 Woodland Planting Management Constraint

The Electricity Safety, Quality and Continuity Regulations 2002 (ESQCR, 2002)[1] specify safety standards to protect the public and consumers from danger of overhead electricity powerlines. These standards outline minimum safety clearances and the Distribution Network Operator's (DNO's) duty to maintain these safety clearances.

The regulations also contain requirements on quality and continuity of electricity supply to ensure an efficient and economic service to customers and consumers.

Further legislation arrived in 2006 with the ESQCR, 2006; Amendment[2] , which extended the above

[1] Electricity Safety, Quality and Continuity Regulations 2002 (ESQCR, 2002) URL: www.legislation.gov.uk/uksi/2002/2665/contents/made
[2] Electricity Safety, Quality and Continuity (Amendment) Regulations 2006 (ESQCR, 2006) URL: www.legislation.gov.uk/uksi/2006/1521/made

duties of the DNO to make their overhead powerlines resilient to the effect of major storms. This includes reducing the risk of falling trees and branch-wood of hitting the electricity network.

The result of this legislation is that the DNOs, in addition to maintaining the vegetation to minimum safety clearances, now must seek to achieve further clearances for trees which may be affected by storm weather conditions.

Due to the requirements of the ESQCR it is generally not feasible to replant woodland within the operational areas of the Project. Therefore, in order to replant the woodland removal area of the Project, 'off-site'[3] woodland planting must be implemented.

4 Compensatory Planting Scheme

The Applicant will implement the required woodland planting through the management of a Compensatory Planting Scheme. This management process is based on liaising and securing agreements with landowners that are located within the same Local Authority area as the Project for woodland planting of suitable bare land by the Applicant.

The Applicant is and will continue to undertake liaison with,

- Landowners who own the land where the proposed Project is to be located.
- 'Not for Profit' Organisations eg. Community Trusts, who own or have rights to areas of land and wish to plant woodland.
- Landowners within the Local Authority area of the proposed Project, who wish to plant woodland.

Through liaison with these landowners, areas of bare land suitable for woodland planting will be identified and whereby they would enter into a Compensatory Planting Scheme agreement with the Applicant. The total area of bare land secured for woodland would meet the total area of woodland removal of the Project.

On agreement with the landowner a formal woodland planting scheme design will be produced and submitted to Scottish Forestry[4] for consultation and approval.

Following completion of the approval process, the Applicant will undertake the woodland planting as per the scheme design and will maintain the newly planted area for the required period in-line with forestry industry best practice to ensure successful woodland establishment is achieved.

5 Reporting

After planting scheme approval is received from Scottish Forestry, the Applicant will formally report to the Planning Authority that the required woodland planting area has been achieved to meet the total woodland removal area of the Project and has secured no net loss of woodland.

[3] 'off-site' meaning alternative bare land areas suitable for woodland planting out-with the Development's operational area.

[4] Scottish Forestry - the Scottish Government agency responsible for forestry policy, support and regulations. URL: www.forestry.gov.scot

ICP SUDS Mean Annual Flood

Input

Return Period (years) 200 SAAR (mm) 2333 Urban 0.000
Area (ha) 0.200 Soil 0.500 Region Number Region 1

Results l/s

QBAR Rural 4.5
QBAR Urban 4.5

Q200 years 12.7

Q1 year 3.8
Q30 years 8.5
Q100 years 11.2

Summary of Results for 200 year Return Period (+46%)

