VOLUME 5: CHAPTER 2: THE ROUTEING PROCESS AND ALTERNATIVES – ALTERNATIVE ALIGNMENT

Figures (Volume 2 of this EIA Report)

Appendices (Volume 4 of this EIA Report)

There are no appendices associated with this Chapter.

This page is intentionally blank.

2. THE ROUTEING PROCESS AND ALTERNATIVES – ALTERNATIVE ALIGNMENT

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 Development's alternative connection, referred to as the Alternative Alignment.

2.1.2 The Alternative Alignment has followed the same routeing process as set out in **Volume 1: Chapter 2: The Routeing Process and Alternatives**, and as such a number of cross references to that Chapter are made where relevant.

2.1.3 The decision by the Applicant to present an Alternative Alignment as part of the consent application is driven by the proposal for Melvich Wind Energy Hub, as set out in **Volume 1: Chapter 1: Introduction and Background** and **Volume 5: Chapter 1: Introduction – Alternative Alignment** of this EIA Report.

2.1.4 The Applicant's preference is to construct and operate the Proposed Alignment, as presented in **Volume 2: Figure V1-1.1: Overview of the Proposed Development**. The Applicant requests that the Scottish Ministers consider both the Proposed Alignment and the Alternative Alignment whilst noting that only one of the options would be built.

2.2 A Rationalised Approach

2.2.1 The Proposed Development forms part of the Connagill Cluster Grid Connections. Following a review of various technology options available, the Applicant identified a rationalised approach across the other grid connections that make up the Connagill Cluster Grid Connections.

2.2.2 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 Alternative Alignment) are set out in the documents listed in **Section 2.3** of **Volume 1: Chapter 2** and are available via the Applicant's webpage[3].

2.2.3 During the consultation process the Alternative Alignment was referred to as the "Strathy South Wind Farm 'Northern Alternative Section' Grid Connection".

2.2.4 As set out in **Section 2.3** of **Volume 1: Chapter 2**, the Applicant considered the use of an overhead line (OHL) supported by a steel lattice tower would be the optimal OHL design solution to be considered going forward at routeing and alignment stage for the Alternative Alignment. However, the use of an underground cable (UGC) was also considered, as set out in Section 2.5 below.

2.2.5 Further decisions in relation to the routeing and alignment stages relevant to the Alternative Alignment are discussed further in this Chapter.

2.3 Development Considerations

2.3.1 As set out in **Section 2.4 of Volume 1: Chapter 2**, the Applicant considered technical, economic and environmental factors in evaluating practicable alternatives, with the objective of identifying an alignment and

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

design solution which is *'technically feasible and economically viable'* and *'which causes the least disturbance to the environment and to the people who live, work, visit and recreate within it'.*

2.4 Approach to Route and Alignment Selection

The approach to route and alignment selection was informed by SSEN Transmission's guidance 'Procedures for Routeing Overhead Lines and Underground Cables of 132 kV and above'[4] which provides a framework to ensure environmental, technical and economic considerations are identified and appraised at each stage of the routeing process.

2.4.1 The guidance splits 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.

2.4.2 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 can vary depending on the type, nature and size of a project and consultation is carried out at each stage of the process as appropriate.

2.4.3 For further detail on each stage of the routeing process, refer to **Section 2.5** of **Volume 1: Chapter 2.**

Routeing Strategy Development (Stage 0)

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

Corridor Selection (Stage 1)

2.4.5 A corridor was identified to enable the identification of feasible route options for the Alternative Alignment, this was bound to the north by A836 road, to the south by Loch nah-Eaglaise Beag, to the west by the River Strathy and to the east by the existing Connagill 275/132 kV substation.

Route Selection (Stage 2)

2.4.6 The Route Selection stage (Stage 2) involved the identification of alternative route options and an appraisal of environmental, technical and economic constraints of the alternative route options, prior to arriving at an optimal alternative route[5] for the purpose of consultation and a proposed alternative route[6] to take forward to the alignment selection stage (Stage 3).

2.4.7 Route options were initially identified following desk-based review, informed by prior knowledge and experience of the area.

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

[5] An alternative route to be taken forward to stakeholder consultation following a comparative appraisal of alternative route options.

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

Alignment Selection (Stage 3)

2.4.8 The Alignment Selection stage of the project sought to determine an optimal alternative alignment[7] within the proposed alternative route, carried out in accordance with SSEN Transmission's guidance[4] for the purposes of consultation, and a proposed alternative alignment[8] to take forward to the EIA and consenting stage.

