Scottish & Southern Electricity Networks

TRANSMISSION

Alignment Stage Consultation Document

Achany Wind Farm Extension Grid Connection

June 2023

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Scottish & Southern Electricity Networks
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Glossary

Term	Definition
Alignment	A centre line of an overhead line OHL, along with location of key angle structures.
Alignment Option	A distinct alignment option through an identified preferred route.
Alignment (preferred)	An alignment for the overhead line taken forward to stakeholder consultation following a comparative appraisal of alignment variants.
Alignment (proposed)	An alignment taken forward to consent application. It comprises a defined centre line for the overhead line and includes an indicative support structure (tower or pole) schedule, also specifying access arrangements and any associated construction facilities.
Alignment Variant	An alternative section of an alignment where there are different ways to avoid a localised constraint(s).
Amenity	The natural environment, cultural heritage, landscape and visual quality. Also includes the impact of SSEN Transmission's works on communities, such as the effects of noise and disturbance from construction activities.
Ancient Woodland Inventory (AWI)	The Ancient Woodland Inventory (AWI) is a provisional guide to the location of Ancient Woodland. It contains three main categories of woodland, all of which are likely to be of value for their biodiversity and cultural value by virtue of their antiquity: Ancient Woodland (1a and 2a); Long-established woodlands of plantation origin (LEPO) (1b and 2b); and other woodlands on 'Roy' woodland sites (3).
Biodiversity Net Gain (BNG)	A process intended to leave nature in a better state than it started using good practice principles established by the Business and Biodiversity Offset Programme (BBOP) and organisations including Construction Industry Research and Information Association (CIRIA), The Chartered Institute of Ecology and Environmental Management (CIEEM) and the Institute of Environmental Management and Assessment (IEMA).
Conductor	A metallic wire strung from structure to structure, to carry electric current.
Consultation	The dynamic process of dialogue between individuals or groups, based on a genuine exchange of views and, normally, with the objective of influencing decisions, policies or programmes of action.
Corridor	A linear area which allows a continuous connection between the defined connection points. The Corridor may vary in width along its length; in unconstrained areas it may be many kilometres wide.
DNO Crossings	The crossing of distribution lines also known as Distribution Network Operators (DNO) crossings.
EA	When a Proposed Development is unlikely to give rise to significant environmental effects and is not considered an EIA development it would not be subject to an EIA and the preparation of an EIA Report. In this circumstance, an optional Environmental Appraisal (EA) detailing the results of surveys, and any appropriate mitigation, can accompany a consent application.
Environmental Impact Assessment (EIA)	Environmental Impact Assessment. A formal process codified by EU directive 2011/92/EU, and subsequently amended by Directive 2014/52/EU. The national regulations are set out in The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017. The EIA process is set out in Regulation 4(1) of the regulations and includes the preparation of an EIA Report by the developer to systematically identify, predict, assess and report on the likely significant environmental effects of a proposed project or development.
Habitat	Term most accurately meaning the place in which a species lives, but also used to describe plant communities or agglomerations of plant communities.
Kilovolt (kV)	One thousand volts.

Listed Building	Building included on the list of buildings of special architectural or historic interest and afforded statutory protection under the 'Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997' and other planning legislation. Classified categories A – C(s).
Micrositing	The process of positioning infrastructure to avoid localised environmental or technical constraints.
Mitigation	Term used to indicate avoidance, remediation or alleviation of adverse impacts.
Overhead line (OHL)	An electric line installed above ground, usually supported by steel lattice towers or wood poles.
Plantation Woodland	Woodland of any age that obviously originated from planting.
Route	A linear area of approximately 1 km width (although this may be narrower/wider in specific locations in response to identified pinch points / constraints), which provides a continuous connection between defined connection points.
Route (preferred)	A route for the overhead line taken forward to stakeholder consultation following a comparative appraisal of route options.
Route (proposed)	A route taken forward following stakeholder consultation to the alignment selection stage of the overhead line routeing process.
Routeing	The work undertaken which leads to the selection of a proposed alignment, capable of being taken forward into the consenting process under Section 37 of the Electricity Act 1989.
Scheduled Monument	A monument which has been scheduled by the Scottish Ministers as being of national importance under the terms of the 'Ancient Monuments and Archaeological Areas Act 1979'.
Sites of Special Scientific Interest (SSSI)	Areas of national importance. The aim of the SSSI network is to maintain an adequate representation of all natural and semi-natural habitats and native species across Britain.
Span	The section of overhead line between two structures.
Special Area of Conservation (SAC)	An area designated under the EC Habitats Directive to ensure that rare, endangered or vulnerable habitats or species of community interest are either maintained at or restored to a favourable conservation status.
Special Landscape Area (SLA)	Landscapes designated by the Highland Council which are considered to be of regional/local importance for their scenic qualities.
Stakeholders	Organisations and individuals who can affect or are affected by SSEN Transmission works.
Study Area	The area within which the Corridor, route and alignment study takes place.
The National Grid	The electricity transmission network in the Great Britain.
Underground Cable (UGC)	An electric cable installed below ground, protected by insulating layers and marked closer to the surface to prevent accidental damage through later earthworks.
Volts	The international unit of electric potential and electromotive force.

