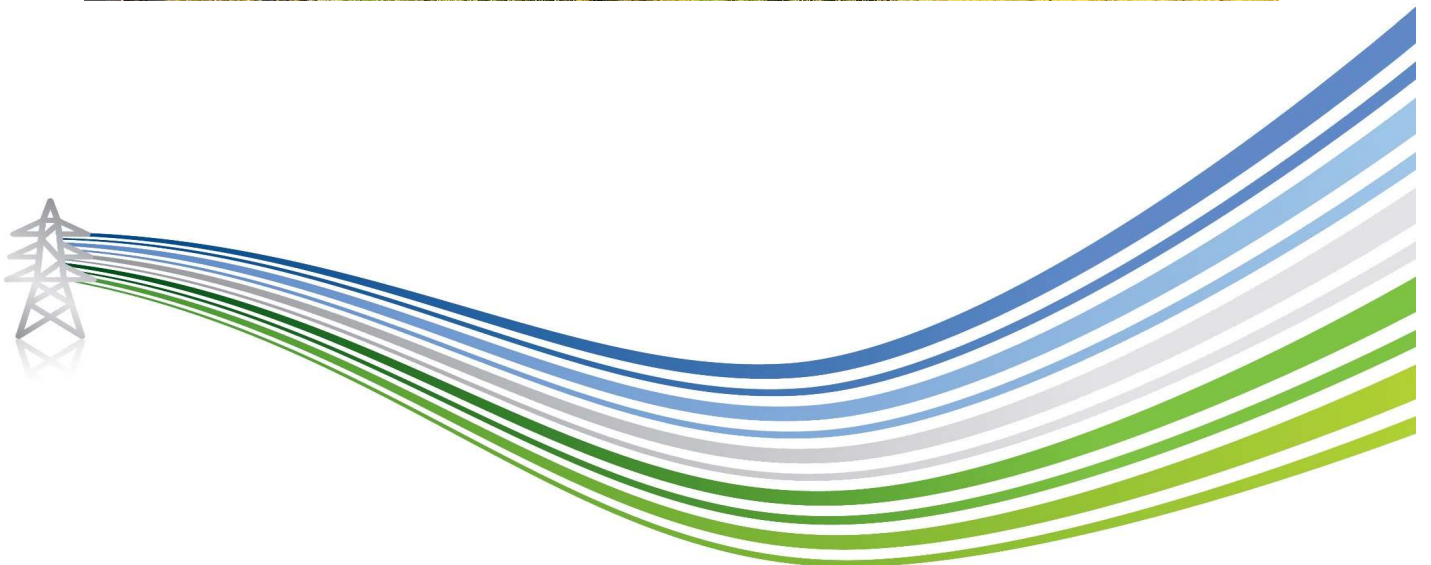


Blarghour 132 kV Wind Farm Connection

Consultation Document

May 2022



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GLOSSARY

Term	Definition
Above Ordnance Datum (AOD)	The term 'Ordnance Datum' refers to the height of mean sea level. Therefore Above Ordnance Datum, means above the height of mean sea level.
Alignment	A centre line of an overhead line route, along with location of key angle structures.
Alignment (Indicative Proposed)	An alignment for the overhead line identified following public consultation that is taken forward to EIA and detailed design.
Alignment Preferred	An alignment for the overhead line taken forward to stakeholder consultation following a comparative appraisal of alignment options.
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.
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	Woodland which has been in continuous existence since before 1750 in Scotland and is important for biodiversity and cultural identity. Ancient semi-natural woodland is Ancient Woodland composed of mainly locally native trees and shrubs that derive from natural seed fall or coppice rather than from planting.
Angle Tower	Support structure (tower or pole) which allows a change in direction of the overhead line.
Area of Panoramic Quality (APQ)	These are areas of regional importance in terms of their landscape quality.
Barrier and Collision Effects	Barrier effect is where the development creates an obstacle to regular movements of birds (e.g. to and from breeding sites or migration routes). Collision effects are where the proposed development poses a risk of harm to birds through direct contact.
BNG	Biodiversity Net Gain
Centre Line	The linear connection between the central point of each support structure along the length of the overhead line.
Circuit	Overhead line or underground cable consisting of multiple conductors, to carry electric current.
Commercial Forestry	Planting, maintaining and growing trees for commercial timber production.
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.
Craggy Upland Landscape Character Type (LCT)	Craggy Moorland is typically characterised by: <ul style="list-style-type: none"> • <i>Upland moor with irregular, rather amorphous landform;</i> • <i>Rounded knolls, rock outcrops and numerous lochs in low-lying hollows and glens;</i> • <i>Open moorland predominates, but extensive conifer plantations camouflage the landscape pattern in some areas;</i>

Term	Definition
	<ul style="list-style-type: none"> • <i>Oak-birch woodland on lower slopes;</i> • <i>Stone walls enclose an irregular patchwork of pastures within glens on margins of moorland;</i> • <i>Isolated farmsteads and small villages in sheltered sites within glens;</i> • <i>Numerous archaeological remains, often concentrated on rounded knolls on lower slopes; and</i> • <i>Historic intricate, irregular landscape pattern in glens.</i>
Desk-based Assessment	A desktop appraisal using existing information (e.g. from online sources, mapping and through information requests to relevant organisations).
European Protected Species	<p>European protected species are those species listed on:</p> <ul style="list-style-type: none"> • Habitats Regulations 1994 Schedule 2 – European protected species of animal • Habitats Regulations 1994 Schedule 4 – European protected species of plants <p>They comprise species of plants and animals protected by law throughout the European Union.</p>
Environmental Impact Assessment (EIA)	A formal process set down in The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 used to systematically identify, predict and assess the likely significant environmental impacts of a proposed project or development.
Gardens and Designed Landscape (GDL)	The Inventory of Gardens and Designed Landscapes lists those gardens or designed landscapes which are considered by a panel of experts to be of national importance.
Geographical Information Systems (GIS)	A spatial system that creates, manages, analyses, and maps all types of data.
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.
Landscape Character Type (LCT)	Landscape character is defined as the distinct, recognisable and consistent pattern of elements in the landscape. It is these patterns that give each locality its 'sense of place', making one landscape different from another, rather than better or worse.
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).
Local Nature Conservation Site (LNCS)	LNCSs identify locally important natural heritage that could be affected by development.
Major Crossing	Major crossings include other electric lines of 132kV and above, railways, rivers/loch (200m+), navigable watercourses, motorways and other major roads, and major pipelines.
Micrositing	The process of positioning individual structures to avoid localised environmental or technical constraints. A limit of deviation of 100m horizontal and 20% vertical for towers, and a 50m limit of deviation for tracks is proposed for this project.
Minor Crossing	Minor crossings include all road crossing and minor watercourses not considered major. Private tracks and driveways may also be considered where the need for access to be maintained is present, or where relatively high traffic volumes are anticipated.
Mitigation	Term used to indicate avoidance, remediation, or alleviation of adverse impacts.