2.4.9 When identifying and appraising alternative 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 site surveys, along with those of the Strathy North 132 kV Grid Connection (2013) and updated surveys as required, including targeted National Vegetation Classification (NVC) habitat surveys, protected species surveys and peat depth and condition surveys;
- Review of ornithological survey data and records for the area, including requests for data held by RSPB and the 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, Strathy Wood, Melvich and Kirkton wind farm planning applications, and Strathy North 132 kV Grid Connection 2013 EA;
- Workshops to discuss alignment options prior to the identification of an optimal alternative alignment; and
- Site reconnaissance visits by the SSEN Transmission engineering team and environmental consultants to review alternative alignment options.

2.5 Summary of Appraisal: Route Selection (Stage 2)

2.5.1 During routeing studies, SSEN Transmission identified four route options for the alternative connection at widths of 1 km, although widths were reduced in some areas to account for localised constraints, based on an initial desk-based review and knowledge of the site. A summary of the route options is outlined below and are displayed on **Plate V5-2.1** and **Volume 2: Figure V5-2.1**.

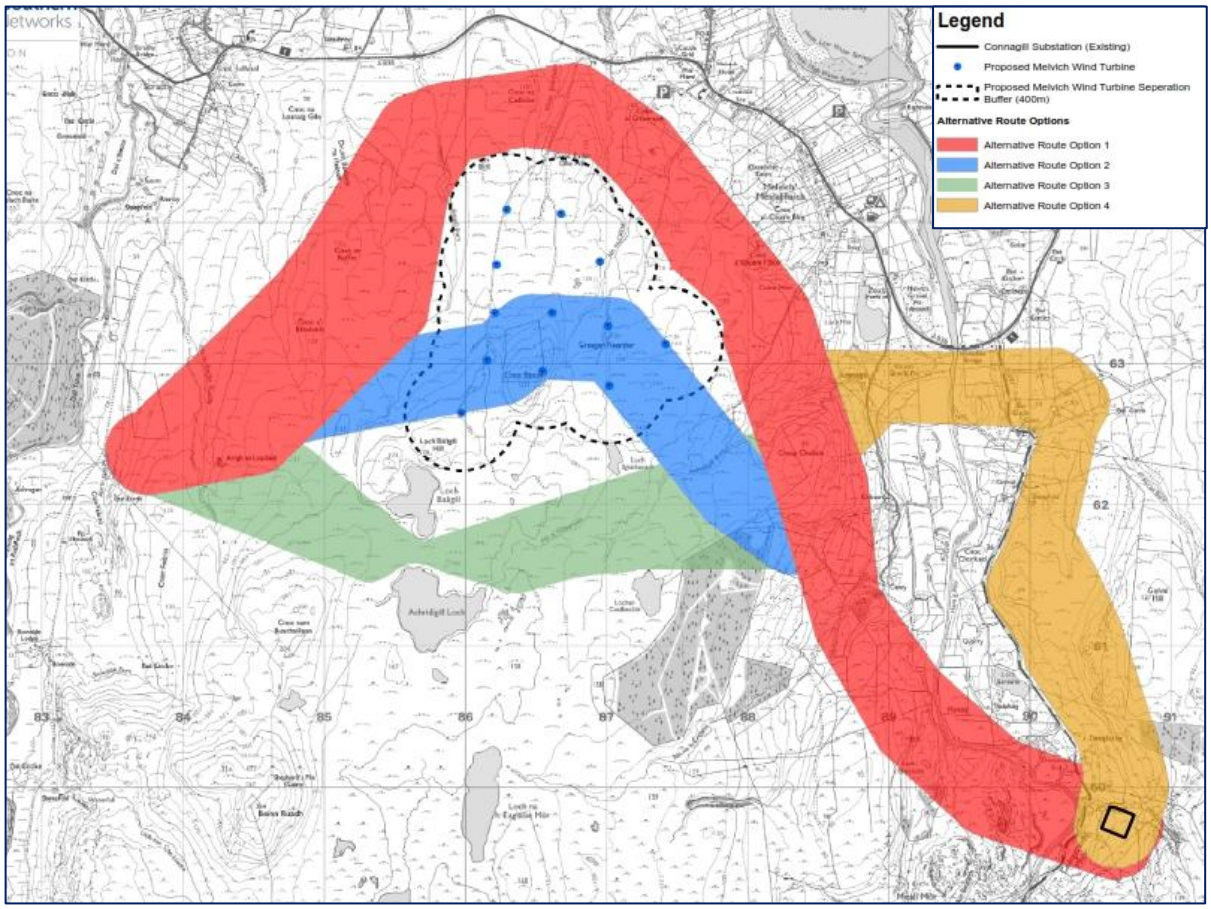
- **Alternative Route Option 1:** Approximately 11.5 km in length and achieved via OHL for almost its entirety. The route heads in a north-easterly direction from its starting point (where it would deviate from the 'Strathy South Wind Farm Grid Connection Proposed Alignment' to the east of the Alltan nam Muc watercourse). From there it would pass along Cnoc a'Bhodaich and Cnoc an Ruffer, skirting the western extent of the proposed Melvich wind turbines and upon reaching the Scottish Water Distribution Service Reservoir, would travel in an easterly direction crossing the Alltan Domhaich watercourse and to the north of Cnoc Eadar Dha Allt. The route would travel in a south-easterly direction, between the eastern side of the Melvich wind turbines and the telecommunication mast at Cnoc a'Choire Mhor, continuing for approximately 3 km, passing between the plantation near Lochan Coulbackie and Kirkton Road. For the final stretch before reaching Connagill substation, the route crosses a meandering section of the Halladale River, and the A897 road. A short section of UGC would be required to enter into Connagill 275/132 kV substation and a cable sealing end (CSE) would be required to enable the transition from OHL to UGC.
- **Alternative Route Option 2**: This alternative route option would largely follow 'Strathy South Wind Farm Grid Connection Proposed Alignment', traversing directly through the proposed Melvich wind turbines using UGC for approximately 2 km. Once beyond the wind turbines, the UGC would rejoin either Alternative Route Option 1 or 4, to complete the connection to Connagill 275/132 kV substation as OHL. A short section of UGC would be required to enter into Connagill 275/132 kV substation. To enable transition from OHL to UGC, CSE compounds would be required at either end of the UGC

