

# LOCH URR GRID CONNECTION: PHASE A

Routeing Consultation Document

**AUGUST 2015**



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# R1. INTRODUCTION

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## R1.1 BACKGROUND

R1.1.1 There is a need to connect the proposed Loch Urr wind farm to the transmission grid in South West Scotland. Scottish Power Transmission (SPT) as the transmission licence holder is obliged to provide such connections when a wind farm developer applies within their area of jurisdiction. As with all grid connections of this type, the initial premise is that this will be provided through an overhead line (OHL). In broad terms this will run from a substation at Loch Urr wind farm to a new collector substation (the Kendoon North Substation), which links to the proposed L7 section of the Blackcraig and Margree (B&M) grid connection. This collector substation will be located somewhere along the L7 OHL, between Dalshangan and the New Cumnock substation, and is provided not only for the Loch Urr connection, but will also have the capacity to accept new underground connections, being proposed by others, from the proposed Quantans Hill and Benbrack wind farms.

R1.1.2 The scope of this study is limited to the routeing of the Loch Urr OHL connection and the siting of the collector substation, and does not consider the underground connections identified above. These connections are to be provided by the developer of the wind farms (E.ON). The locations of the different elements of the electrical infrastructure within the Routeing Study Area, and the wind farm locations, are illustrated on **Figure 1**.

## R1.2 THE NEED FOR ENVIRONMENTAL IMPACT ASSESSMENT

R1.2.1 The proposed development to install an above-ground electric line of 132KV, is of a nature and scale that brings it within the scope of Schedule 2 of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000, as amended. The proposed development is therefore an 'EIA development,' within the meaning given to it by the Regulations and for which an Environmental Statement must be prepared:

*"(d) an electric line installed above ground with a voltage of 132 kilovolts or more, the installation of which (or the keeping installed of which) will require a section 37 consent but which is not Schedule 1 development;"*

R1.2.2 This routeing study is intended to inform the consultation and scoping process, which is also set out in the Regulations. In addition, the options considered in the routeing study will form part of the 'assessment of alternatives' required as part of the ES under the EIA regulations.

## R1.3 SPT AND THE ELECTRICITY ACT (1989)

R1.3.1 SP Transmission Ltd (SPT) is responsible for the transmission network from the English/Scottish border to just north of Stirling, an area of some 23,000 square kilometres. For SPT to comply with its licence obligations, it must provide all new forms of electricity generation with access to the electricity network. Scottish Power Energy Networks (SPEN) is responsible for the delivery of the transmission network on behalf of SPT.

R1.3.2 Under the Electricity Act 1989, SPT (on behalf of Scottish Power) is the holder of a transmission licence. Under Section 37 of the Electricity Act 1989, SPT is required to seek consent from the Scottish Ministers for the construction of any non-exempted overhead line operating at a voltage greater than 20 kilovolts (kV). The proposed OHL is to be constructed at 132kV to facilitate the capacity of the proposed Loch Urr wind farm only.

- R1.3.3 Applications will be made by SPT to the Scottish Ministers for Section 37 (S37) consents under the Act in respect of the overhead electricity distribution line and any ancillary development, and, a short time in advance, requests will be made for a direction under Section 57(2) of the Town and Country Planning (Scotland) Act 1997, that planning permission be deemed to be granted in respect of the Kendoon North substation.
- R1.3.4 As part of their obligation under the licence agreement, and as defined in Section 9 of the Act, SPT have a statutory obligation 'to develop and maintain an efficient, co-ordinated and economical system of electricity distribution' and also 'to facilitate competition in the supply and generation of electricity'.
- R1.3.5 These dual obligations are required to be undertaken at all times with regard to the protection of the environment, including fisheries, flora, fauna and amenity, and as specified within Schedule 9 of the Act. Schedule 9 states that in formulating any relevant proposals, a licence holder shall, when undertaking generation, transmission, distribution or supply of electricity:
- "(a) ...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*
- (b) ...shall do what he 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."*
- R1.3.6 In adhering to Schedule 9, SPT provide a Position Statement, reviewed and updated every 5 years, which details how they will carry out their duties in developing and maintaining their network.
- R1.3.7 In taking account of both the Statutory Obligations of Section 9 and those specific responsibilities detailed in Schedule 9, SPT ensure that they are able to balance the technical, environmental and economic factors when developing overhead lines and substations as are proposed for the Loch Urr connection.

## **R1.4 APPROACH TO ROUTEING OVERHEAD LINES**

- R1.4.1 SPT at all times aim to undertake routeing of OHLs with regard for the natural environment and the amenity of people living and working within an area, and in line with guidance on routeing such as that contained within the Holford Rules. Whilst additional guidance, over and above that contained within the Holford Rules, is largely absent, these Rules are tried and tested and are still applicable to routeing in the modern era, despite being conceived in the 1950s.
- R1.4.2 SPT undergo routeing for overhead lines via a sequential process which takes account of the range of technical, environmental and economic constraints at a broad and detailed level and with regard to comprehensive consultation with relevant stakeholders and the public. In doing so, they are able to provide viable routes which address the foreseeable constraints of a given study area. The use of the 'Preferred Route' as a means for consultation at the pre-scoping stage ensures that comments are then evaluated and revisions made to the route in the identification of a 'Proposed Route' to be taken through the EIA process.

## **R1.5 THE DEVELOPMENT AND CONSENTING PROCESS**

- R1.5.1 In June 2013, The Environmental Dimension Partnership Ltd (EDP) and their wider team of specialised sub-consultants were commissioned by SPEN to undertake an Environmental Impact Assessment of the Loch Urr grid connection project. SPT have a tried and tested method of developing grid infrastructure and integrating this into the wider existing network within the area

under their control. SPEN's approach to developing OHLs consists of two primary phases, within each of which additional sub-phases apply:

### **Phase 1: Routeing and Consultation**

- R15.2 SPEN are committed to consulting with statutory and non-statutory bodies throughout the development process, not only as a statutory duty within the planning system, but as a measure to involve, and gain feedback from, as broad a range of consultees and stakeholders as possible. Consultation with statutory organisations is not required as part of these early routeing studies; however involving these consultees at this initial stage is considered an essential part of being able to define, early in the project, those constraints which will be key to the wider routeing study.
- R15.3 The first stage of the project involves the identification of a 'Preferred Route' – this being the route upon which detailed consultation is undertaken – through the provision of this 'Routeing Consultation Report' document. This document provides a detailed analysis of the constraints and opportunities of a given study area in the definition of the Preferred Route.
- R15.4 The Preferred Route will be the subject of the main formal consultation undertaken during the pre-application stages. Following this consultation it is possible that some changes to the route will be suggested as a result of the emergence of new information. Subject to acceptance in environmental terms, the suggested changes are adopted, and if necessary, subjected to additional consultation. Subject to agreement by all parties, the Preferred Route, with suggested changes, can be identified as the 'Proposed Route'. It is this route that is taken forward into the Environmental Impact Assessment (EIA) phase of the project.

### **Phase 2: Environmental Impact Assessment**

- R15.5 The EIA Process is set out in full within the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000. EIA is required for developments falling within Schedule 2 to the EIA Regulations that are likely to have significant effects on the environment by virtue of factors such as nature, size or location. In determining whether the proposed OHL development is likely to have significant effects on the environment, regard should be had to the selection criteria detailed at Schedule 3 to the EIA Regulations.
- R15.6 Under the Regulations, Section 37 development that is considered likely to have significant effects on the environment must be subject to EIA and an Environmental Statement (ES) must be submitted with the Section 37 application.
- R15.7 Where EIA is required, environmental information must be provided by the developer in an Environmental Statement. Schedule 4 specifies the information that must or may be provided in such a Statement.
- R15.8 The proposed overhead grid connection is Schedule 2 development: *"(4) an electric line installed above ground with a voltage of 132 kilovolts or more, the installation of which (or the keeping installed of which) will require a Section 37 consent but which is not Schedule 1 development."* If therefore it is likely to have significant environmental effects because of factors such as its nature, size or location, it is 'EIA development', and a formal EIA is required.
- R15.9 The proposed OHL will be some 25km in length, and although it will not include ancillary infrastructure in the form of substation development, due to the nature and size of the proposal it is recognised that the development is likely to have some significant effects on the environment. On this basis SPT proposes to submit an Environmental Statement with the application for consent for the development. In accordance with regulation 3(2), this intention to submit an Environmental Statement confirms the development as EIA development.

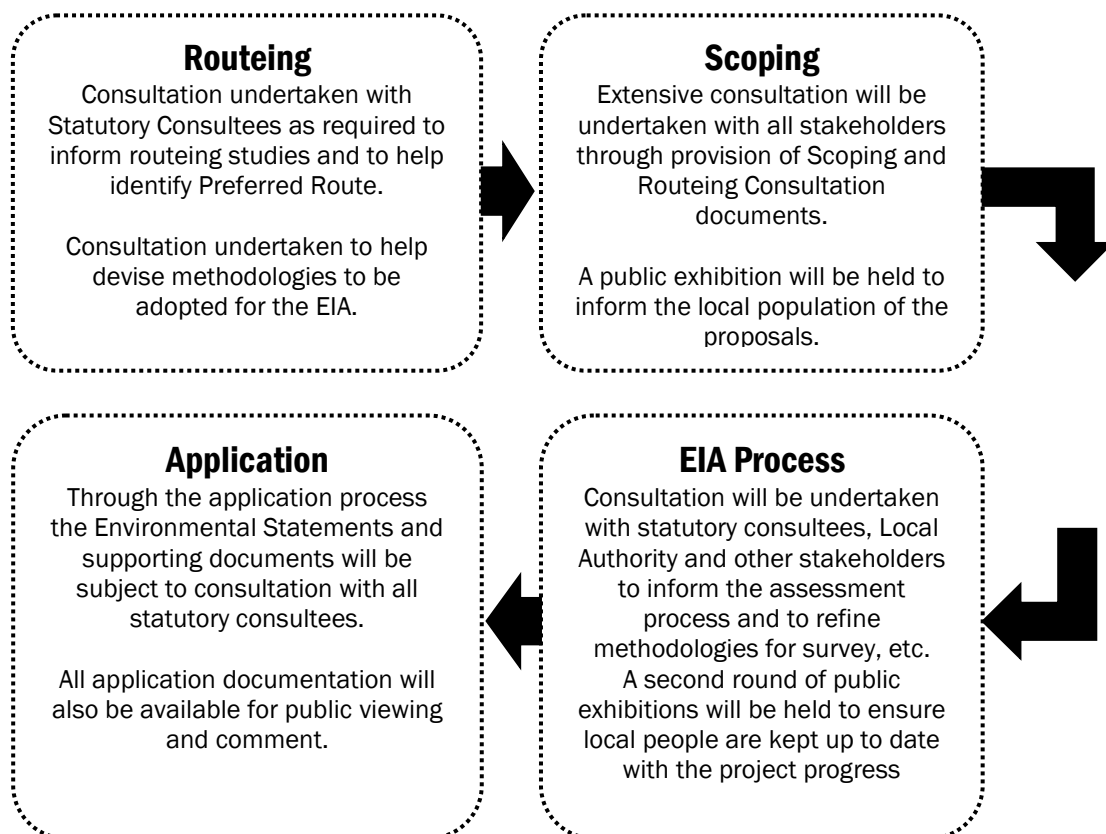
## The Statutory Consents Procedures

R15.10 Following the EIA, EDP will be responsible for producing, in collaboration with the wider project team, the Environmental Statement (ES). The ES will form the main application documentation, supported by any relevant Technical Appendices and other information. The application to install, and maintain in perpetuity, a 132kV grid connection and all ancillary infrastructure, will be made to the Scottish Ministers under Section 37 of the Electricity Act. In conjunction with this application, requests will be made for a direction under Section 57(2) of the Town and Country Planning (Scotland) Act 1997, that planning permission be deemed to be granted in respect of the overhead electricity distribution line and any ancillary developments.

## R1.6 PURPOSE OF THIS DOCUMENT AND CONSULTATION

R16.1 This 'Routeing Consultation Report' has been prepared to set out the steps taken in identifying the 'Preferred Route' for the 132kV OHL to service the Loch Urr wind farm, and to identify the proposed location for the new Kendoon North collector substation. It is provided for issue to interested stakeholders, giving them the information required to engage and comment on the project at an early stage. It sets out SPT's approach to routeing and the suggested form of the grid connection based on the work undertaken to date and offers an opportunity for comment.

