Lorg Wind Farm Grid Connection

Environmental Impact Assessment Report

Chapter 2: Route Selection and Alternatives

November 25

Land & Planning

Contents

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2 ROUTE SELECTION AND ALTERNATIVES

2.1 Introduction

2.1.1 This Chapter outlines The Applicant's approach to routeing, the routeing methodology and the outcomes of the routeing and consultation process for the Proposed Development.

2.1.2 The design strategy for the Proposed Development is discussed, including the consideration given to reasonable alternatives which, in combination with the routeing work undertaken, played a critical role in seeking to avoid and reduce likely significant environmental effects.

2.2 Alternatives

2.2.1 Regulation 5(2)(d), of The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (hereafter referred to as 'the EIA Regulations', requires The Applicant to report upon the reasonable alternatives that were studied which are relevant to the Proposed Development and its specific characteristics, and provide an indication of the main reasons for the choice of the Proposed Development, taking into account the likely significant environmental effects.

2.2.2 In addition to the routeing process outlined below, various alternatives have been considered during the design phase of the Proposed Development, including:

- the "Do Nothing" Scenario; and
- alternative technical options.

"Do-Nothing Scenario"

2.2.3 The Applicant has a legal duty under the Electricity Act[1] to provide grid connections to new electricity generating developments.

2.2.4 The "do-nothing" scenario would result in The Applicant being non-compliant with its duties under the Electricity Act and is therefore not a viable alternative.

Alternative Technical Options to OHL

2.2.5 The Applicant is obliged to comply with the requirements of the Electricity Act to develop and maintain an efficient, co-ordinated and economical system of electricity transmission. SPEN's approach seeks to find an Overhead Line (OHL) solution for all connections, and only where there are exceptional constraints would underground cables be considered as a design alternative. Such constraints can be found in urban areas and in rural areas of the highest scenic and amenity value. Where an OHL solution is not achievable for technical reasons, SPEN looks to an underground cable solution as an alternative. However, sections of underground cable identified for inclusion within a scheme must balance the economic, technical and environmental considerations. This approach is supported by national planning policy found in the National Policy Statement for Electricity Networks Infrastructure (EN-5) which provides at paragraph 2.9.20 that *"the government's position that overhead lines should be the strong starting presumption for electricity networks developments in general"* with the presumption only reversed "*when proposed developments will cross part of a nationally designated landscape (i.e. National Park, The Broads, or Area of Outstanding Natural Beauty)"*[2].

2.2.6 The viability of using underground cables for either part of the route or its entire was considered at an early stage of the Proposed Development. Whilst underground cables have visual benefits, there are associated technical, environmental, and economic disadvantages, including:

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[1] UK Government (1989) Electricity Act 1989 (as amended). Available online at: https://www.legislation.gov.uk/ukpga/1989/29/introduction?view=extent.

[2] UK Government (2024): National Policy Statement for electricity networks infrastructure (EN-5). Available online at: https://www.gov.uk/government/publications/national-policy-statement-for-electricity-networks-infrastructure-en-5

- the physical extent of land required;
- the fault repair time;
- difficulties associated with general maintenance;
- increased cost;
- greater ground disturbance from excavating trenches;
- the restriction of development and planting within the underground transmission cable corridor;
- requirements for cable sealing end compounds or platforms at each end of each section of underground cable; and
- and the fact that underground cabling is a less efficient means of transporting electricity.

2.2.7 In consideration of the above factors, including consideration of the likely significant environmental effects of installing a new 132 kV OHL between Lorg Wind Farm and the proposed Holm Hill substation, the proposed OHL solution and alignment meet with The Applicant's project routeing objectives.

2.2.8 This approach and its conclusion also reflect The Applicant's overarching approach to routeing of major electrical infrastructure[3].

2.2.9 In terms of alternative technologies proposed for the OHL, there are two types of Trident wood poles which could be considered for the Proposed Development – 'single' poles and 'H poles'. 'H' poles are used for 'extreme environments' (above 200 m) as they are subject to greater ice and wind loadings, whereas 'single' poles are typically used at lower altitudes. Given the topography and likely meteorological conditions within which the OHL would be located, it was considered that Trident wood poles in the 'H' configuration would be more suitable for the Proposed Development than a 'single' pole design.

2.3 Established Practice for OHL Routeing

2.3.1 It is generally accepted across the Electricity Industry that the guidelines developed by the late Lord Holford in 1959 for routeing OHL, 'The Holford Rules[4]', should continue to be employed as the basis for routeing high voltage OHL.

2.3.2 The Holford Rules were reviewed circa 1992 by the National Grid Company Plc (now National Grid Transmission (NGT)) as owner and operator of the electricity transmission network in England and Wales, with notes of clarification added to update the Holford Rules. A subsequent review of the Holford Rules (and NGC clarification notes) was undertaken by Scottish Hydro Electric Transmission Limited (SHETL) in 2003 to reflect Scottish circumstances.

2.3.3 Key principles of the Holford Rules include avoiding prominent ridges and skylines, following broad wooded valleys, avoiding settlements and residential properties and maximising opportunities for 'backclothing' and the screening of infrastructure.