1 Introduction

1.1.1 This document has been prepared by ASH design+assessment Ltd. (ASH) on behalf of Scottish and Southern Electricity Networks Transmission (SSEN Transmission). SSEN Transmission, operating under licence held by Scottish Hydro Electric Transmission plc, owns, operates and develops the high voltage electricity transmission system in the north of Scotland and remote islands. This document invites comments from all interested parties on the Preferred Alignment for a new 132 kV single circuit OHL between the proposed Achany Wind Farm Extension on-site substation and the existing Shin substation. The project is known as the Achany Wind Farm Extension Grid Connection and is referred to in this report as the 'Proposed Development'.

1.1.2 This document describes the alignment selection process followed, the alignment options (referred to as 'variants' identified, the appraisal undertaken and the selection of a Preferred Alignment. This document supports the information made available to the public and statutory authorities in June 2023, and can be accessed on the Proposed Development website:

https://www.ssen-transmission.co.uk/projects/project-map/achany-wind-farm-extension-connection

1.1.3 This document, the consultation booklet and public event banners, as prepared for the public consultation events, were produced in order to provide a more detailed overview of the process that has been followed to reach the current stage in the Proposed Development.

1.1.4 This consultation exercise provides stakeholders and members of the public with the opportunity to provide feedback on the Preferred Alignment.

2 Project Background and Need

2.1.1 SSEN Transmission has a statutory duty under Schedule 9 of the Electricity Act 1989 to develop and maintain an efficient, co-ordinated and economical transmission system in its licenced areas. SSEN Transmission has obligations to offer non-discriminatory terms for connection to the transmission system.

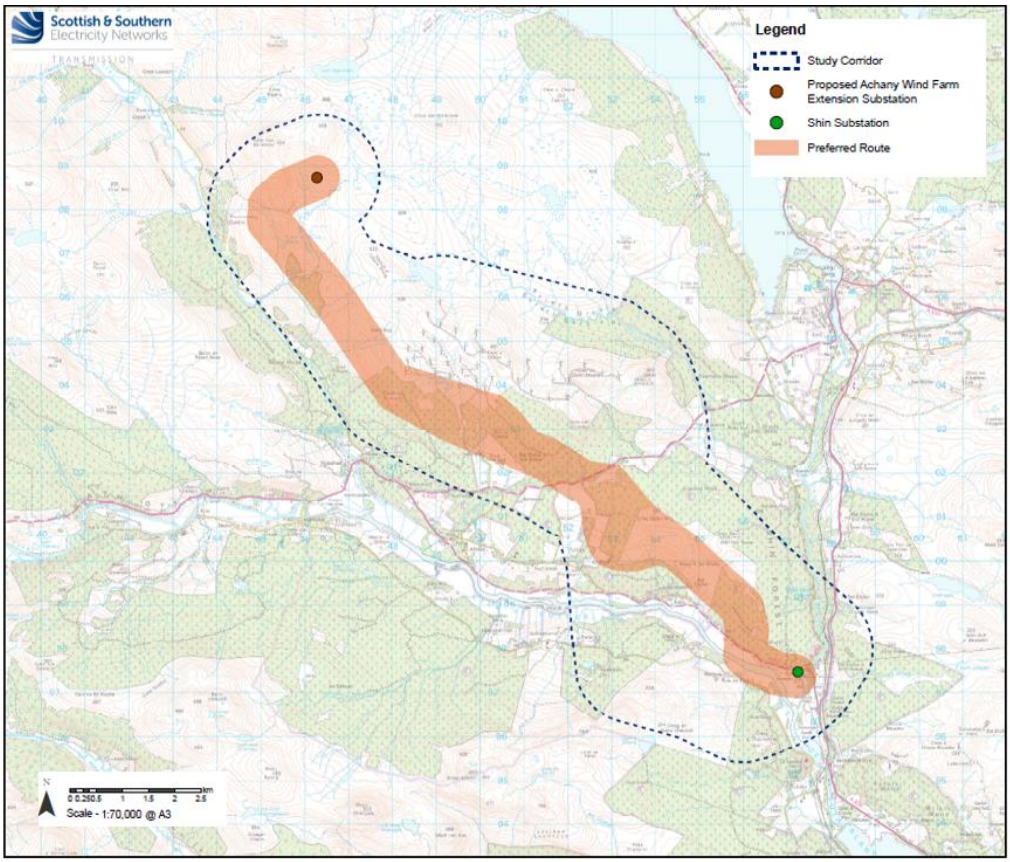
2.1.2 The proposed Achany Wind Farm Extension (comprising 18 turbines, with approximate capacity in excess of 80 Megawatts (MW)), adjacent to the operational Achany Wind Farm, approximately 4.5 km north of the village of Rosehall and 11 km north-west of Lairg, requires connection to the electricity transmission network at Shin substation. The proposed connection is in accordance with agreements between SSEN Transmission, National Grid Electricity System Operator (as operator of the National Grid), and SSE Renewables, as developer of the wind farm.

