VOLUME 1: CHAPTER 2: THE ROUTEING PROCESS AND ALTERNATIVES

Figures (Volume 2 of this EIA Report)

Appendices (Volume 4 of this EIA Report)

There are no appendices associated with this Chapter.

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2. THE ROUTEING PROCESS AND ALTERNATIVES

2.1 Introduction

2.1.1 The Proposed Development has been the subject of a routeing process and consideration of alternatives to establish a proposed route[1], alignment[2] and design solution that was determined to provide an optimum balance of environmental, technical and economic factors. This Chapter describes the work that has been undertaken for the Proposed Alignment and **Volume 5: Chapter 2 – The Routeing Process and Alternatives – Alternative Alignment**, describes the consideration of alternatives for the Alternative Alignment.

2.1.2 The routeing process included a programme of consultation at both routeing and alignment stages designed to engage with key stakeholders in order to invite feedback on the rationale for, and approach to, the selection of the proposed route, alignment and design solution of the Proposed Development.

2.1.3 Further review of the Proposed Development by SSEN Transmission during the EIA stage of the project has also led to further refinements to minimise potential environmental effects where practicable.

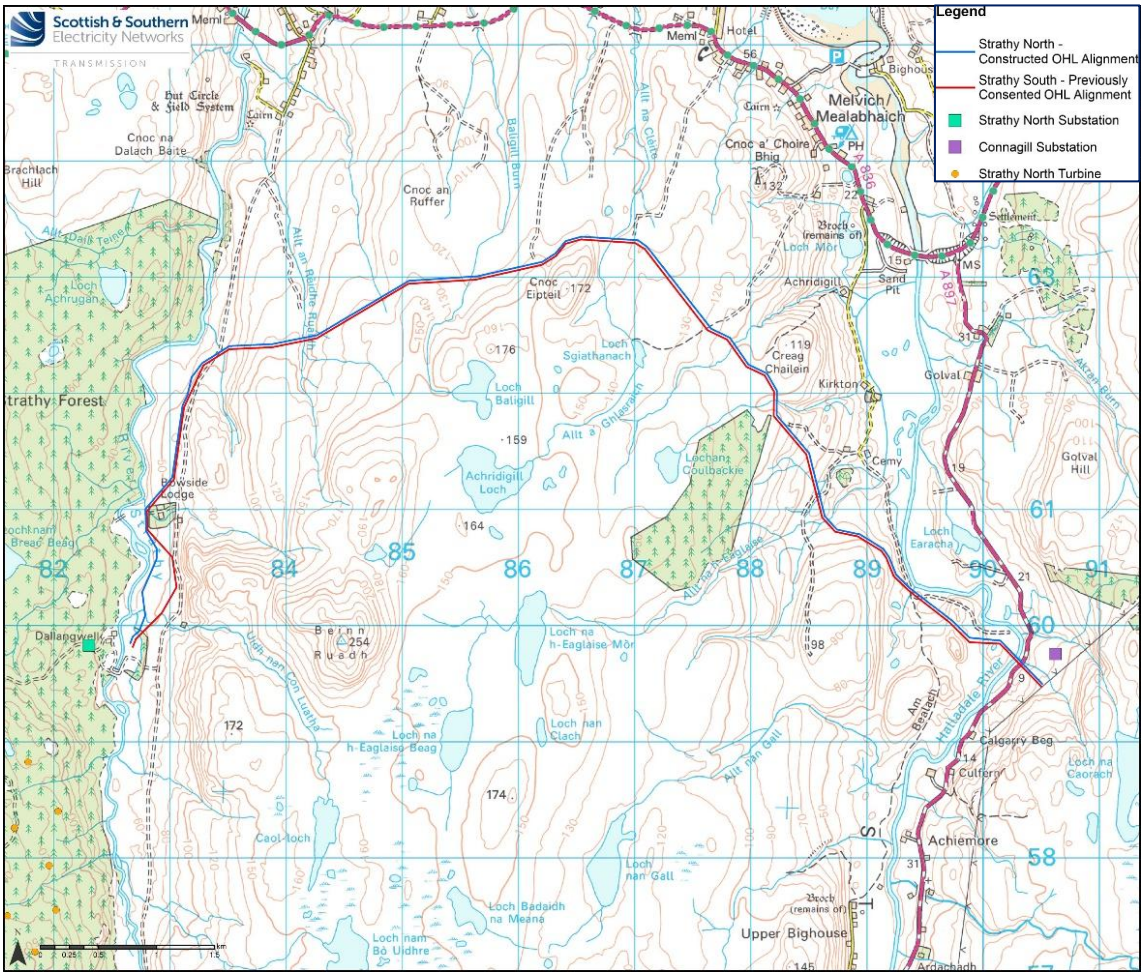
2.1.4 These processes have enabled the consideration of reasonable alternatives, in accordance with Regulation 5(2)(d) and Schedule 4, paragraph 2 of the EIA Regulations.

