

Sheirdrim 132 kV Wind Farm Connection

Consultation Document – Alignment Selection

September 2022



Rev								
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GLOSSARY

Term	Definition
ABC	Argyll and Bute Council
Alignment	A centre line of an overhead line route, along with location of key angle structures.
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.
Baseline Alignment	The Baseline Alignment aims to provide the optimal alignment within the Proposed Route, taking account of engineering criteria as per Table A7 of SSEN Transmission guidance.
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.
CEMP	Construction Environmental Management Plan
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. The corridor may vary in width along its length; in unconstrained areas it may be many kilometres wide.
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 (EIA) (Scotland) Regulations 2000 (as amended in 2008) used to systematically identify, predict, and assess the likely significant environmental impacts of a proposed project or development.
GEMP	General Environmental Management Plan
GWDTE	Groundwater Dependent Terrestrial Ecosystem

Habitat	Term most accurately meaning the place in which a species lives, but also used to describe plant communities or agglomerations of plant communities.
Indicative Proposed Alignment	An alignment for the overhead line identified following public consultation that is taken forward to EIA and detailed design.
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.
LOD	Limits of Deviation, an area which defines the practical limits within which micro-siting of the OHL infrastructure can occur within the terms of the s37 consent which is to be sought. The purpose of Limits of Deviation is to allow flexibility within a s37 consent for the final micro-siting of individual towers to respond to localised ground conditions, topography, engineering, and environmental constraints
LIDAR	A detection system which works on the principle of radar but uses light from a laser.
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.
Micro-siting	The process of positioning individual structures 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 lattice steel towers or poles.
OPGW	Optical fibre ground wire
PAC	Pre Application Consultation
PAN	Proposal of Application Notice
Plantation Woodland	Woodland of any age that obviously originated from planting.
Proposed Development	The Proposed Development comprises the construction and potation of a 132 kV overhead line (OHL) and underground cable (UGC) to connect the proposed Sheirdrim Wind Farm to Crossaig Substation with an approximate length of 8-11km. The wind farm site and substation are located approximately 11km south-west of Tarbert.
RAG	Red/Amber/Green, rating applied for the comparative appraisal. A high impact is shown as red, a medium impact is shown as amber, and a low impact is shown as green.
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.
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)	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.
Sky-lining	The process of positioning an overhead line along the top of an elevated area.
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 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
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.
Switching Station	A central node on the network where multiple lines of the same voltage can connect. Switches allow each line in and out to be controlled without affecting the other lines.
Underground Cable (UGC)	An electric line installed below ground.
UXO	Unexploded ordnance
Volts	The international unit of electric potential and electromotive force.
Wayleave	A voluntary agreement entered into between a landowner upon whose land an overhead line is to be constructed and SSEN Transmission.
132 kV	132 kilo-volt capacity electricity power line

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 proposed Sheirdrim Wind Farm Connection project.

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

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

- Tuesday 27th September 2022 Whitehouse Village Hall, Tarbert A29 6XR – 2pm till 7pm
- Wednesday 28th September 2022 Skipness Village Hall PA29 6XT - 2pm till 7pm

Virtual Event: You can also view the proposals online using the virtual consultation room. Live Instant Message (IM) chats with the project team will be held on:

- Thursday 6th October 5pm till 7pm

The virtual event can be accessed via the project website: <https://www.ssen-transmission.co.uk/projects/sheirdrim-wind-farm-connection/>

Comments on this document should be sent to:

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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 Tuesday 18th October 2022

1. EXECUTIVE SUMMARY

SSEN Transmission is proposing to construct and operate a 132 kV overhead line (OHL) and Underground Cable (UGC) to connect the proposed Sheirdrim Wind Farm to the existing Crossaig Substation (the 'proposed development'). The developer for Sheirdrim Wind Farm has a contracted connection date of April 2026. The 84 MW wind farm requires a single circuit 132 kV connection from the proposed wind farm substation compound and terminating at the existing Crossaig Substation.

Three OHL alignment options and three underground cable (UGC) alignment options have been identified, in addition to a single UGC connection into the existing Crossaig Substation. All options have been appraised against environmental, engineering and economic criteria. This Consultation Document invites comments from all interested parties on the alignment options under consideration.

The key environmental considerations are impacts on peatland habitats, blanket bog and woodlands listed on the Ancient Woodland Inventory (AWI). The key engineering considerations are clearance distances from existing infrastructure, access for construction and maintenance and proximity to wind turbine wake zones.

Through the environmental appraisal, OHL Option 1 was identified as having a lower magnitude of impact on irreplaceable blanket bog habitat and AWI. This alignment will also likely require the loss of less commercial forestry on account of the use of the proposed Inveraray to Crossaig 275 kV OHL operational corridor.

From an engineering perspective OHL alignment Option 1 is the preferred option, on account of; no major infrastructure crossings; the ability to utilise the proposed new permanent accesses and accommodation works associated with the Inveraray to Crossaig 275 kV OHL currently in construction and Option 1 remains outside any existing or proposed turbine wake zones.

No option proved to be significantly different from a cost perspective.

Option 1 is the overall preferred OHL alignment option for the connection between the proposed Sheirdrim Wind Farm and the existing Crossaig Substation, achieved through consideration of environmental, engineering and economic appraisals of all three route options.

UGC Option 3 is the preferred option environmentally as it passes through no Statutory protected habitats or designated sites and has lower potential for impact on Class 1 Peatland.

From an engineering perspective, UGC Option 2 is considered marginally preferable to Option 1, as it adheres more closely to the proposed access tracks associated with the proposed Sheirdrim Wind Farm, allowing better and marginally less constrained access during construction and operational maintenance.

The preferred UGC alignment from a cost perspective is Option 3 because it is the lowest cost option.

UGC Option 2 is selected as the preferred option as on balance, whilst Option 2 transects the greatest area of Class 1 Peatland, impacts may be limited due to the use of existing access tracks associated with the proposed Sheirdrim Wind Farm. Technically, due to UGC Option 2's alignment more closely following the proposed Sheirdrim Wind Farm access tracks, there are fewer associated constraints to the construction and future maintenance of the UGC and fewer additional access tracks will be required to be constructed.

Face to face consultation events will be held on 27th September 2022 (Whitehouse Village Hall, Tarbert) and 28th September 2022 (Skipness Village Hall) between 2pm and 7pm. A Virtual Exhibition with Live Chat Sessions will be held on Thursday 6th October 2022, between 5pm and 7pm. The responses received, and those sought from statutory consultees and other key stakeholders will inform further consideration and design of the Preferred Alignment leading to the identification of a Proposed Alignment to take forward to the consenting stage.

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 18th October 2022.

2. INTRODUCTION

2.1 Purpose of Document

SSEN Transmission operating under licence held by Scottish Hydro Electric Transmission plc, is proposing to construct and operate a 132 kV OHL and UGC to connect the proposed Sheirdrim Wind Farm to the existing Crossaig Substation (the 'Proposed Development').

The overall purpose of this document is to inform a face to face and virtual consultation events covering the Proposed Development (refer to Preface), and to aid the overall project understanding for stakeholders as well as allowing for potential cumulative effects to be understood.

This document presents the findings of an environmental, technical and cost appraisal of the three alignment options identified by SSEN Transmission and describes the process by which a preferred alignment for the OHL and UGC has been selected. The preferred alignment is considered to provide the optimal opportunity to achieve an economically viable, technically feasible and environmentally balanced solution.

Interested parties are invited to provide their views on the Preferred Alignment and alignment options put forward in this document. All comments received will inform SSEN Transmission's selection of a Proposed Alignment to be taken forward for Environmental Assessment and more detailed technical assessment prior to submission of an application for consent under section 37 of the Electricity Act 1989, as amended (hereafter referred to as s37 consent).

2.2 Background and Project Need

SSEN Transmission has a duty under Section 9 of the Electricity Act 1989 to 'develop and maintain an efficient, coordinated and economical system of electricity transmission and to facilitate competition in the generation and supply of electricity.' SSEN Transmission also has obligations to offer non-discriminatory terms for connection to the transmission system, both for new generation and for new sources of electricity demand.

The developer of Sheirdrim Wind Farm is seeking consent under Section 36 of the Electricity Act 1989 for an 84 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 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.

2.3 Previous Work

SSEN Transmission consulted¹ on the Route Options for the Proposed Development in December 2021² and the consultation period opened on Monday 22nd November 2021 and continued until the 15th January 2022. Following analysis of the consultation feedback, along with technical, environmental and cost considerations, and further discussions with Landowners and the Ministry of Defence, it was identified that our preferred route, Route A, was not suitable. Route A passes through an area that poses a high risk from unexploded ordnance (UXO).