Half Drain Time : 2226 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	175.027	0.027	0.0	0.2	0.2	59.8	O K
30 min Summer	175.036	0.036	0.0	0.4	0.4	78.8	O K
60 min Summer	175.047	0.047	0.0	0.6	0.6	103.6	O K
120 min Summer	175.062	0.062	0.0	0.8	0.8	135.4	O K
180 min Summer	175.072	0.072	0.0	1.0	1.0	157.6	O K
240 min Summer	175.080	0.080	0.0	1.1	1.1	175.1	O K
360 min Summer	175.092	0.092	0.0	1.2	1.2	202.3	O K
480 min Summer	175.101	0.101	0.0	1.2	1.2	223.1	O K
600 min Summer	175.109	0.109	0.0	1.3	1.3	239.8	O K
720 min Summer	175.115	0.115	0.0	1.3	1.3	253.7	O K
960 min Summer	175.122	0.122	0.0	1.4	1.4	268.0	O K
1440 min Summer	175.129	0.129	0.0	1.4	1.4	284.4	O K
2160 min Summer	175.136	0.136	0.0	1.5	1.5	299.6	O K
2880 min Summer	175.141	0.141	0.0	1.5	1.5	309.5	O K
4320 min Summer	175.149	0.149	0.0	1.6	1.6	327.9	O K
5760 min Summer	175.153	0.153	0.0	1.6	1.6	336.7	O K
7200 min Summer	175.155	0.155	0.0	1.6	1.6	340.2	O K
8640 min Summer	175.155	0.155	0.0	1.6	1.6	340.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	159.816	0.0	15.0	27
30 min Summer	105.584	0.0	23.7	42
60 min Summer	69.754	0.0	54.5	72
120 min Summer	46.084	0.0	78.1	130
180 min Summer	36.161	0.0	95.2	190
240 min Summer	30.445	0.0	108.7	248
360 min Summer	23.890	0.0	129.6	368
480 min Summer	20.114	0.0	144.9	486
600 min Summer	17.601	0.0	156.5	606
720 min Summer	15.783	0.0	165.3	724
960 min Summer	12.941	0.0	172.7	962
1440 min Summer	9.783	0.0	175.6	1348
2160 min Summer	7.395	0.0	312.8	1692
2880 min Summer	6.064	0.0	329.6	2076
4320 min Summer	4.695	0.0	336.6	2900
5760 min Summer	3.916	0.0	517.3	3744
7200 min Summer	3.401	0.0	554.2	4544
8640 min Summer	3.032	0.0	579.4	5368

Summary of Results for 200 year Return Period (+46%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control Σ (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status
10080 min Summer	175.154	0.154	0.0	1.6	1.6	338.5	O K
15 min Winter	175.030	0.030	0.0	0.3	0.3	66.9	O K
30 min Winter	175.040	0.040	0.0	0.4	0.4	88.2	O K
60 min Winter	175.053	0.053	0.0	0.7	0.7	116.0	O K
120 min Winter	175.069	0.069	0.0	0.9	0.9	151.6	O K
180 min Winter	175.080	0.080	0.0	1.1	1.1	176.7	O K
240 min Winter	175.089	0.089	0.0	1.1	1.1	196.5	O K
360 min Winter	175.103	0.103	0.0	1.3	1.3	227.2	O K
480 min Winter	175.114	0.114	0.0	1.3	1.3	250.8	O K
600 min Winter	175.123	0.123	0.0	1.4	1.4	269.8	O K
720 min Winter	175.130	0.130	0.0	1.4	1.4	285.7	O K
960 min Winter	175.137	0.137	0.0	1.5	1.5	302.4	O K
1440 min Winter	175.147	0.147	0.0	1.6	1.6	322.5	O K
2160 min Winter	175.153	0.153	0.0	1.6	1.6	336.5	O K
2880 min Winter	175.157	0.157	0.0	1.6	1.6	345.9	O K
4320 min Winter	175.164	0.164	0.0	1.7	1.7	361.4	O K
5760 min Winter	175.166	0.166	0.0	1.7	1.7	365.7	O K
7200 min Winter	175.166	0.166	0.0	1.7	1.7	364.1	O K
8640 min Winter	175.163	0.163	0.0	1.7	1.7	359.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
10080 min Summer	2.751	0.0	591.6	6160
15 min Winter	159.816	0.0	18.4	27
30 min Winter	105.584	0.0	27.7	41
60 min Winter	69.754	0.0	63.4	70
120 min Winter	46.084	0.0	90.1	128
180 min Winter	36.161	0.0	109.0	186
240 min Winter	30.445	0.0	124.0	244
360 min Winter	23.890	0.0	146.4	362
480 min Winter	20.114	0.0	162.4	478
600 min Winter	17.601	0.0	174.0	594
720 min Winter	15.783	0.0	182.4	708
960 min Winter	12.941	0.0	188.7	936
1440 min Winter	9.783	0.0	191.4	1374
2160 min Winter	7.395	0.0	349.3	1760
2880 min Winter	6.064	0.0	365.4	2200
4320 min Winter	4.695	0.0	368.8	3124
5760 min Winter	3.916	0.0	580.9	4040
7200 min Winter	3.401	0.0	620.9	4904
8640 min Winter	3.032	0.0	647.9	5792