Term	Definition
National Scenic Area (NSA)	A national level designation applied to those landscapes considered to be of exceptional scenic value.
Operational Corridor	The area needed for the safe operation and maintenance of the Overhead Line.
Ordnance Survey (OS)	Ordnance Survey is the national mapping agency for Great Britain.
Overhead line (OHL)	An electric line installed above ground, usually supported by lattice steel towers or trident wood poles.
Proposed Development	The construction and operation of the 132 kV overhead line and underground cable to connect the Blarghour Wind Farm to the proposed Creag Dhubh Substation.
RAG	Red/Amber/Green, rating applied for the comparative appraisal.
Report on Consultation Document	A report that documents the result of a consultation process.
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'.
Semi-natural Woodland	Woodland that does not obviously originate from planting. The distribution of species will generally reflect the variations in the site and the soil. Planted trees must account for less than 30% of the canopy composition.
Sites of Special Scientific Interest (SSSI)	<p>Areas of land and water that are designated for their natural heritage in terms of:</p> <ul style="list-style-type: none"> • flora – i.e. plants • fauna – i.e. animals • geology – i.e. rocks • geomorphology – i.e. landforms • a mixture of these natural features <p>SSSI's form a set of nationally important natural areas in the UK. SSSIs in Scotland are notified by NatureScot under powers granted by the Nature Conservation (Scotland) Act 2004.</p> <p>The aim of the SSSI network is to maintain an adequate representation of all natural and semi-natural habitats and native species across Britain.</p>
Sky-lining	The process of positioning an overhead line along the top of an elevated area.
Special Area of Conservation (SAC)	SACs in Scotland are designated by Scottish Ministers under the EC Habitats Directive (Directive 92/43/EEC). They are areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive.
Special Protection Area (SPA)	An area designated under the Wild Birds Directive (Directive 74/409/EEC) to protect important bird habitats. Implemented under the Wildlife and Countryside Act 1981.
SSEN Transmission	Scottish and Southern Energy Networks Transmission.

Term	Definition
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.
Substation	Part of the electrical transmission and distribution system that transforms voltage from high to low, or the reverse, before switching to another electricity network.
Terminal Pole	A pole required where the line terminates either at a substation or at the beginning and end of an underground cable section.
The National Grid	The electricity transmission network in Great Britain.
Underground Cable (UGC)	An electric line installed below ground.
Volts	The international unit of electric potential and electromotive force.
VP	Vantage Point
Wild Land Area (WLA)	Those areas comprising the greatest and most extensive areas of wild characteristics within Scotland.
Wirescape Impact	A landscape dominated by overhead wires.

PREFACE

This Consultation Document has been prepared by ERM on behalf of Scottish and Southern Electricity Networks Transmission (SSEN Transmission), to seek comments from all interested parties on the Blarghour Wind Farm Connection project.

This Consultation Document is available online at: <https://www.ssen-transmission.co.uk/projects/blarghour-wind-farm-connection-project/>.

Public consultation face to face and virtual events detailing the proposals described in this document will be held at the following times:

Face to Face Public Consultation Event:

Tuesday 18th and Wednesday 19th May 2022, from 2pm - 7pm, Loch Fyne Hotel, Inveraray, PA32 8XT.

Virtual Exhibition Live Chat Sessions:

Tuesday 24th and Wednesday 25th May 2022, from 5pm-7pm.

Chat sessions can be accessed using the link below:

<https://www.ssen-transmission.co.uk/projects/blarghour-wind-farm-connection-project/>

Comments on this document should be sent to:

Caitlin Quinn
Scottish & Southern Electricity Networks (SSEN) Transmission
Inveralmond House
200 Dunkeld Road
Perth, PH1 3AQ
Email: Caitlin.Quinn@sse.com
Mobile: 07901 135758

All comments are requested by **Monday 6th June 2022**

EXECUTIVE SUMMARY

SSEN Transmission is proposing to construct and operate a 132 kV overhead line (OHL) to connect the Blarghour Wind Farm to the proposed Creag Dhubh Substation (the 'proposed development'). Coriolis Energy and ESB are the developer for Blarghour Wind Farm which was consented on 29th October 2021. The 73.1 MW wind farm requires a single circuit 132 kV connection from the wind farm substation compound and terminating at the proposed Creag Dhubh Substation.

Two route options have been identified to achieve the connection and these have been appraised against environmental, engineering and economic criteria. This Consultation Document invites comments from all interested parties on the two route options under consideration.

The key environmental considerations are impacts on peatland habitats, collision and barrier effects (e.g. golden eagle) on protected bird species, cultural heritage and landscape and visual impacts. The key engineering considerations are clearance distances from existing infrastructure, peat, access for construction and maintenance, and elevation of the route options.

Through the environmental appraisal, Route 2 was identified as having a lower magnitude of impact on Annex 1 peat and blanket bog habitat. Both route options have cultural heritage features within the 2 km study area that may experience effects to settings. Route 2 has the greatest potential due a higher number of scheduled monuments, Class A Listed Buildings and undesignated assets, which are found within the route corridor.

From an engineering perspective Route 2 is preferred. This is because the constraints present along the route option are better understood as a result of SSEN Transmission's current and planned works in the area. Although Route 1 scored a lower engineering risk rating, challenges are presented due to the presence of peatland and the high altitude, the combination of which are likely to highly restrict and impact the selection of a suitable tower/pole structure.

The economic appraisal identified Route 2 as significantly less costly than Route 1.

The overall preferred route for the connection between Blarghour Wind Farm and the proposed Creag Dhubh Substation is therefore Route 2, achieved through consideration of environmental, engineering and economic appraisals of both route options.

Face to face consultation events will be held at Loch Fyne Hotel on 18th and 19th May between 2pm and 7pm. We will also hold Virtual Exhibition Live Chat Sessions on Tuesday 24th and Wednesday 25th May 2022, from 5pm-7pm. Meetings will be arranged with statutory and other stakeholders. The responses received, and those sought from statutory consultees and other key stakeholders will inform further consideration and design of the preferred route leading to the identification of a proposed route to take forward to the alignment and consenting stages.

Please submit your comments to Caitlin Quinn, Community Liaison Manager, SSEN Transmission, Inveralmond House, 200 Dunkeld Road, Perth, PH1 3AQ (Caitlin.quinn@sse.com). All comments are requested by 6th June 2022.

1. INTRODUCTION

1.1 Purpose of this Document

SSEN Transmission is proposing to construct and operate a 132 kV overhead line (OHL) connection to connect Blarghour Wind Farm to the proposed Creag Dhubh Substation (the 'proposed development'). This Consultation Document invites comments from all interested parties on the two route options under consideration (see Figure 1).

This document presents the findings of an environmental, engineering and cost appraisal of the two route options identified by SSEN Transmission, and describes the process by which a preferred route for the OHL has been selected. The preferred route is considered to provide the optimal opportunity to achieve an economically viable, technically feasible and environmentally sound alignment within it.

1.2 Document Structure

This Consultation Document comprises the following sections:

- Section 1: Introduction
- Section 2: The need for the proposals – describes the project need, the project overview, and consultation history;
- Section 3: Route selection process – describes the process for selecting the route, based on environmental, engineering and economic considerations;
- Section 4: Description of routes – describes the identification of route options and provides a summary of each route option (1 and 2);
- Section 5: Comparative appraisal – a summary of the environmental, engineering and economic topics, followed by a comparative analysis summary and a description of the Preferred Route; and
- Section 6: Consultation on the proposals – invites comments on the preferred option process, the identification of preferred route and next steps.