SSEN undertook a range of surveys over spring and summer of 2022 to identify UXO risk for the proposed development. This work has now been completed and allowed the publication of the Report on Consultation (RoC³). The RoC identified a new preferred route option, Route C (**Figure 1.1, Appendix A**). In combination with other consultation feedback, Route C is considered the least constrained from an environmental, technical, and cost perspective and avoids the area of high UXO risk.

¹ <https://www.ssen-transmission.co.uk/projects/sheirdrim-wind-farm-connection/>

² Virtual consultation events were held on the 8th and 9th December 2021.

³ Routeing Consultation – Report on Consultation (RoC) can be found here: https://www.ssen-transmission.co.uk/media/7161/sheirdrim-routeing-report-on-consultation_september-2022.pdf

Route C was taken forward as the Proposed Route Option. The project then moved into the alignment stage to identify a Preferred Alignment for the OHL and UGC within the Proposed Route Option.

2.4 Document Structure

This Consultation Document comprises the following sections:

- Section 1: Executive Summary
- Section 2: Introduction
- Section 3: Description of proposals – describes the proposals including key activities and construction programme;
- Section 4: Alignment selection process – describes the process for selecting the alignment, based on environmental, engineering, and cost considerations;
- Section 5: Alignment Selection – Describes the options under assessment and any deviations from the selected route option.
- Section 6: Comparative appraisal – a summary of the environmental, engineering and cost topics, followed by a comparative analysis summary and a description of the Preferred Alignment; and
- Section 7: Consultation on the proposals – invites comments on the preferred option process and next steps.

This document is supported by a series of figures within **Appendix A**.

3. DESCRIPTION OF THE PROPOSALS

3.1 Alignment Design and Construction

The technology solution proposed and appraised considers:

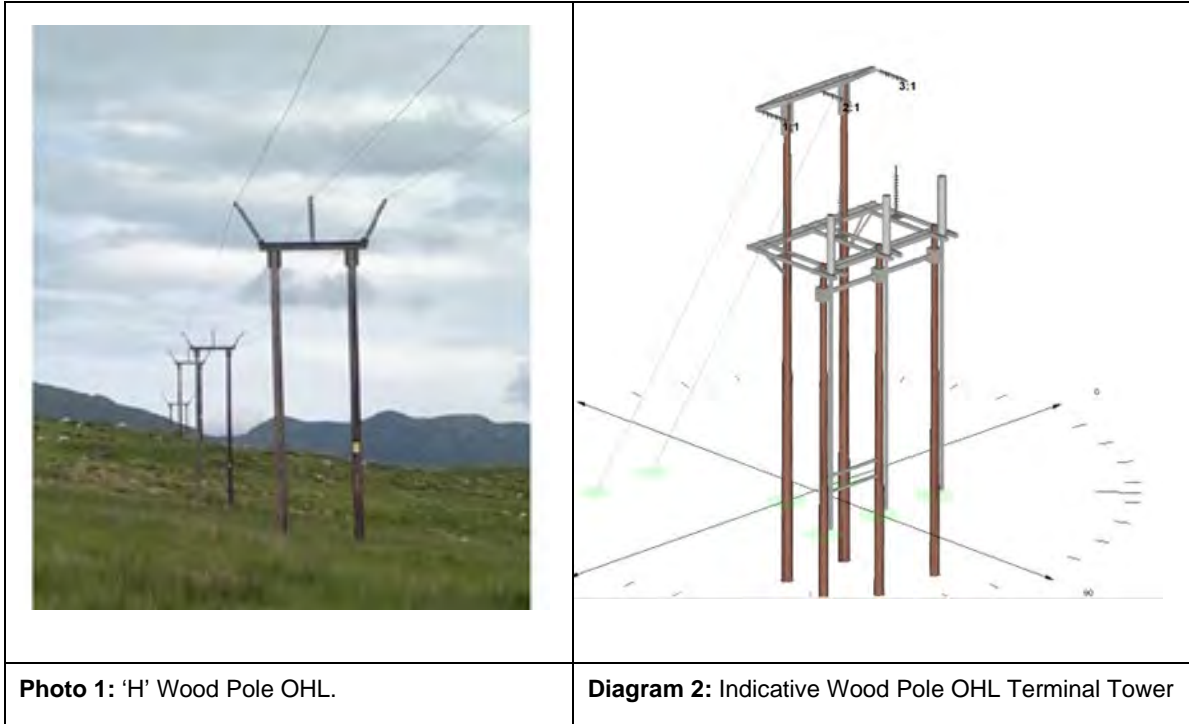
- Three OHL alignment options comprising trident wood pole (**Photo 1**);
- Three UGC alignment options extending from the Proposed Sheirdrim Wind Farm Substation; and
- One UGC connection to the existing Crossaig Substation.

Figure 1.2 (Appendix A) shows the alignments that are presented in this Consultation Document.

3.2 Trident Wood Pole

The spacing between poles will vary depending on topography, altitude, and land use but would likely be between 30 m to 250 m. At this stage, it has been assumed that a typical average pole height will be 30 m above ground level.

To transfer the UGC sections to OHL, terminal towers would be required. These comprise a five-pole structure similar to that shown in **Diagram 2**.



3.3 Construction Activities

Key tasks during construction would involve:

- 1 Establish laydown areas for material and install temporary and permanent access tracks, where required;
- 2 Upgrade existing stone access tracks and construct new stone tracks, where required. Where possible, existing access tracks will be used and upgraded as required. New access tracks may be required and where there is a justified long-term requirement (e.g. for operational maintenance) they will be left in place;
- 3 Install temporary access tracks comprising bog mats and trackway for wood pole construction;
- 4 Deliver structures and materials to site;
- 5 Assemble and erect wood pole structures and stays;
- 6 Excavate trench and install UGC; and
- 7 String conductors using hauling ropes and winches.
- 8 Permanent OHL and UGC commissioning;
- 9 Re-instatement and landscaping;

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 an UGC would involve:

1. Establish laydown areas for materials and welfare;
2. Installation of temporary access tracks and drainage;
3. Delivery of structures and materials to site;
4. Excavate a trench in which to lay the cable;
5. Excavation and construction of joint bays; and
6. Remedial works to reinstate the immediate vicinity of the works and any ground disturbed, to pre-existing use.

3.4 Forestry Removal

Alongside the construction activities (**Section 3.3**), 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.

An operational corridor through wooded areas would be required to enable the safe operation and maintenance of the OHL. This will vary depending on the type of woodland in proximity to the OHL. In areas of native woodland, it is usually possible to provide a narrower corridor due to a reduced risk of trees falling on the OHL.

3.5 Indicative Project Construction Programme

Subject to consents and approvals being granted, construction would be over approximately a 15-month period, commencing in late 2024, with energisation of the project scheduled for early 2026. The detailed construction phasing and programme would be subject to change as the design progresses and necessary consents and wayleaves are agreed.

4. ALIGNMENT SELECTION PROCESS

4.1 Guidance Documents

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

- Procedures for Routeing Overhead Lines and Underground Cables of 132 kV or above, SSEN 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, technical and economic considerations throughout a staged process.

The principal routeing stages are:

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

This consultation document presents the appraisal completed at Stage 3 – Alignment Selection.

The method of identifying a preferred alignment option in this study has involved the following four key tasks:

- Identification of the baseline;
- Identification of alternative alignment options;
- Environmental, technical and cost analysis of alignment options; and
- Identification of a preferred alignment option.

4.2 Main Considerations

Alignment options were identified following site appraisals that considered the constraints identified during the desk-based baseline studies. The following has been taken into account:

- 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 alignment in key views and where necessary, cross ridges obliquely where a dip in the ridge provides an opportunity;
- Target the alignment 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
- Technical issues related to clearances, connectivity, outages, maintenance, and faults.

4.3 Baseline Conditions

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

- Identification of environmental designated sites and other constraints, utilising GIS datasets available via SNHi 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 map⁴).
- 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.

Further to the desk study data, the assessment was supplemented by information collected during habitat surveys, undertaken along the preferred route option in May/June 2022. Habitats were classified in line with UK Habitat Classification (UKHab)⁵ methodology and, where appropriate, a condition rating calculated and applied.