Summary of Results for 200 year Return Period (+46%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control Σ (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status
10080 min Winter	175.160	0.160	0.0	1.6	1.6	352.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
10080 min Winter	2.751	0.0	658.0	6656

Rainfall Details

Rainfall Model	FEH
Return Period (years)	200
Site Location	GB 204900 705750 NN 04900 05750
C (1km)	-0.017
D1 (1km)	0.492
D2 (1km)	0.400
D3 (1km)	0.459
E (1km)	0.252
F (1km)	2.532
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+46

Time Area Diagram

Total Area (ha) 0.200

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.067	4	8	0.067	8	12	0.067

Model Details

Storage is Online Cover Level (m) 176.000

Cellular Storage Structure

Invert Level (m) 175.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.20
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	11000.0	0.0	1.000	11000.0	0.0

Orifice Outflow Control

Diameter (m) 0.046 Discharge Coefficient 0.600 Invert Level (m) 175.000

Scottish & Southern Electricity Networks

TRANSMISSION

Annex K - Hydrology Methodology

September 2022

Scottish & Southern Electricity Networks

North Argyll 275 kV Upgrade:

An Suidhe Substation

Environmental Appraisal

Annex K – Hydrology Methodology

Table K.1 Estimating the Sensitivity of Receptors

Sensitivity of Receptor	Definition
High	• A large, medium or small waterbody with a SEPA water quality classification of 'High' or 'Good'; • The hydrological receptor and downstream environment has no or limited capacity to attenuate natural fluctuations in hydrochemistry and cannot absorb further changes without fundamentally altering its baseline characteristics / natural processes; • Aquifer classified by the British Geological Survey (BGS) as 'moderately or highly productive aquifer' and is of local or regional importance. May affect statutorily designated nature conservation sites or local areas of nature conservation dependent on groundwater; • The hydrological receptor will support abstractions for public water supply, or private water abstractions which supply more than 25 people and / or 100 livestock (at any given point in the year) and/ or is used for the mass-production of food and drinks; • GWDTEs which are classified by SEPA as "highly groundwater dependent" and have no (<1%) or minor (1 -25%) functional impairment by man-made influence (such as drainage or forestry); • The hydrological receptor is of high environmental importance and is designated as European or International Importance such as a Special Area of Conservation (SAC), Special Protection Areas (SPA) or Wetland of International Importance (Ramsar), or is of national importance such as a Site of Special Scientific Interest (SSSI) and National Nature Reserves (NNR); • The receptor act as an active floodplain or other flood defence, or is located within an active flood plain, in accordance with SPP 2014; • Soil type and associated land use are highly sensitive (e.g., peat/blanket bog); • Class 1 or 2 priority peatland, carbon-rich and peaty soils cover >20% of the development area; • Areas containing geological or geomorphological features considered to be of national importance (e.g., geological SSSIs); and/or • Receptor contains areas of regionally important economic mineral deposits.
Medium	• A large, medium or small waterbody with a SEPA water quality classification of 'Moderate'; • The hydrological receptor and downstream environment will have moderate capacity to attenuate natural fluctuations in hydrochemistry but cannot absorb certain changes without fundamentally altering its baseline characteristics / natural processes; • Aquifer of limited value (less than local) and is classified by the BGS as a 'low productivity aquifer' as water quality does not allow potable or other quality sensitive uses. Exploitation of local groundwater is not far-reaching. Local areas of nature conservation known to be sensitive to groundwater effects; • GWDTEs/ wetlands which are classified by SEPA as "highly groundwater dependent" but have moderate (25% - 50%) functional impairment by man-made influence (such as drainage or forestry); • GWDTEs which are classified by SEPA as "moderately groundwater dependent" have no functional impairment by man-made influence (such as drainage or forestry);