[7] An alternative alignment to be taken forward to stakeholder consultation following a comparative appraisal of alternative alignment options
[8] An alternative alignment taken forward following stakeholder consultation to the EIA and consenting stage

section, along with the construction of permanent joint bays / link boxes at regular intervals along the UGC. Permanent access would be required to CSE compounds. If delivered in conjunction with Alternative Route Option 1 this route option would be approximately 9 km in length.

- **Alternative Route Option 3:** This alternative route option would be an OHL for almost its entirety. It is routed in a south-easterly direction from where it would deviate from the 'Strathy South Wind Farm Grid Connection Proposed Alignment', for approximately 2 km, routed to the south of the proposed Melvich wind turbines. From this point, the route would head in a slight north-easterly direction between Loch Sgiathanach and the plantation near Lochan Coulbackie, before joining Alternative Route Option 1 or 4, in proximity to Creag Chailein. A short section of UGC would be required to enter into Connagill 275/132 kV substation and a CSE compound would be required to enable the transition from OHL to UGC. If delivered in conjunction with Alternative Route Option 1, this route option would be approximately 8.5 km in length.
- **Alternative Route Option 4:** This alternative route option would be an alternative connection into Connagill 275/132 kV substation for Alternative Route Options 1, 2 or 3. It would be an OHL for almost its entirety and would extend for approximately 12 km (assuming it would be in combination with Alternative Route Option 1). Between Coire Mor and Creag Chailein and around the Achridigill Burn, this alternative route would take an easterly direction, crossing the Halladale River and A897 to the south of the A836, in proximity to the Kirkton Gravel Pit and Halladale Bridge. Once across the A897, the alternative route would head in a southerly direction for approximately 3 km, alongside the A897 road, before crossing the Connagill Burn and approaching Connagill 275/132 kV substation from the north.

Plate V5-2.1: Alternative Route Options



Optimal Alternative Route

2.5.2 The comparative appraisal included within the Connagill Cluster Grid Connections Consultation Document (Routeing Stage)[9] ("the Route Stage Consultation Document") noted that after taking the various constraints and route preferences into account, the optimal alternative route was considered to be **Alternative Route Option 1**.

2.5.3 Alternative Route Option 4 had the longest connection length and would require a greater number of angle towers than the other options. This alternative route option is also situated within 100 m of dwellings within Strath Halladale and routed through a denser area of archaeological assets and in closer proximity to the Halladale Bridge hut circles scheduled monument and is therefore less optimal from an engineering, environmental and cost perspective.