R16.2 This consultation on the Preferred Route will be carried out using the information contained in this report and subsequently through the issue of the Scoping Report to the Scottish Government Energy Consents and Deployment Unit (ECDU). Following consultation on the Preferred Route, any comments raised will be considered in order to identify the 'Proposed Route'. The following diagram illustrates the main stages in identifying a Proposed Route and carrying out the EIA, and highlights the stages at which consultation will occur:



R1.6.3 This routeing consultation report contains the following principal sections, which detail the requirement for the grid connection, the proposed form of this and how this has been identified:

- **Section R1:** Introduction;
- **Section R2:** The Need for the Development;
- **Section R3:** Elements of the Grid Connection;
- **Section R4:** Planning Policy Context;
- **Section R5:** Routeing Methodology;
- **Section R6:** The Routeing Process Applied to this Project;
- **Section R7:** Environmental Baseline of the Study Area;
- **Section R8:** Application of the Substation Siting Methodology;
- **Section R9:** Application of the Routeing Methodology;
- **Section R10:** Next Steps;
- **Section R11:** Consultees and Contact Information; and
- **Section R12:** Figures Supporting this Document.



## R2. THE NEED FOR THE DEVELOPMENT

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- R2.1.1 SPT has received a Grid Connection Application from the developers of the Loch Urr wind farm. The proposed wind farm, for which an application was submitted on 20 November 2014, comprises up to 26 turbines and has a potential installed capacity of up to 83.2MW, and is being developed by the electricity generator E.ON. The proposed Kendoon North substation will also cater for future connections from the Quantans Hill and Benbrack wind farms, for which a separate Grid Connection Application has been received. These are also being developed by E.ON and have capacities of approximately 57MW and 59.4MW respectively. Whilst the proposed Kendoon North substation will have the ability to accommodate these connections, the connections themselves do not form part of this project or any future applications related to this and are a consideration in locating the substation only.
- R2.1.2 All three wind farms are the subject of separate, and current, 'Section 36' applications to the Scottish Ministers, under the Electricity Act 1989. The area of the Loch Urr wind farm has only limited existing electricity transmission and distribution infrastructure, generally comprising the electricity distribution network at 33kV, 11kV and low voltage. The Quantans Hill and Benbrack developments are both located in close proximity to the proposed Blackcraig and Margree grid connection, more detail of which is provided below.
- R2.1.3 SPT are developing proposals for the reinforcement of the transmission grid in this part of South-West Scotland to facilitate the connection of a number of wind farms being promoted in this area. This includes the connection of a number of projects located in the vicinity of the Loch Urr development, including the Blackcraig Wind Farm (a consented scheme of 23 turbines) and the Margree Wind Farm (Scoping stage development of 17 turbines). These developments are both sited within 4.5km of the proposed Loch Urr wind farm, as illustrated on **Figure 1**.
- R2.1.4 **Figure 1** also illustrates the route of the proposed Blackcraig and Margree Grid Connection, this having recently been consented, in three parts, by the Scottish Ministers. As part of the Blackcraig and Margree proposal, SPT are planning to upgrade the existing N-Route OHL (see **Figure 1**) to facilitate the extra generating capacity of the two wind farms, and as part of a general upgrading of the electrical infrastructure of the Galloway Hydro-Electric Scheme. The Blackcraig & Margree grid connection route contains the following key components:
- A heavy duty wood pole OHL between Blackcraig wind farm, via a substation at Margree wind farm, to a location near Dalshangan; and
  - An L7 lattice tower OHL between Dalshangan and the proposed New Cumnock substation. This section of the route replaces the current N-Route which will be decommissioned and removed as part of the works.
- R2.1.5 With regards to the siting of the new substation along the L7 route, the location of the Blackcraig and Margree connection, in addition to the various elements of the Galloway Hydro-Scheme (as illustrated on **Figure 1**), are important strategic considerations.

## R3. ELEMENTS OF THE GRID CONNECTION

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### R3.1 INTRODUCTION

R3.1.1 A connection to the grid at a location between Dalshangan and New Cumnock is required as there is not sufficient capacity within the transmission network closer to the wind farm. The existing high voltage transmission lines in the area, the N-Route and R-Route (see **Figure 1**), and the proposed B&M connection, lie approximately 12.5km west of the wind farm location, and provide a connection for the Galloway Hydro-Electric Scheme and a number of other wind farms in the local area, as well as connecting into the wider transmission grid via the New Cumnock substation.

R3.1.2 In order to provide the required connection to the transmission network, the project requires the following key components, the requirement for each of which is detailed below:

- Wind farm substation at Loch Urr;
- The Kendoon North collector substation along the route of the L7 tower OHL; and
- A 132kV overhead line connection between these two substations.

R3.1.3 As indicated above, the underground connections for Benbrack and Quantans Hill developments will be the subject of separate applications.

### R3.2 SUBSTATIONS

R3.2.1 There will be a substation at the Loch Urr wind farm that will 'step-up' the 33kV underground connections within the wind farm to 132kV for transmission by overhead line. This substation is included within the Section 36 application for the proposed Loch Urr wind farm.

R3.2.2 The Loch Urr substation would also be provided by the wind farm developer. It would be connected to the Kendoon North substation by the 132kV overhead line the subject of this routeing and consultation document. The Benbrack and Quantans Hill substations would also be provided by the wind farm developer. They will be connected to the Kendoon North substation by an underground cable, which would also be installed by the wind farm developer.

R3.2.3 The proposed SPT collector substation known as Kendoon North would have an area of approximately 100m x 80m and would be comprised of a GIS double busbar substation with six bays and a bus coupler breaker (expandable up to ten bays), including four bays to tee off to the 132kV Margree/Kendoon-New Cumnock 132kV circuit, immediately adjacent to a 132/33kV 90MVA transformer and a single 33kV metered circuit breaker acting as the Benbrack and Quantans Hill point of connection. The Loch Urr overhead line will include a short section of underground cable to enter into the GIS Kendoon North building immediately at the substation site. A 2.74m high fence would surround the substation.

R3.2.4 The new collector substation adjacent to the L7 OHL will provide an endpoint for not only the proposed Loch Urr overhead line, but also two future underground 33kV connections from the Quantans Hill and Benbrack developments. These connections, being developed by others, will access the substation and will be 'stepped up' to 132kV via transformers within the substation compound, for onward transmission along the proposed L7 route.

R3.2.5 The location of the substation will be determined based upon the most technical, environmental and cost-effective 'best fit', and with the overarching need to link to the proposed L7 section of the B&M connection. Indicative images presenting the design of the substation are shown at **Figure 2**.

These images show another ScottishPower substation, and reflect the broad design of the proposed Kendoon North substation, rather than an exact replica of that proposed.

- R3.2.6 Whilst the location of the proposed Kendoon North substation is considered as part of this routeing consultation report, in order that a considered and viable location is proposed, the substation will not form part of the Section 37 application for the proposed OHL. Due to its size, it is not considered appropriate to include it as ancillary infrastructure, and as such a separate Town and Country Planning Application will be submitted for this structure, in advance of the Section 37 application for the OHL.

### R3.3 OVERHEAD LINE

- R3.3.1 In light of its licence obligations to provide the best technical and most cost-efficient solution for connection, SPT policy seeks to find an OHL solution for all transmission 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 overhead line solution is not achievable for technical reasons, the company will look to an underground cable solution as an alternative.

- R3.3.2 The primary reasons for selecting an overhead option, against that of an underground connection, are as follows:

- 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; and
- Requirements for cable sealing end compounds or platforms at each end of each section of underground cable.

- R3.3.3 The starting point for considering this connection is therefore the assumption that the grid connection will be provided by an OHL along its entire length (i.e. as opposed to an underground cable). Should the constraints determine that an underground cable is required this will be evaluated as necessary.

### OVERHEAD LINE DESIGN

- R3.3.4 The overhead line is proposed as a 132kV connection to be supported by the 'Trident' wood pole design, which will have a starting point of the substation within the Loch Urr wind farm, and an endpoint of the Kendoon North collector substation adjacent to the L7 route (as described above). This would link to this route at a point between Dalshangan and New Cumnock, the location of which is to be determined through the routeing and siting process undertaken within this document.
- R3.3.5 The 'Trident' wood pole 132kV overhead line design utilises two standard pole types, as illustrated on **Figure 3**; a 'single' pole and an 'H' pole configuration. For single poles, the nominal height of the wood poles is likely to be c.15m, with a maximum above-ground height of 22m and a minimum above-ground height of 10m. The spacing between the poles will vary but will generally be 100m,

with a maximum span length of 150m. For the 'H' pole configuration, the height will again be between 10m and 22m (above-ground).

- R3.36 The 'Trident' overhead line design specification is a UK Electricity Industry Design Standard and the final designation of pole type is generally dependant on three main factors: altitude, weather and the topography of the route. The size of poles and span lengths will also vary depending on these factors, with poles being closer together at high altitudes to withstand the effects of greater exposure to high winds, ice and other weather events. The pole configuration, height and the distance between poles will therefore only be fully determined after a detailed line survey.
- R3.37 The proposed wood pole will support three conductors (wires) in a horizontal flat formation as shown in **Figure 3**. In addition, there is an earth conductor suspended beneath the main conductors in order to provide lightning protection. This also includes fibre optic cores for communication purposes.
- R3.38 Following identification of the proposed route for the new line, a detailed topographical survey will be carried out. This is required to identify the proposed positions and heights of each individual tower and wood pole. Site surveys to examine the subsoil conditions will also be carried out at proposed tower and wood pole positions where required. These will inform the tower foundation designs.

## OVERHEAD LINE CONSTRUCTION

- R3.39 Overhead line construction typically follows a standard sequence of events which is:
- Prepare access to the pole locations;
  - Install pole foundations;
  - Erect wood poles;
  - String conductors; and
  - Reinstate pole sites and remove temporary accesses.
- R3.310 For wood pole line construction, a crane is unlikely to be necessary, with the 'poles' generally being erected using normal agricultural machinery such as a digger with a lifting arm. Once the poles have been erected, the conductors are winched to/pulled from section poles, thus access to these structures is required for conductor drums and large winches.
- R3.311 A tracked excavator and low ground-pressure vehicles, (e.g. tractor, argocat, quad bikes) will be used to deliver, assemble and erect each wood pole structure at each location. The erection of the wood poles will require an excavation to allow the pole brace block and/or steel foundation braces to be positioned in place. A typical pole excavation will be 3m<sup>2</sup> by 2m deep. The excavated material will be sorted into appropriate layers and used for backfilling. No concrete will be used. The excavator(s) then hoist the assembled structure into position and once the structure has been braced in position the trench is backfilled.
- R3.312 Prior to stringing the conductors, roads and railways that are to be crossed by the power line have to be protected by building a scaffold tunnel through which vehicles/trains can pass. Other obstacles such as existing power lines have to be either switched off, deviated or protected using 'live line' scaffolds.
- R3.313 In all cases, every effort is made to cause least disturbance to landowners and local residents during construction. The route of the line is selected to avoid as far as possible communities and individual dwellings, and ground disturbance during construction of the new line will be reinstated.

## OVERHEAD LINE MAINTENANCE

- R33.14 In general, a transmission line requires very little maintenance. It is periodically inspected to identify any unacceptable deterioration of components so that they can be replaced. From time to time, inclement weather, storms or lightning can cause damage to either the insulators or the conductors. If conductors are damaged, short sections may have to be replaced – that would involve winching to or from section poles. There is therefore a preference that any crushed stone access tracks built to section towers are left in situ for future use; this will be dependent on agreement with individual landowners and having regard to the views of other interested parties. Insulators and conductors are normally replaced after about 40 years and towers painted every 15-20 years.

## R4. PLANNING POLICY CONTEXT

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### R4.1 INTRODUCTION

R4.1.1 The study area is located primarily in Dumfries and Galloway, with the northern section within East Ayrshire. In order to avoid confusion, the planning policy context set out below is focussed on the Dumfries & Galloway Local Development Plan (LDP), and does not refer to the East Ayrshire Plan. At this stage of the project, it is considered highly unlikely that the connection to the L7 line will occur in East Ayrshire, as to do so would involve passing north of the proposed Benbrack wind farm. Benbrack is the most northerly of the three wind farms that the substation is intended to serve. Furthermore, the topography of this portion of East Ayrshire is both steep and elevated, presenting a material technical constraint to the project.

R4.1.2 Notwithstanding the comments above, should the results of the routeing consultation suggest a Preferred Route that makes its connection to the L7 line somewhere in East Ayrshire, the policy context will be amended accordingly in the Section 37 Application.

### R4.2 ENERGY POLICY

#### THE ELECTRICITY ACT

R4.2.1 Section 37 of the Electricity Act 1989 ('the Act'), provides that an application to install or keep installed an above-ground electricity line, shall be made to the Scottish Ministers who may direct that planning permission for the development and any ancillary development shall be deemed to be granted under Section 57 (2) of the Town & Country Planning (Scotland) Act 1997.