2.1.3 It is proposed that the connection would be an OHL supported by trident H-wood pole. There would be a requirement to install a short section of UGC, of approximately 500 m close to Achany Wind Farm Extension substation. This is due to the proximity of the proposed Achany Wind Farm Extension wind turbines and the engineering requirement to maintain a minimum separation from OHL infrastructure within their vicinity.

2.1.4 In October 2022, a Consultation Document[1] was prepared to set out the Proposed Development need and seek comments from stakeholders and members of the public on the route option studies undertaken, and the rationale for, and approach to, the selection of the Preferred Route. Comments received were documented in a Report on Consultation (April 2023)[2] which set out the consultation process for the Proposed Development between October 2022 and January 2023, during the route option stage of the Proposed Development. The Report on Consultation also confirmed that the Preferred Route would be taken forward as the Proposed Route for the consideration of alignment options. The Proposed Route is shown within Plate 2.1.[3]

2.1.5 Work has since been carried out to identify and appraise alignment options within the Proposed Route. The results of this work are summarised in this Consultation Document.

Plate 2.1: Proposed Route



[1] Achany Wind Farm Extension Grid Connection: Consultation Document (Route Options), October 2022, produced by SSEN Transmission

[2] Achany Wind Farm Extension Grid Connection: Report on Consultation (Route Options), April 2023, produced by SSEN Transmission

[3] Whilst Route Option 1 was selected as the proposed route, some of the alignment variants that have been identified for appraisal go beyond the extent of it across a short section in Shin Forest. This was done to take advantage of an existing forestry operational corridor where an OHL is to be removed in the forest when crossing the A837 to connect into Shin substation. This area formed part of another route option's appraisals (Route Option 2) during the route selection stage. All statements made throughout this Report regarding the Proposed Route, also include the small areas of Route Option 2, that some alignment options pass into.

3 Project Overview

Technology Solution

3.1.1 The trident wood poles would have a height of approximately 16 m (including insulators and support). The proposed trident wood pole would support three conductors in a horizontal flat formation. The spacing between poles would vary depending on topography and altitude. The specific distances would be determined after a detailed line survey but would be approximately 100 m apart. A photograph showing a typical wood pole trident line is shown in Plate 3.1 below.

Plate 3.1: Example Trident H-wood poles

3.1.2 At routeing strategy development stage, the most appropriate solution for the operation and maintenance of the network and in the best interest of the UK billpayer was considered to be OHL over UGC wherever possible. This was primarily as:

- SSEN Transmission's license obligations are to develop an efficient, co-ordinated and economical system of electricity transmission. As such SSEN Transmission is obliged to seek the most cost-effective solution, which is usually an OHL connection. In areas where an OHL connection has been deemed unfeasible on environmental, engineering or economic grounds, i.e. due to proximity to proposed wind farm turbines, UGC solutions are being explored.
- Maintenance of a line in the future must be considered. In the event of a fault on a line, the fault can be detected and rectified in a matter of days with OHL. However, if a fault occurs with an UGC, the time needed to locate and rectifying the fault increases and could potentially take months to fix and cause ongoing disruption to the land.
- Undergrounding a line would result in increased impact to the surrounding ground, as well as the overall footprint of the Proposed Development. The installation of UGC would require a cable trench

and a 30 m construction zone with a trench to be dug. It is considered that this would increase potential to damage local environments during construction.

- The costs for UGC would also be significantly more expensive than an OHL option therefore not representing the most economic option in terms of best value for UK bill payers.
- SSEN Transmission's Operations teams also require permanent access to be maintained to the sealing end compounds, which enable the transition between OHL and UGC. These often cannot be easily located adjacent to an existing access, so permanent access may need to be created causing further disruption.

3.1.3 As stated in Section 2 though, a short section of UGC would be required near the proposed Achany Wind Farm Extension substation. This would involve establishing a working corridor approximately 30 m wide, prior to installing the cable in a trench. Once the cable has been placed in the trench, surrounded by engineered backfill in suitable layers for protection and marker boards placed above the cable line, the working corridor would be reinstated using the excavated material.

Forestry Removal

3.1.4 Construction of the Proposed Development may require the removal of sections of commercial forest. This would be undertaken in consultation with affected landowners. Scottish Forestry would also be consulted throughout the development of the Proposed Development and the Proposed Development would adhere to Scottish Government's Control of Woodland Removal Policy.[4]

3.1.5 After felling, any timber removed that is commercially viable would likely be sold and the remaining forest material would be dealt with in a way that delivers the best practicable environmental outcome and is compliant with waste regulations.

3.1.6 An operational corridor would be required to enable the safe operation and maintenance of the OHL. This would vary depending on the type of woodland (based on species present) in proximity to the OHL, and the height of support structures used within each woodland area.