2.5.4 Although Alternative Route Option 3 has the shorter overall length of the connection, and the requirement for fewer angle towers and additional infrastructure compared to other route options, from an environmental perspective it was considered the least optimal option, primarily due to Alternative Route Option 3 falling directly within the Caithness and Sutherland Special Area of Conservation (SAC), Special Protection Area (SPA), Ramsar site and underlying West Halladale Site of Special Scientific Interest (SSSI), and the potential impact on the qualifying features of these sites. The topography along this alternative route is much flatter, allowing deeper peats to form which provides more sensitive habitat and more challenging conditions for construction. Being the most southerly option, and further from the public roads, there is minimal to no existing access opportunities for much of the route, which would require the construction of additional infrastructure within the protected areas.

2.5.5 Alternative Route Option 2 was considered the slightly more optimal environmental option given it is the shortest in length and by making use of an UGC for a section of this route may allow the connection to appear slightly less prominent in views from the north, albeit this is not the most sensitive part of the landscape. The section of UGC passes through areas of peatland, and while there could be opportunities for restoration of habitats along the temporary construction corridor of the UGC, it should be recognised that tower locations have the ability to be microsited to minimise and reduce impacts on peat compared to an UGC. There would be additional habitat loss associated with permanent above ground infrastructure that would be required along the section of UGC (in the form of link boxes and joint bays) and at either end (in the form of CSE compounds) that would increase the connections footprint and required land take. There are a number of engineering challenges associated with Alternative Route Option 2 which makes it less favourable, including the construction of an UGC through a landscape of deep peat, and the lack of existing access opportunities. The construction of an UGC through a third-party wind farm (Melvich Wind Energy Hub[10]) would also be very challenging due to the need to avoid interference with existing wind turbines and their associated cable connection, all of which would require adequate clearance to provide the required width of the working construction corridor. Using UGC limits the future flexibility of the network as adding additional connections or increasing circuit ratings is more intrusive than with the equivalent amendments to an OHL. UGCs also present challenges in maintenance and power restoration, especially if a fault occurs. Restoring power in the event of a cable fault can take significantly longer than for an OHL and often require extensive works, specialist resource and significant civil works to complete. There are also higher associated capital costs of constructing an UGC (with associated infrastructure), which are significantly higher compared to all other route options.

2.5.6 Overall, Alternative Route Option 1 is considered the Optimal Alternative Route. It is completely outwith the designated and protected areas of the Caithness and Sutherland SPA, SAC, Ramsar and underpinning West

[9] 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 [Accessed January 2025]

[10] The purpose of the Alternative Alignment is to avoid conflict with the proposed Melvich Wind Energy Hub, in accordance with the proposals currently submitted, and therefore the appraisal has assumed that this proposed development is present.

Halladale SSSI, albeit falls within the northern part of the Flow Country World Heritage Site (WHS). Being the most northerly of all route options, it also offers more limited disturbance to qualifying bird species of the SPA given the increased distance from it. While it does bring development in closer proximity to settlement in the north and west (including Melvich and Strathy), it was considered that a robust review at alignment stage could consider options to mitigate some of the key effects. As explained in **Section 1.1** of **Volume 5: Chapter 1,** it should be noted that this alternative connection would only be required should the Melvich Wind Energy Hub, in accordance with the proposals currently submitted, gain planning approval, in which case, this OHL would be seen in combination with much larger wind turbine infrastructure.

2.6 Route Selection (Stage 2): Reporting and Consultation

2.6.1 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 Alternative Route, as is described further in **Volume 4: Appendix V1-4.1** associated with **Volume 1: Chapter 4 – Scope and Consultation**.

2.6.2 SSEN Transmission aimed to streamline consultation of the routeing process for the Connagill Cluster Grid Connections, of which the Proposed Development forms 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

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

2.6.4 The Highland Council suggested in their response that it may be worthwhile considering an iteration of Alternative Route Option 1, but with an UGC section in the northern part of the route, where it runs closest to the A836 and settlements. Within the Connagill Cluster Grid Connection Report on Consultation (Route Stage)[11] ("Report on Consultation (Route Stage)"), the Applicant noted that OHL technology is considered as a starting point for all connections, however the use of UGC is also considered where appropriate, for example to mitigate a likely significant effect; but it should be acknowledged that an UGC does not come without its own constraints, as set out in paragraph 2.5.5, For example, the working corridor required for the installation of an UGC can result in additional land take and the potential for environmental effects, particularly during construction but also during the operational lifetime of UGC assets, particularly on habitats (including peatland) and hydrology. In response to THC's suggestion, the Applicant acknowledged in the Report on Consultation (Route Stage), that Alternative Route Option 1 falls within the (at the time) candidate Flow Country WHS and that the intention was to minimise impacts, where possible, on this sensitive receptor. As OHLs cross over peatland, tower locations can be microsited to minimise impacts on peat, and the footprint of other infrastructure can also be designed to reduce impacts on peat, compared to an UGC. Other considerations in relation to the use of UGC that the Applicant flagged, in response to THC's suggestion, within the Report on Consultation (Route Stage), is that for UGCs longer than 1 – 2 km in length, additional above ground infrastructure would be needed, enlarging the connections footprint. At each point where sections of cable are jointed or connected together, there is a requirement for intermediate joint bays. These cable joint bays would result in some permanent above ground infrastructure in the form of manholes and link boxes which would be installed in a free-standing pillar arrangement to allow for ongoing maintenance access. For protection of the assets at these locations, the manholes and pillars would be contained within small, fenced compounds, with a footprint of