R4.2.2 The following hierarchy of policies and guidance will be considered:

- Government Energy Policy;
- National Planning Policies and Guidance;
- The Development Plan; and
- Topic related policies relevant to the development.

#### UK and Scotland Energy Policy

R4.2.3 The UK is legally committed<sup>1</sup> to meeting 15% of its energy demand from renewable sources by 2020. The achievement of this target also helps achieve energy security and carbon reduction objectives.

R4.2.4 In June 2013, the Scottish Government published the Electricity Generation Policy Statement, following draft versions in 2010 and 2012. It is now government policy that Scotland's generation mix should:

- Deliver a secure source of electricity supply;
- Deliver energy at an affordable cost to consumers;

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<sup>1</sup> Via the 2009 Renewable Energy Directive 2009/28/EC

- Be largely decarbonised by 2030; and
- Achieve the greatest possible economic benefit and competitive advantage for Scotland including opportunities for community ownership and community benefits.

R4.25 The objectives noted above are framed around a series of targets as set out below:

- Delivering the equivalent of at least 100% of gross electricity consumption from renewables by 2020 as part of a wider, balanced electricity mix, with thermal generation playing an important role though a minimum of 2.5GW of thermal generation progressively fitted with Carbon Capture and Storage (CCS);
- Enabling local and community ownership of at least 500 MW of renewable energy by 2020;
- Lowering final energy consumption in Scotland by 12%;
- Demonstrating CCS at commercial scale in Scotland by 2020, with full retrofit across conventional power stations thereafter by 2025-30; and
- Seeking increased interconnection and transmission upgrades capable of supporting projected growth in renewable capacity.

R4.26 The Loch Urr Wind Farm Grid connection project is most directly compliant with the last of these five targets in that it provides a grid connection to a renewable energy project. In more general terms, however, it is evident that grid connections are a necessary part of energy infrastructure without which new generation projects are unable to contribute to the achievement of the targets set out in the first and second bullet points above.

### **R4.3 DEVELOPMENT PLAN POLICY**

R4.3.1 Sections 25 and 37 (2) of the Town and Country Planning (Scotland) Act 1997 (as amended by the Planning etc. (Scotland) Act 2006) require that planning decisions be made in accordance with the development plan, unless material considerations indicate otherwise.

R4.3.2 The current development plan is the Dumfries and Galloway LDP (2014). The policy areas covered in this document will need to be assessed in determining the application. However, the assessment will also need to take account of other relevant material considerations.

### **MATERIAL CONSIDERATIONS**

R4.3.3 In addition to the primacy of the development plan, decisions will also be made in the context of the following material policy considerations:

- The Climate Change Scotland Act (2009);
- The Scottish Renewables Action Plan (2009) and 2020 Route Map for Renewables in Scotland;
- The National Planning Framework 3 (NPF3) (2014);
- Scottish Planning Policy (SPP) (2014);
- Dumfries and Galloway Wind Energy Development Draft Supplementary Guidance (September 2014);
- Planning Advice Notices (PANs); and

- Scottish Government Web-based renewable advice.<sup>2</sup>

## **R4.4 NATIONAL PLANNING POLICY CONTEXT**

### **NATIONAL PLANNING FRAMEWORK FOR SCOTLAND**

R4.4.1 The National Planning Framework for Scotland 3 (NPF) sets out the spatial strategy for Scotland's development. The framework highlights that having an efficient High Voltage Electricity Transmission Network is *"vital in meeting national targets for electricity generation, statutory climate change targets, and security of energy supplies"*.

R4.4.2 The framework highlights the need to have electricity transmission links to connect the energy produced by new renewable developments to the Grid. It states that an enhanced high voltage network is *"needed to facilitate renewable electricity development and its export"* and that *"electricity grid enhancements will facilitate increased renewable electricity generation across Scotland"*. The Framework goes on to state that *"strengthening the electricity grid will be essential in unlocking renewable resources, both onshore and offshore"*.

### **SCOTTISH PLANNING POLICY**

R4.4.3 Scottish Planning Policy (SPP) was published in June 2014 and is the Scottish Government's policy statement on national land use planning matters. Paragraph 154 states that the planning system should *"support the development of a diverse range of electricity generation from renewable energy technologies"*.

R4.4.4 The Policy goes on to state in Paragraph 156 that:

*"Strategic development plans should support national priorities for the construction or improvement of strategic energy infrastructure, including generation, storage, transmission and distribution networks. They should address cross-boundary issues, promoting an approach to electricity and heat that supports the transition to a low carbon economy"*.

R4.4.5 In addition, the Policy states that development plans should *"ensure an area's full potential for electricity and heat from renewable sources is achieved, in line with national climate change targets."*

### **THE CLIMATE CHANGE SCOTLAND ACT (2009)**

R4.4.6 This Act commits to reduce greenhouse gases and increase Scotland's potential for sustainable economic growth. The delivery of renewable energy generation and associated grid connection infrastructure is central to the policy.

### **THE SCOTTISH RENEWABLES ACTION PLAN (2009) AND 2020 ROUTE MAP FOR RENEWABLES IN SCOTLAND**

R4.4.7 This document outlines several targets for Scotland to achieve by 2020:

- 100% electricity demand equivalent from renewables;

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<sup>2</sup> <http://www.scotland.gov.uk/Topics/Built-Environment/planning/National-Planning-Policy/themes/renewables>



- 11% heat demand from renewables by 2020;
- at least 30% overall energy demand from renewables by 2020; and
- 500MW of community and locally-owned renewable energy by 2020.

## R4.5 KEY PLANNING ISSUES

R4.5.1 The table below details the policies at all levels from which we derive the key issues to be considered in determining this planning application. Note that the Draft Dumfries & Galloway SPG on Wind Energy Development has been prepared following the adoption of the new LDP. The guidance is currently with the Scottish Ministers for consideration before it comes into force.

**Table R4.1: Key Planning Issues**

Issue	Policy and Guidance	Criteria to meet
Landscape and Visual impacts	<p>Scottish Planning Policy (2014)            Scottish Government's Web-based renewable advice            Draft Dumfries and Galloway SPG – Part 1 Wind Energy Development: Development Management Considerations            Dumfries and Galloway LDP Policy OP1: Development Considerations            Dumfries and Galloway LDP Policy IN1 – Renewable Energy            Dumfries and Galloway LDP Policy IN2 – Wind Energy</p>	<p>Consideration of landscape and visual impacts, including effects on wild land.</p> <p>Power lines within the site connecting the individual turbines to the on-site substation should always be underground. Beyond that, careful consideration should be given to the relative merits of underground versus overhead lines from the substation to the electricity distribution system.</p> <p>Where power lines cannot be underground careful consideration should be given to the visual impacts of any pylons and the suitability of any route.</p> <p>Cable routes should be carefully chosen to avoid sensitive areas, which would be difficult to protect/renovate, and the land should be fully reinstated.</p> <p>Development proposals should respect, protect and/or enhance the region's landscape character, scenic qualities and features and sites designated for their landscape quality at any level. They should also reflect the scale and local distinctiveness of the landscape. Principles established in the European Landscape Convention and the Dumfries and Galloway Landscape Assessment, and any subsequent revised or amended document, will be a material consideration in the assessment of proposals.</p> <p>'Visual impacts' can be minimised by use of appropriate siting and design of ancillary buildings, power lines, access tracks etc.</p> <p>An assessment of the extent to which the landscape is capable of accommodating the development without significant detrimental impact on landscape character or visual amenity should be carried out.</p> <p>Proposals should take account of guidance contained in the Dumfries and Galloway Windfarm Landscape Capacity Study.</p>
Development Design/Principle Considerations	<p>As above but also including Dumfries and Galloway LDP Policy OP2: Design Quality of New Development</p>	<p>Development should relate well to the scale, density, massing, character, appearance and use of materials of the surrounding area and in so doing be sympathetic to the local built forms as well as respecting the important physical, historic and landscape features of the site and its vicinity.</p>
Forestry/Trees	<p>Draft Dumfries and Galloway SPG</p>	<p>The inclusion of tree planting in landscaping and</p>

Issue	Policy and Guidance	Criteria to meet
	<p>- Part 1 Wind Energy Development: Development Management Considerations</p> <p>Dumfries and Galloway LDP Policy NE7: Trees and Development</p> <p>Dumfries and Galloway LDP Policy IN2 – Wind Energy</p> <p>Dumfries and Galloway LDP Forestry and Woodland Strategy SPG (2014)</p>	<p>development schemes is encouraged.</p> <p>New planting is important in helping to offset net losses in woodland cover through changing forestry practice or to wind farm development.</p> <p>Protect and retain trees valued for their rarity, visual amenity or cultural significance and ensure appropriate compensatory planting occurs where trees are lost as part of approved development works</p> <p>Proposals will be supported if they:</p> <ul style="list-style-type: none"> <li>- maintain trees, woodlands (in particular ancient and semi-natural woodlands), and hedgerows and require developers to incorporate, wherever feasible, the existing woodland resource into their schemes;</li> <li>- appropriately incorporate the woodland resource into the overall design of the scheme;</li> <li>- show how existing trees will be appropriately protected during the construction period.</li> </ul> <p>If a woodland resource cannot be retained then an appropriate replacement planting will be required and agreed by the Council.</p> <p>Developments need to ensure that tree, forest and woodland planting or restructuring are appropriate to and enhance their landscape setting.</p> <p>Developers must work with emerging guidance on integrating wind energy developments within forest landscapes.</p>
Natural Heritage/- Biodiversity	<p>Scottish Planning Policy (2014)</p> <p>Draft Dumfries and Galloway SPG – Part 1 Wind Energy Development: Development Management Considerations</p> <p>Dumfries and Galloway LDP Policy OP1: Development Considerations</p> <p>Dumfries and Galloway LDP Policy NE1: National Scenic Areas</p> <p>Dumfries and Galloway LDP Policy NE2: Regional Scenic Areas</p> <p>Dumfries and Galloway LDP Policy NE3: Sites of International Importance for Biodiversity</p> <p>Dumfries and Galloway LDP Policy NE4: Species of International Importance</p> <p>Dumfries and Galloway LDP Policy NE5: Sites of National Importance for Biodiversity and Geodiversity</p> <p>Dumfries and Galloway LDP Policy CF2: Green Networks</p> <p>Dumfries and Galloway LDP Policy IN1: Renewable Energy</p> <p>Dumfries and Galloway LDP Policy IN2 – Wind Energy</p> <p>PAN 60- Planning for Natural Heritage</p>	<p>Impacts on natural heritage, wildlife and habitat, ecosystems and biodiversity need to be assessed. Any impacts occurring should be avoided or adequately resolved.</p> <p>Development proposals should respect, protect and/or enhance the region’s biodiversity, geodiversity and sites designated for their contribution to the natural environment at any level including ancient and semi-natural woodland. The guidance contained within the Local Biodiversity Action Plan, and any subsequent revised or amended document, will be a material consideration in the assessment of proposals.</p> <p>Development within or that would have an effect on a National Scenic Area (NSA) will only be permitted where:</p> <ul style="list-style-type: none"> <li>- it will not adversely affect the integrity of the area or the qualities for which it has been designated; or</li> <li>- any such adverse effects are clearly outweighed by social, environmental or economic benefits of national importance.</li> </ul> <p>Development within, or which affects Regional Scenic Areas (RSAs), may be supported where the local Council is satisfied that:</p> <ul style="list-style-type: none"> <li>- the landscape character and scenic interest for which the area has been designated would not be significantly adversely affected; or</li> <li>- there is a specific need for the development at that location which could not be located in a less sensitive area.</li> </ul> <p>Development proposals likely to have a significant effect on an existing or potential Special Protection</p>