4.4 Appraisal Method

Appraisal of alignment options has involved systematic consideration against the following environmental topic areas:

4.4.1 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 4.1**. SSE guidance “Procedures for Routeing Overhead Lines of 132 kV or above” has been followed.

Most Preferred	No Impact	
	Lower Impact	Low potential for the development to be constrained

⁴ <http://map.sepa.org.uk/floodmap/map.htm>

⁵ <https://ukhab.org/>

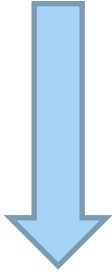
 Least Preferred	Moderate Impact	Intermediate potential for the development to be constrained
	Higher Impact	High potential for the development to be constrained

Table 4.1: Environmental RAG Rating for Comparative Analysis

4.4.2 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 4.2**. SSE guidance “Procedures for Routeing Overhead Lines of 132 kV or above” has been followed.

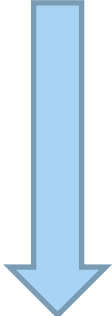
 Least Preferred	No Impact	
	Lower Impact	High potential to accommodate the required infrastructure within the context of the consideration appraised.
	Moderate Impact	Moderate potential to accommodate the required infrastructure within the context of the consideration appraised.
	Higher Impact	Low potential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

Table 4.2: Engineering RAG Rating for comparative analysis

4.4.3 Cost:

Appraisal of alignment 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 4.3**.

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

Table 4.3: Cost RAG Rating for Comparative

5. ALIGNMENT SELECTION

5.1 Potential Alignments

Three potential OHL alignments are identified as illustrated on **Figure 1.2 (Appendix A)** and described below.

5.1.1 Option 1 (Baseline – Preferred Alignment)

Extends from Sheirdrim Wind Farm Substation comprising UGC for approximately 2.5 km. The OHL section is approximately 8.6 km in length and heads south east passing to the south of Loch Cruinn and through a section of commercial forest (fire break). It then runs parallel to the new Inveraray to Crossaig 275 kV OHL, which is currently being constructed (Figure 1.6, Appendix A). At Cnoc Dhubh, Option 1 turns to the south west to avoid steeper gradients and slopes and runs parallel with the new 275 kV OHL and the B842 road. The OHL terminates approx. 750 m from the existing Crossaig Substation, where it will become UGC to connect into the substation.

5.1.2 Option 2 (Alternative Alignment)

Extends from Sheirdrim Wind Farm Substation comprising UGC for approximately 2.5 km. The OHL section is approximately 8.8 km in length and heads in a more easterly direction through a commercial forestry area. Option 2 follows the existing 132 kV OHL for approximately 2 km. At Cnoc Dhubh, Option 2 turns to the south west to avoid steeper gradients and slopes and runs along the corridor of the existing 132 kV OHL (**Figure 1.6, Appendix A**) and the B842 road. The OHL terminates approx. 750 m from the existing Crossaig Substation, where it will become UGC to connect into the substation.

To Note: The existing 132 kV OHL (**Figure 1.6, Appendix A**) will be dismantled as part of the Inveraray to Crossaig OHL project currently in construction⁶, leaving an existing cleared corridor which Option 2 could occupy for part of its alignment.

5.1.3 Option 3 (Alternative Alignment)

Extends from Sheirdrim Wind Farm Substation comprising UGC for approximately 1.5 km. Alignment Option 3 is approximately 8.5 km of OHL and is the shortest alignment of the three options. This option offers the potential for no UGC, if wind turbine clearance can be achieved, meaning OHL would extend directly from the Sheirdrim Wind Farm in place of the UGC (investigations are ongoing). The alignment heads south between Cnoc Creagach and Capull Cruidah avoiding steep slopes and high ground, then traverses across the slope towards Escart Farm. The alignment then picks up the edge of a large commercial forest boundary and crosses Crossaig Glen. The OHL terminates approx. 750 m from the existing Crossaig Substation, where it will become UGC to connect into the substation.

5.1.4 Cable Options

Three UGC cable options are presented (**Figure 1.2, Appendix A**) that extend from Sheirdrim Wind Farm to pass through the area of proposed turbines at Sheirdrim Wind Farm before converting to OHL. All the UGC options could connect to each of the three proposed OHL alignment options.

A short section of UGC is proposed to connect to the existing Crossaig Substation. Due to the proposal to construct Crossaig North Substation⁷, adjacent to the existing Crossaig Substation, there is limited space in which to provide UGC alignment options. Therefore, one option has been presented.

⁶ <https://www.ssen-transmission.co.uk/projects/inveraray-crossaig/>

⁷ 21/01884/PAN Argyll and Kintyre 275kV Substations (ssen-transmission.co.uk)

5.2 Deviation from the Proposed Route Corridor.

During the alignment selection process, further technical studies and modelling work is undertaken to develop alignments options that are technically feasible. In this instance, the following sections of the proposed alignment deviate from the Proposed Route C (**Figure 1.5, Appendix A**).

- Option 2 OHL
- Option 3 OHL
- Option 1 UGC
- Option 2 UGC

The desk-based baseline study (**Section 4.3**) has been expanded to include these areas and the findings are considered in the Comparative Appraisal (**Section 6**).

6. ENVIRONMENT, ENGINEERING AND COST COMPARATIVE APPRAISAL

6.1 Introduction

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

Baseline Environmental Constraints are presented in **Figure 1.3** and **1.4 (Appendix A)**.

6.2 Environment Baseline and Appraisal

OHL Alignments

Analysis of environmental constraints has identified sensitivities in relation to various environmental topics. The three OHL alignments are all within approximately 1 km of each other and share many of the same environmental sensitivities. The main considerations are as follows.

Proximity to the Kintyre Goose Roosts Special Protection Area (SPA) and Sound of Gigha SPA, with the potential for barrier and collision impacts to Schedule 1 species. These protected bird species may cross the alignments to access these designated sites or be deterred from accessing these areas through disturbance and physical effects associated with the construction and/or operation of the Proposed Development.

Proximity of the three alignments to known golden eagle (*Aquila chrysaetos*) nest locations, with the potential for collision impacts, resulting from birds flying into OHL conductors as they use their territory and wider habitats.

All three OHL alignments pass through areas of Class 1 Peatland (nationally important) with potential for direct impacts resulting from the installation of wood poles, access tracks and ancillary works.

All three OHL alignments pass through areas of blanket bog. Blanket bog when maintained in moderate to good condition is an irreplaceable habitat defined as:

“Habitats which would be technically very difficult (or take a very significant time) to restore, recreate or replace once destroyed, taking into account their age, uniqueness, species diversity or rarity. They include ancient woodland, ancient and veteran trees, blanket bog, limestone pavement, sand dunes, salt marsh and lowland fen.”⁸

All three OHL alignments pass through two areas of AWI located at Crossaig Glen and Allt Romain.

Commercial forestry would need to be felled to create a clear space for the construction and operation of all three alignments, access tracks and ancillary works.

Forestry removal to make way for the OHL will need to be permanent, likely extending to approx. 72m through commercial forest and 60m through broadleaved woodland. Forestry clearance for access tracks and ancillary works may be temporary, with areas likely being restocked following construction.

All three alignments will necessarily cross over The Kintyre Way long distance footpath⁹, with close range views for a short section of the route for users.

A summary RAG assessment of the three OHL alignment options can be found in **Table 6.1**.

The differences between the environmental sensitivities of the alignment options area as follows.

Option 1

This alignment passes through approximately 1660 m of Class 1 Peatland and approximately 3.45 ha (assuming 10 m buffer on alignment¹⁰) of blanket bog, of which 0.6 ha has been assessed as in moderate or good condition.

⁸ <https://www.gov.uk/government/publications/national-planning-policy-framework--2> [Accessed 05.09.2022].

⁹ <https://thekintyreway.com/>

¹⁰ Where alignments deviate from the preferred route remotely sensed data (Landcover Scotland 2020, NatureScot) have been used to infer habitat type. Alignments located within the preferred route were subject to botanical survey.

This alignment follows the edge of the existing wayleave created for the new Inveraray to Crossaig 275 kV OHL (**Figure 1.6, Appendix A**). As such it utilises existing gaps in the Ancient Woodland Inventory (AWI) woodland at Crossaig Glen and Allt Romain, minimising the need for woodland removal.

Habitat losses associated with this option are anticipated to be lower on account of existing access tracks created for the new Inveraray to Crossaig 275 kV OHL, currently under construction¹¹.

This alignment runs parallel to the alignment of the new Inveraray to Crossaig 275 kV OHL. Placing two OHLs on parallel alignments may result in lower net impacts on landscape and visual receptors than two OHLs placed wider apart. There may be a lower impact on ornithological receptors, on account of the potential increased visibility of both OHLs.