2.2 Project History

2.2.1 As discussed in **Volume 1: Chapter 1 – Introduction and Background**, in 2013, SSEN Transmission sought consent for the construction of two parallel 132 kV trident wood pole OHL's; one to connect the consented Strathy North Wind Farm to the electricity transmission network and the other to provide a connection for the then proposed Strathy South Wind Farm. These connections were collectively referred to as Strath Halladale to Dallangwell 132 kV Connection (see **Plate V1-2.1**).

[1] A linear area of approximately 1 km width (although this may be narrower/wider in specific locations in response to identified constraints), which provides a continuous connection between defined connection points.
[2] A centre line of an overhead line or underground cable.

Plate V1-2.1: Consented Strath Halladale to Dallangwell 132kV Connection



2.2.2 Consent for the Strath Halladale to Dallangwell 132 kV Connection was granted by Scottish Ministers in February 2014[3] and construction of one of the OHLs (to connect Strathy North Wind Farm to the electricity transmission network) was completed in 2015. The second consented OHL (to provide a connection for the then proposed, but not consented, Strathy South Wind Farm) was not constructed due to delays in consenting of the wind farm. The section 37 consent for the second OHL has now lapsed.

2.2.3 The Strathy South Wind Farm developer opted to change the point of connection from Strathy North substation (near Dallangwell) (as per the lapsed consent) to Strathy South Wind Farm on-site substation, which triggered the need for further optioneering studies in 2021 by the Applicant. At the same time, the Applicant carried out a review of the grid connection between Strathy North substation (near Dallangwell) and Connagill 275/132 kV substation to consider whether the previously consented OHL alignment and design solution (trident 'H' wood pole) remained optimal.

2.3 A Rationalised Approach

2.3.1 The Proposed Development forms part of the Connagill Cluster Grid Connections which, following a review of various technology options available, resulted in the Applicant identifying a rationalised approach across the other grid connections that make up the Connagill Cluster Grid Connections.

[3] Received consent form the Scottish Ministers in February 2014 (ECU Reference 99/13-14 and 100/13-14).

2.3.2 Consultation on this approach, and the options that have been considered during the route and alignment stages of the Connagill Cluster Grid Connections (including the Proposed Development) are set out in the following documents available via the Applicants webpage[4]:

- SSEN Transmission (December 2023): Connagill Cluster Grid Connections: Consultation Document (Route Stage).
- SSEN Transmission (April 2024): Connagill Cluster Grid Connections: Report on Consultation (Route Stage).
- SSEN Transmission (May 2024): Connagill Cluster Grid Connections: Consultation Document (Alignment Stage).
- SSEN Transmission (September 2024): Connagill Cluster Grid Connections: Report on Consultation (Alignment Stage).

2.3.3 Consultation on the options considered were also presented at public consultation events, as follows:

- Routeing Stage Public Consultation Event held on 30th November 2023 at Strathy Village Hall.
- Alignment Stage Public Consultation Event held on 20th May 2024 at Strathy Village Hall.

2.3.4 During the consultation process the Proposed Development was referred to as the "Strathy South Wind Farm 'Northern Section' Grid Connection".