[11] 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 [Accessed January 2025]

approximately 5 m x 5 m and with one compound for each circuit. Additionally, at each point, where an UGC transitions to an OHL, there is a requirement for a CSE compound. This would consist of a stoned hard standing platform with a security fence around its perimeter where the underground cabling would transition and connect to an overhead steel tower. The footprint of these compounds is estimated to be around 70 m x 70 m. As such, overground elements of infrastructure would still be required (and visible) for an UGC connection. As set out in paragraph 2.5.5, using UGC limits the future flexibility of the network and presents challenges in maintenance and power restoration, especially if a fault occurs. Given these constraints and SSEN Transmission's responsibility for an economical and efficient transmission network, it is considered that OHL is the most appropriate choice of technology for this connection. Nevertheless, the Applicant acknowledged that further environmental and engineering studies would be undertaken at Alignment Selection stage (Stage 3) to seek to find an acceptable alignment, and to consider whether further mitigation is required to minimise potential effects.

2.6.5 NatureScot provided development advice on protected areas, specifically the Caithness and Sutherland Peatlands SAC and SPA, and the [at the time] candidate Flow Country 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 would be connected by the Proposed Development, for information with respect to SPA species distribution and movement.

2.6.6 Historic Environment Scotland (HES) noted that Alternative Route Option 4 passes in close proximity (approximately 100 m) to the Halladale Bridge hut circles scheduled monument. While this alternative route would be visible from parts of the monument, it would be unlikely to significantly affect its setting, and the monument's relationship with Strath Halladale would still be readily understood, appreciated and experienced. Nevertheless, while HES acknowledged that Alternative Route Option 4 was not the Applicant's preferred route option, HES advised against choosing this route option if possible. Within the Report on Consultation (Route Stage)[11], the Applicant acknowledged HES's concerns and confirmed that Alternative Route Option 4 was not the optimal route option for progressing to Alignment Selection stage.

2.6.7 HES went on to comment on the optimal alternative route option (Alternative Route Option 1), which they noted had the potential to impact the east-west axial view from the category A Listed Building Bighouse garden pavilion and walled garden (LB7160), and there may also be potential for cumulative impacts alongside the proposed Melvich Wind Energy Hub which should be taken into consideration. HES suggested that a photomontage showing the view from the garden pavilion looking west along the axial view towards the alternative route option be undertaken to assist with the understanding of potential impacts on the setting of the buildings, and requested that the visualisation also include the proposed Melvich Wind Energy Hub to demonstrate potential cumulative impacts. The Applicant confirmed that the potential setting impacts on historic designated sites would continue to be reviewed as the project progresses through the alignment selection and EIA stages of the project. Following the alignment selection stage, should Bighouse garden pavilion be considered likely to be impacted by the OHL, further discussion would take place with HES regarding the requirement for a visualisation from this site (see paragraph 2.8.2).

2.6.8 RSPB Scotland welcomed that the optimal alternative route would avoid designated sites with the exception of the WHS boundary. However, concerns were raised that all alternative route options span an important area used by breeding SPA species to access feeding at sea. Surveys and assessment are therefore required to understand the risks to Common Scoter and both Red- and Black-throated diver flight paths. Existing collision risk calculations and assessment of barrier effect from wind farm EIAs should be considered, along with the cumulative impacts of these sites to inform the assessment. Further surveys need to be conducted before any route decisions are finalised. Within the Report on Consultation (Route Stage)[11], the Applicant confirmed that

ornithology surveys were carried out in this area between 2022-2023 comprising flight activity surveys, moorland breeding bird surveys, scarce breeding bird surveys, raptor surveys, black throated-diver focal watches and breeding diver surveys, all complete in accordance with species-specific methodologies. It was also acknowledged that substantial pre-existing baseline bird data also exists from surveys completed for developments that are either operational, consented or proposed in the wider area and that the Applicant intends to draw upon the collated data to inform the alignment selection stage and future ornithological impact assessments for the project.