Commercial forestry losses associated with this alignment may also be lower on account of the proposed development utilising the edge of the operational corridor of the new Inveraray to Crossaig OHL.

Option 2

This alignment passes through approximately 1277 m of Class 1 Peatland and approximately 5.08 ha (assuming 10 m buffer on alignment) of blanket bog, of which 1.82 ha has been assessed as in moderate or good condition.

This alignment passes through existing gaps in the AWI woodland at Crossaig Glen and Allt Romain, where the existing 132 kV Inveraray to Crossaig OHL is due to be removed (**Figure 1.6, Appendix A**) minimising the need for woodland removal.

There may be negligible change to the impacts on ornithological receptors, on account of their habituation to the existing OHL.

Commercial forestry losses associated with Option 2 would be lower on account of the existing OHL operational corridor.

This alignment passes closer to known private water supplies with greater potential for impact on water flow/quality during construction of the proposed development.

Option 3

This alignment passes through approximately 2290 m of Class 1 Peatland and approximately 4.97 ha (assuming 10 m buffer on alignment) of blanket bog, of which 1.44 ha has been assessed as in moderate or good condition.

This alignment would require a new wayleave to be cut through AWI woodlands at Crossaig Glen and Allt Romain, estimated at 60 m wide to form an operational corridor. However, this could be reduced significantly following further detailed design.

¹¹ <https://www.ssen-transmission.co.uk/projects/inveraray-crossaig/>

OHL Alignment	RAG Impact Rating - Environmental															
	Natural Heritage					Cultural Heritage		People	Landscape			Land Use			Planning	
	Designations	Protected Species	Habitats	Hydrology/geology	Ornithology	Designations	Assets	Proximity to dwellings	Designations	Character	Visual	Agriculture	Forestry	Recreation	Proposals	Policy
1	H	L	H	L	M	M	M	L	M	M	M	L	M	M	L	M
2	H	L	H	L	M	M	M	L	M	M	M	L	M	M	L	M
3	H	L	H	L	M	M	M	L	M	M	M	L	M	M	L	M

Table 6.1: Environmental Appraisal of Alignment Options (OHL Sections)

Summary

OHL alignment Option 1 is the preferred option environmentally on account of the lower potential impacts on blanket bog (in good or moderate condition, 0.6 ha) and AWI woodland (utilisation of existing operational corridor). This alignment is likely to result in reduced loss of commercial forestry on account of the use of the Crossaig to Inveraray 275 kV OHL operational corridor, which is currently under construction, and will allow use of its existing access tracks reducing the amount of new access that would be needed for the proposed development.

UGC Alignments

The three UGC alignments are all within approximately 1 km of each other and share many of the same environmental sensitivities.

None of the UGC alignments pass through designated sites and as such no direct impacts are anticipated. As the cables are underground there are also no indirect impacts anticipated on sites designated for ornithology e.g., from collision or barrier effects.

Due to the methods of construction for UGC all alignments can be microsited to avoid all known cultural heritage assets (designated and non-designated), avoiding direct impacts. As the cables will be underground there will be no impact on the setting of assets.

Protected species found within this area will be subject to short term disturbance and temporary displacement for all cable alignments. Habitats will be fully reinstated following construction works allowing species to return after construction.

It is anticipated that for all UGC alignments, impacts on hydrology and aquatic habitats can be managed through implementation of SSEs General Environmental Management Plans (GEMP) and best practice construction methods.

The area of habitat affected by each UGC alignment has been calculated based on a 10 m buffer of the alignment (20 m working width), this is to account for working areas and required access tracks. Should any pre-existing access tracks be present then this would reduce impacts on habitats associated with a given option.

Table 6.2 provides a summary RAG assessment of the three UGC alignment options and the Crossaig Substation UGC connection.

Differentiating feature of the three UGC alignment options as follows.

Option 1

This alignment passes through approximately 1000 m of Class 1 Peatland and approximately 2.48 ha of blanket bog, of which none has been assessed as in moderate or good condition.

Option 2

This alignment passes through approximately 1250 m of Class 1 Peatland and approximately 3.30 ha of blanket bog, of which none has been assessed as in moderate or good condition.

Option 3

This alignment passes through approximately 500 m of Class 1 Peatland and approximately 3.49 ha of blanket bog, of which none has been assessed as in moderate or good condition.

This alignment's location at the foot of Cruach nam Fiadh places it in an area of potentially greater hydrologically sensitive location than the other two options, passing near Loch Lurach and Loch Cruinn.

Crossaig Substation UGC Connection

This alignment passes through approximately 750 m of commercial forestry, in close proximity to the existing Crossaig Substation.

UGC Alignment	RAG Impact Rating - Environmental														
	Natural Heritage					Cultural Heritage		Landscape			Land Use			Planning	
	Designations	Protected Species	Habitats	Ornithology	Hydrology/geology	Designations	Assets	Designations	Character	Visual	Agriculture	Forestry	Recreation	Proposals	Policy
1	L	L	M	L	L	N	L	L	L	L	L	N	L	L	L
2	L	L	M	L	L	N	L	L	L	L	L	N	L	L	L
3	L	L	M	L	L	N	L	L	L	L	L	N	L	L	L
Crossaig	L	L	L	L	L	N	L	L	L	L	N	M	L	L	L

Table 6.2: Environmental Appraisal of Alignment Options (UGC Sections)

Summary

UGC alignment Option 3 is the preferred option environmentally, on account of the lower potential for impact on Class 1 Peatland within the assumed 20 m working corridor.

Crossaig Substation UGC connection has only one option presented, with loss of commercial forestry the main environmental consideration.

6.3 Engineering Baseline and Appraisal

OHL Alignments

Analysis of technical constraints has identified considerations in relation to various technical topics. The three OHL alignments are all within approximately 1 km of each other and share many of the same technical characteristics. The main considerations are as follows.

All alignment options within this study do not exceed the 200 m AOD limit. SSEN Transmission are currently engaging a LIDAR survey on the alignments to fully confirm elevations.

The only areas where flood risk is apparent on the alignment options is the ravine and gorge crossings. Alignment studies have determined that the specific ravine and river crossing sites associated with the alignment options have sufficient standoff distances to avoid the flood risk areas.

Across all three alignments, slopes could be mitigated/avoided during the micrositing stage. The RAG scoring table (**Table 6.3**) details a similar score for all alignments - this is due to routing the alignments to flat plateau areas available from certain topographic features.

At alignment stage the identification of peatland is considered high level due to the corridor coverage and available data sets. Only at micrositing stage can the risk be fully determined at all wood pole sites. Peat probing will be undertaken to prove peat depths and types around pinch point areas. Peat depths for pole connection schemes would be limited to 2.5 m (max) to allow for maximum planting depths, specifically on angle structures, to be achieved and the construction of foundations to be carried out with a standard excavator. All three alignments adhere to this requirement.

Table 6.3 provides a summary RAG assessment of the three OHL alignment options.

Option 1

Alignment Option 1 appraisal is detailed below:

A Low RAG rating (no major infrastructure crossings).

This option is preferable in terms of terrain and gradient than Options 2 & 3. It is recognised that the most significant gradient issue at the southern end of the alignment affects all three options.

Option 1 performs best from an access perspective, as the alignment utilises the new permanent access tracks associated with the in construction Inveraray to Crossaig 275 kV OHL. This alignment makes best use of the new access at the northern end where there are few existing public access routes. This means the proposed development can avoid using existing public footpaths, where they are present, (e.g. The Kintyre Way) and will result in less access track works for construction and operation.

Option 1 starts from the proposed cable end of the proposed Sheirdrim Wind Farm Substation and has been aligned to stay outside any existing or proposed turbine wake zones. Although it has a high RAG score, this option is comfortably away from any issues relating to wake effect.

Whilst all options would require tree removal from commercially and environmentally sensitive woodland (AWI) sites, Option 1 causes the least impact on both these woodland types and would be preferred option.

Option 2

Alignment Option 2 would require crossing the proposed new Inveraray to Crossaig 275 kV OHL four times, a significant design and health and safety consideration. The proposed line is currently under construction and will be fully energised and commissioned by the time Sheirdrim 132 kV OHL begins construction. A specific design solution would not be considered appropriate at this stage but there is a risk that any future OHL alignment would need to be undergrounded due to technical constraints and specific operational requirements.