2.3.4 The Applicant's approach to routeing requires the standard application of the Holford Rules.

[3] SP Energy Networks *Approach to Routeing Major Electrical Infrastructure Projects*. Available online at: https://www.spenergynetworks.co.uk/userfiles/file/SPEN_Approach_to_Routeing_FINAL_20150527.pdf

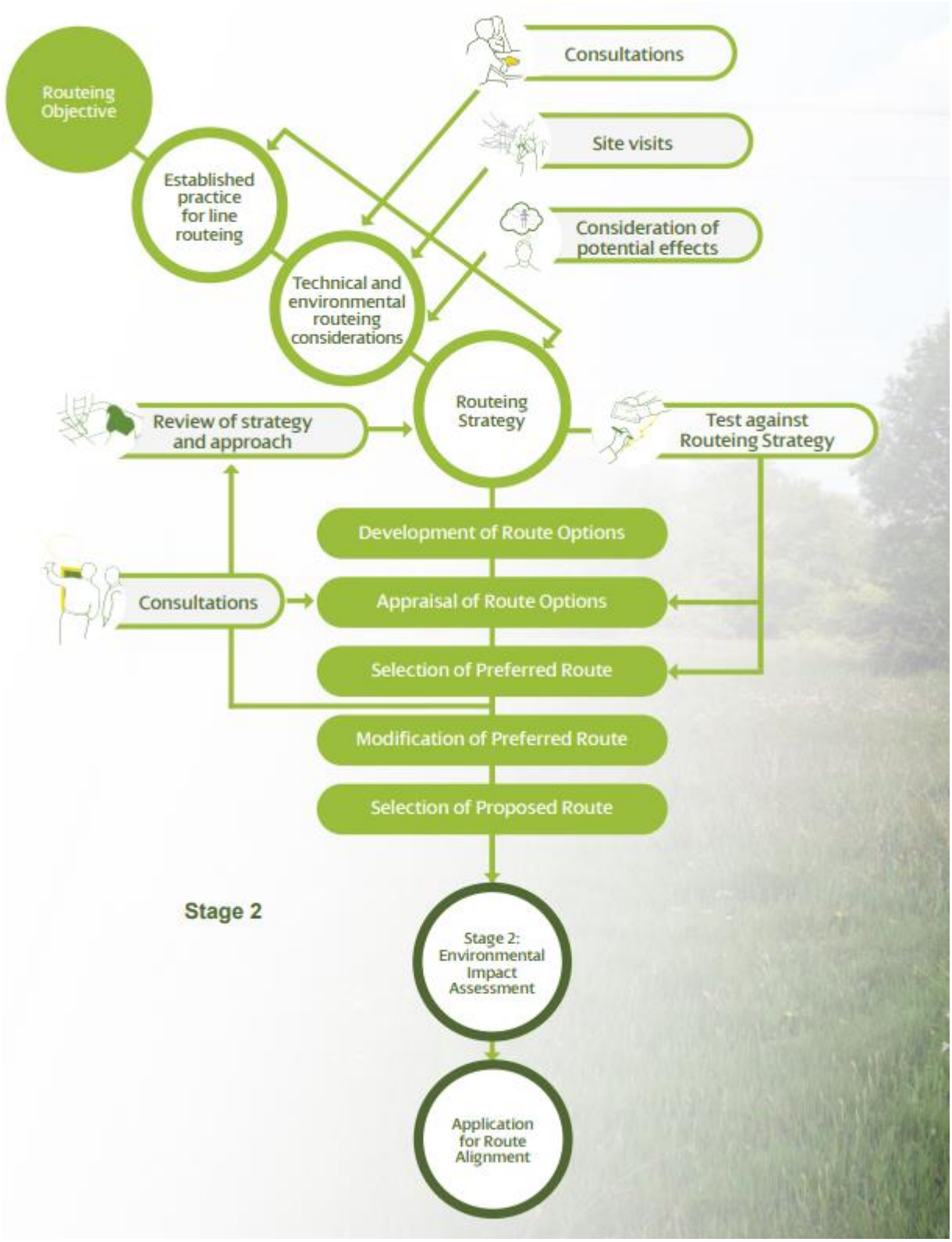
[4] SP Energy Networks (n.d.) *Appendix A – Holford Rules*. Available online at: https://www.spenergynetworks.co.uk/userfiles/file/Appendix-A-Holford-Rules.pdf

2.4 SPEN'S Approach to Routeing

2.4.1 In 2020, SPEN published a summary document outlining the approach taken to routeing transmission infrastructure (Approach to Routeing and Environmental Impact Assessment, SPEN 2020)[5]. The routeing of the Proposed Development has been undertaken in accordance with the process outlined in this document, as summarised in **Plate 2.1** and detailed in the sections below.

[5] SP Energy Networks (n.d.) Approach to Routeing Document (2nd version). Available online at: https://www.spenergynetworks.co.uk/userfiles/file/SPEN_Approach_to_Routeing_Document_2nd_version.pdf

Plate 2.1: Routeing and Environmental Impact Assessment Process



2.5 Routeing Objective

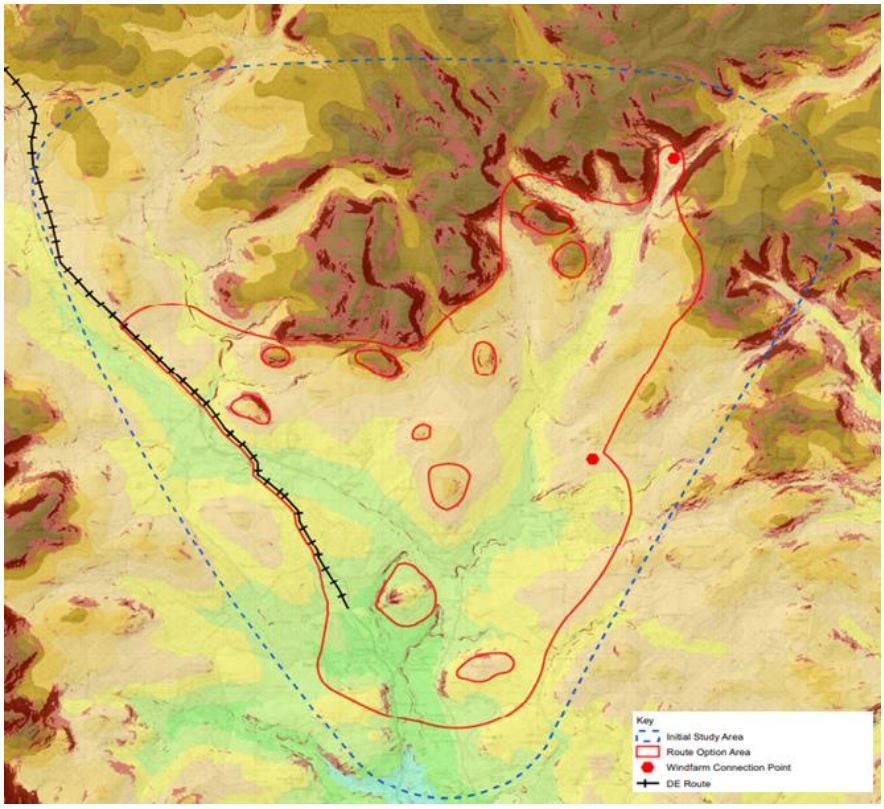
2.5.1 In accordance with the Electricity Act, The Applicant's routeing objective is to identify a technically feasible and economically viable route for an overhead transmission line that meets the technical requirements of the electricity network and causes, on balance, the least disturbance to the environment and the people who live, work and recreate within it.