2.3.5 As part of the rationalised approach, the Applicant considered the use of an OHL supported by a steel structure (i.e. steel lattice tower), which would be capable of carrying a much larger capacity and therefore have the ability to be used as 'shared infrastructure', with the additional benefit of providing an opportunity for futureproofing. It was therefore concluded that a steel lattice tower would be the optimal OHL design solution to be considered going forward at routeing and alignment stage for the Proposed Development.

2.3.6 Further decisions in relation to the routeing and alignment stages relevant to the Proposed Development are discussed further in this Chapter.

2.4 Development Considerations

2.4.1 SSEN Transmission has obligations under section 9 of the 1989 Act to 'develop and maintain an efficient, co-ordinated and economical system of electricity transmission'.

2.4.2 Under Schedule 9 of the 1989 Act, 'when formulating proposals to generate, transmit, distribute or supply electricity', SSEN Transmission are required to:

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

2.4.3 Furthermore, the requirements of the Construction (Design and Management) Regulations 2015[5] (CDM Regulations) require that the project design aims to minimise hazards and reduce risks during construction.

2.4.4 Taking account of these obligations, SSEN Transmission has considered technical, economic and environmental factors in evaluating practicable alternatives to the Proposed Development, with the objective of identifying a proposed alignment and design solution which is 'technically feasible and economically viable' and

[4] https://www.ssen-transmission.co.uk/projects/project-map/Connagill-Cluster/

[5] UK Government (2015), *Construction (Design and Management) Regulations 2015*, Online. Available at: http://www.legislation.gov.uk/uksi/2015/51/contents/made [accessed 08/01/2024]

'which causes the least disturbance to the environment and to the people who live, work, visit and recreate within it'.

2.5 Approach to Route and Alignment Selection

2.5.1 Guidelines for the routeing of new high voltage overhead transmission lines have been established within the electricity supply industry. These guidelines are known as the 'Holford Rules'[6] and have been widely used throughout the UK since the 1960s. The Holford Rules set out a hierarchical approach to routeing which advocates avoiding areas of high amenity value, minimises changes in direction, takes advantage of topography and minimises visual interaction with other transmission infrastructure.

2.5.2 SSEN Transmission has developed its own guidance[7], based on the principles set out in the Holford Rules, but broadening the basis for routeing decisions to reflect contemporary practice, and providing a framework to ensure environmental, technical and economic considerations are identified and appraised at each stage of the routeing process.

2.5.3 The guidance splits the routeing stage of a project into four principal stages, as follows:

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

2.5.4 Each stage is an iterative process and involves an increasing level of detail and resolution, bringing cost, technical and environmental considerations together in a way which seeks to achieve the best balance at each stage. The stages that are carried out can vary depending on the type, nature of and size of a project and consultation is carried out at each stage of the process, where relevant. Each stage is described in further detail in the following sections.

Routeing Strategy Development (Stage 0)

2.5.5 During the Routeing Strategy Development stage, the Applicant considered the proposed strategy for the routeing stage of the project and confirmed which stages, as set out within SSEN Transmission's guidance, are applicable to the Proposed Development.

Corridor Selection (Stage 1) and Route Selection (Stage 2)

2.5.6 The Corridor Selection stage (Stage 1) occurred simultaneously with Stage 2: Route Selection. This included an environmental and technical appraisal of the previously consented route for the OHL connection, to ensure it continued to be suitable given the change in design solution to steel lattice tower (from wood pole), prior to arriving at an optimal route[8] for the purposes of consultation and a proposed route[9] to take forward to the alignment selection stage (Stage 3).

2.5.7 The 2013 Environmental Appraisal (EA) for the Strath Halladale to Dallangwell 132 kV Connection noted that route options were initially identified following desk-based review and site walkovers. In accordance with the steps outlined in the Holford Rules[6], the following principles were taken into account during the route selection stage (where practicable) of the project:

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

[7] SSEN Transmission (2020) Procedures for Routeing Overhead Lines and Underground Cables of 132 kV and more

[8] A route to be taken forward to stakeholder consultation following a comparative appraisal of route options.

[9] A route taken forward following stakeholder consultation to the alignment selection stage (Stage 3) of the routeing process

- 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 structures required;
- Avoid skylining the route in key views and where necessary, cross ridges obliquely where a dip in the ridge provides an opportunity;
- Target the route towards open valleys and woods where the scale of poles or 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 effect; and
- Approach urban areas through industrial zones and consider the use of undergrounding in residential and valued recreational areas.