1.3 Next Steps

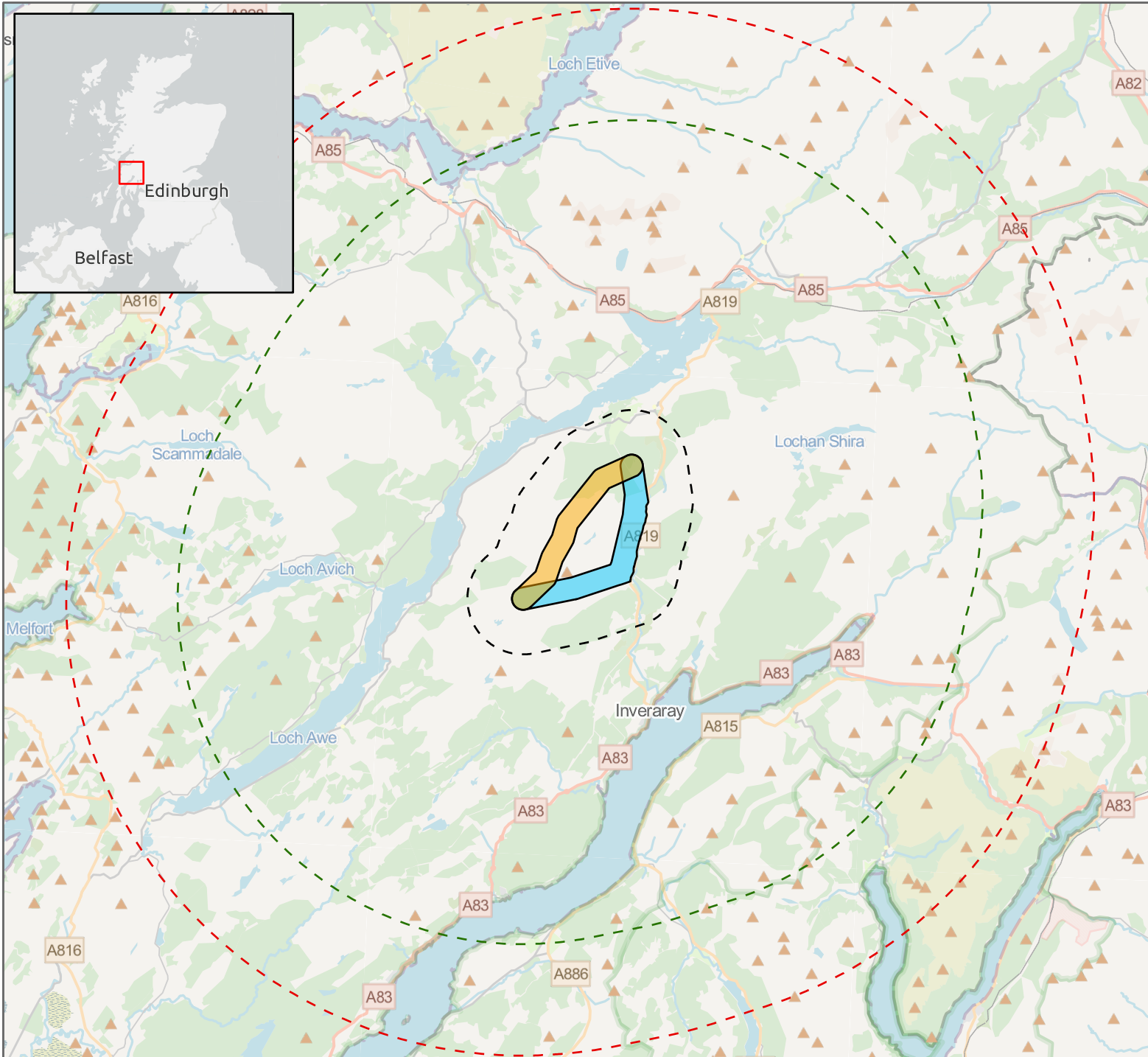
As part of the consultation exercise, comments are sought from members of the public, statutory consultees, and other stakeholders on the preferred route option put forward in this report.

A Report on Consultation will be published after the consultation period has ended, which will document the consultation responses received, and the decisions made considering these responses to select a Proposed Route. The Proposed Route will go forward to Alignment Selection, Stage 3 (see Section 4.1).

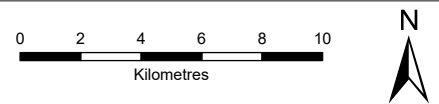
Further engineering and environmental studies will be undertaken to identify a Preferred Alignment within the Proposed Route. Consultation on a Preferred Alignment will be undertaken in Autumn / Winter 2022.

Upon completion of the alignment selection process, an Indicative Proposed Alignment will be selected and further technical and environmental assessment will be undertaken. This will culminate with an application to Scottish Ministers for consent for the construction and operation of an OHL under section 37 of the Electricity Act 1989.

The intention is to submit the application for consent in Spring / Summer 2023.



- Route 1
- Route 2
- Cultural Heritage Study Area - 2 km Buffer
- Landscape and Visual Study Area - 15 km Buffer
- Natural Heritage Study Area - 20 km Buffer



SCALE: See Scale Bar
 SIZE: A4
 PROJECT: 0612294
 DATE: 10/05/2022

VERSION: A01
 DRAWN: DN
 CHECKED: SC
 APPROVED: KG

Figure 1
Blarghour Route Options & Study Areas



PROJECTION: British National Grid

2. THE PROPOSALS

2.1 Need for the Project

Scottish Hydro Electric Transmission plc who, operating and known as Scottish and Southern Electricity Networks Transmission (SSEN Transmission), holds a licence under the Electricity Act 1989 to develop and maintain an efficient, co-ordinated, and economical system of electricity transmission in the north of Scotland and remote islands.

The developer of Blarghour Wind Farm has been granted consent¹ under Section 36 of the Electricity Act 1989 for a 73.1 MW wind farm, which has a contracted connection date of April 2025. SSEN Transmission has a statutory duty under Schedule 9 of the Electricity Act 1989 to connect the new development to the transmission network by the contracted connection date (“The Proposed Development”).

The development is in line with SSEN Transmission’s commitment and licence obligation to facilitate the connection of renewables generators to the grid through an economical, efficient and coordinated approach to transmission reinforcement.

2.2 Project Overview

Two types of technology solution have been proposed and appraised:

- Routes comprised of trident wood pole; and
- Routes comprised of steel lattice tower structures.

The spacing between poles or towers would vary depending on topography, altitude, and land use but would likely be between 30 m to 250 m. If steel lattice towers are used, permanent access tracks are likely to be required to any angle and terminal tower locations, with temporary access tracks used to access all other towers. At this stage, it has been assumed that a typical average OHL pole or tower height will be 30 m above ground level. Figure 1 shows the routes that are presented in this Consultation Document. Plate 1 shows an example of a trident wood pole and steel lattice tower.



Plate 1: ‘H’ Trident Wood Pole and Steel Lattice Tower examples.

¹ <https://www.energyconsents.scot/ApplicationDetails.aspx?cr=EC00005267>

2.3 Construction Activities

Key tasks during construction are listed below. Alongside these activities, the construction would require the removal of sections of commercial forest, which would be undertaken in consultation with Scottish Forestry and affected landowners. After felling, any timber removed that is commercially viable would 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.

Key tasks during construction would involve:

1. Establishment of suitable laydown areas for material and installation of temporary track solutions as necessary;
2. Establishment of temporary construction compounds/welfare units;
3. Upgrades to existing tracks and potentially new tracks where required;
4. Delivery of structures and materials to site;
5. Assembly and erection of steel lattice and wood pole structures and stays; and
6. Stringing of conductors using hauling ropes and winches.
7. It may be necessary to install a short section of underground cable to facilitate entry into the wind farm and proposed Creag Dhubh Substation.

Installation of the wood poles would involve:

1. Excavate a suitable area for the wood poles, and backfilling after installation of the pole;
2. In some pole locations, it may be necessary to add imported hard-core backfill around the pole foundations to provide stability in areas where the natural sub soils have poor compaction qualities;
3. In some pole locations where shallow bedrock is present, it may be necessary to break or remove rock to accommodate pole foundations;
4. Conductors would be installed on the wood poles using full tension stringing to prevent the conductor coming into contact with the ground; and
5. Remedial works to reinstate the immediate vicinity of the structure, and any ground disturbed, to pre-existing use.