2.5.2 At the inception of routeing, the routeing objective was to identify a technically feasible and economically viable OHL route between the proposed Lorg Wind Farm, the proposed Longburn Wind Farm and the existing DE electricity transmission OHL (hereafter referred to as the DE Route), which causes the least disturbance to people and the environment. As the routeing progressed, the connection to Longburn Wind Farm was no longer required, and the location of the proposed Holm Hill substation was identified as the DE tie in point. The routeing process and considerations from this initial route objective down to the selection of the Proposed Route are described below.

2.6 Development of Route Options

2.6.1 An Initial Study Area was used as a starting point for the identification of route options, which broadly covered an area encompassing Lorg and Longburn Wind Farm Substations, the DE Route and regions to the north and south. This Initial Study Area was further refined to identify the broad area within which feasible route options could be located, known as the Route Option Area. The key factor defining the Route Option Area was topographic. An upper altitude limit of 500 m was applied, steep slopes were avoided, and hilltop high points at lower altitude were also excluded. The southern extent was limited by the DE Route connection point, which must be north of the Dalshangan sealing end compound near Polquhanty (tower 102R of the DE Route). The Initial Study Area and Route Option Area are shown on **Plate 2.2** below.

Plate 2.2: Initial Study Area and Route Option Area

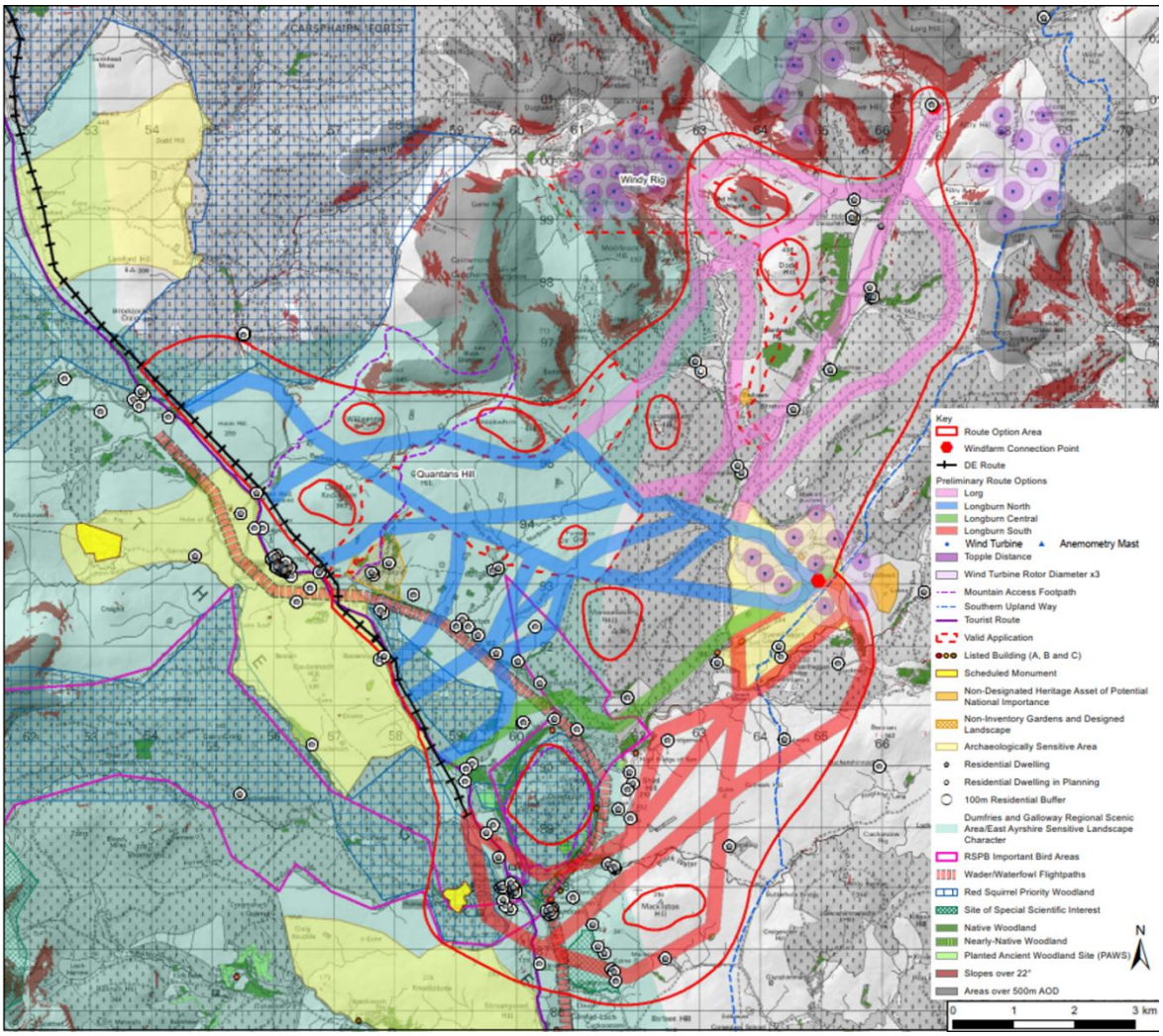


2.6.2 Route options were identified by determining strategic constraints to the proposed route and categorising these into Hard Constraints, which must be avoided, Moderate Constraints, which should be avoided where alternative routes are available and Soft Constraints, which should be easy to mitigate. Technical constraints and environmental constraints relating to landscape, heritage, ecology, ornithology, geology, land use, recreation and tourism were identified. Further details on these constraints are outlined in Table 7.1 of **Appendix 2.1: Lorg and Longburn Grid Connection Routing Consultation Report**. The potential Route Options identified were grouped according to broad geographical locations:

- Lorg: Route options connecting Lorg Wind farm to the Lorg-Longburn Junction (Pink);
- Longburn North: Route options connecting Longburn Wind Farm to the DE Route passing north of Marsalloch Hil (Blue)l;
- Longburn Central: Route options connecting Longburn Wind Farm to the DE Route passing between Marsalloch Hill and Dundeugh Hill (Green);
- Longburn South: Route options connecting Longburn Wind Farm to the DE Route passing south of Dundeugh Hill (Red)

2.6.3 A high-level comparative assessment was undertaken for the three Longburn groups identified, the conclusions of which are outlined in Table 7.2 of the **Appendix 2.1: Lorg and Longburn Grid Connection Routing Consultation Report**. An equivalent exercise was not needed for the Lorg Group due to the 500 m maximum altitude limit, which restricted the potential for alternative routes. The route options and groupings are shown in **Plate 2.3** below.

Plate 2.3: Preliminary Route Options



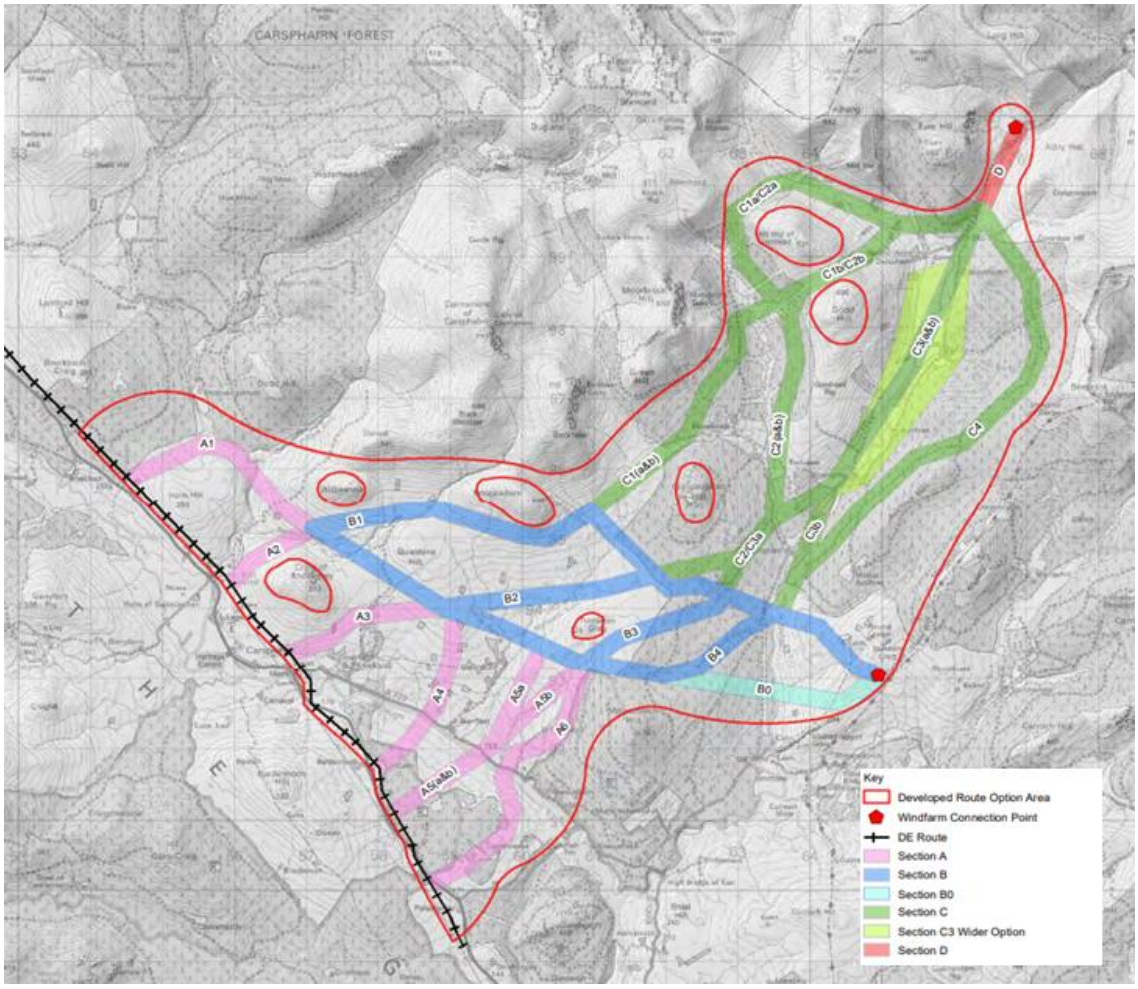
2.6.4 The comparative assessment showed that Longburn North (shown in blue in **Plate 2.3**) was more favourable in respect of high-level screening of strategic constraints. These included the presence of RSPB Important Bird Areas, Native and Nearly-native Woodland, Red Squirrel Priority Areas and Waterfowl Flight Paths within the Longburn Central and South groups, which were not present in the Longburn North group. The route option area was therefore refined to the developed route option area based around the Lorg and Longburn North route options, as outlined in **Section 2.7** below.

2.7 Appraisal of Route Options

2.7.1 A number of route options and sections were then identified within the developed route option area, as shown on **Plate 2.4** below.