2.5.8 Appraisal of route options involved systematic consideration against a number of environmental and engineering topics.

2.5.9 Whilst the route options appraised were initially selected in 2013 prior to publication of SSEN Transmission's guidance[7], the systematic process undertaken at that time also followed a similar process of considering both environmental and technical factors prior to arriving at an optimal route.

Alignment Selection (Stage 3)

2.5.10 The Alignment Selection stage of the project sought to determine an optimal alignment[10] within the proposed route, carried out in accordance with SSEN Transmission's guidance[7] for the purposes of consultation, and a proposed alignment[11] to take forward to the EIA and consenting stage.

2.5.11 When identifying and appraising alignment options for Stage 3, localised constraints needed to be considered. The following tasks were therefore undertaken during this process:

- Desk-based review and targeted site survey by project landscape architects, ecologists, ornithologists, archaeologists, geologists and hydrologists to review alignment options;
- Review of baseline data acquired as part of the Strath Halladale to Dallangwell 132 kV Connection 2013 EA, including data gathering as part of site surveys, updated as necessary. This included targeted National Vegetation Classification (NVC) habitat surveys, protected species surveys and peat depth and condition surveys, update of nearby dwellings, to supplement existing data;
- Review of ornithological survey data and records for the area, including requests for data held by RSPB, Highland Raptor Study Group (HRSG) and request of bird data from surrounding developments to supplement the existing survey data;
- Review of information submitted for the Strathy North, Strathy South and Strathy Wood wind farms planning applications, and the aforementioned 2013 EA;
- Workshops to discuss alignment options prior to the identification of an optimal alignment; and
- Site reconnaissance visits by the SSEN Transmission engineering team and environmental consultants to review alignment options.

[10] An alignment to be taken forward to stakeholder consultation following a comparative appraisal of alignment options

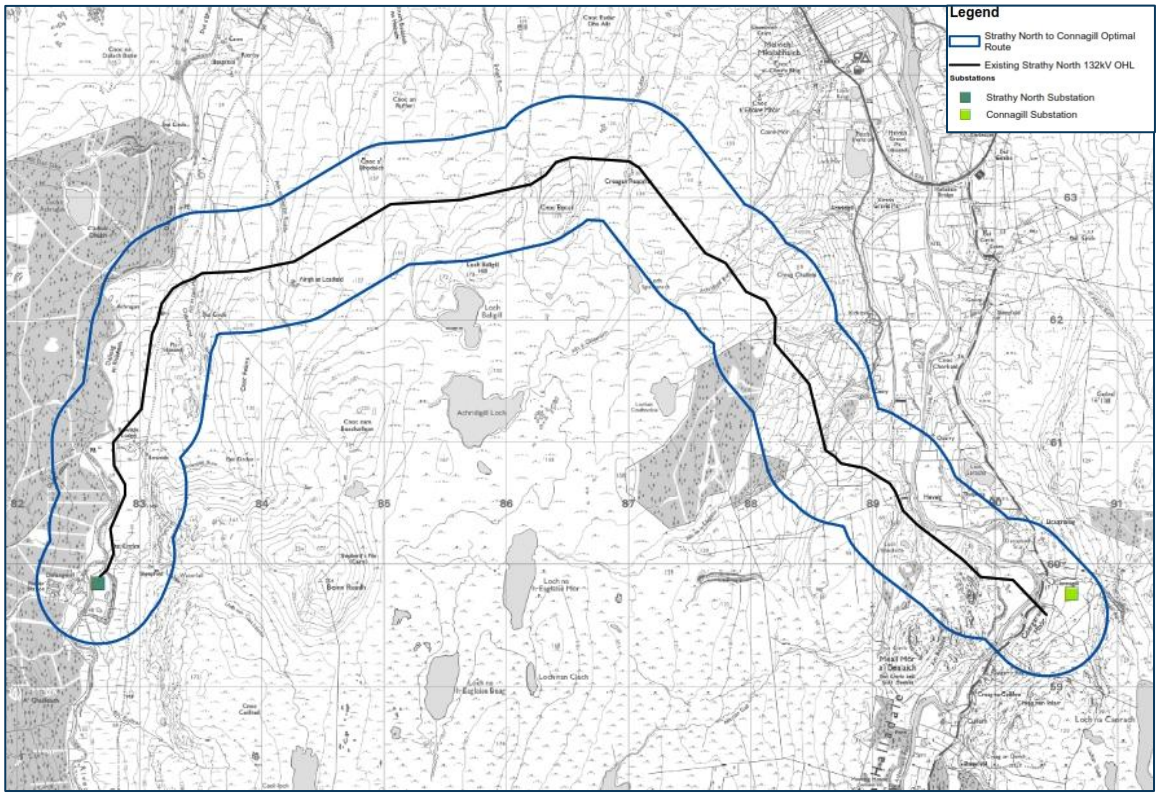
[11] An alignment taken forward following stakeholder consultation to the EIA and consenting stage