2.6.9 RSPB Scotland also suggested that where high risks of collision are predicted (in relation to the Proposed Development), the consideration of undergrounding or Horizontal Directional Drilling (HDD) is considered (depending on the extent and quality of peatland habitats present) to reduce impacts over line-marking. Given the rarity and protected status of the Common Scoters and Black-throated Divers breeding in the Flow Country and their inability to perceive fine detail in flight, RSPB Scotland flagged concerns that there is insufficient evidence that power line bird diverters would be effective in protecting these populations from collisions. These concerns relate to all weather conditions but are particularly pertinent to adverse weather and nocturnal conditions when the birds' perception of diverter objects, and the cables to which they are attached, will be poor at best. It is highly likely that such fast flying birds with low manoeuvrability will have insufficient response time to take evasive action. Within the Report on Consultation (Route Stage)[11], the Applicant acknowledged RSPB's concerns and noted that they would be considered when assessing potential collision risk to important ornithological features (see **Volume 5: Chapter 6: Ornithology – Alternative Alignment**). However, as stated in paragraphs 2.5.5 and 2.6.4, the use of UGC does not come without its own limitations on other environmental disciplines.

2.6.10 RSPB Scotland agreed with the Applicant that Alternative Route Option 3 could be considered the worst choice as it encroaches most extensively into the designated sites. As Alternative Route Option 1 is the most northerly route option considered, and completely outwith the Caithness and Sutherland Peatlands SPA, SAC and Ramsar site and the West Halladale SSSI, this may limit disturbance to qualifying bird species of the SPA. However, it would then be within distance of foraging for some qualifying species of the North Caithness Cliffs SPA and this must be considered during assessments. Within the Report on Consultation (Route Stage)[11], the Applicant welcomed these comments. While it is acknowledged that Alternative Route Option 1 would be within 2 km of the North Caithness Cliffs SPA, this designated site would be considered in the ornithological impact assessment and shadow HRA process (see **Volume 5: Chapter 6: Ornithology – Alternative Alignment)**.

2.6.11 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 Alternative Route (Alternative Route 1) was to be taken forward as the Proposed Alternative Route (referred to hereafter as the 'Proposed Alternative 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).

2.6.12 The reporting on the consultation process, detailed within the Report on Consultation (Route Stage)[11] concluded that the Optimal Alternative Route (i.e., Alternative Route Option 1) identified within the Route Stage Consultation Document[9Error! Bookmark not defined.] would be taken forward as the Proposed Alternative Route to the Alignment Stage (Stage 3).