Access Strategy

3.1.7 Vehicle access is required to each pole location during construction to allow excavation and creation of foundations and pole installation. Existing tracks would be used where possible. Preference will be given to lower impact access solutions including the use of low pressure tracked personnel vehicles and temporary track solutions in boggy / soft ground areas to reduce any damage to, and compaction of, the ground. These journeys would be kept to a minimum to minimise disruption to habitats along the route. However, temporary and permanent stone tracks may be necessary in some areas depending on existing access conditions, terrain and altitude.

[4] Forestry Commission Scotland (2009) Control of Woodland Removal Policy

Programme

3.1.8 It is anticipated that construction of the Proposed Development would take place over a 16-month period, following the granting of consents, although detailed programming of the works would be the responsibility of the Contractor in agreement with SSEN Transmission.

4 Alignment Selection

Overview

4.1.1 The approach to alignment selection was informed by SSEN Transmission's guidance 'Procedures for Routeing Overhead Lines and Underground Cables of 132 kV and above'. The guidance sets out SSEN Transmission's approach to selecting a route for an OHL. This document helps SSEN Transmission to meet its obligations under Schedule 9 of the Electricity Act 1989, which requires transmission license holders:

- to have a regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interests; and
- to do what they reasonably can to mitigate any effect that the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects.

4.1.2 The guidance develops a process which aims to balance these environmental considerations with technical and economic considerations throughout the route options process.

4.1.3 The guidance splits a project into six stages, as follows:

- Pre-Routeing Activities: Selection of proposed connection option;
- Stage 0: Routeing strategy development;
- Stage 1: Corridor Selection;
- Stage 2: Route Selection;
- Stage 3: Alignment Selection; and
- Stage 4: EIA and consenting.

4.1.4 The stages that are carried out can vary depending on the type, nature and size of a project and consultation is carried out at each stage of the process as appropriate. The Proposed Development is currently at Stage 3: Alignment Selection, the objective of which is to identify a Preferred Alignment to be taken forward for consultation prior to commencing the EIA and consenting stage.

4.1.5 In consideration of the principles outlined in the guidance document, the method of identifying a Preferred Alignment in this study has involved the following four key tasks:

- Review and update, where required, of the baseline situation established at Stage 2;

- Identification of alignment options;
- Environmental and engineering analysis of alignment options and alignment variants; and
- Identification of a Preferred Alignment.

4.1.6 Desk-based studies were supplemented by high-level walkover assessments by specialist consultants and OHL engineers. These walkover surveys obtained further site data and observations of localised constraints.

Alignment Identification and Selection Methods

4.1.7 As can be seen in **Figure 1**, a 'Baseline Alignment' has been identified on the basis of it being the most technically feasible and economically viable alignment whilst minimising interaction with the environmental constraints identified within the proposed route based on the key environmental and engineering constraints identified during Stage 2: Route Selection. A number of alignment 'variants' have been identified from the Baseline Alignment in order to avoid localised constraints. The 12 alignment variants can be seen on **Figure 1**. The preferred alignment taken forward to stakeholder consultation could be a combination of the Baseline Alignment and alignment variants.

4.1.8 The steps outlined in the Holford Rules[5] and SSEN Transmission's internal guidance have been taken into account as far as is practicable in establishing the alignment options. In particular, alignments have sought to:

- Avoid if possible major areas of highest amenity value (including those covered by national and international designations and other sensitive landscapes);
- Avoid by deviation, smaller areas of high amenity value;
- Try to avoid sharp changes of direction and reduce the number of larger angle towers required;
- Avoid skylining the route in key views and where necessary, cross ridges obliquely where a dip in the ridge provides an opportunity;
- Target the route towards open valleys and woods where the scale of poles will be reduced and views broken by trees (avoid slicing through landscape types and try to keep to edges and landscape transitions);
- Consider the appearance of other lines in the landscape to avoid a dominating or confusing wirescape effect; and
- Approach urban areas through industrial zones and consider the use of undergrounding in residential and valued recreational areas.

[5] Scottish Hydro Electric Transmission Limited (SHETL). (October 2004). The Holford Rules: Guidelines for the Routeing of New High Voltage Overhead Transmission Lines with NGC 1992 and SHETL 2003 Notes; Revision 1.01

Appraisal Method

4.1.9 Appraisal of alignment options has involved systematic consideration against the environmental and engineering topic areas included in Table 4.1.

Table 4.1: Environmental and Engineering Topic Areas Considered

	Category	Sub-Topic
Environmental	**Natural Heritage**	Designations
		Protected Species
		Habitats
		Ornithology
		Geology, Hydrology and Hydrogeology
	Cultural Heritage	Designations
		Cultural Heritage Assets
	People	Proximity to Dwellings
	Landscape and Visual	Designations
		Character
		Visual
	Land Use	Agriculture
		Forestry
		Recreation
	Planning	Policy
		Proposals
Engineering	**Infrastructure Crossings**	Major Crossings (132kV, 275kV, Rail, 200+m wide river, navigable canal, gas or hydro pipeline)
		Road Crossings
	Environmental Design	Elevation
	Ground Conditions	Terrain
		Peat
	Construction / Maintenance	Access
		Angle Structure
	Proximity	Clearance Distance
	Other Considerations	DNO Crossings

Identification of a Preferred Alignment

4.1.10 Following review of all of the potential alignment options, the environmental, engineering and cost considerations have been considered in combination to arrive at a preferred alignment.