Issue	Policy and Guidance	Criteria to meet
		<p>Area (SPA), existing or candidate Special Area of Conservation (SAC) or Ramsar Site, including developments outwith the site, will require an appropriate assessment and will only be permitted where:</p> <ul style="list-style-type: none"> <li>- the development does not adversely affect the integrity of the site; or</li> <li>- there are no alternative solutions and there are imperative reasons of overriding public interest including those of a socio-economic nature.</li> </ul> <p>Development proposals that would be likely to have an adverse effect on a European Protected Species will not be permitted unless it can be shown that:</p> <ul style="list-style-type: none"> <li>- there is no satisfactory alternative, and</li> <li>- the development is required for preserving public health or public safety or for other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment, and</li> <li>- the development would not be detrimental to the maintenance of the population of the species at a favourable conservation status in its natural range.</li> </ul> <p>Developments affecting SSSI sites will only be permitted where:</p> <ul style="list-style-type: none"> <li>- it will not adversely affect the integrity of the area or the qualities for which it has been designated, or</li> <li>- any such adverse effects are clearly outweighed by social, environmental or economic benefits of national importance.</li> </ul> <p>Green Networks should be protected and enhanced. Proposals for development in areas which form part of this network should seek to avoid fragmentation of a network and/or improve connectivity, where appropriate.</p>
Impact on historical/ cultural environment	<p>Scottish Planning Policy (2014)  Scottish Government's Web-based renewable advice  Draft Dumfries and Galloway SPG – Part 1 Wind Energy  Development: Development Management Considerations  Dumfries and Galloway LDP Policy OP1: Development Considerations  Dumfries and Galloway LDP Policy IN1 – Renewable Energy  Dumfries and Galloway LDP Policy IN2 – Wind Energy  Dumfries and Galloway LDP Policy HE3 – Archaeology  Dumfries and Galloway LDP Policy HE4: Archaeologically Sensitive Areas  Dumfries and Galloway LDP Policy HE6: Gardens and Designed Landscapes</p>	<p>Potential impacts on the historic environment and cultural heritage, including scheduled monuments, listed buildings and their settings should be considered.</p> <p>Any impacts arising on the historic environment and cultural heritage should be avoided or adequately resolved.</p> <p>Development proposals should protect and/or enhance the character, appearance and setting of the region's historic environment principally by ensuring they are sympathetic to nearby buildings, sites and features, integrate well and complement the surrounding area. The information contained within the Council's Historic Environment Record and Scottish Historic Environment Policy, and any subsequent revised or amended document, will be a material consideration in the assessment of proposals.</p> <p>Development should not affect archaeological sites, monuments and other non-designated historic assets and areas of historical interest.</p> <p>Conversely development that protects significant archaeological and historic assets and the wider historic environment, including the setting of</p>

Issue	Policy and Guidance	Criteria to meet
		<p>Archaeologically Sensitive Areas (ASAs) from adverse effects will be supported</p> <p>Development that protects or enhances the significant elements, specific qualities, character, integrity and setting, including key views to and from, gardens and designed landscapes will be supported.</p>
Public Access	<p>Scottish Planning Policy (2014)</p> <p>Dumfries and Galloway LDP Policy CF4: Access Routes</p>	<p>Impacts on public access, including impact on long distance walking and cycling routes and scenic routes should be taken into account.</p> <p>Development proposals should not impact adversely on any access routes and Core Paths.</p> <p>New or alternative access routes and enhancements to existing routes will be supported, especially if these can form part of green networks.</p>
Impact on Geology, Hydrology and Hydrogeology	<p>Scottish Planning Policy (2014)</p> <p>Draft Dumfries and Galloway SPG – Part 1 Wind Energy Development: Development Management Considerations</p> <p>Dumfries and Galloway LDP Policy OP1: Development Considerations</p> <p>Dumfries and Galloway LDP Policy NE11: Supporting the Water Environment</p> <p>Dumfries and Galloway LDP Policy NE12: Protection of Water Margins Environment</p> <p>Dumfries and Galloway LDP Policy IN1 – Renewable Energy</p> <p>Dumfries and Galloway LDP Policy IN7: Flooding and Development</p> <p>Dumfries and Galloway LDP Policy IN8: Surface Water Drainage and Sustainable Drainage Systems (SuDS)</p> <p>Dumfries and Galloway LDP Flooding and Development SPG (2014)</p> <p>Dumfries and Galloway LDP Protection of Water Margins SPG (2014)</p>	<p>Effects on hydrology, the water environment and flood risk need to be considered.</p> <p>Impacts on soil and ground stability will also need to be considered.</p> <p>Development proposals should maintain or enhance water quality, and take account of the need to manage water quantity, including flooding. In securing these objectives they should also seek to contribute positively to the general environmental quality of their area.</p> <p>The Council will not permit development which would result in deterioration in the status of a waterbody.</p> <p>If development is proposed adjacent to or in the vicinity of waterbodies, the water margins will be protected unless there are compelling reasons to justify why this should not be done.</p> <p>It some cases it is beneficial to build buffer strips alongside water bodies to minimise impacts.</p> <p>Before a planning application is lodged the following flood risk and drainage matters should be considered:</p> <ul style="list-style-type: none"> <li>- Is the development site at risk of flooding from any source;</li> <li>- Would development of the site lead to increased flood risk elsewhere?;</li> <li>- Would safe access and egress to and from the development be possible during flood events?;</li> <li>- Is the development likely to prevent safe access to and maintenance of bodies of water and/or flood defence measures?;</li> <li>- Is the development design employing SuDS?;</li> <li>- How is natural water emanating from the site being dealt with and managed?;</li> <li>- How is extraneous water, viz. uphill surface or ground water, being dealt with?;</li> <li>- What is to be done during construction phases to control water contamination and limit flow rates?;</li> <li>- Who will be responsible for maintenance?</li> </ul> <p>Development which could lead to an unacceptable onsite or off site flood risk, as defined by the Risk Framework in SPP, will generally not be permitted.</p> <p>Where a proposed development could lead to an</p>

Issue	Policy and Guidance	Criteria to meet
		<p>unacceptable flood risk, it may be that a Flood Risk Assessment (FRA) is able to clarify to the satisfaction of the Council and SEPA that the level of risk both on and off site would be acceptable.</p> <p>Sustainable Drainage Systems (SuDS) will be a required part of all proposed development as a means of treating the surface water and managing flow rates.</p> <p>For any site a Drainage Impact Assessment (DIA) may be required to ensure that surface water flows are properly taken into account in the development design.</p>
Tourism and Recreation	<p>Scottish Planning Policy (2014) Draft Dumfries and Galloway SPG – Part 1 Wind Energy Development: Development Management Considerations Dumfries and Galloway LDP Policy IN1: Renewable Energy Dumfries and Galloway LDP Policy IN2 – Wind Energy</p>	<p>Impacts on tourism and recreation should be assessed. Any impacts arising should be avoided or adequately resolved.</p> <p>Development proposals which do not have significant impacts on areas and routes important for tourism or recreational use in the countryside will generally be supported.</p>
Impact on Communities	<p>Scottish Planning Policy (2014) Scottish Government's Web-based renewable advice Draft Dumfries and Galloway SPG – Part 1 Wind Energy Development: Development Management Considerations Dumfries and Galloway LDP Policy OP1: Development Considerations Dumfries and Galloway LDP Policy IN1: Renewable Energy Dumfries and Galloway LDP Policy IN2 – Wind Energy</p>	<p>Impacts on communities and individual dwellings, including visual impact/dominance, residential amenity, noise and shadow flicker should be examined.</p>
Pollution	<p>Dumfries and Galloway LDP Policy OP1: Development Considerations Dumfries and Galloway LDP Policy IN1 – Renewable Energy PAN 51- Planning, Environmental Protection and Regulation</p>	<p>Environmental pollution to water, air, or soil is a material consideration.</p> <p>The development should not have a significant adverse impact on air quality.</p> <p>Noise and Nuisance may be material considerations, both in terms of proposed developments that are likely to cause noise or nuisance and in terms of proposed sensitive developments which may be affected.</p>
Transport and access impacts	<p>Scottish Planning Policy (2014) Dumfries and Galloway LDP Policy T1: Transport Infrastructure Dumfries and Galloway LDP Policy T2: Location of Development / Accessibility Dumfries and Galloway LDP Policy T4: Freight transport South West Scotland Regional transport Strategy Dumfries &amp; Galloway local Transport Strategy Dumfries &amp; Galloway Core Paths Plan</p>	<p>Impacts road traffic and adjacent trunk roads needs to be considered.</p> <p>Development proposals that have the potential to affect the performance or safety of the strategic transport network need to be appraised to determine their effects.</p> <p>Development which involves a new direct access onto the regional road network should not, individually or incrementally, materially reduce the level of service of a route.</p> <p>In certain situations developers may be required to:</p> <ul style="list-style-type: none"> <li>- prepare and implement travel plans to support a development proposal that will result in significant travel generation, by virtue of its size,</li> </ul>

Issue	Policy and Guidance	Criteria to meet
		nature, or location (as determined by the Council); - prepare a Transport Assessment and implement appropriate mitigation measures where required.
Aviation	Scottish Planning Policy (2014) Scottish Government's Web-based renewable advice Draft Dumfries and Galloway SPG – Part 1 Wind Energy Development: Development Management Considerations Dumfries and Galloway LDP Policy IN2: Wind Energy	Impacts on aviation and defence interests and seismological recording should be taken into account.
Impact on broadcasting installations	Scottish Planning Policy (2014) Draft Dumfries and Galloway SPG – Part 1 Wind Energy Development: Development Management Considerations	Impacts on telecommunications and broadcasting installations need to be considered, particularly ensuring that transmission links are not compromised.
Decommissioning and Restoration	Scottish Planning Policy (2014) Scottish Government's Web-based renewable advice Draft Dumfries and Galloway SPG – Part 1 Wind Energy Development: Development Management Considerations Dumfries and Galloway LDP Policy IN2: Wind Energy	Consideration is required of the potential decommissioning of a development including ancillary infrastructure, and site restoration. There should be appropriate provision in any assessment for decommissioning and restoration.
Cumulative Impacts	Scottish Planning Policy (2014) Scottish Government's Web-based renewable advice Draft Dumfries and Galloway SPG – Part 1 Wind Energy Development: Development Management Considerations Dumfries and Galloway LDP Policy IN2 – Wind Energy	Consideration of wider cumulative impacts with other neighbouring renewable energy developments. In assessing cumulative landscape and visual impacts, the scale and pattern of the turbines plus the tracks, power lines and ancillary development will be relevant considerations.

## DUMFRIES AND GALLOWAY LOCAL DEVELOPMENT PLAN

R4.5.2 A number of the themes in the proposed development plan are similar to those in the previous local plan and structure plans such as landscape and visual impacts, natural heritage and archaeology. However, there are some new issues of note which are summarised below.

1. There is an emphasis on sustainability and in particular “*sustainable economic growth*”, which reflects the national priorities set out in Scottish Planning Policy. In terms of the proposed development, there is focus on incorporating sustainable principles into the layout and design of new development;
2. Green networks should be protected and enhanced and fragmentation should be avoided. Proposals which improve or add to green networks will be encouraged;
3. The policy on trees, woodland and forestry supports development that incorporates existing and additional trees into its design. If it is demonstrated that woodland cannot be retained or has to be removed, re-planting should take place within the region and should comply with the Council's Forestry and Woodland Strategy (adopted 1<sup>st</sup> December 2014);

4. There is a presumption against wind energy development in sites that have national/international landscape designations or are of high natural heritage value. Significant mitigation action is required if development is to take place on these identified sites. There is also emphasis on cumulative sensitivity; and
5. The LDP gives guidance on flooding and notes that a Flood Risk assessment may be required to show that the level of risk is acceptable. In addition, a Drainage Impact Assessment may be required to ensure that surface water flow is taken into account during the development design.

## R5. ROUTEING METHODOLOGY

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- R5.1.1 The objective of routeing an overhead transmission line between specified points is to identify a technically feasible and economically viable route, which causes the least disturbance to people and the environment. The process of 'routeing' accounts for all elements of the grid connection, including the overhead line and substation infrastructure that forms the endpoints of it. This is SPEN's routeing commitment relating to overhead lines and will be pursued through the routeing process for this project.
- R5.1.2 With respect to the routeing commitment detailed above, the routeing of the overhead line and siting of the proposed collector substation requires in the first instance that the broad parameters of the route are identified. This relates to both technical and infrastructural parameters, and is particularly important for this proposed grid connection in light of the strategic upgrades being carried out by SPEN throughout Dumfries and Galloway and the proximity of a number of proposed grid connections, in particular the B&M route.
- R5.1.3 Whilst geographically it would appear that a route from the Loch Urr wind farm into the B&M route would constitute a potential option in terms of routeing, there are three technical reasons why this is not an option at this stage. These are indicated below:
1. It is not possible to link the Loch Urr OHL into the proposed Blackcraig substation, as it is not a collector substation and is only contracted to provide a connection for Blackcraig wind farm;
  2. It is not possible to link into the proposed Margree substation as this substation is contracted for a capacity of 176MW, which is the combined capacity of Blackcraig and Margree wind farms. An additional circa 83MW from Loch Urr wind farm would clearly exceed the contracted capacity; and
  3. It is not economically viable to propose two collector substations, one in the vicinity of Margree to provide for the Loch Urr connection and one adjacent to the L7 route to provide for the Benbrack and Quantans Hill developments. This is notwithstanding the reduced length of OHL that would be required for Loch Urr.
- R5.1.4 It is on this basis that the Loch Urr connection assumes a connection point, via a collector substation, into the 132kV L7 section of the proposed Blackcraig and Margree grid connection, which commences at a point near to Dalshangan, to the west of the A713 (see **Figure 1**), and terminates at New Cumnock substation, to the east of Dalmellington. This has been deemed at a strategic level the most cost-effective and environmentally acceptable solution of providing the links required.
- R5.1.5 Assuming the technical option of pursuing a 132kV wood pole OHL and collector substation as described, consideration of the following more detailed technical, economic and environmental constraints are relevant, as are the Holford Rules which guide the routeing of OHLs and the siting of substations.