Alignment Option 2 starts from the proposed cable end of Sheirdrim Wind Farm Substation and has been aligned to avoid any existing or proposed turbine wake zones. Although it has a high RAG score, this option is comfortably away from any issues relating to wake effect.

Option 3

Alignment Option 3 has a Low RAG rating (no major infrastructure crossings).

This option passes within existing or proposed turbine wake zones. Further studies are required to understand the feasibility of this option aligning through proposed wind farm and the effect of wake on the OHL.

Access is limited along the alignment of option 3 and is considered a limiting factor in aligning the trident wood poles. Access would also be challenging for the safe operation and maintenance required throughout the life of the wood pole infrastructure. Option 3 scores best from a RAG rating perspective.

OHL Alignment	RAG Impact Rating - Engineering														
	Infrastructure Crossings		Env Design					Ground Conditions		Cons and Maintenance		Proximity			
	Major Crossings	Minor Roads	Elevation	Atmospheric Pollution	Contaminated Land	Flooding	Terrain	Peatland	Access	Angle Towers	Clearance Distances	Windfarms	Communications Masts	Urban Developments	Metallic Pipes
1	L	M	L	L	L	L	M	H	L	H	M	H	L	L	L
2	H	H	L	L	L	L	M	H	L	L	H	H	L	L	L
3	L	L	L	L	L	L	M	H	M	H	L	H	L	L	L

Table 6.3: Engineering Appraisal of OHL Alignment Options.

Summary

OHL alignment Option 1 is the preferred option from a technical perspective, on account of; no major infrastructure crossings, the ability to utilise the new permanent accesses and accommodation works associated with the in construction Inveraray to Crossaig 275 kV OHL, remaining outside any existing or proposed turbine wake zones and it involves the least woodland removal of all alignments.

UGC Alignments

Analysis of the three alignments options have been reviewed to identify the specific technical constraints for each possible option. The three cable options have expected lengths ranging from 2.5 km to 3.2 km and are mainly following routes along the north-eastern area of the proposed Sheirdrim Wind Farm.

Unknown ground conditions are currently a factor taken into consideration for all cable options including steep topography and water crossings. The aim of the alignment options is to mitigate the issues where possible by utilising planned access tracks which will be installed as part of the proposed wind farm works or alternatively routing the cable through more even terrain sections, where possible.

The RAG scores for alignment Options 1 and 2 have similar outcomes due to the alignment options utilising the wind farm access tracks to varying extents, as mentioned above, which covers similar terrain. Alignment Option 3 varies in the scoring due to it being developed as an alternative option to the initial two alignments in case it is not possible to utilise the planned wind farm access. Option 3 carries the additional engineering challenges of access for installation and maintenance alongside additional water crossings.

At alignment stage the identification of peatland is considered high level due to the available data. Only at refinement stage can the risk be fully determined at all cable locations. Peat probing will be undertaken to prove peat depths and types around pinch point areas. Peat depths for cable installation would be reviewed and mitigated where possible while acknowledging that it may not be possible to avoid peat installation in all instances.

Table 6.4 provides a summary RAG assessment of the three UGC alignment options.

Option 1

Option 1 scored joint lowest on the RAG assessment and is preferable to Option 3. The proposed cable route utilises sections of planned access installed as part of the wind farm access tracks. There are sections of the Option mainly at each end of the cable circuit where it does not follow the planned access tracks in order to take a more direct route and reduce the expected alignment length.

Option 2

Option 2 also scored joint lowest on the RAG assessment and is preferable to Option 3. The proposed cable route varies from Option 1 as it utilises the planned access installed as part of the wind farm access tracks which have been accommodated to the greatest extent possible. While the alignment is the longest of the three options it benefits in construction and maintenance aspects by utilising the access tracks, which will be in place across a challenging terrain with no other existing access currently in place.

When taking into consideration the added benefit of access for installation and maintenance purposes across the lifetime of the asset Option 2 is the most preferable option.

Option 3

Option 3 scored the lowest of the three possible alignments, however, only marginally. The alignment takes the most direct path over the lower lying landscape towards the northern edge of the proposed wind farm boundary and in doing so reduces the overall cable system length.

By not utilising the planned access tracks in a topography where ground conditions are known to be challenging, including identified watercourses and areas of peat, any benefit obtained from a shorter cable length is likely to be outweighed by the additional mitigation works required to provide suitable access.

Crossaig Substation UGC Connection

An indicative alignment is shown for this section of UGC (**Figure 1.2, Appendix A**). This alignment interfaces with the proposed Crossaig North Substation and the existing Crossaig Substation and its technical development is dependent on the design of the proposed new Crossaig North Substation, which is underway.

UGC Alignment	RAG Impact Rating - Engineering												
	Infrastructure Crossings		Env Design		Ground Conditions		Construction and Maintenance		Proximity			Design	Additional Cons
	Major Crossings	Minor Roads	Elevation	Contaminated Land	Terrain	Peatland	Access	Cable Haul Road	Clearance Distance	Wind Farms	Communication Masts	Joint bays and Link Boxes	Route Length
1	L	L	H	L	L	H	L	M	L	H	L	L	L
2	L	L	H	L	L	H	L	M	L	H	L	L	L
3	L	L	L	L	L	H	H	H	L	H	L	L	L

Table 6.4: Engineering Appraisal of UGC Alignment Options.

Summary

UGC Options 1 and 2 score similarly in the Engineering RAG assessment. Option 2 is considered marginally preferable to Option 1, as it adheres more closely to the proposed access tracks associated with the Sheirdrim Wind Farm allowing better and marginally less constrained access.

Crossaig Substation UGC connection's technical development is dependent on the design of the proposed new Crossaig North Substation, which is underway, and constraints provided by the existing Crossaig Substation.

6.4 Cost Appraisal

OHL Alignments

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.

Table 6.5 provides a summary RAG assessment of the three OHL alignment options.

Option 1

Alignment Option 1 has a green RAG rating for capital cost and is the middle cost option of the three Alignment Options, it is still rated as Green as the cost differences between the different route options are low, i.e. it is 2% lower than the highest cost option. All Alignment Options have high tree felling costs due to the requirement to complete the route alignment through an area of AWI, SSEN Transmission are working to minimise the impact to ancient woodland through avoidance and mitigation in design and construction.

Option 2

Alignment Option 2 has the lowest capital cost of the three Alignment Options. It has been provided an amber rating for consent mitigations due to the requirement of passing through AWI, similar to the Alignment Options 1 and 3. All Route Alignment Options have high tree felling costs due to the requirement to complete the route alignment through an area of ancient woodland, SSEN Transmission are working to minimise the impact to ancient woodland through avoidance and mitigation in design and construction.

Option 3

Option 3 has the lowest capital cost of the three Route Options and has an overall green RAG rating. Operations (inspection and maintenance) have been allocated an amber RAG rating due to more difficult accessibility than the other Route Alignment Options. All Alignment Options have high tree felling costs due to the requirement to complete the route alignment through an area of ancient woodland, SSEN Transmission are working to minimise the impact to ancient woodland through avoidance and mitigation in design and construction.

Table 6.5: Cost Appraisal of OHL Alignment Options.

Alignment Route	RAG Impact Rating – Cost - Overhead Line								
	Capital	Diversions	Public Road Improvement	Tree Felling	Land Assembly	Consent Mitigations	Inspections	Maintenance	Total Cost
Alignment Route 1 (OHL)	103%	G	G	H	G	A	G	G	110%
Alignment Route 2 (OHL)	105%	G	G	H	G	A	G	G	112%
Alignment Route 3 (OHL)	G	G	G	H	G	A	A	A	G

Summary

There is no preferred OHL alignment option from a cost perspective as all costs are comparable, with no alignment cost varying significantly to indicate an overall preference.

UGC Alignments

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.

Table 6.6 provides a summary RAG assessment of the three UGC alignment options.

Option 1

Option 1 has an amber RAG rating for capital cost and is the middle cost option of the three options, however it is only 3% lower than the highest cost option. Inspections and maintenance have been provided an amber rating due to the increase difficulty inspecting and maintaining an underground cable.

Option 2

Option 2 has the highest capital cost of the three options, however it is only marginally more expensive than Option 1. Inspections and maintenance have been provided an amber rating due to the increase difficulty inspecting and maintaining an underground cable.

Option 3

Option 3 has the lowest capital cost of the three options and has an overall green RAG rating due to being a shorter underground cable length than the other two options. Inspections and maintenance have been provided an amber rating due to the increase difficulty inspecting and maintaining an underground cable.