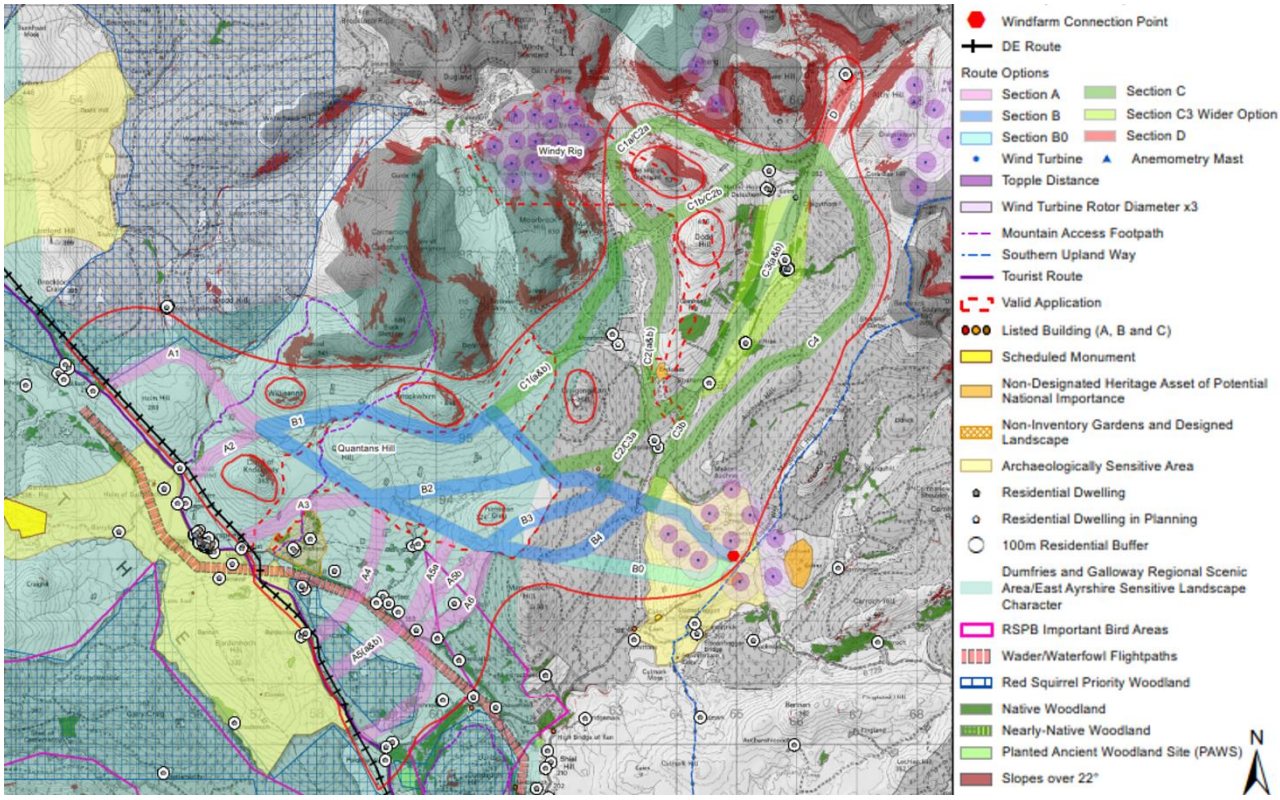
2.7.2 The developed route options were split into four sections (A, B, C and D) to facilitate the appraisal process. A Preferred Option was identified for Sections A and C, and then a Section B route, which would sensibly join the preferred A and C Sections, was chosen. This approach was decided upon due to the limited number and extent of constraints within the Section B area.

Plate 2.4: Initial Route Options



2.7.3 These route options and sections were considered in terms of likely significant environmental impacts on landscape, visual amenity, cultural heritage, ecology and ornithology, land use, forestry, flooding and peat, as shown in **Plate 2.5** below.

Plate 2.5: Strategic Environmental Constraints and Considerations



2.7.4 Strategic constraints were categorised in terms of their potential to impact the process of route option identification as follows:

- **Hard Constraint**: Feature must be avoided
- **Moderate Constraint**: Feature normally avoided where other alternative routes/alignments are available. If no other alternatives are available, feature can be passed through with mitigation
- **Soft Constraint**: Feature present that could be relatively easy to mitigate, either by design, micro-siting or construction practices

2.7.5 Routes A1, B4 and C4 were chosen as the Preferred Route. Routes A1 and A2 both scored favourably in terms of environmental impacts; however, Route A1 would avoid a requirement to divert the DE Route to provide a new terminal tower and was therefore considered preferable. Section C4 was considered the Preferred Route as the best compromise relating to landscape impacts, forestry loss and heritage impacts. Route B4 to connect A1 and C4 was marginally preferred from a landscape perspective over the other Routes in Section B, and there were no other marked differences between the Routes in Section B. Section 8.3 of **Appendix 2-1: Lorg and Longburn Grid Connection Routing Consultation Report** outlines the analysis of each route option, which was undertaken.