### TECHNICAL FACTORS

- R5.1.6 The primary fixed constraint for the route of the OHL is the location of the Loch Urr wind farm on-site substation, whose geographical position has been advised by the developers of the wind farm as being 273284, 584372, and which forms the start point for the connection. The substation is located just outwith an area of commercial forestry on the western side of the wind farm at Craigmuaie Moor, and there is no reason to suggest that this location will be revised between the Consultation stage (the current stage) and the submission and application of the Environmental Statement.



- R5.1.7 The potential route of the OHL passes in close proximity to a number of wind farms other than those for which it is providing a link. Known developments in this regard include the Blackcraig and Margree schemes, circa 1.2km and 4.5km to the south-west of the Loch Urr scheme respectively. The presence of these developments forms both a technical and economic constraint. Technically, there may not be the ability to route through the wind farm (overhead) due to the potential 'wake' and therefore risk of 'toppling'. With regards toppling, wind turbines should be positioned such that the minimum horizontal distance from the worst case pivot point of the wind turbine and the overhead line conductors hanging in still air is the tip height of the turbine plus 10%. For the Blackcraig scheme this would be 121m and for Margree 137.5m.
- R5.1.8 In terms of wake effects, turbulence caused by the downwind wake of a wind turbine can have appreciable effects on overhead line conductors. This may result in increased maintenance operations and in the worst case, conductor clashing. Generally, if OHLs are over 3 x rotor diameter from the relevant turbine, then the effects are likely to be similar to naturally occurring atmospheric conditions and are unlikely to be considered to result in harm. Factors to be aware of when assessing this include the relevant heights of the turbine and electrical tower. If the wind rose generated by the turbine is above the height of the tower, then harm is likely to be avoided.
- R5.1.9 Whilst undergrounding the lines may be a suitable alternative option, this is not the desired approach and would only be pursued in the event that a more environmentally and technically efficient option cannot be identified.
- R5.1.10 The operators of the wind farms may also place unreasonable demands on the Distribution Network Operator (DNO) (who in this instance are the proposers of the Loch Urr OHL) in terms of ground rent, routeing (which will be naturally dependent on the layout of the wind farm) or long-term maintenance activities, which would result in the connection option being unfeasible on technical and economic grounds. The DNO is the same as the proposer of this OHL, namely SPT.
- R5.1.11 Wood poles of the design proposed are able to operate and be installed on ground which has less than 15 degrees of slope and in areas absent of rocky outcrops and areas of deep peat. The restriction on slope relates to construction and operational activities and at greater elevation the prevailing weather conditions, and in particular temperature and wind factors, increase the risk of failure of the infrastructure.
- R5.1.12 With regards to altitude constraints, Trident wood poles are able to be utilised above 300m Above Ordnance Datum (aOD), although only for short lengths. The reason for this is twofold: firstly, the narrower spans required at this altitude mean there is greater potential to create an unacceptable visual effect, and the creation of a 'wirescape' within views becomes more likely; and secondly, the necessity to use the 'H' pole configuration results in greater costs per linear unit. What constitutes a 'short length' varies dependent on the specific site circumstances, and for this project anything greater than 1km is considered as such.
- R5.1.13 With the evidence of existing transmission infrastructure within the study area, and in particular the Blackcraig and Margree connection, it is important to consider the required offsets to this should a combined corridor be considered. SPEN require that where two OHLs run side-by-side, there remains a 40m buffer between the line routes to ensure sufficient space for construction and maintenance activities, and to ensure in the case of infrastructure failure there are no health and safety concerns.
- R5.1.14 Power-frequency electric and magnetic fields (EMF) in the vicinity of high-voltage electric power equipment are a concern when considering routeing of OHLs. SPEN ensure at all times that they comply with generally agreed exposure limits, although it should be noted that there are currently no statutory limits that require to be adhered to.

## ENVIRONMENTAL FACTORS

R5.1.15 The range of environmental constraints which can affect routeing will vary depending upon the landscape through which the line is to be routed. Section 9 of the Electricity Act is explicit in stating that the SPT must take account of environmental matters, including factors relating to people and the natural environment. As for all development, the first ambition should be to preserve environmental receptors in their original state. However, it is acknowledged that all development will result in some impacts upon the local environment, and that where this is the case mitigation should be proposed such that impacts are minimised.

R5.1.16 When considering environmental factors, the approach to routeing is sequential in that the most important environmental constraints are considered first, followed by those of lesser, and reducing, importance. The range of environmental factors considered as part of the routeing of the OHL and siting of the substation includes the following (not listed here in order of importance):

- Landscape and visual matters, including sensitive landscapes and effects upon landscape character;
- Ecological factors, including protected species and habitats;
- Ornithological factors, including breeding and wintering birds and raptors;
- Archaeological and cultural heritage assets, including below-ground assets and those assets whose settings may be affected;
- Hydrological and geological factors, including private water supplies, watercourses, waterbodies and water-based habitats;
- Land uses including mineral operations, agriculture and forestry;
- Recreation and tourism factors, including locally valued facilities; and
- Traffic and transport matters, including access provision and road crossings.

R5.1.17 The range of constraints and their implications for the routeing are investigated in more detail within the routeing process below. Some constraints (such as hitherto unrecognised archaeology) can only be dealt with during the construction stage of the project.

## ECONOMIC FACTORS

R5.1.18 In compliance with Section 9 of the Electricity Act 1989, the Routeing Objective requires the proposed solution to be 'economically viable'. This is interpreted by SPEN as meaning that as far as is reasonably possible, and other things being equal, the line should be as direct as possible and the route should avoid areas where technical difficulty or compensatory requirements would render the scheme unviable on economic grounds. In addition, the supposition should be that the line is provided as an overhead connection, unless exceptional environmental or technical constraints would mean underground cables would be considered as a preferred design alternative.

## THE HOLFORD RULES

R5.1.19 It is generally accepted across the electricity industry that the guidelines developed by the late Lord Holford in 1959 for routeing overhead transmission lines, 'The Holford Rules', should continue to be employed as the basis for routeing high voltage overhead transmission lines. The Holford Rules were reviewed circa 1992 by the National Grid Company (NGC) 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 Rules.

- R5.1.20 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. These guidelines for the routeing of new high voltage overhead transmission lines, with the NGC 1992 and SHETL 2003 notes, form the basis for routeing the Loch Urr Windfarm OHL.
- R5.1.21 Whilst the Holford Rules relate specifically to high voltage steel lattice tower lines, essentially they provide clarification as to what is good practice in the locating and designing of any structures within a landscape context, but tailors this to linear infrastructure, and the nature of the elements proposed for a (steel lattice) overhead line. It therefore follows that the adoption of the rules is fully justified for the smaller scale of wood pole overhead line proposed for this project, where the types of impacts that may arise will be largely similar, although potentially of a more limited extent, to the larger structures.
- R5.1.22 It is also important to note that the Holford Rules are guidelines only and can be adapted to reflect the characteristics of the area in question, provided that this is justified fully. A summary of the Rules are provided below, with the full version, and accompanying Appendices to the Holford Rules, provided at **Appendix 2** of this report.

## **RULE 1**

*Avoid altogether, if possible, the major areas of highest amenity value, by so planning the general route of the line in the first place, even if the total mileage is somewhat increased in consequence.*

## **RULE 2**

*Avoid smaller areas of high amenity value, or scientific interest by deviation; provided that this can be done without using too many angle towers, i.e. the more massive structures which are used when lines change direction.*

## **RULE 3**

*Other things being equal, choose the most direct line, with no sharp changes of direction and thus with few angle towers.*

## **RULE 4**

*Choose tree and hill backgrounds in preference to sky backgrounds, wherever possible; and when the line has to cross a ridge, secure this opaque background as long as possible and cross obliquely when a dip in the ridge provides an opportunity.*

*Where it does not, cross directly, preferably between belts of trees.*

## **RULE 5**

*Prefer moderately open valleys with woods where the apparent height of towers will be reduced, and views of the line will be broken by trees.*

## **RULE 6**

*In country which is flat and sparsely planted, keep the high voltage lines as far as possible independent of smaller lines, converging routes, distribution poles and other masts, wires and cables, so as to avoid a concatenation or 'wirescape'.*

## RULE 7

*Approach urban areas through industrial zones, where they exist; and when pleasant residential and recreational land intervenes between the approach line and the substation, go carefully into the comparative costs of undergrounding, for lines other than those of the highest voltage.*

## THE HOLFORD RULES AND SITING OF SUBSTATIONS

R5.123 As is described previously, the Loch Urr project requires provision of substations at both ends of the route to allow the transmission of electricity from the Loch Urr wind farm to the 132kV L7 tower route. The Holford Rules, whilst focusing on the routeing of OHLs, does also contain supplementary guidance on the siting of substations. Whilst the location proposed for the wind farm substation will be guided primarily on the basis of the most efficient point relative to the onward routeing and the position of the wind turbines and other infrastructure which form part of the Loch Urr development, the location of the proposed Kendoon North collector substation requires more detailed consideration on account of the wider technical requirement to be sited adjacent to the 132kV L7 tower route, which in itself is some 25km in length.

R5.124 The guidance on substations within the Holford Rules siting is summarised below:

*“a) Respect areas of high amenity value (see Rule 1) and take advantage of the containment of natural features such as woodland, fitting in with the landscape character of the area.*

*b) Take advantage of ground form with the appropriate use of site layout and levels to avoid intrusion into surrounding areas.*

*c) Use space effectively to limit the area required for development, minimizing the effects on existing land use and rights of way.*

*d) Alternative designs of substations may also be considered, e.g. ‘enclosed’, rather than ‘open’, where additional cost can be justified.*

*e) Consider the relationship of towers and substation structures with background and foreground features, to reduce the prominence of structures from main viewpoints.*

*f) When siting substations take account of the effects of line connections that will need to be made.”*

R5.125 The substation is an integral part of the grid connection, and notwithstanding the requirement for its siting to be considered in its own right, its location must also remain at least partly flexible (albeit its broad location must be known) on account of the wider requirements of ascertaining a Preferred Route for the connection. Although neither constituent element (i.e. the overhead line nor the substation) is dominant in terms of siting, there may be locations for the substation that are ruled out on account of the inability for it to be accessed by an overhead line route (due to environmental, technical or economic reasons). Similarly, the routeing of the overhead line must take regard of the need to provide a substation at its western end, and have at least a notional ‘endpoint’ at which to terminate the connection.

R5.126 It is therefore imperative that a broad location (if not a definitive fixed position) is identified for the collector substation prior to the detailed routeing for the overhead line. This therefore forms the first stage in the wider routeing process.

## R6. THE ROUTEING PROCESS APPLIED TO THIS PROJECT

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- R6.1.1 EDP, in coordination with SPEN, and with due regard to the local landscape, have devised a routeing methodology that seeks to ensure SPEN comply with their Statutory Obligations to achieve a balance between technical requirements and environmental protection. The methodology seeks to use the broad principles of the Holford Rules in association with the environmental parameters that are presented within the study area. In particular, the methodology seeks to provide a solution to the combined requirement for an overhead line and a collector substation at some point along the L7 section of the B&M proposed route.
- R6.1.2 In developing this methodology, a hierarchical approach has been adopted that seeks to offer greatest protection to those most valued receptors, whilst also offering a more modest, yet important, level of protection to those which are considered less sensitive.
- R6.1.3 The routeing methodology is essentially a number of sequential steps, each of which looks to suggest routeing options or strategies based upon the distribution of environmental and technical constraints presented, and the connection required. For this connection, the first stage involves identifying strategically the 'endpoint' for the connection, at a point located somewhere along the 132kV L7 B&M route, i.e. the broad location for the proposed collector substation.
- R6.1.4 As is detailed above, whilst it is imperative that the proposed collector substation location remains at least partially flexible, a degree of certainty about its location is required to allow routeing of the overhead line. This notional location will remain partly flexible until the fixing of the Proposed Route.
- R6.1.5 Following the identification of the broad location for the substation, the application of the following stages will result in the identification of the Preferred Route, and finally, the Proposed Route.