Installation of steel lattice towers would involve:

1. Excavate a suitable area for the tower pad;
2. Installation of foundation; either concrete pad and column, raft, piled or rock anchor;
3. Erection of towers;
4. Conductors would be installed using full tension stringing to prevent the conductor coming into contact with the ground; and
5. Remedial works to reinstate the immediate vicinity of the structure, and any ground disturbed, to pre-existing use.

3. ROUTE SELECTION PROCESS

3.1 Guidance Documents

The approach to route selection is informed by the following SSEN Transmission guidance:

- Procedures for Routeing Overhead Lines and Underground Cables of 132kV or above, SHE Transmission, 2020 (PR-NET-ENV-501)
- Biodiversity Net Gain Flow Chart, Guidance and Project Toolkit (FC-NET-ENV-500)

The guidance develops a process which aims to balance environmental, engineering and economic considerations throughout a staged route options process.

The principal routeing stages are:

- Stage 0: Routeing Strategy Development;
- Stage 1: Corridor Selection;
- Stage 2: Route Selection; and
- Stage 3: Alignment Selection.

For certain projects, such as Blarghour Wind Farm connection, Stage 1 is not required due to the small scale of the project. As a result, this consultation document presents the appraisal completed at Stage 2 – Route Selection.

In consideration of the above, the method of identifying a preferred route option in this study has involved the following four key tasks:

- Identification of the baseline;
- Identification of alternative route options;
- Environmental, engineering and economic analysis of route options; and
- Identification of a preferred route option.

3.2 Main Considerations

Route options were identified following appraisals, which considered the constraints identified during the desk-based baseline studies. The following has been taken into account during route selection (Stage 2) and will be considered in more detail at the next stage - alignment selection (Stage 3).

- 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 sky lining 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 apparent height of towers 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 impact; and
- Consider technical issues related to clearances, connectivity, outages, maintenance, and faults.

3.3 Baseline Conditions

The following information sources have informed the desk based baseline study to identify potential environmental constraints within and adjacent to the route options. The study area applied for natural heritage features was 20 km, for landscape and visual 15 km, and cultural heritage 2 km (Figure 1).

- Identification of environmental designated sites and other constraints, utilising GIS datasets available via Site Link and other sources. These include:

- Special Areas of Conservation (SAC);
 - Special Protection Areas (SPA);
 - Proposed Special Protection Areas (pSPA);
 - Sites of Special Scientific Interest (SSSI);
 - National Scenic Area (NSA);
 - Wild Land Areas (WLA);
 - Royal Society for the Protection of Birds (RSPB) reserves;
 - Land capability for agriculture;
 - Geological Conservation Review Sites;
 - Carbon-rich soil, deep peat and priority peatland habitats; and
 - Areas at risk of flooding (SEPA flood map ⁽²⁾).
- Identification of archaeological designations and other recorded sites, utilising GIS datasets available via Historic Environment Scotland Data Services and Local Historic Environment Teams. These include:
 - World Heritage Sites (WHS) and buffers;
 - Scheduled Monuments;
 - Category A, B and C listed buildings; and
 - Gardens and Designed Landscapes.
 - Review of the Argyll and Bute Council Local Development Plan 2015 to identify local policies and further environmental constraints and opportunities, such as Local Nature Conservation Sites (LNCS), core paths or other locations important to the public;
 - Review of landscape character assessments of relevance to the Study Area;
 - Review of Ordnance Survey (OS) mapping (1:50,000 and 1:25,000) and online GIS data sources from OS Open Data) and aerial photography (where available) to identify other potential constraints such as settlement, properties, walking routes, cycling routes etc.;
 - Extrapolation of OS Vectormap GIS data to identify further environmental constraint including locations of watercourses and waterbodies, roads classifications and degree of slope; and
 - Review of other local information through online and published media such as tourism sites.

Vantage point surveys are being undertaken in 2021/22 to understand the interaction between birds and potential overhead lines along the routes.

3.4 Appraisal Method

Appraisal of route options has involved systematic consideration against the following environmental, engineering and economic topic areas:

3.4.1 Environmental:

- Natural Heritage (Designations, Protected Species, Habitats, Ornithology and Geology, Hydrology and Hydrogeology);
- Cultural Heritage (Designations and Cultural Heritage Assets);
- People (Proximity to dwellings);
- Landscape (Designations and Character); and
- Land Use (Agriculture, Forestry and Recreation).

Environmental sensitivity has been considered qualitatively, based on professional judgement and utilising the Red, Amber, Green (RAG) rating. It has been applied to each topic area indicating potential impacts. This rating is based on a four-point scale as described in Table 1 below. SSEN Transmission guidance “Procedures for Routing Overhead Lines of 132 kV or above” (Section 3.1) has been followed.

(2) <http://map.sepa.org.uk/floodmap/map.htm>

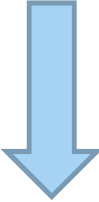
	Most Preferred	No Impact	
	Lower Impact		High potential to accommodate the required infrastructure within the context of the consideration appraised
	Moderate Impact		Moderate potential to accommodate the required infrastructure within the context of the consideration appraised
	Least Preferred	Higher Impact	

Table 1: Environmental RAG Rating for Comparative Analysis.

3.4.2 Engineering:

- Infrastructure crossings – major crossings, road crossings;
- Environmental design – elevation, atmospheric pollution, contaminated land, flooding;
- Ground conditions – terrain, peat;
- Construction/Maintenance – access;
- Proximity – clearance distance, communication masts, metallic pipelines.

Engineering sensitivity has been considered qualitatively, based on professional judgement and utilising the Red, Amber, Green (RAG) rating. It has been applied to each topic area indicating potential impacts. This rating is based on a four-point scale as described in Table 2 below. SSEN Transmission guidance “Procedures for Routeing Overhead Lines of 132 kV or above” (Section 3.1) has been followed.

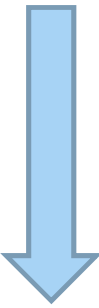
	Most Preferred	No Impact	
	Lower Impact		High potential to accommodate the required infrastructure within the context of the consideration appraised.
	Moderate Impact		Moderate potential to accommodate the required infrastructure within the context of the consideration appraised.
	Least Preferred	Higher Impact	

Table 2: Engineering RAG Rating for comparative analysis.

3.4.3 Cost:

Appraisal of route options has involved systematic consideration against capital cost including construction, diversions, public road improvements, felling and land assembly.

To allow comparative appraisal a Red, Amber, Green (RAG) rating has been applied using the criteria described in Table 3.

Red	Amber	Green
>140% of least cost option	120-140% of least cost option	< 120% of least cost option

Table 3: Cost RAG Rating for Comparative Analysis

4. DESCRIPTION OF ROUTES

4.1 Identification of Route Options

4.1.1 Route 1

Route 1 heads north east from the Blarghour Wind Farm following the Cruach Mhor ridge line to the proposed Creag Dhubh Substation. Upon exiting the Blarghour Wind Farm substation, the route passes multiple existing turbines in the south of the wind farm. The total length of this route is 9 km.