Alignment Route	RAG Impact Rating – Cost - Underground Cable								
	Capital	Diversions	Public Road	Tree Felling	Land Assembly	Consent Mitigations	Inspections	Maintenance	Total Cost
Alignment Route 1 (UGC)	126%	G	G	G	G	G	A	A	126%
Alignment Route 2 (UGC)	129%	G	G	G	G	G	A	A	129%
Alignment Route 3 (UGC)	G	G	G	G	G	G	A	A	G

Table 6.6: Cost Appraisal of UGC Alignment Options.

Summary

Overall, preferred UGC alignment from a cost perspective is Option 3 because it is the lowest cost option.

6.5 Comparative Analysis Summary and Selection of Preferred Alignment

6.5.1 Comparison of OHL and UGC Alignment Options

OHL

From an environmental perspective, all alignment options are in close proximity to the Kintyre Goose Roosts Special Protection Area (SPA) and Sound of Gigha SPA, with the potential for barrier and collision impacts to Schedule 1 species. These protected bird species may cross the alignments to access these designated sites or be deterred from accessing these areas through disturbance and physical effects associated with the construction and/or operation of the Proposed Development.

All options are in close proximity to known golden eagle nest locations, with the potential for collision impacts, resulting from birds flying into OHL conductors as they use their territory and wider habitats.

All three OHL alignments pass through areas of blanket bog rated to be in moderate or good condition (irreplaceable habitat). Option 1 passes through the lowest area (0.6 ha), when compared to Option 2 and 3 (1.82 ha and 1.44 ha respectively).

All alignment options pass through areas of Class 1 Peatland (nationally important) with potential for direct impacts. Option 2 passes through the smallest area (1277 m) when compared to Options 1 and 3 (1660 m and 2290 m respectively).

All three OHL alignments pass through areas of woodland listed on the AWI and all three alignments cross The Kintyre Way.

In terms of the technical assessment, Option 1 performs best from an access perspective, as the alignment utilises the proposed new permanent accesses associated with the in construction Inveraray to Crossaig 275 kV OHL. Options 2 and 3 are located further from existing access tracks and as such would require new access to be constructed.

Alignment Option 2 would require crossing the new Inveraray to Crossaig 275 kV OHL four times, a significant design and health and safety consideration. Options 1 and 3 do not require any OHL crossings

Option 3 passes within the wake zones of existing or proposed wind turbines. Further studies are required to understand the feasibility of this option aligning through proposed wind farm and the effect of wake on the OHL. Option 1 and 2 do not pass within any wake zones.

There is no significant differentiator based on cost between the three options.

UGC

From an environmental perspective, none of the UGC alignments pass through sites designated for Natural Heritage or Statutory protected habitats and as such no direct impacts are anticipated. As the cables are underground there are also no indirect impacts anticipated on sites designated for ornithology e.g., from collision or barrier effects.

Due to the methods of construction for UGC all alignments can be micro sited to avoid known cultural heritage assets (designated and non-designated), avoiding direct impacts. As the cables will be underground there will be no impact on the setting of assets.

Protected species found within this area will be subject to short term disturbance and temporary displacement for all cable alignments. Habitats will be fully reinstated following construction works allowing species to return after construction.

Option 3 impacts the least Class 1 Peatland (500 m) when compared with Options 1 and 2 (1000 m and 1250 m respectively).

UGC Options 1 and 2 score similarly from a technical perspective. Option 2 is considered marginally preferable to Option 1, as it adheres more closely to the proposed access tracks associated with the proposed Sheirdrim Wind Farm allowing better and marginally less constrained access during construction and operational maintenance.

Option 3 is the lowest cost option when compared with Options 1 and 2 (126% and 129% respectively).

6.5.2 Selection of Preferred Alignment

OHL

OHL alignment Option 1 is the preferred option environmentally on account of the lower potential impacts on blanket bog (in good or moderate condition, 0.6 ha) and AWI woodland (utilisation of existing operational corridor). This alignment is also likely to result in reduced loss of commercial forestry on account of the use of the proposed Inveraray to Crossaig 275 kV OHL operational corridor, which is currently under construction, and use of its associated permanent access tracks.

OHL alignment Option 1 is the preferred option from a technical perspective on account of; no major infrastructure crossings, the ability to utilise the new permanent accesses and accommodation works associated with the in construction Inveraray to Crossaig 275 kV OHL, remaining outside any existing or proposed turbine wake zones and it involves the least woodland removal of all alignments.

There is no preferred OHL alignment option from a cost perspective as all costs are comparable, with no alignment cost varying significantly to indicate an overall preference.

OHL Alignment Option 1 is selected as the Preferred OHL Alignment.

UGC

UGC alignment Option 3 is the preferred option environmentally as it passes through no Statutory protected habitats or designated sites and has lower potential for impact on Class 1 Peatland.

UGC Options 1 and 2 score similarly in the technical assessment. Option 2 is considered marginally preferable to Option 1, as it adheres more closely to the proposed access tracks associated with the proposed Sheirdrim Wind Farm allowing better and marginally less constrained access during construction and operational maintenance.

The preferred UGC alignment from a cost perspective is Option 3 because it is the lowest cost option.

On balance, whilst Option 2 transects the greatest area of Class 1 Peatland, impacts maybe limited due to the use of existing access tracks associated with the proposed Sheirdrim Wind Farm. Technically, due to UGC Option 2's alignment more closely following the proposed Sheirdrim Wind Farm access tracks, there are fewer associated constraints to the construction and future maintenance of the UGC and fewer additional access tracks will be required to be constructed.

UGC Alignment Option 2 is selected as the Preferred UGC Alignment.

7. CONSULTATION ON THE PROPOSALS

7.1 Questions for Consideration by Consultees

7.1.1 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.

7.1.2 The proposals detailed in this report have been developed through environmental and technical analysis of various alignment 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 Options would you consider the best option for SSEN Transmission to develop? Please provide an explanation of your answer.
- Which of the 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?




7.2 Next Steps

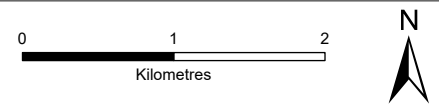
7.2.1 A series of events will be held in September 2022 (refer to Preface for details) and meetings will be offered with statutory and other stakeholders. The responses received, and those sought from statutory consultees and other key stakeholders will inform further consideration and design of the preferred alignment leading to the identification of a Proposed Alignment to take forward to the consenting stage.

Please submit your comments to Caitlin Quinn, Community Liaison Manager, Scottish Hydro Electric Transmission, Inveralmond House, 200 Dunkeld Road, Perth, PH1 3AQ (Caitlin.Quinn@sse.com). All comments are requested by Tuesday 18th October 2022.

APPENDIX A FIGURES



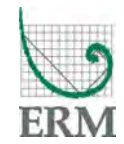
-  Proposed Route Option C
-  Sheirdrim Substation
-  Crossaig Substation (Existing)



SCALE: See Scale Bar
 SIZE: A4
 PROJECT: 0612294
 DATE: 09/09/2022

VERSION: A01
 DRAWN: DN
 CHECKED: SC
 APPROVED:

Project Name: Sheirdrim Wind Farm Connection
Figure 1.1: Proposed Route Option
Date: 08/09/2022

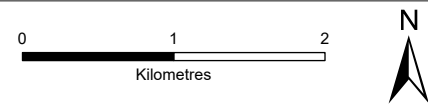


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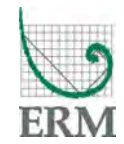
- Alignment Option 1 – Overhead Line (OHL) (Preferred)
- Alignment Option 2 – OHL
- Alignment Option 3 – OHL
- - - Alignment Option 1 – Underground Cable (UGC)
- - - Alignment Option 2 – UGC (Preferred)
- - - Alignment Option 3 – UGC
- Proposed Alignment - Underground Cable (UGC) Corridor
- Sheirdrim Substation
- Crossaig Substation (Existing)