2.6 Summary of Appraisal: Route Selection (Stage 2)

2.6.1 In 2021, the Applicant carried out an exercise to review the OHL route and alignment from the original 2013 consent to confirm its continued suitability for the Proposed Development, from both an engineering and environmental perspective.

2.6.2 The review concluded that the route previously identified, which now follows the route of the existing Strathy North 132 kV OHL, remained optimal (see **Plate V1-2.2**). The review exercise in 2021 considered that the connection at that time would continue to be wood pole structure.

Plate V1-2.2: Strathy South Wind Farm 'Northern Section' Optimal Route



2.6.3 As part of the assessment to rationalise the Connagill Cluster Grid Connections, the Applicant carried out a further review in 2023 to consider an OHL supported by steel lattice tower which concluded that the optimal route for a wood pole OHL is also considered the optimal route for a steel lattice tower OHL.

2.6.4 The Optimal Route, as displayed on **Plate V1-2.2**, was presented in the Connagill Cluster Grid Connections Consultation Document (Routeing Stage)[12] ("the Route Stage Consultation Document").

2.7 Route Selection (Stage 2): Reporting and Consultation

2.7.1 The route selection stage reporting and consultation process was designed to engage with stakeholders including statutory and non-statutory consultees, local communities, landowners and individual residents in order to invite feedback on the rationale for and approach to, the selection of the Optimal Route, as is described further in **Volume 4: Appendix V1-4.1: Public Consultation Report** associated with **Volume 1: Chapter 4: Scope and Consultation**.

[12] Connagill Cluster Grid Connections: Consultation Document (Route Stage) (December 2023), produced by SSEN Transmission. Available at https://www.ssen-transmission.co.uk/globalassets/projects/connagill-cluster-documents/connagill-cluster-grid-connections---routeing-consultation-document.pdf

2.7.2 SSEN Transmission aimed to streamline consultation of the routeing process for the Connagill Cluster Grid Connections, which the Proposed Development is part of. This was to allow stakeholders the opportunity to review the Connagill Cluster Grid Connections as a whole during the routeing stages to consider the proposals to consolidate infrastructure and construction practices where practicable.

Route Stage Consultation Responses and the Applicant's Response

2.7.3 At route selection stage, consultation responses received from statutory and non-statutory consultees provided general support for the Optimal Route identified. No specific comments were received from the local community.

2.7.4 NatureScot provided development advice on protected areas, specifically the Caithness and Sutherland Peatlands Special Area of Conservation (SAC) and Special Protection Area (SPA), and the [at the time] proposed Flow Country World Heritage Site (WHS). They set out the information needed to be supplied in an application for consent to allow NatureScot to be able to comment on the proposals with regards to National Planning Framework 4 (NPF4) and their remit for protected areas. This would include habitat survey data, a construction management plan, peat management plan and a habitat management plan. NatureScot also suggested that the Applicant consult with the developers of the proposed and consented wind farms, which are to be connected by the project, for information with respect to SPA species distribution and movement.

2.7.5 RSPB Scotland welcomed that the Optimal Route appeared to largely avoid natural heritage designated sites in the area, however noted that the [at the time] proposed Flow Country World Heritage Site could not be avoided.