### STAGE 1: Identification of Routeing Study Area

- R6.1.6 When defining a study area for the overhead line, the process starts by identifying the notional start-and endpoints for the route, which represent the fixed geographical elements of the route. Where exact locations are known, these should be used in preference. From these points, it is then necessary to establish the extent of the study area taking account of the technical, environmental and economic constraints which exist.
- R6.1.7 This relates to the aspirations of Rule 1, which state that areas of highest amenity value should be avoided, even if the total mileage of the route is increased. The routeing is not required to take a direct point between the start and endpoints, and must route according to the constraints identified. The routeing study area is presented at **Figure 1**. As can be seen, this includes the south-western periphery of the Loch Urr wind farm, a swathe of landscape between this and approximately Carsphairn, and the full length of the 132kV L7 B&M route between Dalshangan and Meikle Hill.

### STAGE 2: Identification of Strategic Environmental and Technical Constraints

- R6.1.8 The primary consideration of the range of constraints happens during this stage. Through a combination of Geographic Information Systems (GIS) analysis, field work, consultation and liaison with the wider technical and environmental project team, those constraints considered key in terms of avoidance, are mapped for the study area. This will include at least those listed within the note on Holford Rule 1 (see **Appendix A**).
- R6.1.9 Of critical importance during this stage, for many overhead lines, is the identification and understanding of the range of technical constraints that may categorically dictate the routeing of a line. Whereas all environmental constraints are somewhat flexible in their level of constraint,

technical constraints commonly are not. Examples include the location of large waterbodies that can't be crossed or existing electrical infrastructure that cannot be moved, rerouted or crossed.

- R6.1.10 With reference to Holford Rule 2, it is considered that even small areas of high amenity value should be included within this section as size is not necessarily directly proportionate to importance in environmental terms. The balance between route options and large or small areas of high value will be balanced as part of subsequent stages in the routeing process.

### **STAGE 3: Identification of High Level Strategic Options and Corridors**

- R6.1.11 In response to the identification of the key environmental and technical parameters, a number of strategic options that respond to the locations or the pattern of constraint, and the identified start-and endpoints will be identified. Secondary at this stage is the directness of the route, which although a consideration borne out by Holford Rule 3, is something that has to be balanced technically and environmentally throughout the routeing process. It may be that the technical and environmental parameters are such that just a single high level strategic route is identified at this stage, with this particularly common for shorter routes.

- R6.1.12 Once the strategic options have been identified, the next stage is to identify corridors that follow these broad alignments. There is no definitive width for the strategic 'corridors' and these will be as broad or as narrow as the prevailing baseline dictates. The Preferred Route (and ultimately the Proposed Route) will, notwithstanding the emergence of further constraints information, fall within one of these broad corridors. The aim of identifying potentially wide corridors is to provide a broadly compliant route, but one that contains flexibility for selecting a range of route options.

### **STAGE 4: Appraisal of Route Corridors**

- R6.1.13 Dependent on the size of the study area and distribution of environmental and technical constraints, a wide range of potential route corridors may emerge from Stage 4. In order to focus the identification of a Preferred Route, and to avoid unnecessary detailed routeing analysis during subsequent stages, it is appropriate to appraise the route corridors in terms of their wider environmental acceptability and to carry out a comparative exercise to appraise their relative potential, with a focus on the landscape and visual acceptability of the options as directed by Holford Rules 3 to 7. It may be that all corridors exhibit a comparative level of potential. However, this is rare, especially when appraised against both the constraints identified in Stage 2 and the landscape and visual acceptability of the corridor.

- R6.1.14 The conclusion of this stage will be the emergence of a 'Preferred Route Corridor', somewhere within which, the Preferred Route (and ultimately the Proposed Route) will be defined. Whilst this route corridor will be defined based upon the available data to date, further consultation or technical matters may emerge which render the Preferred Route Corridor no longer the best option (for example the emergence of hitherto unknown technical constraints). Where this occurs, the comparative analysis carried out will have defined the 'second best' alternative corridor to pursue.

### **STAGE 5: Consideration and Appraisal of Detailed Routeing Options**

- R6.1.15 Following the identification of the Preferred Route Corridor in Stage 4, it is then necessary to identify where, within this corridor, the potential overhead line route options exist. There may only be a single route within a corridor, or there may be several options, or there may be a single route, with options at different points along its length. This will depend on two factors: firstly the width of the corridor, and secondly the distribution of landscape elements and constraints which guide the route.

R6.1.16 This stage, in the first instance, identifies the potential route options on the basis of a 'best fit' route (or routes) within the broad corridor. It then goes on to undertake a comparative appraisal of these route options with the aim of identifying a single Preferred Route.

### **STAGE 6: Identification and Appraisal of the Preferred Route**

R6.1.17 This stage takes the results of the evaluation undertaken in Stage 5 to identify and illustrate the Preferred Route. Unless further environmental or technical constraints emerge subsequent to, or during this stage, this route will be that taken forward to the formal consultation stage.

### **STAGE 7: Consultation and Refinement**

R6.1.18 Consultation on the Preferred Route is perhaps the key part of identifying the most technically and environmentally acceptable route option. Whilst the analysis of route options undertaken up to this point is based upon all available technical and environmental constraints and consultation with statutory bodies, consultation with a broader range of stakeholders often raises further constraints which were hitherto unidentified, but which are important in the context of routeing.

### **STAGE 8: Identification of Proposed Route**

R6.1.19 Following the consultation undertaken at Stage 7, which for this project includes the issuing of this Routeing Consultation Report, any changes required to the Preferred Route are evaluated and accepted if found to be acceptable in general routeing terms. With the changes incorporated, the route then forms the Proposed Route which becomes the subject of the Environmental Impact Assessment.

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## **R7. ENVIRONMENTAL BASELINE OF STUDY AREA**

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### **R7.1 INTRODUCTION**

R7.1.1 This section reviews the prevailing environmental baseline of the study area and in so doing provides a strategic understanding of the key environmental constraints which have guided the identification of the Preferred Route.

### **R7.2 STAGE 1: DESCRIPTION OF THE STUDY AREA**

R7.2.1 The study area is a swathe of landscape comprising nearly 23,000 hectares that stretches across the counties of Dumfries and Galloway and East Ayrshire. The landscape is largely rural in nature, with only limited incidence of human habitation, focussed in and around Kendoon (concurrent with the A713 and the power station), Carsphairn and to the north, Dalmellington. Within the more remote areas farmsteads and individual or small groups, of dwellings, are evident.

R7.2.2 The eastern portion of the study area, stretching approximately from Loch Urr to Carsphairn is more remote than the western end and contains a landscape more appropriate to this; in this regard large tracts of moorland are prevalent as are large blocks of commercial forestry and wind farm development (such as that at Blackcraig). Areas of more intimate landscape are found in this area, generally focused around the valleys and watercourses. The landscape is served by a number of minor road routes and is crossed from north to south by the Southern Upland Way (SUW) long distance walking route. The highest point of the study area is to the west, at Fell Hill (417m aOD), and the landscape gradually falls to the north-west towards Knowehead which lies at circa 200m aOD.

R7.2.3 The western portion of the study area is largely linear, and concentrates on the immediate surroundings of the L7 part of the B&M OHL route, although it does extend subtly northwards to include parts of the Quantans Hill and Benbrack wind farm developments. Passing through this broad, expansive valley between the Galloway Forest Park to the west and the Carsphairn Forest to the east, and broadly parallel to the OHL, is the A713 Galloway Tourist Route. Although appearing as a generally low level landscape, the elevation here is deceiving, with the road sitting at around 200m aOD at Carsphairn and remaining so northwards to Dalmellington. Land use within this corridor is a broadly even mix of open moorland grazing and large tracts of commercial forestry, with these evident to both the east and west of the road, resulting in different perceptual and visual experiences as one travels along the road.

### **R7.3 IDENTIFICATION OF ENVIRONMENTAL AND TECHNICAL BASELINE**

#### **LANDSCAPE AND VISUAL**

##### **Planning Context and Landscape Designations**

R7.3.1 There are a number of landscape-related designations, reflecting the diversity and quality of landscapes found within the study area. These are set out and described below, and illustrated on **Figure 4**.

R7.3.2 Regional Scenic Areas (RSAs) are locally designated (i.e. by the Local Authority) scenic areas, and can be found in two locations within the study area. Both are within Dumfries and Galloway, and are covered under LDP Policy NE2. LDP Policy NE2 states that the siting and design of development



should respect the special nature of the area, and that development would only be permitted where the landscape character and scenic interest would not be adversely affected, or where there is a specific need for the development at that location which could not be located in a less sensitive area. The Galloway Hills RSA occupies the largest tract of land within the study area, and encompasses a large area far beyond the study area's boundaries, particularly to the south and west. It is characterised by upland, valley and coastal landscapes extending from the Ayrshire boundary to the coast. The Thornhill Uplands RSA forms a small area to the east of the study area, focussed around Brown Hill (350m aOD). However, beyond the study area's boundary, the RSA extends north-eastwards to the Nith Valley and the Lowther Hills, including varied valley and upland scenery.

- R7.3.3 Environmentally Sensitive Areas (ESAs) “*conserve specially designated areas of the countryside where the landscape, wildlife or historic interest is of particular importance and where these environmental features can be affected by farming operations*” (The Scottish Government website). These are not landscape designations per se, but the scheme directs resources into assisting farmers maintain and enhance habits and landscape features. The designation can therefore be considered a general indication of the quality and value of the landscape. The majority of the study area is covered by this designation; the only exception being the southern-most portion between a generally north-south line joining Benneiloan-Kinair Hill-Troquhain Hill and the edge of the study area. The boundary broadly corresponds to the western edge of a large area of plantation forestry.
- R7.3.4 Sensitive Landscape Character Areas (SLCAs) within East Ayrshire have been identified in the Ayrshire Joint Structure Plan (Policy ENV2) and in the Local Plan, under Strategic Policy ENV3. Structure Plan Policy ENV2 states that SLCAs shall be given full consideration in the determination of planning applications, whilst Local Plan Policy ENV3 aims to ensure that all development proposals respect, in terms of their design, size, scale and location, the local landscape characteristics of the particular area within which they are proposed. Within the study area, an area of Sensitive Landscape Character occupies the valley of the River Doon from Loch Doon to Dalmellington in the far north. It is part of a larger designation that includes vast swathes of South Ayrshire from Loch Ryan in the south to the outskirts of the Ayr in the north, and east from Girvan across the forested uplands of Carrick into East Ayrshire. South Ayrshire Scenic Areas are designated under South Ayrshire Local Plan Policy ENV8, although none are found within the study area.
- R7.3.5 There are no Gardens and Designed Landscapes (GDLs) within the study area. However, Craiggengillan sits within c.100m of the study area boundary between Bellsbank Plantation and Dalmellington, East Ayrshire. Further information is provided below under cultural heritage.
- R7.3.6 Within Dumfries and Galloway (only), an additional selection of Non-inventory Gardens and Designed Landscapes (NIDLs), prepared by the Garden History Society, is covered by LDP Policy HE6. There are five such landscapes that fall wholly or partly within the study area. From north to south, these are defined subsequently under the cultural heritage section.
- R7.3.7 Although gardens and designed landscapes are assessed under the subject heading of Heritage, they are mentioned here because they contribute towards the landscape character of an area. In this respect they form a routeing and siting constraint on account of potential direct effects, and also indirect (or setting) effects that may occur.
- R7.3.8 The Galloway Forest Park is managed by Forestry Commission Scotland as a commercial (principally coniferous) forest and as a recreational resource. The park covers an area of 70,000ha to the west of the study area. Two areas overlap with the study area at the Bellsbank Plantation, near Dalmellington, and a small area west of the A713, close to Polmaddie.

## Topography

- R7.3.9 Topography within the study area is a combination of upper valley (generally orientated north-west to south-east) and upland fringes and foothills, associated with, and bounded to the east and west by, the main areas of the Southern Uplands. The elevation range within the main valley (The Glenkens) is c.100m in the south to c.250m in the north where it approaches its watershed. Topography also demonstrates a distinctive north-south division. To the south, the valley is wide and connected to a series of other valleys which dissect foothills rising to over 400m. As the valley narrows towards the north, the valley sides become steeper and rise quickly to the high peaks of Coran of Portmark (623m), Waterhead Hill (539m), Cairnsmore of Carsphairn (797m) and Benbrack (581m) all of which overlook the study area, To the south-west of the study area are the high peaks of Meaul (695m) and the slightly more distant Meikle Millyea (746m).