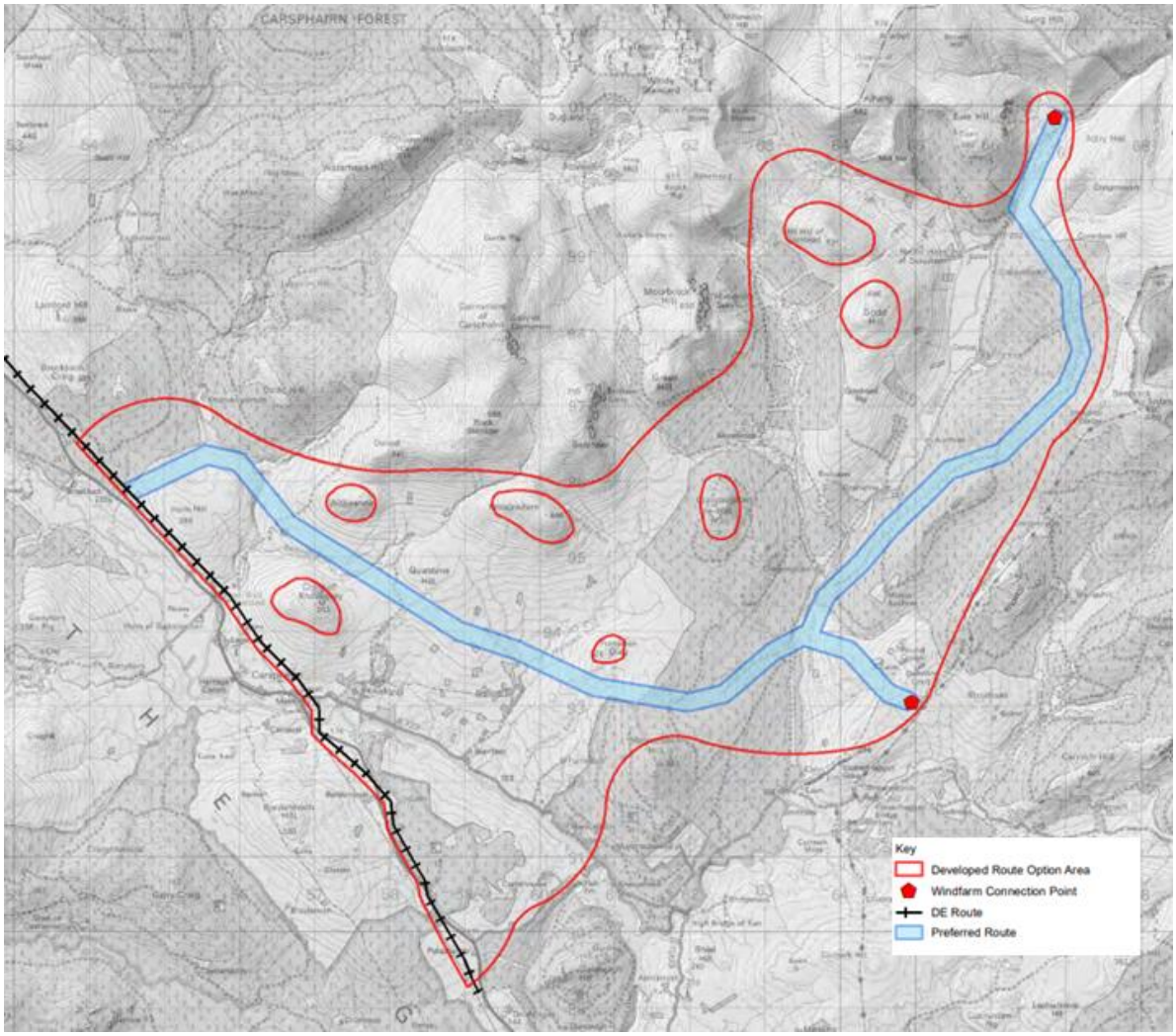
2.8 Selection of Preferred Route

2.8.1 The Preferred Route selected was 20.9 km in length, as illustrated in **Plate 2.6** below. This route option balanced environmental, technical and economic considerations. Technical considerations included topography and interfaces with existing infrastructure and the location of the proposed Wind farms. These were balanced against environmental constraints to minimise impacts on forestry, landscape, visual amenity, ecology, ornithology, peat and cultural heritage. Economic factors such as land use, recreation and tourism were also considered.

2.8.2 The Preferred Route ran south from the Lorg connection point along the Water of Ken valley for approximately 1 km, then obliquely uphill into the forestry plantation on the western slopes of Benbrack. From there, it ran through the plantations on the side of the valley for approximately 6 km, mainly following existing forestry tracks and firebreaks, dropping back down to the valley floor south of Craigengillan. Just south of Craigengillan, the Longburn spur connects to the OHL Route, from the proposed Longburn Wind Farm at Dunnans Craig. The Longburn Spur is approximately 2 km.

2.8.3 The Route then followed the shallow side of the valley of the Black Burn, again mainly following the existing tracks and firebreaks through forestry, to cross the ridge just north of Marsalloch Hill. From there, it ran west along the edge of the rough grazing north of Marbrack and below Quantans Hill, then north of Craig of Knockgray and Holm Hill to join the DE Route at the edge of the forestry near Brockloch.

Plate 2.6: Preferred Route



2.8.4 Further details of the route options appraisal and how this informed the selection of the Preferred Route are presented in the Routeing Consultation Report (**Appendix 2.1: Lorg and Longburn Grid Connection Routeing Consultation Report**). This provides details of the works undertaken up to April 2017, to select a Preferred Route. Any subsequent refinements or amendments to the Preferred Route are discussed in the rest of this Chapter.

2.9 Consultation on Preferred Route

2.9.1 In line with SPEN's routeing methodology guidance, 'Major Electrical Infrastructure Projects: Approach to Routeing and Environmental Impact Assessment'[6] non-statutory consultation on the Preferred Route was undertaken with statutory consultees, non-statutory consultees, and the general public.