5 Description of Alignments

5.1.1 This section of the document describes the Baseline Alignment and each of the alignment variants identified for appraisal, which are displayed on **Figure 1**. The alignment variants were developed at different stages during the alignment selection process to address particular constraints, and their numbering reflects the order in which they were developed. Please see Table 5.1 for a description of the Baseline Alignment and each alignment variant with a description of the reason for development and inclusion in the alignment selection process.

Table 5.1: Baseline Alignment and Alignment Variants Description and Reason for Development

Alignment	Description	Reason for development
Baseline Alignment	The Baseline Alignment leaves Achany Wind Farm Extension substation and travels southwest for approximately 1 km through an area proposed for wind turbine development as part of the Achany Extension Wind Farm. It then turns in a south-easterly direction remaining to the west of the existing wind turbines of the operational Achany Wind Farm through Glen Rossal and to the south of the operational Rosehall Wind Farm. The Baseline Alignment would continue in a south-easterly direction, and after it has crossed the A839, it would pass to the south of Braemore wood, while keeping to the north of the A837 and Linsidemore. After passing Linsidemore, prior to reaching the village of Invernan, the Baseline Alignment would travel south to cross the A837. It would remain to the north of the Kyle of Sutherland River Estuary and connect into Shin substation from the northwest. The Baseline Alignment is approximately 17 km in length.	The Baseline Alignment was developed to be an environmentally, technically and economically feasible alignment. It was designed to be the shortest connection which avoids or minimises interaction with the environmental constraints and challenging ground conditions of the area. All alignment variants to the Baseline Alignment exist to avoid a localised constraint.
Alignment Variant 1	Alignment Variant 1 is approximately 1.5 km in length and departs from the Baseline Alignment to the south of Rosehall Wind Farm. It would initially travel northeast to the north of the Baseline Alignment, passing over a core path and through some sparse forestry. It would then turn southeast to re-join the Baseline Alignment northwest of Durcha.	Alignment Variant 1 was developed to reduce the potential for visual constraints associated with a core path in comparison to the Baseline Alignment.
Alignment Variant 2	Alignment Variant 2 is approximately 0.6 km in length and departs from the Baseline Alignment to the northeast of Durcha, directly to the north of the hut circles at Doir A' Chatha. It would curve slightly north then south to re-join the Baseline Alignment.	Alignment Variant 2 was developed to minimise potential impacts on a cultural heritage asset, in comparison to the Baseline Alignment.
Alignment Variant 3	Alignment Variant 3 is approximately 2.8 km in length and departs from the Baseline Alignment to the south of Rosehall Wind Farm. The variant takes a more northerly	Alignment Variant 3 was developed to avoid a cultural

	route through the forest, travelling parallel to a Core Path for a short distance. Alignment Variant 3 would then re-join the Baseline Alignment to the east of the hut circles at Doir A' Chatha.	heritage asset, in comparison to the Baseline Alignment.
Alignment Variant 4	Alignment Variant 4 is approximately 2.4 km in length and departs from the Baseline Alignment approximately 1 km to the northwest of Linsidemore. This variant initially takes a more southerly route than the Baseline Alignment before crossing back over to its northern side at a slightly higher elevation before re-joining the Baseline Alignment east of Linsidemore.	Alignment Variant 4 was developed to minimise potential impacts on a cultural heritage asset, in comparison to the Baseline Alignment.
Alignment Variant 5	Alignment Variant 5 is approximately 2.8 km in length and departs from the Baseline Alignment approximately 1.2 km to the northwest of Linsidemore. It would travel east, at a higher elevation before re-joining the Baseline Alignment east of Linsidemore.	Alignment Variant 5 was developed to minimise potential impacts on cultural heritage assets, in comparison to the Baseline Alignment.
Alignment Variant 6	Alignment Variant 6 is approximately 1 km in length and would depart from the Baseline Alignment approximately 0.7 km to the northeast of Shin substation. It would travel east then southeast then southwest to approach Shin substation via an existing forestry operational corridor in Achany Forest. It would cross the A837 to connect into Shin substation from the northeast.	Alignment Variant 6 was developed to take advantage of an existing forestry operational corridor that will be left behind after the removal of an existing OHL.
Alignment Variant 7	Alignment Variant 7 is approximately 1.3 km in length and would depart from the Baseline Alignment to the east of Linsidemore. It would travel to the south of the Baseline Alignment on slightly lower ground to pass through the forestry. It would re-join the Baseline Alignment to the northwest of Shin substation.	Alignment Variant 7 was developed to minimise impacts on forestry, in comparison to the Baseline Alignment in this area.
Alignment Variant 8	Alignment Variant 8 is approximately 5.7 km in length and departs from the Baseline Alignment as Alignment Variant 5 would. The alignment variant is located to the north of the Baseline Alignment, initially along the northern border of the forestry plantation. Within Achany Forest. Alignment Variant 8 would turn south then southwest to approach Shin substation via an existing forestry operational corridor in Achany Forest. It would cross the A837 to connect into Shin substation from the northeast.	Alignment Variant 8 was developed to minimise impacts on forestry in comparison to the Baseline Alignment, and to take advantage of an existing forestry operational corridor that will be left behind after the removal of an existing OHL.
Alignment Variant 9	Alignment Variant 9 is approximately 5.5 km in length and departs from the Baseline Alignment as Alignment Variant 8 would. Within Inveran Wood, Alignment Variant 9 would turn south then southeast for approximately 0.8 km. Then, for a distance of	Alignment Variant 9 was developed to avoid potential impacts on woodland recorded on the AWI, in