Sensitivity of Receptor	Definition
	• The hydrological receptor does not act as an active floodplain or other flood defence but is considered to provide some degree of natural flood management (e.g., peat soils); • The hydrological receptor is of local environmental importance (such as Local Nature Reserves (LNR)); • Soil type and associated land use are moderately sensitive (e.g. commercial forestry); • Class 1 or 2 priority peatland, carbon-rich and peaty soils cover <20% of the Proposed Development; • Class 3 and 5 peatland areas, carbon rich and peaty soils; • Receptor contains areas of locally important economic mineral deposits; and/or • Areas containing geological features of designated regional importance including Regionally Important Geological/geomorphological Sites (RIGS), considered worthy of protection for their historic or aesthetic importance.
Low	• A large, medium or small waterbody with a SEPA water quality classification of 'Poor' or 'Bad'; • The hydrological receptor and downstream environment will have capacity to attenuate natural fluctuations in hydrochemistry but can absorb any changes without fundamentally altering its baseline characteristics / natural processes; • Poor groundwater quality and / or very low permeability make exploitation of groundwater unfeasible. Changes to groundwater not expected to affect local ecology; • The hydrological receptor does not support abstractions for public water supply or private water abstractions; • GWDTEs which are classified by SEPA as "highly groundwater dependent" but have major (>50%) functional impairment by man-made influence (such as drainage or forestry); • GWDTEs which are classified by SEPA as "moderately groundwater dependent" but have functional impairment by man-made influence (such as drainage or forestry); • GWDTEs which are classified by SEPA as "highly or moderately groundwater dependent" but are ombrotrophic; • The hydrological receptor does not act as an active floodplain or other flood defence; • The hydrological receptor is not of regional, national or international environmental importance; • The hydrological receptor is not designated for supporting freshwater ecological interest; • Geological features or geology not protected and not considered worthy of specific protection; • Soil type and associated land use not sensitive to change in hydrological regime (e.g. intensive grazing); and/or • Receptor contains non-peatland areas, with no carbon-rich and/or peaty soils.
Negligible	• The receptor is resistant to change and is of little environmental value.