2.7.6 The Highland Council (THC) had no further comments from those that they raised in the pre-application response (see **Volume 4: Appendix V1-4.5: The Highland Council Pre-Application Advice for Major Developments – September 2023**).

2.7.7 Whilst the environmental sensitivities were noted and would be considered further during the alignment selection stage of the project, on balance it was considered that the Optimal Route (as per the 2013 section 37 consent) was to be taken forward as the Proposed Route, comprising a 132 kV double circuit OHL supported by steel lattice tower (and a section capable of operating at 275 kV in the future, if required).

2.7.8 The reporting on the consultation process, detailed within the Report on Consultation (Route Stage)[13] concluded that the Optimal Route identified within the Route Stage Consultation Document[12], and shown on **Volume 2: Figure V1-2.1: Proposed Route**, would be taken forward as the Proposed Route to the Alignment Selection stage (Stage 3).

2.7.9 All comments at route stage were taken forward into the alignment stage. This process remained inclusive, seeking further consultation where appropriate.

2.8 Summary of Appraisal: Alignment Selection (Stage 3)

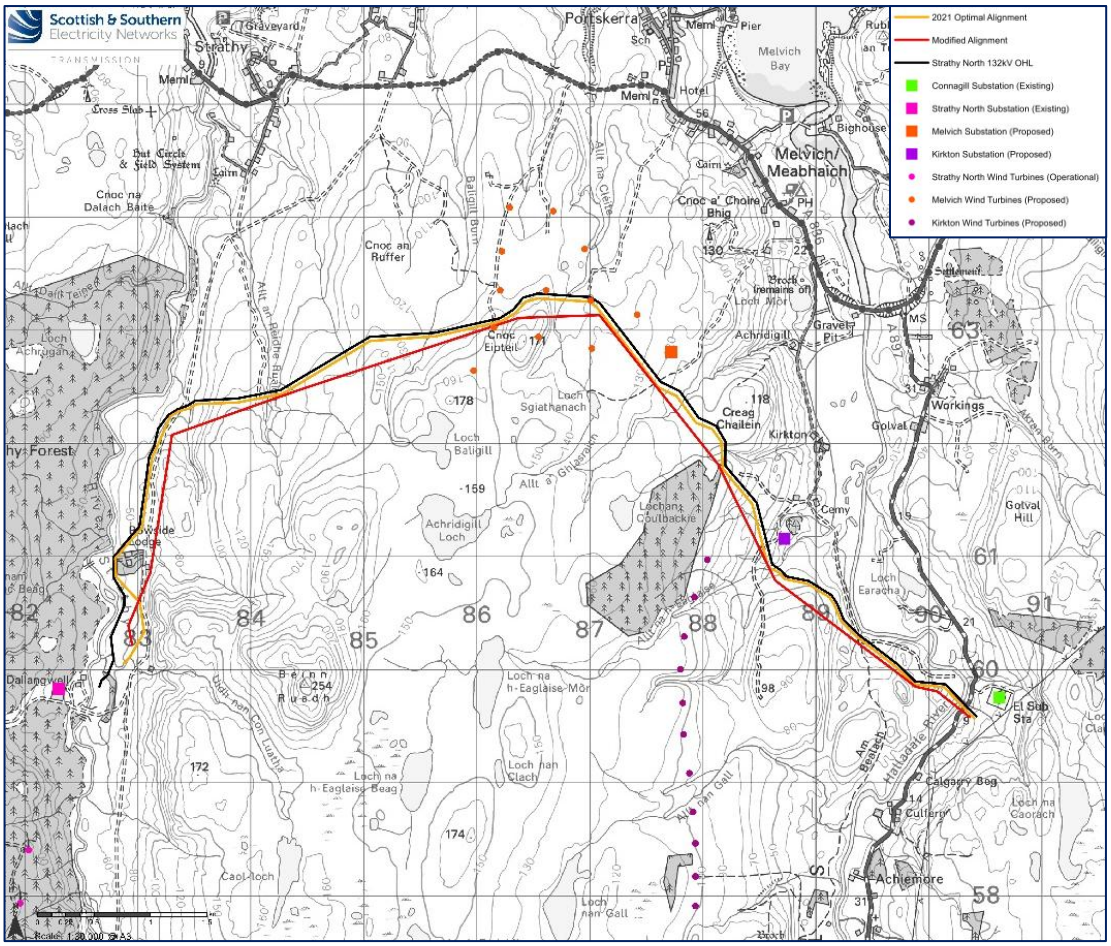
2.8.1 As mentioned in paragraph 2.6.1, in 2021 the Applicant carried out an exercise to review the route and alignment from the original 2013 consent, to connect Strathy South Wind Farm to the electricity transmission network. At this time the connection continued to be considered an OHL supported by trident 'H' wood pole (as per the 2013 consent). The 2021 review concluded that the alignment previously identified, which follows alongside the existing Strathy North 132 kV trident 'H' wood pole OHL, remained optimal.