	approximately 0.1 km, Alignment Variant 9 would turn southwest to approach Shin substation via the final extent of an existing forestry operational corridor. It would cross the A837 to connect into Shin substation from the northeast.	comparison to Alignment Variant 8.
Alignment Variant 10	Alignment Variant 10 is approximately 1.7 km in length and departs from the Baseline Alignment to the north of Durcha. It travels to the south of the Baseline Alignment. It would travel southeast to the south of the Baseline Alignment along a forestry edge before turning northeast to connect back into the Baseline Alignment east of Durcha, to the north of the Allt Mor and the A839.	Alignment Variant 10 was developed to minimise felling, in comparison to the Baseline Alignment in this area.
Alignment Variant 11	Alignment Variant 11 is approximately 4.9 km in length and departs from the Baseline Alignment as Alignment Variant 9 would. Within Inveran Wood, Alignment Variant 11 would turn southwest for a distance of approximately 0.5 km before re-joining the Baseline Alignment approximately 0.5 km northwest of Shin substation.	Alignment Variant 11 was developed to minimise impacts on forestry in comparison to the Baseline Alignment and in comparison, to alignment variants 8 and 9.
Alignment Variant 12	Alignment Variant 12 is approximately 0.6 km in length and departs from the Baseline Alignment to the north of Tullich, forming a corner around a forestry edge going south for approximately 0.3 km then east for approximately 0.3 km to connect back into the Baseline Alignment.	Alignment Variant 12 was developed to minimise felling in comparison to the Baseline Alignment in this area.

6 Appraisal of Alignment Options

Overview

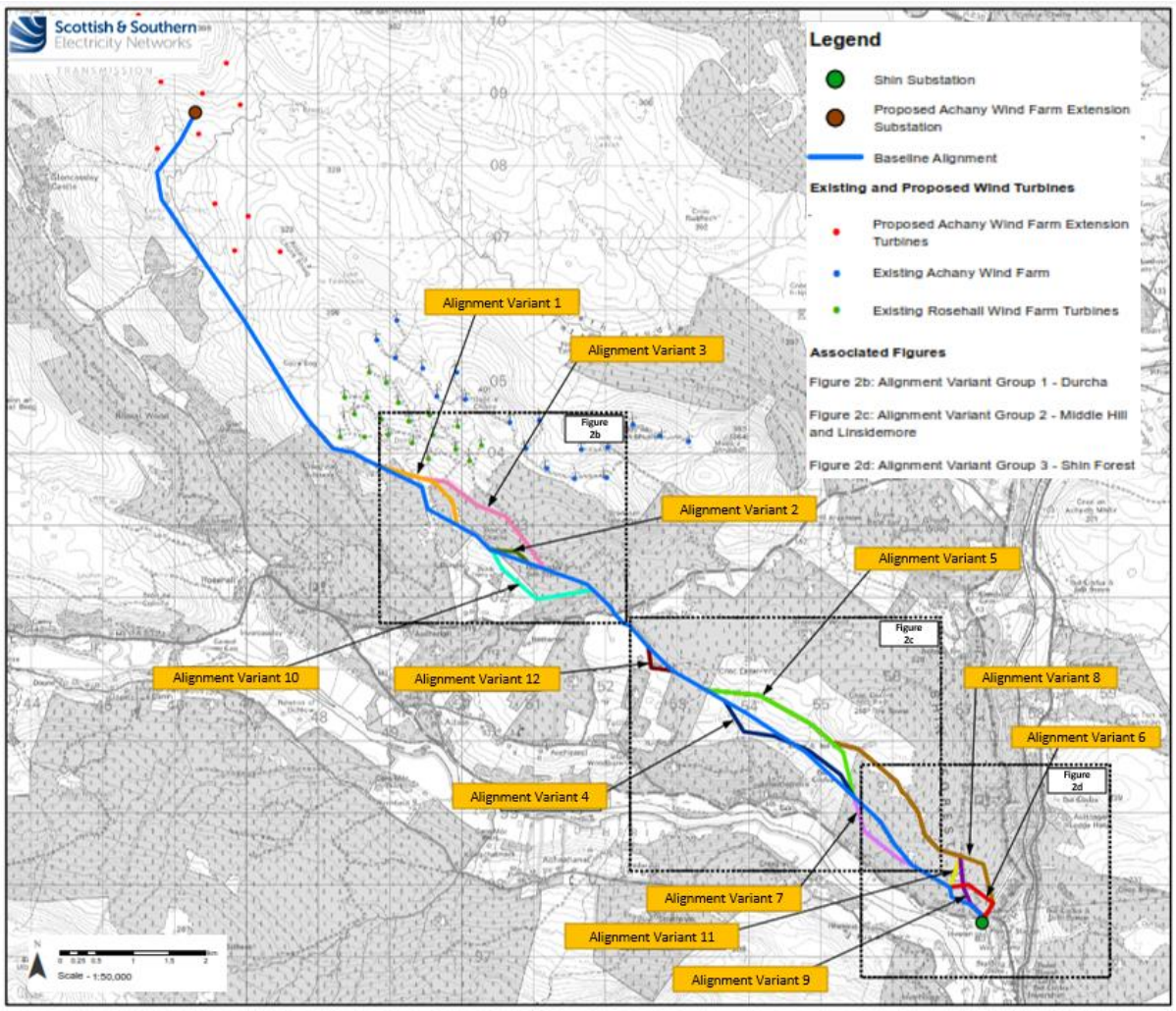
6.1.1 An appraisal of the Baseline Alignment and alignment variants has been undertaken, considering the environmental, technical and economic constraints of each prior to arriving at a preferred alignment. A summary of this appraisal is provided in this section. Reference should also be made to **Figures 2 (a-d)**, **3** and **4**, as well as **Appendix 1** which contains a more detailed breakdown of the environmental appraisal of these options, and justification for alignment preference.