Table K.2 Magnitude of Potential Impacts

Magnitude of Impact	Definition
High	• A short or long-term major shift in hydrochemistry or hydrological conditions sufficient to negatively change the ecology of the receptor. This change will equate to a downgrading of a SEPA water quality classification by two classes e.g. from 'High' to 'Moderate'; • A sufficient material increase in the probability of flooding onsite and offsite, adding to the area of land which requires protection by flood prevention measures or affecting the ability of the functional flood plain to attenuate the effects of flooding by storing flood water (in accordance with SPP); • A major loss of (greater than 50% of Hydrology Study Area) or total loss of highly dependent and high value GWDTE, or where there will be complete hydrological severance which will fundamentally affect the integrity of the feature; • A major permanent or long-term negative change to groundwater quality or available yield; • The yield of existing supplies may be lost or major long-term or short-term reduction in quantity and/ or deterioration in quality; • Changes to groundwater quality or water table level that will negatively alter local ecology or will lead to a groundwater flooding issue; • Major or total loss of or alteration to peatland resource such that post development characteristics or quality will be fundamentally or irreversibly changed; • Long term/permanent change to human or environmental health; • Catastrophic failure of site infrastructure due to ground instability; • Long term/permanent change to baseline resource; and/or • Major or total loss of a geological site or mineral deposit, where the value of the site would be severely affected.
Medium	• A short or long term non-fundamental change to the hydrochemistry or hydrological environment, resulting in a change in ecological status. This change will equate to a downgrading of a SEPA water quality classification by one class e.g. from 'High' to 'Good'; • A moderate increase in the probability of flooding onsite and offsite, adding to the area of land which requires protection by flood prevention measures or affecting the ability of the functional flood plain to attenuate the effects of flooding by storing flood water (in accordance with SPP); • A loss of part (approximately 10% to 50% of Hydrology Study Area) of a moderately dependent and moderate value GWDTE – significant hydrological severance affects the integrity of the feature, but it could still function; • Changes to the local groundwater regime that may slightly affect the use of the receptor; • The yield of existing supplies may be reduced or quality slightly deteriorated; • Fundamental negative changes to local habitats may occur, resulting in impaired functionality; • Loss of, or alteration to the baseline resource such that post development characteristics or quality will be partially changed; • Mid-term/permanent change to human or environmental health; • Ground failure that requires remediation but does not cause catastrophic failure of site infrastructure; • Mid-term/permanent change to baseline resource; and/or

Magnitude of Impact	Definition
	• Partial loss of a geological site or mineral deposit, with major effects to the settings, or where the value of the site would be affected.
Low	• A detectable non-detrimental change to the baseline hydrochemistry or hydrological environment. This change will not result in a downgrading of the SEPA water quality classification; • A marginal increase in the probability of flooding onsite and offsite, adding to the area of land which requires protection by flood prevention measures or affecting the ability of the functional flood plain to attenuate the effects of flooding by storing flood water (in accordance with SPP); • A detectable but non-material effect on the receptor (up to 5%) or a moderate effect on its integrity as a feature or where there will be a minor severance or disturbance such that the functionality of the receptor will not be affected; • A detectable effect on a GWDTE (loss of between 5% - 10% of Hydrology Study Area) or a minor effect on a GWDTE's integrity as a feature or where there will be a minor severance or disturbance such that the functionality of the receptor will not be affected; • Changes to groundwater quality, levels or yields do not represent a risk to existing baseline conditions or ecology; • Small loss of soils or peatland, or where soils will be disturbed but the value not impacted; • Short-term change to human or environmental health; • Ground settlement/subsidence that does not adversely affect site infrastructure or require remedial action; • Short-term change to baseline resource; and/or • Small effect on a geological site or mineral deposit, such that the value of the site would not be affected.
Negligible	• No perceptible changes to the baseline hydrochemistry or hydrological environment; • No change to the SEPA water quality classification; • No increase in the probability of flooding onsite and offsite; • A slight or negligible change from baseline condition of geological resources; • Change hardly discernible, approximating to a 'no change' in geological condition; • Minimal detectable effect on a GWDTE (between to 0.1% - 5% of Hydrology Study Area) or no discernible effect on its integrity as a feature or its functionality; • Minimal or no change to soils or peatland deposits; • Minimal or no change to human or environmental health; • Minimal or no change to ground stability; • A very slight change from the baseline conditions. The change is barely distinguishable, and approximates to the 'no-change' situation; and/or • Minimal or no change to a geological site or mineral deposit.

Table K.3 Framework for Assessment of the Significance of Impact

Magnitude of Impact	Sensitivity of Resource or Receptor			
	High	**Medium**	**Low**	**Negligible**
High	Major	Moderate	Moderate	Minor
Medium	Moderate	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Negligible	Negligible	Negligible