2.9.2 The following methods, regarding consultation, were used:

- **Meetings with Statutory Consultees**: Prior to the selection of the Preferred Route, meetings were offered to statutory consultees to discuss the proposals and to identify issues before the Preferred Route was established. Meetings were held in March 2017 with The Scottish Government Energy Consents Unit (ECU), Dumfries and Galloway Council, Scottish Natural Heritage (now NatureScot) and Scottish Environment Protection Agency (SEPA). Historic Environment Scotland chose to use e-mail correspondence alone;
- **Wider consultation**: Following the consultation with the Statutory Consultees, a wider consultation was undertaken, which ran from 12 April 2017 to 7 July 2017. Information was sent to statutory and non-statutory consultees; local community councils and landowners, comprising a covering letter and copy of the Routeing Consultation Report[7] and/or consultation leaflet (either as a hard copy or CD copy). In addition, a reference copy was deposited at the Dumfries and Galloway Council offices in Dumfries for public viewing. The Routeing Consultation Report was also made available to download from The Applicant's website; and
- **Public Exhibition**: Public Exhibitions were held on 25 April 2017 and 26 April 2017 at Lagwyne Village Hall, Carsphairn, from 14:00 to 20:00. Advertisements providing notice of the consultation, availability of further information and dates of the Public Exhibition were placed in local newspapers. The 26 April 2017 event was planned to coincide with another SPEN event to maximise the number of attendees; there were seven attendees on 25 April 2017 and 18 attendees on 26 April 2017. The public exhibitions provided the opportunity for interested parties to get more information on the proposals and speak to a member of the Proposed Development team. The exhibition boards provided background to the Proposed Development, an overview of the routeing process, information on environmental and technical considerations, details of the Preferred Route, design and construction and next steps.

2.10 Modification of Preferred Route

2.10.1 In response to feedback gathered through the consultation, several amendments were made to the Preferred Route. A summary of the modifications made is presented in **Table 2.1** below. An 'Amendments to the Preferred Route Report' (included in **Appendix 2.2 Lorg and Longburn Grid Connection Amendments to the Preferred Route**) was also produced, which detailed the amendments and was made available to the public on The Applicant's website. This report considered the changes which were made to the Preferred Route up to November 2017.

Table 2.1: Amendments to the Preferred Route

Consultation Feedback Received	Amendment Made	Change to environmental effect
Potential for visual impacts on tourists attending	Route around Holm Hill altered so the OHL is located further from the Knockengorroch Festival Site.	Landscape: no change Visual Amenity: reduced visual impact from Knockengorroch as a

[6] SP Energy Networks (n.d.) Approach to Routeing Document (2nd version). Available at: https://www.spenergynetworks.co.uk/userfiles/file/SPEN_Approach_to_Routeing_Document_2nd_version.pdf

[7] SP Energy Networks (n.d.) Lorg and Longburn Routeing Consultation – Part 1. Available at: https://www.spenergynetworks.co.uk/userfiles/file/Lorg_Longburn_Routeing_Consultation_Pt1.pdf

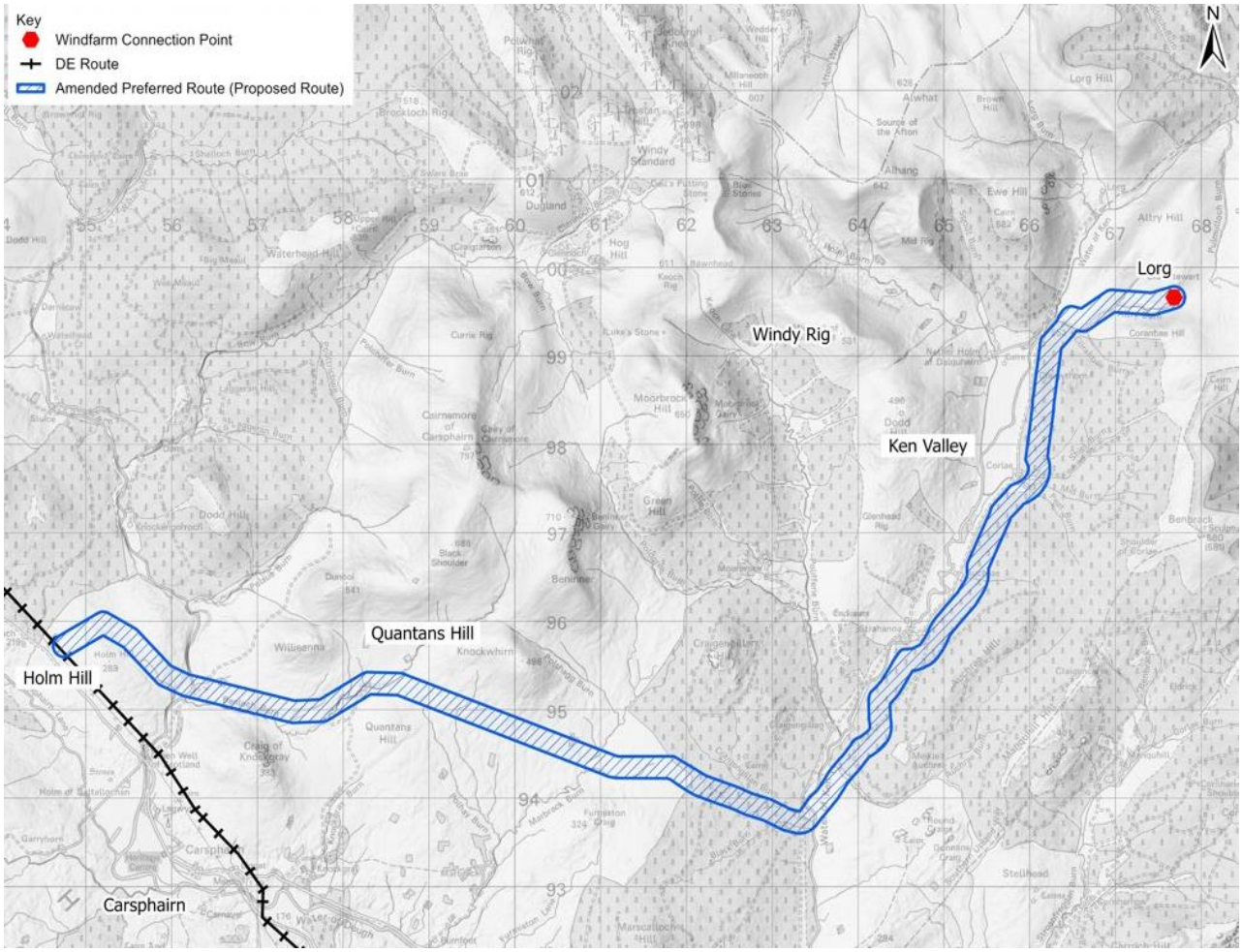
Consultation Feedback Received	Amendment Made	Change to environmental effect
Knockengorroch annual festival		tourist/recreational destination. Slightly improved crossing of route to Cairnsmore of Carsphairn Cultural Heritage: no change Biodiversity: no change Land use: no change Forestry: no change Waterbodies: no change Peat: no change
Curlews, black grouse and red grouse use the south facing slopes of Quantans Hill	Route moved from the south of Quantans Hill to the north	Landscape: no change Visual Amenity: no change Cultural Heritage: no change Biodiversity: reduced potential for effects on waders of conservation concern as preferential habitat is avoided. Land use: no change Forestry: no change Waterbodies: no change Peat: no change
The change around Quantans Hill to move the route further north and reduce impacts on forestry.	Route from Quantans Hill to the Lorg-Longburn Junction moved further north. The route through forestry was moved north due to concerns regarding the potential impact on forestry relating to the use of forestry plant in the vicinity of OHLs; potential sterilisation of areas of forestry; and area of forestry impacted. As the application for a former iteration of Quantans Hill Wind Farm (which had been a constraint in the initial route selection process) had been withdrawn the amendment could be made so the alignment followed a more direct route to join Quantans Hill to the area of forestry.	Landscape: no change Visual Amenity: reduced visual impacts from Knockgray Park, Marbrack and Fermiston. Cultural Heritage: no change Biodiversity: no change Land use: reduced impact for commercial forestry operations Forestry: reduced area of forestry loss. Waterbodies: no change Peat: potentially an increase in the area of peat to be crossed however peat data is not reliable at this stage.
The Preferred Route passed through the centre of two commercial forestry blocks. An 11 kV OHL already passes through these forestry blocks, lower on the hillside, close to the valley floor. Moving the line to run roughly parallel to the existing OHL (within the forestry to the east of the	Route up the Ken Valley moved further down the slope	Landscape: the potential for skylining across the flank of Auchrae Hill has been removed; although there is the potential for short term impacts on the scenic quality of the glen (until the existing trees reach sufficient height to screen the line from view) Visual Amenity: an increase in the potential for visual effects, however this is unlikely to be significant in the long term