6.1.2 For presentation purposes, **Figures 2b** to **2d** have been split into three distinct groupings to more easily display the constraints and opportunities associated with each variant. These are:

- Alignment Variant Group 1 - Durcha
- Alignment Variant Group 2 - Middle Hill and Linsidemore
- Alignment Variant Group 3 - Shin Forest

6.1.3 These three groupings and their corresponding figure numbers can be seen on Plate 6.1 below.

Plate 6.1: Alignment Variant Groupings



Environmental

6.1.4 In selecting the preferred alignment on environmental grounds, consideration has been given to a number of environmental factors and topic areas. Whilst there are a number of potential constraints that are consistent across all topic areas, the key differentiators to consider in this alignment selection exercise are as follows:

- Landscape and Visual;
- Peatland and River Shin surface water catchment;
- Woodland loss, particularly woodland listed on the AWI;
- Cultural heritage assets; and
- Recreation.

6.1.5 Generally, the Baseline Alignment is preferable, with a few exceptions.

6.1.6 As can be seen on **Figure 2b** and in **Appendix 1**, around Durcha, Alignment Variant 3 is the most preferable to the Baseline Alignment in relation to cultural heritage asset MHG12803 Doir a'Chatha. Alignment Variant 2 is also preferable to the Baseline Alignment in relation to this cultural heritage asset, but due to proximity, it still has the potential to impact upon minor features of cultivation associated with the site. Alignment Variant 10 is the least preferable in relation to MHG12803 as it would cut most directly through it, and although there are some benefits in terms of forestry, this alignment variant is also not preferred in terms of other constraints such as proximity to dwellings and visual. Although preferred in terms of cultural heritage, Alignment Variant 3, would lead to a slightly greater visual and recreational effects on a core path in comparison to the Baseline Alignment, whereas Alignment Variant 1 would lead to slightly reduced visual and recreational effects on a core path when compared to the Baseline Alignment. Therefore, Alignment Variant 1 is considered to be preferable when balancing environmental constraints over the other alignment variants and the Baseline Alignment in the area around Durcha.

6.1.7 As can be seen on **Figure 2c** and in **Appendix 1**, around Middle Hill and Linsidemore, Alignment Variant 5 is preferable over the Baseline Alignment in terms of cultural heritage assets MHG 12800 Allt a'Ghlugheran and MHG12891 Linsidemore Wood. It would also be preferable to the Baseline Alignment in terms of proximity to people and agriculture. Alignment Variant 4 has some cultural heritage benefits in relation to MHG 12800 Allt a'Ghlugheran but would have the same impacts as per the Baseline Alignment on MHG12891 Linsidemore Wood. Alignment Variant 7 would avoid approximately 100 m of Class 2 priority peatland but would require 3 additional watercourse crossings (see **Figure 4**). It would also have some cultural heritage asset impacts. There are some forestry benefits to Alignment Variant 12, however, this alignment variant is not preferred in terms of other constraints such as proximity to dwellings and visual. Therefore, although it would pass through some additional peat when compared to the Baseline Alignment, Alignment Variant 5 is considered to be preferable when balancing environmental constraints over the other alignment variants and the Baseline Alignment in the area around Middle Hill and Linsidemore.