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

2.7 Summary of Appraisal: Alignment Selection (Stage 3)

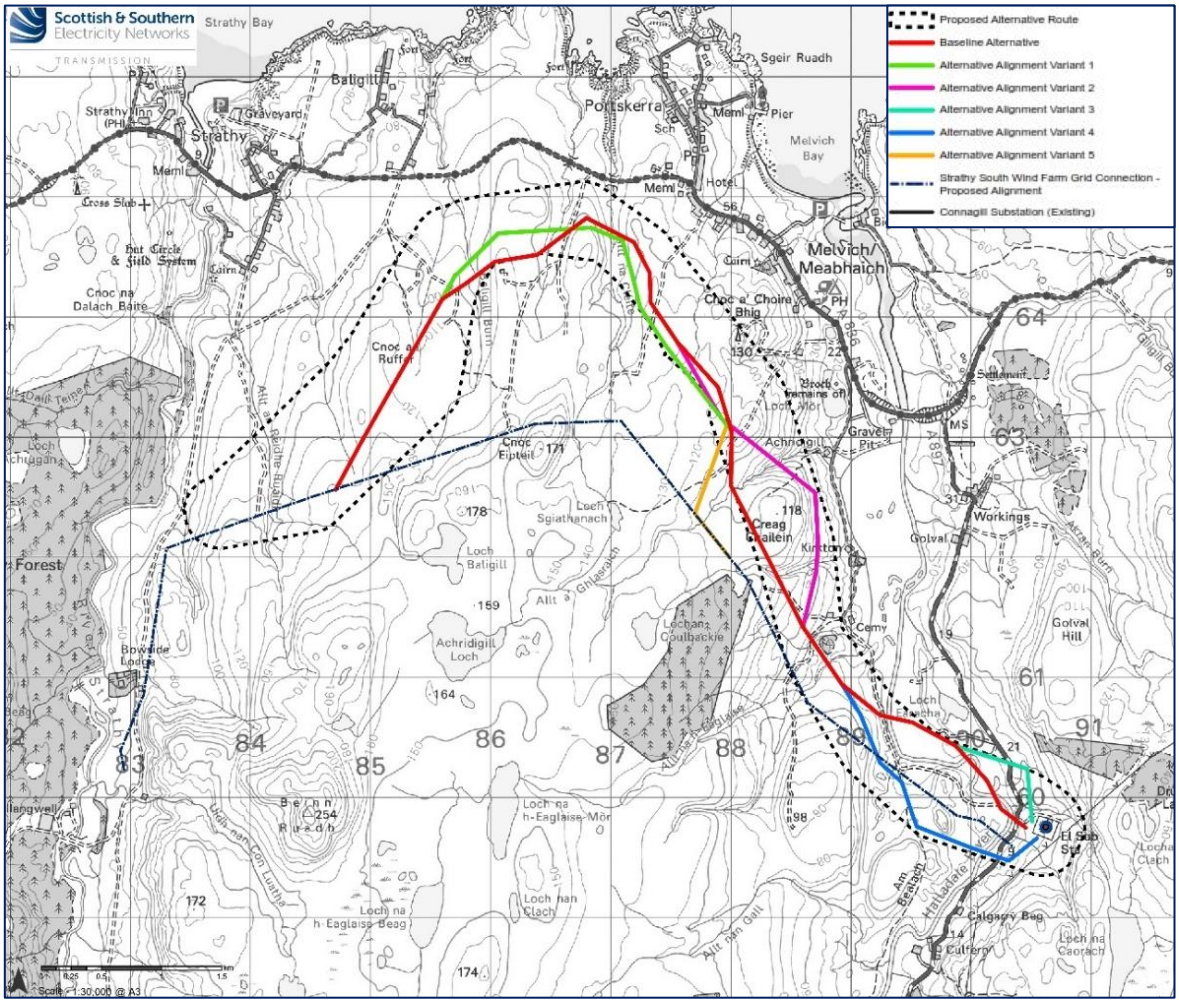
2.7.1 One technically feasible and economically viable alternative alignment option considered to be the shortest connection while avoiding or minimising interaction with the environmental constraints was identified within the Proposed Alternative Route based on the key environmental and engineering constraints identified during

Stage 2: Route Selection. This was referred to as the Baseline Alternative Alignment. A number of variants branching from the Baseline Alternative Alignment were developed to avoid localised constraints.

2.7.2 One of the alternative alignment variants (Alternative Alignment Variant 5) identified for appraisal goes beyond the extent of Proposed Alternative Route. The reason for this was to consider an option that joins the Strathy South Wind Farm Grid Connection Proposed Alignment, once past the Melvich Wind Energy Hub turbines.

2.7.3 One baseline alignment and five alternative alignment variants were included at alignment consultation stage and summarised in the Alignment Stage Consultation Document[12], as displayed on **Plate V5-2.2** and **Volume 2: Figure V5-2.2**.

Plate V5-2.2: Proposed Alternative Route and Alternative Alignment Options



Optimal Alternative Alignment

2.7.4 Various constraints were taken into account to reach an Optimal Alternative Alignment across environmental and technical considerations.

2.7.5 Alternative Alignment Variant 1 was considered optimal for both environmental and engineering considerations (compared to the comparable section of the Baseline Alternative Alignment) as it would slightly reduce the

[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 [Accessed January 2025]

prominence of an OHL from the A836 and settlement of Melvich to the north, although noting that an OHL would still form a prominent feature in views. This variant would also require fewer angle structures and fewer crossing of metallic pipes (water pipelines) and therefore would be less challenging to construct.

2.7.6 In the central section, while engineering preferred Alternative Alignment Variant 2 (compared to the comparable section of the Baseline Alternative Alignment), as it would cross less Class 1 priority peatland and be closer to existing access, making it less challenging to construct, from an environmental perspective this option was considered the least optimal, as it would bring development close to properties within Strath Halladale and would appear imposing in views and have a more notable effect on amenity. Overall, it was considered not appropriate to progress this option. Instead, Alternative Alignment Variant 5 (in combination with 'Strathy South Wind Farm Grid Connection Proposed Alignment') would allow development to be further from the strath and follow the existing OHL thereby keeping development together. However, it would bring development closer to the natural heritage designated sites to the west (Caithness and Sutherland Peatlands SPA, SAC and Ramsar, and the West Halladale SSSI), although the potential effects on qualifying features are expected to be of similar magnitude should other options be progressed. Another advantage of Alternative Alignment Variant 5 (in combination with the 'Strathy South Wind Farm Grid Connection Proposed Alignment') is that although it would require a section of the existing Strathy North 132 kV OHL to be undergrounded, this would be at a point where the existing OHL would already be undergrounded to accommodate the separately proposed Melvich Wind Energy Hub Grid Connection, thereby reducing construction challenges.