Consultation Feedback Received	Amendment Made	Change to environmental effect
existing line, slightly further from the valley floor) would minimise the potential impact on forestry both relating to the use of forestry plant in the vicinity of overhead lines and potential sterilisation of areas of forestry, without encroaching on the glen.		because of recent native woodland planting and because the properties are generally oriented towards the valley and the line would pass 'behind' them. Cultural Heritage: no change Biodiversity: Route supports badger and likely otter; however, any recognised impacts to such species would be manageable. Route also extends across recorded native woodland, however of young, plantation origin and therefore considered of lower value. Land use: reduced impact for commercial forestry operations Forestry: Potential for a small reduction in the amount of forestry loss. Waterbodies: no change Peat: Potentially more likely to be able to avoid BGS mapped peat deposits; although peat data is not reliable at this stage.

2.10.2 In addition to these amendments, the spur to Longburn Wind Farm was no longer required as the Longburn Wind Farm application was refused and was removed from the Proposed Development. The western end of the Preferred Route was also extended by approximately 150 m to accommodate a revised Holm Hill substation location (see **Section 2.11** below).

2.10.3 These modifications resulted in the development of the "Proposed Route" shown on **Plate 2.7** below and a reduction to the overall route length to 17.5 km long.

Plate 2.7: Amended Preferred Route (Proposed Route)



2.11 Further Amendments to the Proposed Route

2.11.1 Following submission of the 2019 Scoping Report, it was determined that the proposed Kendoon Switching Station required to feed into the DE Route was no longer suitable to accommodate the increased number of connections required. The Switching Station was therefore removed from the Proposed Development to be consented under a separate planning application, which was renamed as Holm Hill Substation. This amendment did not change the Proposed Route.

2.12 Consultation on the Proposed Route

2.12.1 Further to the consultations referred to in **Section 2.9**, The Applicant offered an in-person event at Lagwyne Hall, Carsphairn, on 24 April 2024 from 14:00 to 19:00 to engage on the Proposed Route. There were 13 attendees, and there was feedback from residents near the re-aligned route. All stakeholders were also offered the opportunity to attend an online presentation on 17 May 2024 from 12:00 to 13:00. This online presentation was advertised on The Applicant's website, as well as in the Galloway Gazette. Stakeholders were also emailed the details of the virtual online presentation.

2.12.2 The online presentation included the latest updates on the Proposed Development, as well as any responses to feedback gathered through consultation. The presentation also included the details of the amendments made to the Preferred Route throughout the routeing process.

2.12.3 Although there was a wide notification of the event to stakeholders, there were only two RSVPs to attend the online event in May 2024, and they did not join the online presentation on the day. The presentation was recorded and sent to those who registered.

2.12.4 A total of 12 responses were received to the Proposed Route consultation. Three respondents submitted feedback via the feedback form available at the in-person consultation event, and nine provided feedback via email. A summary of the responses received is included in Table 3 of the **Consultation Report**, produced to support the Section 37 submission.

2.12.5 No changes were made to the Preferred Route following consultation; however, there has been a small adjustment to the location of three poles around Corlae.

2.13 Summary

2.13.1 This Chapter outlines the process that was undertaken in selecting and refining the Proposed Route for the Proposed Development, and the alternative routes which were considered as part of this process.

2.13.2 The aim of the route selection process was to find the most suitable route from the Wind Farm to the proposed connection to the DE route. This process involved detailed analysis of environmental, technical and other constraints, with reasonable alternatives taken forward for consideration.

2.13.3 The Proposed Route (**Plate 2.6**) and the associated Infrastructure Location Allowance (ILA) forms the basis of the assessment within this Environmental Impact Assessment Report (EIAR).