SCALE: See Scale Bar
 SIZE: A4
 PROJECT: 0612294
 DATE: 09/09/2022

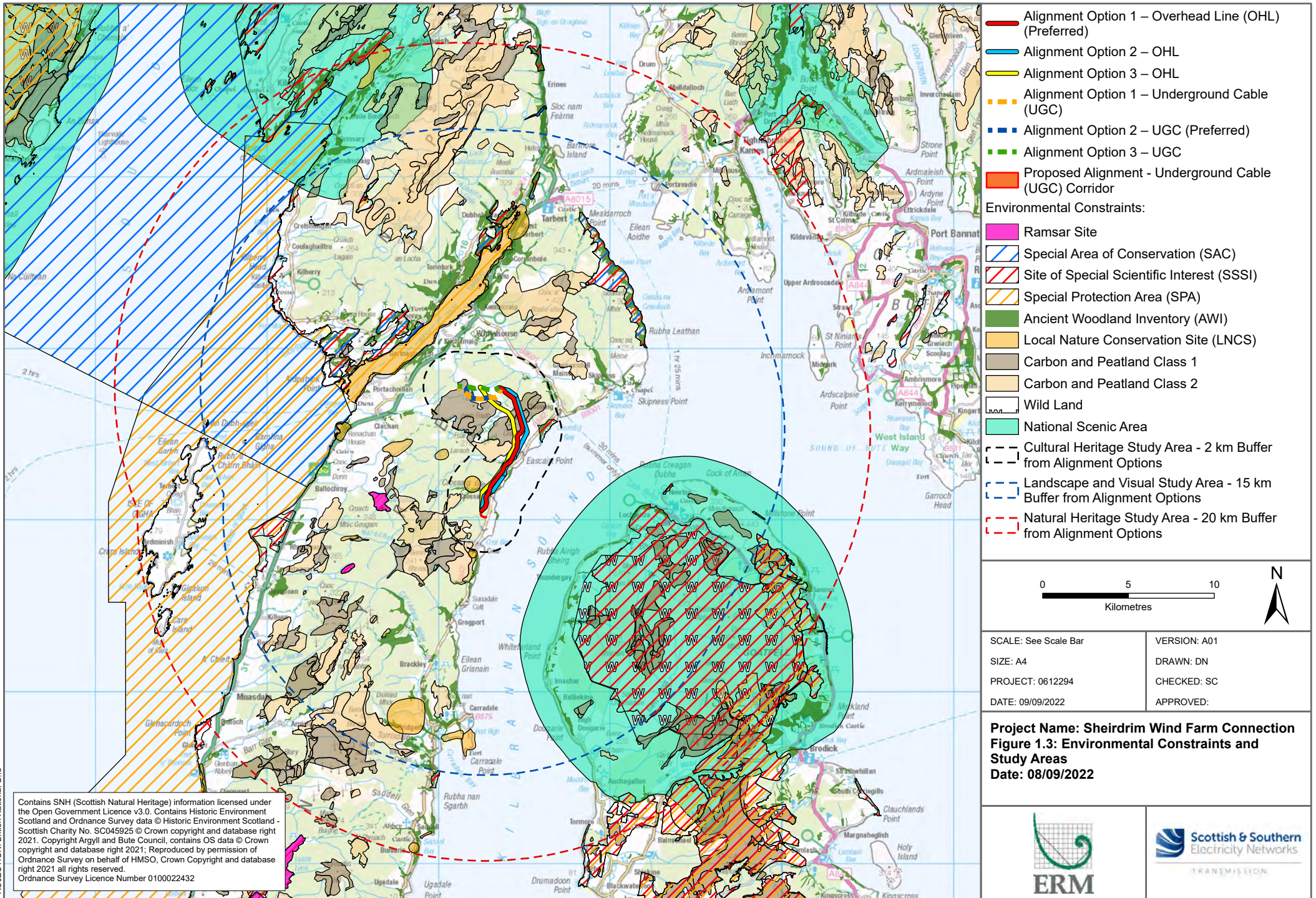
VERSION: A01
 DRAWN: DN
 CHECKED: SC
 APPROVED:

Project Name: Sheirdrim Wind Farm Connection
Figure 1.2: Alignment Options
Date: 08/09/2022

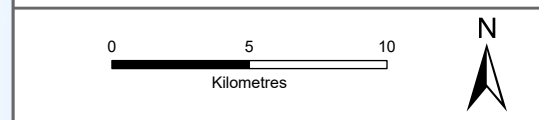


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- Alignment Option 1 – Overhead Line (OHL) (Preferred)
 - Alignment Option 2 – OHL
 - Alignment Option 3 – OHL
 - - - Alignment Option 1 – Underground Cable (UGC)
 - - - Alignment Option 2 – UGC (Preferred)
 - - - Alignment Option 3 – UGC
 - ▨ Proposed Alignment - Underground Cable (UGC) Corridor
- Environmental Constraints:
- ▨ Ramsar Site
 - ▨ Special Area of Conservation (SAC)
 - ▨ Site of Special Scientific Interest (SSSI)
 - ▨ Special Protection Area (SPA)
 - ▨ Ancient Woodland Inventory (AWI)
 - ▨ Local Nature Conservation Site (LNCS)
 - ▨ Carbon and Peatland Class 1
 - ▨ Carbon and Peatland Class 2
 - ▨ Wild Land
 - ▨ National Scenic Area
 - ▨ Cultural Heritage Study Area - 2 km Buffer from Alignment Options
 - ▨ Landscape and Visual Study Area - 15 km Buffer from Alignment Options
 - ▨ Natural Heritage Study Area - 20 km Buffer from Alignment Options



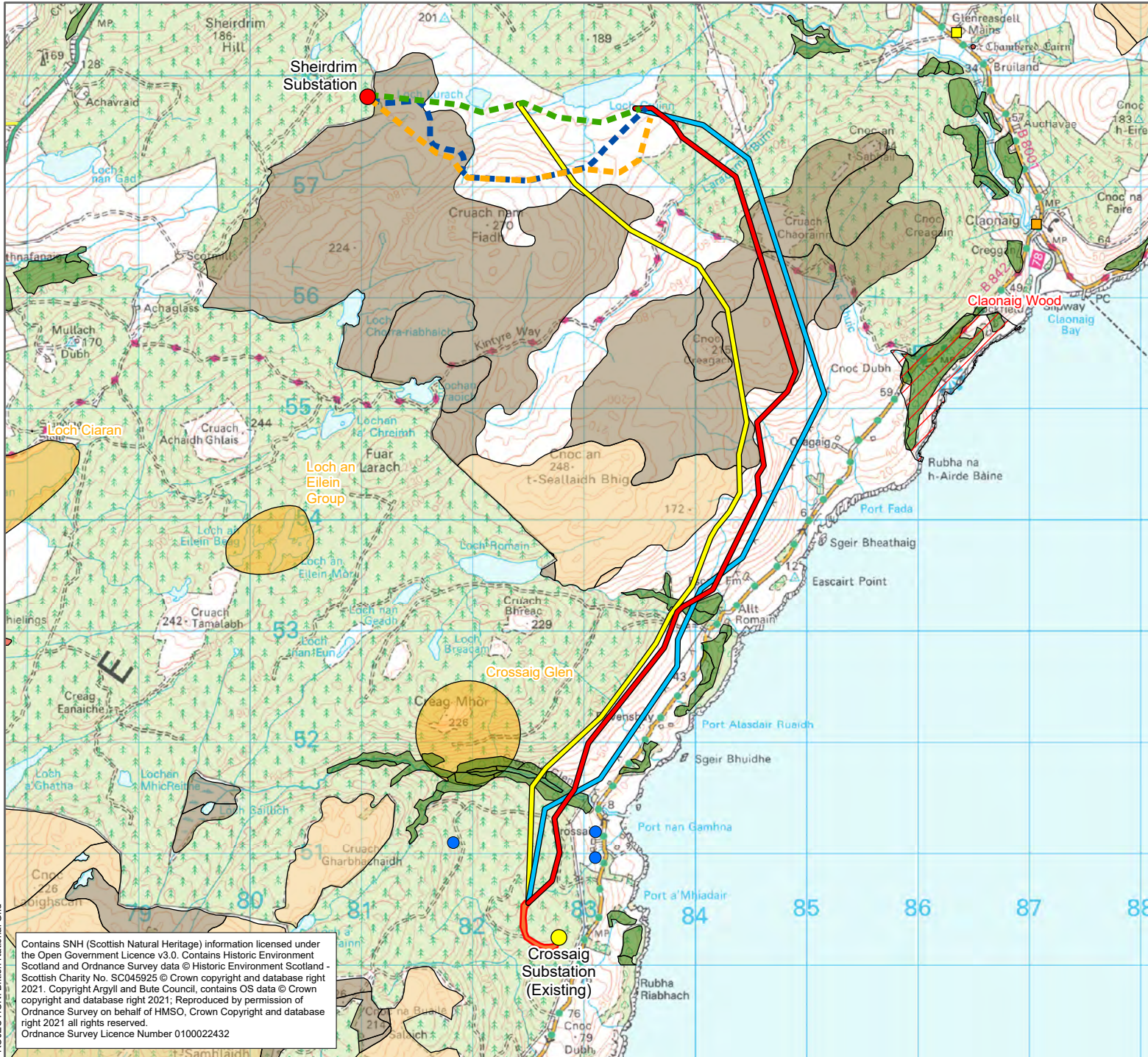
SCALE: See Scale Bar	VERSION: A01
SIZE: A4	DRAWN: DN
PROJECT: 0612294	CHECKED: SC
DATE: 09/09/2022	APPROVED:

Project Name: Sheirdrim Wind Farm Connection
Figure 1.3: Environmental Constraints and Study Areas
Date: 08/09/2022

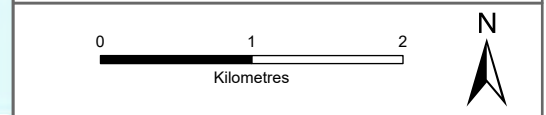


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- Alignment Option 1 – Overhead Line (OHL) (Preferred)
- Alignment Option 2 – OHL
- Alignment Option 3 – OHL
- - - Alignment Option 1 – Underground Cable (UGC)
- - - Alignment Option 2 – UGC (Preferred)
- - - Alignment Option 3 – UGC
- Proposed Alignment - Underground Cable (UGC) Corridor
- Sheirdrim Substation
- Crossaig Substation (Existing)
- Cultural Heritage Constraints:**
- Scheduled Monument
- Listed Building - Category B
- Listed Building - Category C
- Environmental Constraints:**
- Site of Special Scientific Interest (SSSI)
- Ancient Woodland Inventory (AWI)
- Local Nature Conservation Site (LNCS)
- Carbon and Peatland Class 1
- Carbon and Peatland Class 2
- Private Water Supply (PWS)



SCALE: See Scale Bar	VERSION: A01
SIZE: A4	DRAWN: DN
PROJECT: 0612294	CHECKED: SC
DATE: 09/09/2022	APPROVED:












Project Name: Sheirdrim Wind Farm Connection
Figure 1.4: Environmental Constraints in Proximity to Alignment Options
Date: 08/09/2022

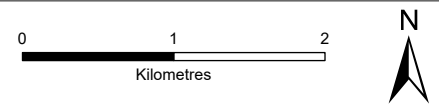


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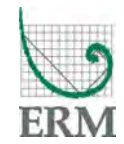
-  Proposed Route Option C
-  Alignment Option 1 – Overhead Line (OHL) (Preferred)
-  Alignment Option 2 – OHL
-  Alignment Option 3 – OHL
-  Alignment Option 1 – Underground Cable (UGC)
-  Alignment Option 2 – UGC (Preferred)
-  Alignment Option 3 – UGC
-  Proposed Alignment - Underground Cable (UGC) Corridor
-  Area of Alignment Deviating from Proposed Route C
-  Sheirdrim Substation
-  Crossaig Substation (Existing)



SCALE: See Scale Bar
 SIZE: A4
 PROJECT: 0612294
 DATE: 09/09/2022

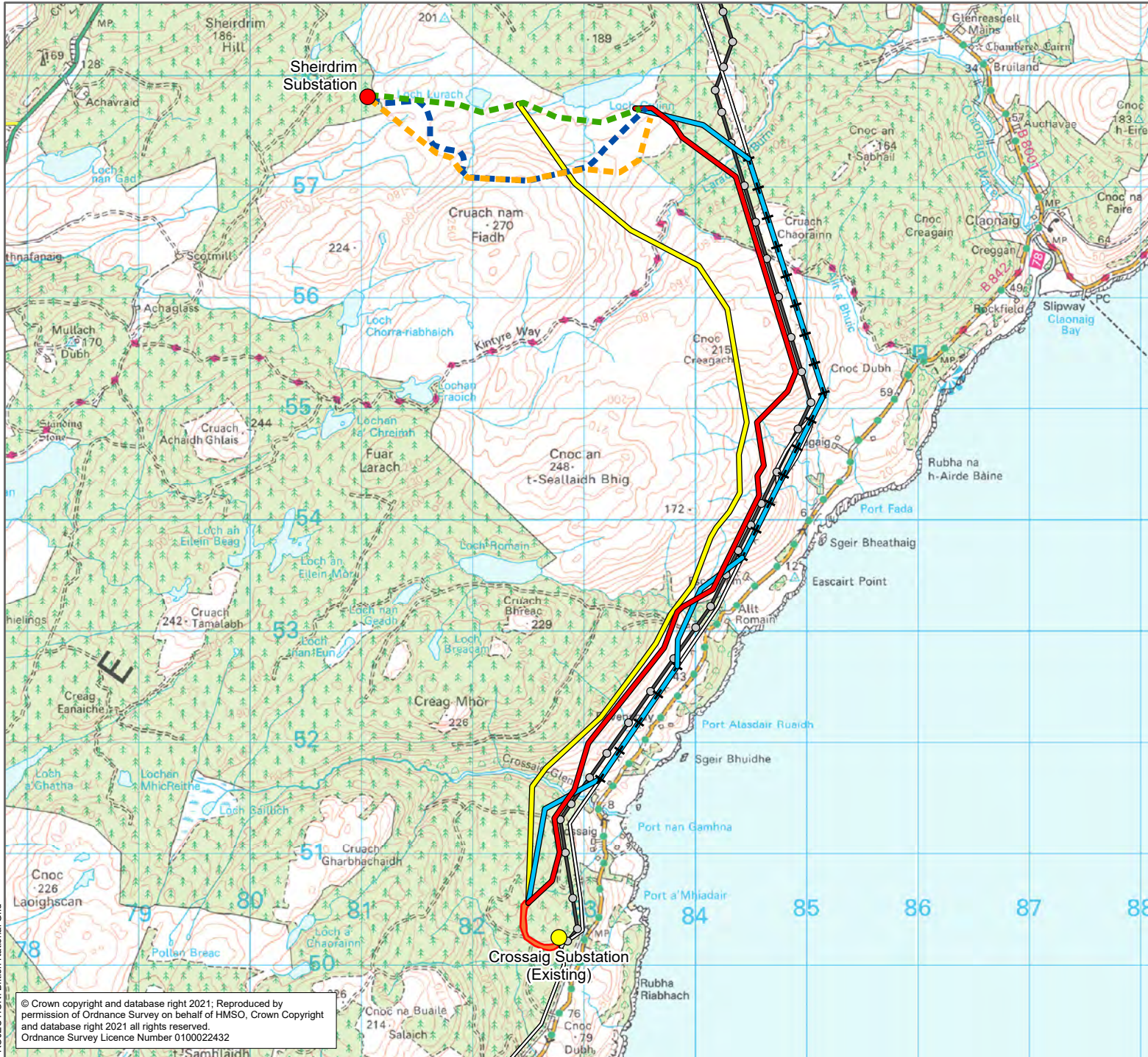
VERSION: A01
 DRAWN: DN
 CHECKED: SC
 APPROVED:

Project Name: Sheirdrim Wind Farm Connection
Figure 1.5: Alignment Deviations from Proposed Route C
Date: 08/09/2022

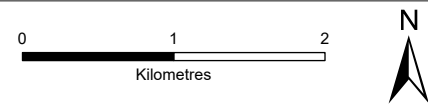


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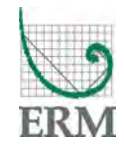


- Alignment Option 1 – Overhead Line (OHL) (Preferred)
- - - Alignment Option 2 – OHL
- - - Alignment Option 2 - OHL (Follows Existing 132 kV OHL)
- Alignment Option 3 – OHL
- - - Alignment Option 1 – Underground Cable (UGC)
- - - Alignment Option 2 – UGC (Preferred)
- - - Alignment Option 3 – UGC
- Proposed Alignment - Underground Cable (UGC) Corridor
- Sheirdrim Substation
- Crossaig Substation (Existing)
- Existing Towers
- Inverary to Crossaig 275 kV Overhead Line (OHL) - (In Construction)
- Existing 132 kV Overhead Line (OHL)



SCALE: See Scale Bar	VERSION: A01
SIZE: A4	DRAWN: DN
PROJECT: 0612294	CHECKED: SC
DATE: 09/09/2022	APPROVED:

Project Name: Sheirdrim Wind Farm Connection
Figure 1.6: Alignment Options and Existing Infrastructure
Date: 08/09/2022



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