2.8.2 As part of the assessment to rationalise the Connagill Cluster, the Applicant carried out a further engineering review in 2023 to consider an OHL supported by steel lattice towers, which resulted in some minor

[13] Conngaill Cluster Report on Consultation (Route Stage), April 2024, produced by SSEN Transmission. Available at: https://www.ssen-transmission.co.uk/globalassets/projects/connagill-cluster-documents/2024-consultation-documents/report-on-consultation-routeing-stage---connagill-cluster---april-2024.pdf

modifications to the 2021 Optimal Alignment to ensure sufficient clearance from the existing Strathy North 132 kV trident 'H' wood pole OHL by larger steel tower structures. This is referred to as the "Modified Alignment". The 2021 Optimal Alignment and the Modified Alignment are illustrated on **Plate V1-2.3.**

Plate V1-2.3: 2021 Optimal Alignment and Modified Alignment



2.8.3 An environmental review of the Modified Alignment was carried out by the Applicant which considered that the increased height of the steel lattice tower could appear more intrusive both to sensitive bird species and to the open character of the landscape and visual receptors, compared to what was considered for the 2021 Optimal Alignment (wood pole). In comparison to wood poles, steel lattice towers would require a longer construction period, which could increase the potential for disturbance to protected species and breeding birds for a longer period, as well as requiring a larger footprint, increased working areas (around the towers) and requirement for additional infrastructure (i.e. access tracks), which may also lead to greater direct habitat loss and further loss, damage or fragmentation of habitats including peatland.

2.8.4 The Modified Alignment would require the careful placement of towers, particularly in relation to targeting the avoidance of sensitive qualifying habitats of the Caithness and Sutherland Peatlands SAC, Ramsar and West Halladale Site of Special Scientific Interest (SSSI), and regionally significant heritage assets, but would also require the application of further mitigation, at both construction and operational stages, to avoid and reduce potential effects on the qualifying interests of the designated sites.

2.8.5 Whilst the potential for constraints and mitigation was recognised for the Modified Alignment, the review concluded that there were no particular constraints that would preclude this alignment from being taken forward. The benefit of the larger scale steel lattice towers should not be overlooked, given they would allow the use of 'shared infrastructure', thereby negating the need for several separate wood pole OHL connections and the

potential consequential cumulative effects. The Modified Alignment was therefore presented as the Optimal Alignment in the Connagill Cluster Grid Connections Consultation Document (Alignment Stage)[14] ("the Alignment Stage Consultation Document").

2.8.6 Following the appraisal of the Strathy South Wind Farm 'Alternative Northern' Grid Connection (see **Volume 5: Chapter 2: The Routeing Process and Alternatives – Alternative Alignment**), the Applicant considered the benefits of the 'Optimal Alternative Alignment' approaching Connagill 275/132 kV substation from the south. An approach from the south would cross Strath Halladale away from the more open valley area and would make better use of the local landform, helping the OHL to appear less prominent from the strath and nearby sensitive properties. As such, it was determined that the Optimal Alignment would be modified to capture the more southerly approach into Connagill 275/132 kV substation, as illustrated on **Volume 2: Figure V1-2.2: Proposed Alignment**.