## Landscape Character

- R7.3.10 Landscape character within the Study Area is described within the SNH character assessments for Dumfries and Galloway (Report Number 94, 1998) and Ayrshire (Report Number 111, 1998). The study area sits within the regional character area known as the Galloway Uplands, a relatively rugged landscape with wild areas, where commercial forestry and, to a lesser extent, open moorland are major features. In more detail, the study area can be broadly categorised as comprising upper valley to the west, foothills to the south-east and uplands to the east, with commercial forestry being a notable land use.
- R7.3.11 Occupying the western side of the study area, the similar 'Upper Dale' (Dumfries and Galloway) and 'Upper River Valleys' (Ayrshire) landscape character types (LCTs) are separated by a watershed near to Loch Muck, some 4km south of Bellsbank. To the south-east, 'Foothills with Forest' and 'Foothills' dominate, whilst the eastern fringes are characterised by alternating areas of 'Southern Uplands with Forest' and 'Southern Uplands'. The valley of the Water of Ken, which heads eastwards from its confluence with the Water of Deugh at Kendoon Loch, is characterised as a 'Narrow Wooded Valley', and punches its way out of the study area deep into the mountains. Small areas of 'Upland Glens' (south-east) and 'Flooded Valley' (south) are also peripherally present within the study area.
- R7.3.12 The LCTs contained within the study area are illustrated on **Figure 5**, and are summarised below. A number of the LCTs that have a very limited presence in the study area have been excluded from description at this stage.

### **Narrow Wooded Valley**

- R7.3.13 These discrete, narrow, incised valleys that cut through more elevated landscapes are the result of fluvio-glacial erosion within areas of more resistant solid geology. The form of the valleys varies along their length from narrow steep-sided V-shapes at the head of the valley to the flat river floors of the lower reaches, although these still display steep valley sides. The lower reaches usually have flat valley floors within which the river meanders.
- R7.3.14 Woodlands are an essential feature of this landscape type; these create intimate enclosure and restrict views. They typically comprise a mixture of semi-natural woodlands, shelterbelts, farm and policy woodlands. Within the wooded structure of the valleys are small-scale pastures divided by hedges and drystone dykes. The valleys typically contain minor roads which follow the valley floor giving access to isolated houses, some with large gardens or designed parkland.

### **Upper Dale**

- R7.3.15 This landscape type is found along the upper reaches of the water of Deugh/Ken as a broad V-shaped valley cut into the more resistant geology, although with some flat areas on the valley floors,

especially to the north. The effects of glacial erosion are evident and the relationship with the adjacent uplands strong. These uplands provide the enclosure to the broad valley landscapes and form the main horizons to either side, although extensive views are possible along the length of the valleys between them.

- R7.3.16 The landscape is less cultivated and woodlands more limited, although with riparian woodlands along tributary channels and some areas of forest plantation. The pastures are locally improved on the valley floor but rising to rougher grazing on the valley sides. Fields are medium to large size and enclosed by dry stone dykes that are a key feature of this somewhat exposed landscape.
- R7.3.17 This area contains limited remote settlements like Carsphairn, although hydro-electric schemes, power lines and communications routes follow the line of the valley landscapes. The hydro schemes in particular have modified the local landscape resulting in changes to the natural water courses, the presence of turbine houses, dams holding back sizable lochs, and the conspicuous tower at Kendoon.

### **Upland River Valley**

- R7.3.18 This landscape type occurs on the north-western boundary of the study area and is represented by the upper section of the Doon Valley running through an area of coal measures, limestone and millstone grit near Dalmellington. The valley is broad in its upper section containing the important wildlife resource of Bogton Loch and the meandering course of the River Doon and its wetland habitats. Pastures on the lower valley slopes give way to rougher moorland on the upper slopes. Early exploitation of the mineral deposits has led to the development of coal mines, iron works, spoil tips, a mineral railway and industrial settlements. Large scale open cast coal mining is evident on the hills above Dalmellington.

### **Foothills**

- R7.3.19 The Foothills are found at heights of between 150m and 400m aOD. The landform is generally undulating but with craggier peaks in the west where the influence of the underlying granite is apparent, and the highest points at Blackcraig Hill in the south. The hills are however divided into an elevated undulating landscape with gently rounded summits separated by numerous incised streams which dissect the landscape. Views within this landscape are limited; however there are local views out from these areas across the adjacent valley landscapes.
- R7.3.20 The land cover is generally semi-improved pasture with areas of rough pasture and heath. Enclosures are generally large and the land is grazed by sheep and occasionally by cattle. Field boundaries are typically stone dykes with hedges and hedgerow trees to some roads. Belts of mixed woodland occur along rivers with small plantations/copses on some lower hills. Scattered farmsteads and small settlements occur throughout served by a network of minor roads. Numerous archaeological sites are present within this landscape. The extensive areas of forest in some areas have given rise to a subset of this landscape type, Foothills with Forestry.

### **Foothills with Forest**

- R7.3.21 Closely related to the Foothills landscape type but with predominantly forest land cover. Dark swathes of almost uniform forests cover many of the rounded peaks and descend onto the lower slopes. The different stages of forest rotation are typically evident, mature conifers contrasting with young plantings. Open ground is mostly rough or semi-improved pasture with patterns of dry stone dykes. Higher pastures are rougher and unenclosed. Old stone enclosures and forts are visible.

## **Southern Uplands**

- R7.3.22 This landscape type ranges typically between 200m and 500m although reaching just shy of 800m at Cairnsmore of Carsphairn. It is characterised by large, smooth domed or conical shaped hills. Steep sided clefts and glens create a strong relief. The hill slopes are generally smooth but there are some incised gullies, rocky outcrops and screes.
- R7.3.23 The majority of this landscape type is covered by coarse grassland but the highest areas also display distinctive heather moorland. The mosaic of grasses, bracken, rushes and heather contribute to this character. Walled enclosures are generally absent and this landscape type has an exposed, remote quality. There are few trees, mostly confined to the courses of the incised burns. The legacy of generations of mineral extraction is evidenced by tunnels, chimneys, spoil heaps and tracks which are locally important local features.

## **Southern Uplands with Forest**

- R7.3.24 Topographically the same as The Southern Uplands, the dominant forest landcover confers a distinctly different character. The visual influence of these forests extends over considerably larger areas than the forested footprint. The dark green of Sitka Spruce is contrasted by the light greens/-browns of Larch. The forests extend over the summits or are concentrated on the side slopes, leaving the domed peaks exposed. The rotational nature of commercial forest results in abrupt local changes to the landscape.

## **Infrastructure Issues Pertaining to Landscape Character**

- R7.3.25 The Dumfries and Galloway LCA report discusses linear energy and infrastructure developments within the region, and asserts that overhead power lines can be both intrusive and obtrusive, and suggests that development in settled areas is intrusive to a large number of people, but may be considered acceptable, while development in 'wild land' area destroys that character but impacts on relatively few people. The report identifies that the key issues are:
- How underground pipelines and cables might be accommodated and their effects mitigated by careful alignment and restoration; and
  - Whether overhead power lines are acceptable features of the landscape character areas potentially traversed, or whether alternative underground solutions should be pursued for the whole or parts of the route(s).
- R7.3.26 The report concludes on this subject, that a detailed landscape assessment should be undertaken in order to determine whether or not pylons [and one assumes other forms of overhead line] could be accommodated, or whether the quality and character of the landscape demands an alternative route or underground solution, and that separate overhead and underground solutions should be examined and compared. It notes that overhead solutions are generally better suited to remote upland areas, whilst undergrounding work can be reinstated more easily in lowland, cultivated, landscapes.
- R7.3.27 Similarly, the report considers the growing pressure for wind farm development within the region, and raises concerns regarding landscape and visual impacts. However, since the focus of this study is a potential grid connection, albeit from a wind farm, and given that the report was published in 1999, and the area has since seen the development of wind farms, this is not an issue of direct relevance to this study. However, this grid connection study has arisen from an application to build the Loch Urr wind farm, and as a consequence is dependent on the outcome of that application.

## Visual Issues

- R7.3.28 For there to be visual effects there have to be visual receptors; usually people whose visual amenity may be affected by a proposed development, either in their homes or outside, whether travelling or recreating, or simply enjoying the view.
- R7.3.29 Generally, topography dictates the nature of views within the study area. Panoramic views can be obtained from high peaks, while views from within valley areas are constrained and dominated by upland slopes. The intervisibility of lowland and highland areas contributes to some of the key characteristics of the scenic qualities of the area. Forestry has a significant impact on the availability of views from many upland areas, and from lowland areas may diminish the quality of some views due to the monotonous character of commercial plantation forestry.
- R7.3.30 Within the study area there are a number of settlements, including (from north to south) Bellsbank, Brochloch, Carsphairn, Dundee/Palmaddie and Kendoon, in addition to a large number of smaller hamlets, farmsteads and isolated properties. Dalmellington's southern tip lies just within the study area. Settlements tend to be located within the valley bottoms, and are well-related to the main road routes through the area, whilst some isolated and outlying farms and dwellings can also be found on the lower slopes of surrounding hills.
- R7.3.31 Road routes through the study area are generally limited to valley bottoms or sides. There are two main A roads through the study area, which meet at St John's Town of Dalry. The A702 from the east links the study area with Edinburgh via Thornhill, the M74 and Biggar, whilst the A713 (the Galloway Tourist Route) passes through the study area from north to south, linking Ayr to the north and Castle Douglas (and the A75) to the south. Between Kendoon and Carsphairn, this road takes a slightly elevated route, passing to the west of Dundee Hill. The B7000 is broadly parallel to the A713 between St John's Town of Dalry, and Kendoon before deviating north-eastwards after Dundee Hill to meet the B729 near Shiel Hill. The B729 enters the study area from the east close to Fingland Hill, and joins the A713 at Carsphairn. A number of unclassified roads form linkages between the main road network or head off into the uplands to become upland access tracks.
- R7.3.32 The area is popular as a recreational resource. Walking, cycling, fishing and shooting are a few of the popular activities within the area. Under the Land Reform (Scotland) Act 2003 everyone has the statutory right of access to all land and inland waters (unless specifically excluded by the Act), and although there are no footpaths or bridleways marked in the 1:25,000 scale map (public rights of way are unaffected by the Act), local councils have a duty to produce Core Paths plans which represent those paths that councils consider to be key in their areas. Councils have a duty to ensure these routes are adequately signed and in a reasonable condition. Both councils within the study area have mapped these routes, which are available to view online.
- R7.3.33 The Southern Upland Way, is one of *Scotland's Great Trails* (formally known as Long Distance Trails), which links the eastern coast of Scotland at Cockburnspath in the Scottish Borders with the south-western coast of Scotland near Portpatrick, in Dumfries and Galloway. This is a 200-mile route, which passes through the study area, in a north-south direction, between Stroanfreggan Bridge and St John's Town of Dalry.

## RESIDENTIAL AMENITY (INC. NOISE)

- R7.3.34 Residential amenity effects relate to the potential effects upon people when they are at their place of residence. Common environmental effects include noise effects from the OHL or other infrastructure (such as substations), visual effects relating to the construction of pylons or other infrastructure or general interference of people when at home (for example land use or traffic). Rule 7 of the Holford Rules deals specifically with residential amenity, and the notes on this rule are as follows:

- a) *When a line needs to pass through a development area, route it so as to minimise as far as possible the effect on development.*
- b) *Alignments should be chosen after consideration of effects on the amenity of existing development and on proposals for new development.*
- c) *When siting substations take account of the effects of the terminal towers and line connections that will need to be made and take advantage of screening features such as ground form and vegetation."*

R7.3.35 ScottishPower aim to site infrastructure and OHLs as far as practicable from residential areas (or individual properties) within the parameters of providing a balance between environmental effects and an economic OHL solution, and in line with the Holford Rules. As a minimum they use a 100m offset distance from private dwellings.

## NATURE CONSERVATION

R7.3.36 Sites of nature conservation value and pertinent protected or notable species and habitat sensitivities present within the Study Area have been identified through a desk-based assessment of online resources (including the Blackcraig & Margree Grid Connection Environmental Statement 2011) and information derived from statutory and non-statutory bodies, including Scottish Natural Heritage (SNH), Royal Society for the Protection of Birds (RSPB), Scottish Wildlife Trust (SWT), Dumfries & Galloway Environmental Record Centre (DGERC), British Trust for Ornithology (BTO) and various local wildlife groups.

R7.3.37 Nature conservation designations and certain species receive legal protection under various national and international legislative instruments. In addition, there are other habitats and species that do not receive legal protection, but which are notable owing to their conservation status. The presence of such nature conservation interests within the Study Area, as derived from the desk study, summarised below and illustrated in **Figure 6**, has been used, in combination with professional judgement, to inform the most sensitive routing of the overhead grid connection through the landscape.