2.7.7 In the eastern extent, the optimal environmental option was Alternative Alignment Variant 4 (compared to the comparable section of the Baseline Alternative Alignment or Alternative Alignment Variant 3) due to the favourable crossing of Strath Halladale and A897. Being further south and away from the open valley, and its use of the local landform to appear less prominent from the strath and sensitive nearby properties, make it favourable compared to all other crossings considered in the eastern extent. Alternative Alignment Variant 4 would be situated further from the Halladale River and outwith the mapped floodplain for a longer stretch, making it preferable from a construction and maintenance perspective. When considered in combination with Alternative Alignment Variant 5 (in combination with the 'Strathy South Wind Farm Grid Connection Proposed Alignment'), Alternative Alignment Variant 4 would not require a crossing of the existing Strathy North 132 kV OHL (as this would already have taken place at a point further north in proximity to Melvich Wind Energy Hub on-site substation); it was for this reason that Alternative Alignment Variant 4 did not factor so favourably in the engineering appraisal.

2.7.8 The Optimal Alternative Alignment was therefore considered to be a combination of the **Baseline Alternative Alignment, Alternative Alignment Variant 1, Alternative Alignment Variant 5 (in combination with 'Strathy South Wind Farm Grid Connection Proposed Alignment')** and **Alternative Alignment Variant 4.**

Optimal Alternative Alignment Modifications

2.7.9 Following the appraisal of alternative alignment options, further engineering studies proposed a slight realignment at the point where Alternative Alignment Variant 5 (in combination with the 'Strathy South Wind Farm Grid Connection Proposed Alignment') would join Alternative Alignment Variant 4 in proximity to Loch a'Bhealaich), to navigate topographical constraints.

2.7.10 The proposed realignment was reviewed from an environmental perspective, and it was noted that the realignment would benefit in pulling infrastructure further from Havaig Fort, a regionally significant heritage asset. Furthermore, while it would move the OHL in closer proximity to suitable otter habitat at Loch a'Bhealaich, it would be slightly further from a golden plover territory. It would also reduce the number of crossings of Core Path SU19.03. Overall, it was considered that no significant environmental risks would occur as a result of this slight realignment. As such, this realignment was incorporated into the Optimal Alternative Alignment which was taken forward to stakeholder consultation.

2.8 Alignment Selection (Stage 3): Reporting and Consultation

2.8.1 As stated in paragraph 2.6.2, SSEN Transmission streamlined consultation for the Connagill Cluster Grid Connections, which the Proposed Development forms part of.

2.8.2 HES reiterated their concerns raised at routeing stage regarding the potential for the Optimal Alternative Alignment to impact on the setting of Category A listed Bighouse, garden pavilion and walled garden (LB7160). HES again recommended that a photomontage be produced to demonstrate and support the assessment of impacts on the setting of this asset. The Applicant consulted with HES to confirm that a visualisation from Bighouse garden pavilion would be produced (from an agreed viewpoint location) to be included within the EIA Report for the Alternative Alignment (see **Volume 1: Chapter 4: Scope and Consultation**).

2.8.3 No concerns were raised by stakeholders on the Optimal Alternative Alignment in relation to the designated natural heritage sites, or the (at the time) proposed Flow Country WHS. No comments were received from members of the public following an alignment stage consultation event.

2.8.4 The reporting on the consultation process, detailed within the Report on Consultation (Alignment Stage)[13], concluded that the Optimal Alternative Alignment identified within the Alignment Stage Consultation Document[12]**Error! Bookmark not defined.** would be taken forward to the EIA and consenting stage as the Proposed Alternative Alignment.

2.8.5 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.

2.9 Further Consideration during the EIA Process

2.9.1 The work that was undertaken during the route and alignment stages of the Alternative Alignment enabled a rigorous consideration of reasonable alternatives with respect to the route options, alignment selection and the consideration of design solutions available. Further review of the proposed Alternative Alignment during the EIA stage by the engineering and environmental teams has resulted in some minor adjustments to the proposed Alternative Alignment including the siting of infrastructure away from sensitive habitats (including those potential to be ground water dependent terrestrial ecosystems) and away from deeper areas of peat where practicable.

2.9.2 The Alternative Alignment is discussed further in **Volume 5: Chapter 3: The Proposed Development - Alternative Alignment** and presented in **Volume 2: Figure V5-3.1**.

[13] 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