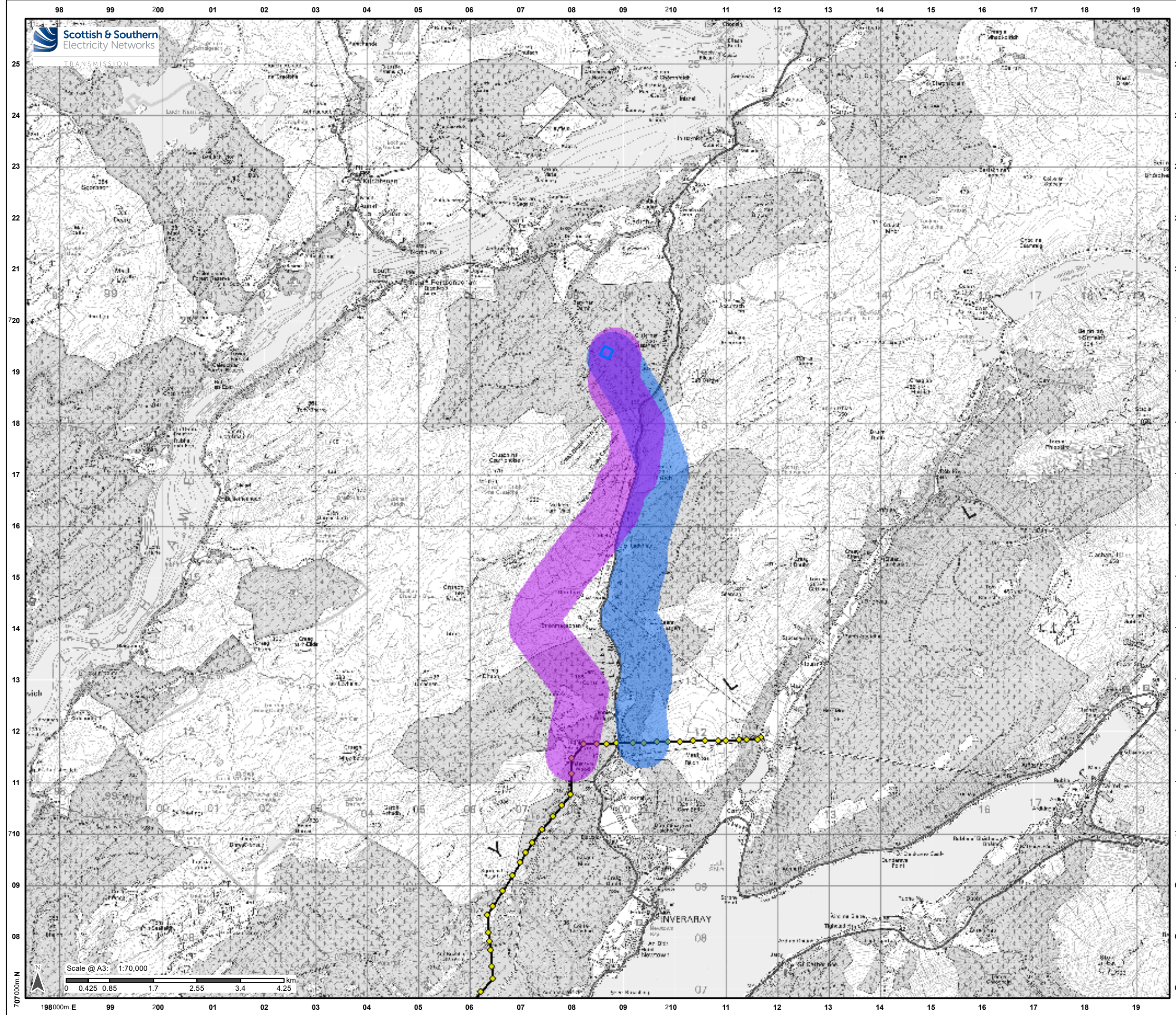
4.1.2 Route 2

Route 2 heads east from the Blarghour Wind Farm substation towards Drimfern. The route then continues north through Glen Aray following a similar route to the existing Inveraray to Taynuilt OHL, running west of the A819 before terminating at the proposed Creag Dhubh Substation. The total length of this route is 9 km.

To Note: Route 2 overlaps with the proposed Creag Dhubh – Inveraray 275 kV OHL where it runs adjacent to the A819 road (Figure 2). The Creag Dhubh to Inveraray project involves constructing nearly 9 km of new 275 kV OHL, supported by steel lattice towers, between the proposed substation at Creag Dhubh and a connection point at Tower 18 on the recently constructed Inveraray to Crossaig OHL.

Once the Creag Dhubh to Inveraray OHL is operational, the existing 132kV Inveraray to Taynuilt OHL between Inveraray and the proposed Creag Dhubh Substation will be removed. The remaining section from Creag Dhubh Substation to Taynuilt will not be altered during this project.

Further information on the Creag Dhubh to Inveraray project can be found here: <https://www.ssen-transmission.co.uk/projects/creag-dhubh-inveraray-275kv-overhead-line/>



Legend

- Inveraray - Crossaig Towers
- Inveraray - Crossaig OHL
- Proposed Route
- Original Proposed Route
- Proposed Creag Dhubh Substation
- Figure Extent



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Project No: LT000194

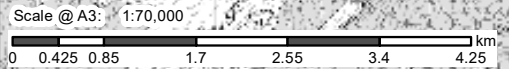
Project: 1620011091

Title: Creag Dhubh to Inveraray 275 kV Overhead Line

Figure 2.1: Original Proposed Route and New Proposed Route

Drawn by: NJ Date: 23/02/2022

Drawing: R162_11091_Fig2.1_OriginalProposedRoute_1



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5. ENVIRONMENTAL, ENGINEERING AND COST APPRAISAL

5.1 Introduction

This section presents a summary of the environmental, engineering and economic appraisal of the route options.

5.2 Route 1

5.2.1 Environmental Baseline and Appraisal

Route 1 begins at the Blarghour Wind Farm, and passes north east through an area of open craggy upland/moorland Landscape Character Type (LCT)³ within a medium - large scale landscape. In the north, Route 1 travels through an area of commercial forestry as it connects into the proposed Creag Dhubh Substation. Approximately half of Route 1 is located within an undesignated landscape, and the northern half is located within the North Argyll Area of Panoramic Quality (APQ) (Figure 3). The landscape is lightly settled with very few residential properties and settlements, the closest settlement being Ardbrecknish at the most northern part of the route. As the route is centrally situated within the craggy upland landscape, it is distant from visual receptors for long sections of the route.

Route 1 does not pass through any internationally, nationally, locally or non-statutory designated sites. However, proximity to Glen Etive and Glen Fyne SPA (1 km to the east at the closest point), mean there is potential for barrier and collision impacts to Schedule 1 species (golden eagle), as they may pass through the route to access the designated site. Further potential risks to natural heritage that have been identified in a desk based assessment are:

- Direct impacts on significant areas of blanket bog and peat⁴; and,
- Impact to European and nationally protected species that may be present.

There are no designated cultural heritage assets within Route 1. There are 17 scheduled monuments, six Listed Buildings, and two Garden and Designed Landscapes within the wider 2 km study area. These may be sensitive to settings impacts, and thus will require further assessment at alignment stage.

Route 1 passes through areas of commercial forestry that would need to be felled to create an operational corridor and access tracks for the proposed OHL. The extent of tree-felling would depend on the final alignment. This may affect the commercial viability of the existing forestry within a limited area surrounding the proposed development.

The environmental appraisal is provided in Table 4.

Route	RAG Impact Rating - Environmental														
	Natural Heritage					Cultural Heritage		People	Landscape			Land Use			Planning
	Designations	Protected Species	Habitats	Hydrology/geology	Ornithology	Designated	Assets		Designations	Character	Visual	Agriculture	Forestry	Recreation	
Route 1	M	L	H	M	M	M	L	L	M	M	M	L	M	L	M

³ NatureScot (2019) Scottish Landscape Character Types Map & Descriptions. Available online at: <https://www.nature.scot/professional-advice/landscape/landscape-character-assessment/scottish-landscape-character-types-map-and-descriptions>.