2.8.7 To help further rationalise the cluster and mitigate some of the visual impacts from the OHL structures in the area, the Applicant proposed that once the Proposed Development is constructed, a section of the existing Strathy North 132 kV trident 'H' wood pole OHL would be dismantled and removed (between Strathy north substation to a point near Melvich Wind Energy Hub on-site substation) and the generation from Strathy North Wind Farm would join the proposed double circuit 132 kV OHL. The retained section of wood pole would be repurposed for other elements of Connagill Cluster Grid Connections.

2.9 Alignment Selection (Stage 3): Reporting and Consultation

2.9.1 As stated in paragraph 2.7.2, SSEN Transmission streamlined consultation for the Connagill Cluster Grid Connections, which the Proposed Development is part of. No concerns were raised by stakeholders on the Optimal Alignment presented in the Alignment Stage Consultation Document[14] in relation to the designated natural heritage sites, or the Flow Country WHS. No comments were received from members of the public following an alignment stage consultation event (see paragraph 2.3.3).

2.9.2 The reporting on the consultation process, detailed within the Report on Consultation (Alignment Stage)[15], concluded that the Optimal Alignment identified within the Alignment Stage Consultation Document[14] and shown on **Volume 2: Figure V1-2.2**, would be taken forward to the EIA and consenting stage as the Proposed Alignment.

2.9.3 All comments raised through the alignment stage consultation, as well as those resulting from any further meetings and liaison with stakeholders were taken forwards to the EIA and consenting stage. The process remained inclusive, seeking further consultation where appropriate.

2.10 Further Consideration during the EIA Process

2.10.1 The work that was undertaken during the route and alignment stages of the Proposed Development confirmed to the Applicant that the previously consented route and alignment of the OHL continued to be suitable (albeit with a slight modification on the approach into Connagill 275/132 kV substation), despite the change in design solution required to enable a rationalised approach to development. In addition, the decision by the Applicant to dismantle and remove approximately 7 km of the existing trident 'H' wood pole OHL, which the Proposed Development would run largely parallel to, would help to mitigate cumulative visual effects in views from settlement to the north and the A836 (North Coast 500 tourist route and National Cycle Route 1), and provide further rationalisation of infrastructure in the area.

[14] Connagill Cluster Grid Connections: Consultation Document (Alignment Stage) (May 2024), produced by SSEN Transmission. Available at: https://www.ssen-transmission.co.uk/globalassets/projects/connagill-cluster-documents/2024-consultation-documents/conngaill-cluster-grid-connections---alignment.pdf

[15] Connagill Cluster Grid Connections: Report on Consultation (Alignment Stage) (September 2024), produced by SSEN Transmission. Available at: report-on-consultation-alignment-stage-september-2024.pdf (ssen-transmission.co.uk)

2.10.2 The consideration of alternatives during the EIA stage of the project focussed on tower positions and the siting of ancillary infrastructure, particularly new permanent and temporary access tracks, as a result of more detailed environmental and engineering information, including NVC survey, peat depth and condition surveys, and ground investigation results.

2.10.3 Changes to the design of the Proposed Development in combination with the Proposed Alignment during the EIA stage were generally minor and included the following where practicable, whilst giving cognisance to the technical requirements for constructing and operating the Proposed Development:

- Proposed utilisation of existing tracks and junctions wherever possible;
- The siting of infrastructure away from sensitive habitats (including those potential to be groundwater dependent terrestrial ecosystems);
- Targeting infrastructure, where technically feasible, in areas of past peat cutting and drainage where large amounts of negative indicators of peatland condition, and few, if any, positive condition indicators are recorded;
- The siting of infrastructure to appear better aligned with the natural topography of the land. For example at Cnoc Eipteil, siting towers closer to the existing wood pole OHL to bring the alignment off the higher ground where it would appear more skylined in views;
- Movement of infrastructure as far as technically viable from mapped sensitive bird nest sites; and
- Careful placement of towers to maximise the open vista northwards from Havaig Fort (a regionally significant cultural heritage asset).

2.10.4 The final alignment of the Proposed Development in combination with the Proposed Alignment is discussed further in **Volume 1: Chapter 3: The Proposed Development** and presented in **Volume 2: Figure V1-3.1**.