6.1.8 As can be seen on **Figure 2d** and in **Appendix 1,** in and around Shin Forest, generally, Alignment Variants 6 and 8 would have the potential to have an increased impact on AWI and were the least preferred Alignment Variants in terms of natural heritage designations, habitats, and forestry. Alignment Variants 6, 9 and 8 would also have the potential for increased recreational and landscape and visual impacts. In terms of cultural heritage assets, Alignment Variants 8, 9 and 11 would be preferable to the Baseline Alignment in terms of cultural heritage assets as they would avoid MHG 12800 Allt a'Ghlugheran and MHG12891 Linsidemore Wood. However, Alignment Variant 9 and to a lesser degree Alignment Variant 11, would all have the potential for a slightly increased visual impact on cultural heritage designated sites to the east, as well as the potential for increased impacts on recreational core paths. Parts of Alignment Variants 6 8, 9 and 11 are located within the River Shin surface water catchment which is considered an important fishery (see **Figure 3**). The Baseline Alignment also crosses a lesser extent of peatland habitats compared to these variants (see **Figure 4**). Therefore, the Baseline Alignment is considered to be preferable when balancing environmental constraints over the other alignment variants in the area around Shin Forest.

6.1.9 The overall environmental preference is therefore the **Baseline Alignment, with Alignment Variant 1 and Alignment Variant 5.** This is as, around Durcha and around Middle Hill and Linsidemore Alignment Variant 1 and Alignment Variant 5 offer opportunities to minimise environmental constraints.

Engineering

6.1.10 This section of this report summarises the engineering constraints associated with the connection. Reference should also be made to **Figures 2a-d**, **3** and **4**. Given the similarities between the alignment options, many of the engineering constraints are comparable. For the engineering topic areas of major crossings, road crossings, access, terrain, elevation and DNO crossings there is no real preference between the Baseline Alignment and any of the alignment variants.

6.1.11 The below engineering topic areas relate to constraints where there are some differences between the Baseline Alignment and the alignment variants.

- Peat: For the engineering topic area of peat, Alignment Variants 8, 9 and 11 are less preferable as they cross a larger extent of Class 1 peatland to the northeast of Linsidemore (see **Figure 4**).
- Angle structures: In relation to angle structures, the Baseline Alignment would be the preferred option. It would be anticipated to require approximately 22 angle structures. The least preferred alignment variants would be Alignment Variants 9, 8 and 11, which would all lead to approximately over 50 % more angle structures when compared to the Baseline Alignment. Some sections of the connection near the proposed Achany Wind Farm onsite substation would be anticipated to be undergrounded, so these percentages are indicative only.
- Clearance: The Baseline Alignment would generally maintain a 200 m buffer from buildings and dwellings along the entirety of the connection, except for one location. This would be on final approach to Shin substation where the Baseline Alignment would pass within 150 m of residential houses and agricultural buildings along the A837. Overall, no alignment variant would offer a particular advantage in terms of proximity to properties near Shin substation. In comparison with the Baseline Alignment, Alignment Variant 10 would bring the OHL closer to properties at Durcha which is at a distance of approximately 160 m. Similarly, Alignment Variant 12 would bring the OHL closer to the residential property at Tullich coming to within approximately 110 m. Towards the southeast end of Alignment Variant 11, a surge shaft connected to Shin hydro scheme is situated proximately 50 m from the alignment (see **Figure 2a-d**).

6.1.12 Therefore, the Baseline Alignment with a combination of Alignment Variant 1, Alignment Variant 2, Alignment Variant 3, Alignment Variant 4, Alignment Variant 5, Alignment Variant 6 or Alignment Variant 7 would all be feasible from an engineering standpoint with no real preferences. Alignment Variants 8, 9 and 11 would be the least preferred in relation to engineering topics, followed by Alignment Variants 10 and 12.

Cost

6.1.13 Costs were assessed as part of this alignment selection process and were considered during development design meetings in which the alignment options were discussed. In terms of costs, there is little difference between the Baseline Alignment and any of the alignment variants.

Conclusion: Preferred Alignment

6.1.14 Around Durcha and around Middle Hill and Linsidemore Alignment Variant 1 and Alignment Variant 5 offer opportunities to minimise environmental constraints. As there are no real engineering preferences between the Baseline Alignment and Alignment Variants 1 to 7, Alignment Variants 1 and 5 are also feasible from an engineering standpoint. In terms of costs, there is little difference between the Baseline Alignment and any of the Alignment Variants.

6.1.15 The overall preferred alignment is, therefore, the **Baseline Alignment, with Alignment Variant 1 and Alignment Variant 5**. This can be seen on **Figure 5**.

6.1.16 Also shown on this figure is Alignment Variant 10 which is also indicated as a potential alignment option near Durcha. Environmental, economic and technical appraisals of this variant are ongoing, and it is included here for completeness.

7 Next Steps

7.1.1 All comments on the alignment selection process and preferred alignment are requested by Friday 14 July 2023. A Report on Consultation will be produced which will document the consultations received, and the decisions made in light of these responses, and the identification of a subsequent proposed alignment.

7.1.2 Following the identification of a proposed alignment, further technical and environmental surveys will be undertaken as appropriate to support an environmental assessment and Section 37 application for the Proposed Development, anticipated to be made in November 2023.