⁴ Blanket bog and peat are an Annex 1 Habitat. Annex 1 lists the specific habitats which have been designated as a Special Area of Conservation, to which common EU-wide legislation applies.

Table 4: Route 1 Environmental RAG Impact Rating.

5.2.2 Engineering Baseline and Appraisal

Route 1 has no major crossings such as railways, major roads, rivers, major pipelines, or other significant infrastructure. There are three minor crossings that will need to be considered along Route 1, including two minor roads/track and one watercourse.

Route 1 is within an area of high elevation. High elevations increase wind and ice loading on the lines, resulting in the need for shorter spans or stronger structures such as steel towers. This can constrain routeing options and increase cost. Additionally, access for construction and maintenance tends to be more difficult at altitude and the risk of severe weather is greater. All of Route 1 is over 200 m AOD⁵, with 94% over 300 m AOD. For wood poles to be used for an OHL, generally elevations above 300 m AOD are less favourable, which may mean steel lattice towers must be used for the majority of the route corridor. The maximum elevation is 520 m.

Areas vulnerable to flooding pose a potential risk during construction, which may prevent maintenance and can pose a physical risk to structures during flood events. Using the SEPA flood map⁶, Route 1 was found to have 5% of the route within a 1 in 200-year flood zone, which shows intermediate potential for development constraints due to flooding.

Steep or mountainous slopes present significant difficulty for routeing, access, construction and maintenance, and areas with a large proportion of slopes can be costlier to build and maintain. Where maximum and average slope gradients are identified to be below 40%, a route is deemed to have low potential to constrain the development. Route 1 has an average gradient of 7.1%, and a maximum gradient of 18.9%.

Routes with a large area of peatland are more likely to be constrained, and thus more difficult and costly to build and maintain. There is a significant amount Class 2⁷ peat in Route 1 (approx. 67% of the route centreline or 5.17 km²), which will be difficult to avoid during construction and maintenance. Route 1 also has a limited existing road network, therefore a larger area of peatland would need to be disturbed in order to construct access tracks to the route corridor.

Route 1 has good clearance from any buildings, properties, or communication masts, with none identified within the route corridor. In regards to clearance from wind farms, excluding Blarghour Wind Farm, there are two other wind farms identified within the region; the Ladyfield Wind Farm and An Suidhe Wind Farm located to the south of Route 1. Upon exiting Blarghour Substation Route 1 passes four proposed turbines, which will cause the alignment to be pushed to the southern extremity of the route in order to maintain the required, three times rotor diameter clearance.

There is no known evidence of contaminated land. Surveys are underway to establish the presence or absence of Unexploded Ordnance (UXOs) within Route 1.

The engineering appraisal is provided in Table 5.

⁵ AOD: Above Ordnance Datum

⁶ SEPA Flood Map:

⁷ Class 1: Nationally important carbon-rich soils, deep peat and priority peatland habitat. These are areas likely to be of high conservation value. Class 2: Nationally important carbon-rich soils, deep peat and priority peatland habitat. These are areas of potentially high conservation value and restoration potential. Available at: <https://soils.environment.gov.scot/>

Route	RAG Impact Rating - Engineering											
	Infrastructure Crossings		Environmental Design			Ground Conditions		Construction and Maintenance	Proximity		Other Considerations	
	Major Crossings	Minor Crossings	Elevation	Contaminated Land	Flooding	Terrain	Peatland	Access	Clearance	Windfarms	Communication Masts	Route Length
Route 1	L	L	H	L	M	L	H	M	L	M	L	L

Table 5: Route 1 Engineering RAG Impact Rating.

5.2.3 Economic Appraisal

The approximate construction cost of the route has been calculated based on a standard per km rate derived from SSEN Transmission's experience of similar projects.

Route 1 has the highest capital cost of the two route options, it is 184% above the lowest cost route option due to a number of factors, including but not limited to: high altitudes, undulating topography and peatland areas. Operations (inspection and maintenance) have been allocated an amber rating due to the access difficulties and high altitudes of Route 1. Overall Route 1 has a red RAG rating due to the capital cost.


















The cost appraisal is provided in Table 6.

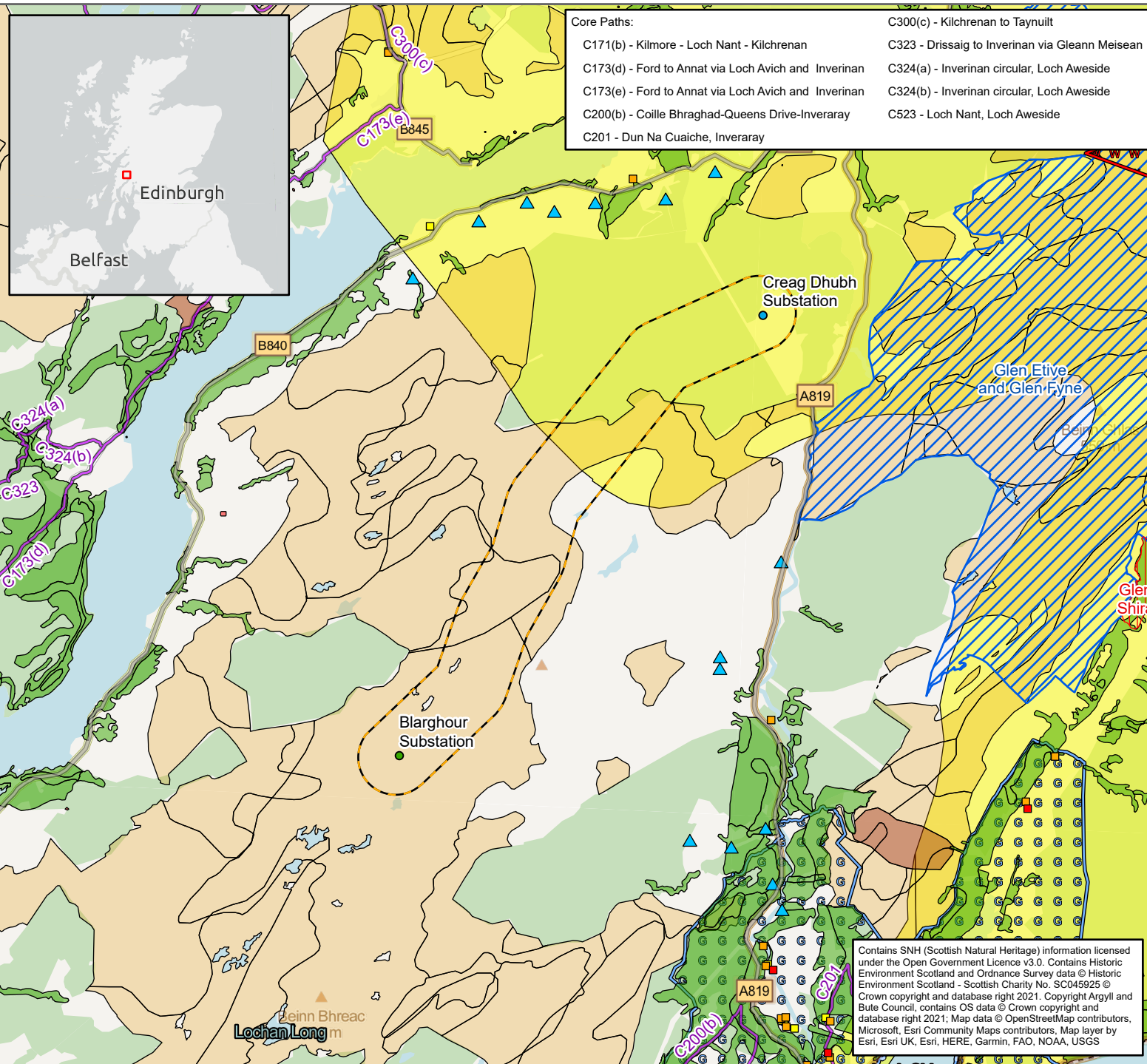
Route	RAG Impact Rating – Cost								
	Capital	Diversions	Public Road Improvement	Tree Felling	Land Assembly	Consent Mitigations	Inspections	Maintenance	Total Cost
Route 1	H	L	L	L	L	L	M	M	H (184%)

Table 6: Cost RAG Rating for Route 1

Core Paths:

C171(b) - Kilmore - Loch Nant - Kilchrenan	C300(c) - Kilchrenan to Taynult
C173(d) - Ford to Annat via Loch Avich and Inverinan	C323 - Drissaig to Inverinan via Gleann Meisean
C173(e) - Ford to Annat via Loch Avich and Inverinan	C324(a) - Inverinan circular, Loch Awe side
C200(b) - Coille Bhraghaid-Queens Drive-Inveraray	C324(b) - Inverinan circular, Loch Awe side
C201 - Dun Na Cuaiche, Inveraray	C523 - Loch Nant, Loch Awe side

-  Route 1
-  Creag Dhubh Substation
-  Blarghour Substation
-  Private Water Supply
-  Category A Listed Building
-  Category B Listed Building
-  Category C Listed Building
-  Core Path
-  Scheduled Monument
-  Ancient Woodland Inventory
-  Wild Land
-  Special Area of Conservation (SAC)
-  Special Protection Area (SPA)
-  Garden and/or Designed Landscape
-  Class 1 Carbon and Peatland
-  Class 2 Carbon and Peatland
-  Area of Panoramic Quality



SCALE: See Scale Bar	VERSION: A02
SIZE: A4	DRAWN: DN
PROJECT: 0612294	CHECKED: SC
DATE: 10/05/2022	APPROVED: KG

Figure 3
Blarghour Route 1 Environmental and Heritage Constraints

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PROJECTION: British National Grid

5.3 Route 2

5.3.1 Environmental Baseline and Appraisal

Route 2 begins within the Blarghour Wnd Farm, and passes east through an area of open craggy upland/moorland LCT within a medium - large scale landscape. As the route continues east, it enters the smaller scale landscape of Glen Aray, where the route meets the A819 and re-directs north towards the proposed Creag Dhubh Substation.

In the north, Route 2 travels through an area of commercial forestry as it connects into the proposed substation. The North Argyll APQ lies within the route corridor in the north, covering approximately a quarter of the route (Figure 4). The landscape is lightly settled with few residential properties and settlements, the closest settlement being Tullich, which the route passes through, where it runs adjacent to the A819 road. In this section, along the A819, the route encompasses farmsteads, with the lower fields forming important grazing land for livestock. Route 2 is situated centrally within the craggy upland, and distant from visual receptors for approximately half of the route, with potential for longer distant views from the local road network to the north west and north. Within Glen Aray, there is the potential for views of Route 2 from the local road network and farm properties, viewed alongside the existing Taynuilt to Inveraray 132kV OHL route, where the route is out with forestry. There is potential for visibility of the OHL from the C31 core path, situated approx. 4km to the north.

Route 2 does not pass through any internationally, nationally, locally or non-statutory designated sites. However, proximity to Glen Etive and Glen Fyne SPA (100 m at the closest point (Figure 4)), mean there is potential for barrier and collision impacts to Schedule 1 species, as they may pass through the route corridor to access the designated site. Further potential risks to natural heritage that have been identified in a desk based assessment are:

- Direct impacts on significant areas of blanket bog and peat intersected by the route;
- Impact on areas of semi natural ancient woodland, which may be possible to avoid through design at alignment stage; and
- Impact to European and nationally protected species that may be present.

There are no designated cultural heritage assets within Route 2. There are 15 scheduled monuments, 31 Listed Buildings, and one Garden and Designed Landscape within the wider 2 km study area. These may be sensitive to settings impacts, and thus will require further assessment at alignment stage. In addition to this, there are 15 known non-designated heritage assets within the route. These include the historic rural townships of Tullich and Drimfern that consist of six to nine historic buildings, with an association to the immediate connected field system and enclosures, as well portions of the historic Military road from Tyndrum to Inveraray.

Route 2 passes through areas of commercial forestry that would need to be felled to create an operational corridor and access tracks for the proposed OHL. The extent of tree-felling would depend on the final alignment. This may affect the commercial viability of the existing forestry within a limited area surrounding the proposed development.

Route 2 has three Private Water Supplies (PWS) within the route that will be considered at alignment stage.

The environmental appraisal is provided in Table 7.

Route	RAG Impact Rating - Environmental														
	Natural Heritage					Cultural Heritage		People	Landscape			Land Use			Planning
	Designations	Protected Species	Habitats	Hydrology/geology	Ornithology	Designated	Non designated		Designations	Character	Visual	Agriculture	Forestry	Recreation	
Route 2	M	L	H	M	M	M	M	M	M	M	M	L	M	L	M

Table 7: Route 2 Environmental RAG Impact Rating.

5.3.2 Engineering Baseline and Appraisal

Route 2 connects from Blarghour Wind Farm to the proposed Creag Dhubh Substation, with approximately 9 km of OHL. Major crossings require specific OHL solutions and can greatly constrain a design, and along Route 2, the 132 kV Inveraray – Taynuilt double circuit OHL will need to be crossed as the route approaches the A819, or upon entry into the proposed Creag Dhubh Substation. A further consideration is the future need to replace the insulators and associated fittings on the Taynuilt – Inveraray double circuit OHL between Creag Dhubh and Taynuilt and the removal of a section of the 132kV Inveraray – Taynuilt double circuit OHL between Creag Dhubh and Inveraray. The routing the new line will require careful programming and planning of works to avoid future construction constraints. There are three minor crossings that will need to be considered along Route 2, including one minor road/track and two watercourses. Route 2 has areas of high elevation. Over 50% of the route is over 200 m AOD, with 32% over 300 m AOD. Similarly to Route 1, this may mean steel lattice towers will need to be used instead of wood poles for sections of the route.

Using the SEPA flood map, Route 2 was found to have approximately 14% of the route within a 1 in 200-year flood zone, which shows high potential for development constraints due to flooding.

The maximum slope of Route 2 is 25.7%, with the average slope being 10.1%. As both of these are less than 40%, it is deemed to have low potential to constrain the development. Despite this, generally where wood pole lines are considered, the maximum slope gradient is reduced to 20%. If Route 2 is the preferred route, it may be possible to reduce the gradient by micrositing of the poles, and therefore eliminate the need for steel lattice structures.

There is a significant amount of Class 2 peat in Route 2 (approx. 41% of the route centreline), which will be difficult to avoid during construction and maintenance. Despite this, Route 2 has the smallest overall area of peatland (Route 2 = 3.23 km², Route 1 = 5.17 km²) of the two route options. Route 2 also has good access as there are numerous existing tracks and minor roads within 1 km, which may help limit peat disturbance and damage.

Route 2 has four buildings/properties identified within the route corridor. In some areas along the 1 km wide route corridor, it may not be feasible to maintain an excess of 250 m clearance from the buildings. In addition, there are two communication masts within the route. OHLs can block existing line of sights for telecommunication masts and thus the line of sights from masts can constrain structure locations. Should Route 2 be selected, the line of sight will be assessed to ensure the OHL does not interfere with the communication masts. Route 2 has good clearance from any nearby wind farms.

There is no known evidence of contaminated land. Surveys are underway to establish the presence or absence of Unexploded Ordnance (UXOs) within Route 2.

The engineering appraisal is provided in Table 8.

Route	RAG Impact Rating - Engineering											
	Infrastructure Crossings		Environmental Design			Ground Conditions		Construction and Maintenance	Proximity			Other Considerations
	Major Crossings	Minor Crossings	Elevation	Contaminated Land	Flooding	Terrain	Peatland	Access	Clearance from Buildings	Windfarms	Communication Masts	Route Length
Route 2	M	L	H	L	H	L	H	L	H	L	H	L

Table 8: Route 2 Engineering RAG Impact Rating.

5.3.3 Economic Appraisal

The approximate construction cost of this route option has been calculated based on a standard per km rate derived from SSEN Transmission’s experience of similar projects.

Route 2 has the lowest capital cost of the two route options and is rated as Green as the cost difference between the different route options is high. Operations (inspection and maintenance) have been allocated a green rating due to proximity to the A819 and general ease of access routes with respect to other OHL infrastructure projects within the vicinity. No public road improvements or tree felling is expected on Route 2. Route 2 has an amber RAG rating for diversions as the existing 132 kV Inveraray – Taynuilt double circuit OHL may have to be temporarily diverted to accommodate the Blarghour Wind Farm Connection OHL route.

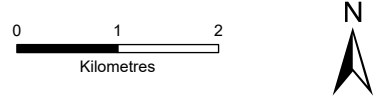
Overall Route 2 has a green RAG rating due to it being a significantly lower cost to the alternative Route 1. The cost appraisal is provided in Table 9.

Route	RAG Impact Rating – Cost								
	Capital	Diversions	Public Road Improvement	Tree Felling	Land Assembly	Consent Mitigations	Inspections	Maintenance	Total Cost
Route 2	L	M	L	L	L	L	L	L	L

Table 9: Cost RAG Rating for Route 2.

- Core Paths:**
- C171(b) - Kilmore - Loch Nant - Kilchrenan
 - C173(d) - Ford to Annat via Loch Avich and Inverinan
 - C173(e) - Ford to Annat via Loch Avich and Inverinan
 - C200(b) - Coille Bhraghad-Queens Drive-Inveraray
 - C201 - Dun Na Cuaiche, Inveraray
 - C300(c) - Kilchrenan to Taynuilt
 - C323 - Drissaig to Inverinan via Gleann Meisean
 - C324(a) - Inverinan circular, Loch Aweaside
 - C324(b) - Inverinan circular, Loch Aweaside
 - C523 - Loch Nant, Loch Aweaside

- Route 2
- Creag Dhubb Substation
- Blarghour Substation
- Private Water Supply
- Category A Listed Building
- Category B Listed Building
- Category C Listed Building
- Core Path
- Scheduled Monument
- Ancient Woodland Inventory
- Wild Land
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- Garden and/or Designed Landscape
- Local Nature Conservation Site
- Class 1 Carbon and Peatland
- Class 2 Carbon and Peatland
- Area of Panoramic Quality



SCALE: See Scale Bar	VERSION: A02
SIZE: A4	DRAWN: DN
PROJECT: 0612294	CHECKED: SC
DATE: 10/05/2022	APPROVED: KG

Figure 4
Blarghour Route 2 Environmental and Heritage Constraints

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PROJECTION: British National Grid

5.4 Comparison of Routes and Preferred Option

5.4.1 Comparison of Routes 1 and 2

There are environmental and engineering challenges for both routes. From an environmental perspective, both route options have the potential to result in barrier and collision effects on Schedule 1 bird species, some of which are associated with the nearby Glen Fyne and Glen Etive SPA. Both route options also have the potential to impact sensitive peatland habitats. However, Route 1 contains a much larger area of peat within the route (Route 2 = 3.23 km², Route 1 = 5.17 km²), so the impact will be greater for this route option. Route 2 contains sensitive ancient woodland habitat, however it is expected that direct impact can be avoided through micro-siting at alignment stage. Both route options have cultural heritage features within the 2 km study area, that may experience effects to settings. Route 2 has the greatest potential due a higher number of scheduled monuments, Class A Listed Buildings and undesignated assets, which are found within the route corridor. Whilst both route options have similar landscape and visual impacts, Route 2 may be preferable due to the ability to backcloth the OHL in Glen Aray, and route alongside existing electrical and road infrastructure.

From a technical perspective, Route 2 presents more challenges due to its increased risk of flooding, proximity to buildings/properties and communication masts. Route 2 also presents a challenge with the major crossing of the existing 132 kV Inveraray – Taynuilt double circuit OHL. Route 1 contains a larger area of peat and also has the poorest access of the two routes, which may mean further disturbance to peatland habitats in order to construct access roads. Route 1 is at higher elevation which is likely to highly restrict and impact the selection of a suitable tower/pole structure.

From an economic perspective Route 2 is preferred as it is significantly less costly than Route 1.

5.4.2 Selection of Preferred Route

From an environmental perspective Route 2 is marginally preferred. This is because Route 2 has a lower potential for impact to sensitive habitat including peat and blanket bog and there is a greater ability to backcloth the OHL in Glen Aray.

Route 2 is preferred because the constraints present along the route option are well understood given SSEN's current and planned works in the area. Although Route 1 scored a lower risk rating, challenges are presented due to the presence of peatland and the high altitude, the combination of which are likely to highly restrict and impact the selection of a suitable tower/pole structure.

From an economic perspective Route 2 is preferred as it is significantly less costly than Route 1.

The preferred route for the connection between the Blarghour Wind Farm and proposed Creag Dhubh Substation is Route 2. This is because the environmental, engineering and economic appraisals of Route 2 are all considered to be favourable over Route 1.

6. CONSULTATION ON THE PROPOSAL

6.1 Introduction

6.1.1 SSEN Transmission places great importance on, and is committed to, consultation and engagement with all parties and stakeholders likely to have an interest in proposals for new projects such as this. Stakeholder engagement is an essential part of an effective development process.

6.1.2 The proposals detailed in this report have been developed through environmental and technical analysis of various route options. The potential for environmental effects remains and further assessment and design will be important in giving detailed consideration to the development and integration of mitigation measures to address significant environmental effects identified.

When providing comment and feedback, SSEN Transmission would be grateful for your consideration of the questions below. We are keen to receive your views and comments in regards to the following:

- Do you feel sufficient information has been provided to enable you to understand what is being proposed and why?
- Which of the two options would you consider the best option for SSEN Transmission to develop? Please provide an explanation of your answer.
- Which of the two options would you consider the least preferable option for SSEN Transmission to develop? Please provide an explanation of your answer.
- Are there any potential risks or benefits associated with this project, that you believe have not been included in the Consultation Document?
- Do you have any other comments on the Proposed Development?

6.2 Next steps

6.2.1 A series of events will be held in May 2022 (see Preface) and meetings will be arranged with statutory and other stakeholders. The responses received, and those sought from statutory consultees and other key stakeholders will inform further consideration and design of the preferred route leading to the identification of a proposed route to take forward to the alignment and consenting stages.

Please submit your comments to:

Caitlin Quinn, Community Liaison Manager
Scottish and Southern Electricity Networks (SSEN) Transmission
Inveralmond House, 200 Dunkeld Road
Perth, PH1 3AQ
(catlin.quinn@sse.com)

All comments are requested by 6th June 2022.