### Nature Conservation Designations

R7.3.38 The Study Area does not contain any sites that have been designated for their nature conservation value at either an international or European level. The closest such designation relates to Merrick Kells Special Area of Conservation (SAC) located approximately 6km west of the Study Area at its closest point. This site has been designated for the heath and bog habitats that it supports.

R7.3.39 A single nationally designated Site of Special Scientific Interest (SSSI), known as Cleugh, is located between the B700 and Carsfad Loch, 5km north of St John's Town of Dalry within the south western extent of the Study Area. The site, which covers approximately 55ha, has been designated for the unimproved lowland neutral grassland it supports and is considered to be one of the best examples of this habitat type in Dumfries and Galloway. The variety of grassland plant communities present are also known to support a diverse range of butterfly species.

R7.3.40 One Local Wildlife Site (LWS), known as Island Block Oak Woodland, is present within the western extent of the Study Area immediately to the south west of Kendoon Loch. This LWS has been designated for the woodland habitat it supports.

R7.3.41 An Important Bird Area (IBA), known as Galloway Forest, is present within the western central section of the Study Area around the southern boundaries of Kendoon Loch. This IBA comprises of a large area of forest, including lochs, rivers and moorland, which stretches from Newton Stewart in Dumfries and Galloway into the Strathclyde region. The IBA supports a range of breeding waders

and waterbirds, in addition to species of forest and moorland, most notably including breeding populations of black grouse (*Tetrao tetrix*), short-eared owl (*Asio flammeus*) and peregrine (*Falcon peregrinus*).

The Study Area contains three areas of woodland that have been identified as Red Squirrel Priority Woodlands (RSPW). The largest of these is Carsphaim Forest that covers large parts of the north-western section of the Study Area. Castlemaddy RSPW lies within the central western section of the Study Area to the south and west of Kendoon Loch while Garcrogo RSPW lies on the south-western boundary of the Study Area.

## Species of Nature Conservation Importance

- R7.3.42 A number of species sensitivities present within the Study Area have been identified through the course of the desk study and are briefly summarised below. Owing to the confidential nature of many of these records, they have not been presented on a figure but have been used by the project team to inform both the routing selection process and scope of future survey works that are likely to be required.
- R7.3.43 Breeding locations for a number of birds of conservation importance (i.e. birds that are internationally protected under Annex 1 of EC Bird Directive) have been recorded within the Study Area including red kite, peregrine, goshawk, osprey and black grouse. Other birds of conservation importance also recorded within the Study Area and considered pertinent to the proposals include hen harrier, short-eared owl, barn owl, merlin, nightjar, whooper swan and pink-footed geese. Non-avian protected species records within the Study Area include red squirrel, badger, otter, adder, common lizard and various bat species. Such sensitive species records principally relate to the south eastern and western extents of the Study Area and are considered to therefore reflect a higher level of historical recording in these areas associated with other wind farm developments and nature conservation sites respectively. A paucity of recordings in other areas has not been taken to mean that species sensitivities are not present.

## Habitats of Nature Conservation Importance

- R7.3.44 Bog and ancient woodland inventories available from SNH, in addition to broad scale habitat mapping supplied by DGERC, have been used to identify and avoid, where possible, sensitive habitats within the Study Area. The principle habitats considered were those of nature conservation value owing to their threatened status, as reflected in their inclusion under the UK Biodiversity Action Plan (BAP).
- R7.3.45 The Study Area comprises predominantly of coniferous forest and grassland dissected by watercourses and occasional lochs. There is no known bog habitat. However, small pockets and fragments of heather-dominated blanket mire are scattered across the Study Area that may qualify as BAP quality bog habitat. The largest of these areas is to the north and south of Galloway Forest within the northern extent of the Study Area. Ancient Woodland is primarily restricted to small fragments around Kendoon Loch and south along the connecting riverine valley sides.

## ARCHAEOLOGY AND CULTURAL HERITAGE

- R7.3.46 The 'archaeology and cultural heritage' of an area comprises archaeological sites, historic buildings and other features in the landscape that have the capacity to provide information about past human activity, or which have cultural relevance due to associations with folklore or historic events. Sites of cultural heritage interest may also be informed by their 'setting' within a wider landscape.
- R7.3.47 National planning policy and guidance recognises that Scotland's cultural heritage is a finite and non-renewable resource that needs to be protected, conserved and enhanced accordingly.

- R7.348 Digital baseline information on known cultural heritage resources recorded within the study area has been supplied by Historic Scotland, The Dumfries and Galloway HER and The West of Scotland Archaeology Service (WoSAS). There are a number of archaeology and cultural heritage-related designations within the study area. These are set out and described below, and illustrated on **Figure 7**.
- R7.349 Scheduled Monuments (SMs) are designated under the Ancient Monuments and Archaeological Areas Act 1979 and are defined as monuments of national importance whose preservation in situ, and within an appropriate setting, is important to retain. Within the study area there are ten scheduled monuments
- R7.350 Listed Buildings are protected under the Listed Buildings and Conservation Areas (Scotland) Act 1997. The purpose of listing is to ensure that any demolition, alteration, repair or extension that would affect the building's special architectural or historic interest is controlled. The term 'building' is defined broadly and can include, for example, walls and bridges. Protection also extends to the interior of listed buildings and to all buildings within the curtilage of the listed building that have formed part of the land since before 1st July 1948. Buildings of special architectural or historic interest are divided into three categories to reflect their degree of interest, however, all listed buildings receive equal legal protection. Within the study area there are 26 listed buildings:
- 1 Category A building of national importance (also scheduled);
  - 17 Category B buildings of regional importance; and
  - 8 Category C buildings of local importance.
- R7.351 The listed buildings within the study area are located predominantly in the west and the south of the study area. They are not discussed individually in this report but are represented graphically on **Figure 7**.
- R7.352 Conservation Areas are protected under the same legislation as listed buildings and are areas of special architectural or historic interest, the character or appearance of which it is desirable to preserve or enhance. There are no Conservation Areas located within the study area, although the Dalmellington Conservation Area lies close to western edge of the study area in East Ayrshire.
- R7.353 There are no Gardens and Designed Landscapes (GDLs) within the study area. However, Craiggengillan, "*a rare example of a complete and un-fragmented estate landscape*" (Historic Scotland), originating from the 16<sup>th</sup> century, with the main phases of garden layout and designed landscape taking place in the 18<sup>th</sup> and 19<sup>th</sup> centuries, sits within c.100m of the study area boundary between Bellsbank Plantation and Dalmellington, East Ayrshire.
- R7.354 Within Dumfries and Galloway (only), an additional selection of Non-inventory Gardens and Designed Landscapes (NIDLs), prepared by the Garden History Society, is covered by LDP Policy HE6. There are five such landscapes that fall wholly or partly within the study area. From north to south, these are as follows:
- Knockgray House near to Carsphairn;
  - Knocknalling to the south of the study area near Carsfad Loch;
  - Earlston Castle near Carsfad Loch;
  - The Tower to the north-east of St John's Town of Dalry; and
  - Barscobe Castle, to the east of St John's Town of Dalry.



- R7.355 Within East Ayrshire, an additional selection of Ayrshire Designed Landscapes, prepared by the Ayrshire Joint Planning Steering Group, is covered by policies of the Ayrshire Joint Structure Plan and Policy ENV5 of the east Ayrshire Local Plan and relates to the following landscape:
- Craigenhillan, an area to the immediate east of the designated GDL.
- R7.356 Within Dumfries and Galloway (only), where areas of archaeological interest and character have been identified extending over large areas, such locations are designated as Archaeologically Sensitive Areas and covered by policy E13 of the Local Structure Plan. Four such Archaeologically Sensitive Areas are located partially within the study area. From north to south, these are as follows:
- Water of Deugh;
  - Bardennoch – Garryhorn;
  - Stroanfreggan; and
  - Polharrowburn.
- R7.357 Within the study area there are a further nine undesignated archaeological sites and monuments classified in the Historic Environment Record as being of, or very likely of, national importance (all in Dumfries and Galloway).
- R7.358 In general terms, the key cultural heritage constraints within the study area are the Scheduled Monuments, Listed Buildings, Archaeologically Sensitive Areas, Non-inventory Gardens and Landscapes and the undesignated features of certain or probable national importance, which national planning policy requires should be protected.
- R7.359 It is highly likely that other, as yet undetected, remains of archaeological interest are present within the study area. Further, more detailed, work will be undertaken to inform the EIA.

## **TRAFFIC AND TRANSPORT**

- R7.360 The study area is accessible at two locations from the Primary Road network, i.e. from the A702 and the A713.
- R7.361 As yet no detailed route investigation has been undertaken, but we would assume that most materials produced off-site, including cables and concrete delivered on conventional road vehicles could use these roads without restriction. Likewise for delivery of plant, e.g. tracked excavators, could be transported to site by low loader.
- R7.362 The minor roads crossed by potential cable routes would need considering on case-by-case basis; not all would necessarily be suitable for large or heavy vehicles.
- R7.363 If poles are erected on wooden poles up to 22m above ground (plus depth of pole beneath ground), transportation of the poles is anticipated to need to be on extendable trailer, exceeding normal 16.5m max. vehicle length for articulated lorries.
- R7.364 Accordingly, the likely source of poles needs to be identified such that the delivery route can be checked. Swept path analysis would be needed at any locations such as junctions where there are turning manoeuvres required. Potentially provision may be needed to take down and re-erect street furniture at tight locations. Should the opportunity present itself in any locations to use shorter poles, obviously the shorter pole would be less of a constraint.

## SOCIO-ECONOMIC AND TOURISM

- R7.3.65 An initial review of tourism and recreation resources/receptors within the study area has identified a number of assets and settlements. Whilst the area is not densely populated, the settlements of Carsphairn, Dalmellington and Bellsbank fall within the study area. It is highly likely that the route will avoid all three of these settlements; however it may pass in close proximity to Carsphairn.
- R7.3.66 A number of routes may be crossed by the proposed route, or potentially affected visually, including:
- A702 (St John's Town of Dalry – Edinburgh);
  - A713 (Galloway Tourist Route);
  - B7000 (St John's Town of Dalry – Knowehead); and
  - B729 (New Bridge – Carsphairn).
- R7.3.67 A total of two local visitor attractions are located in close proximity to a potential route corridor, including the Carsphairn Heritage Centre and the Polmaddy Settlement. Both of these are on the western boundary of the study area and unlikely to be physically impacted by the proposal; however, there may be some potential visual effects to consider.
- R7.3.68 A number of promoted routes, hill tracks, heritage paths core paths and other rights of way may be crossed or visually affected by the proposed route, including:
- The Southern Upland Way;
  - Cairnmore of Carsphairn;
  - Camlarg;
  - Loch Doon;
  - Dundee Forest, near Dalry;
  - Loch Doon and Ness Glen Riverside Walk;
  - 3 no. Hill Tracks;
  - Sanquhar to Stroanfreggan Heritage Path;
  - Sanquhar to Stroanpatrick Heritage Path;
  - Polmadie Pack Road Heritage Path;
  - 25 rights of way have the potential to be affected;
  - 58 core paths have the potential to be affected;
- R7.3.69 A number of cycle routes may be crossed or visually affected by the proposed route, including:
- Southern Upland Circular;
  - Moniaive Back to Moniaive (crossed twice);
  - St John's Town to Drumlanrig to Mennock;
  - Dumfries to St John's Town of Dalry;
  - Mountain Biking (Carsphairn Forest);
  - Carrick Forest;
  - Stranraer to Dunbar;
  - Lochinvar Circular;

- Maybole - Patna - Skares - Dalleagles - Dalmellington - Straiton; and
  - The Coalfield Cycle Route.
- R7.3.70 The Doon Valley Leisure Centre and Bellsbank Adventure Playground, although within the study area, are located at the northern end of this, north of Benbrack, and are unlikely to be physically affected by the proposal. Some visual effect may be experienced.
- R7.3.71 The fishing locations noted below could possibly be affected by the OHL passing over or in close proximity to them. However effects are likely to be limited to visual rather than physical effects. Loch Urr and Kendoon Loch are potentially the most likely to experience an impact.
- Carsfad Loch;
  - Earlstoun Loch;
  - Water of Ken;
  - Moss Roddich Loch;
  - Water of Deugh;
  - Kendoon Loch;
  - Carsphairn Lane;
  - Barscobe Loch;
  - Loch Urr;
  - Lochinvar; and
  - Troston Loch, Loch Muck.

## HYDROLOGY

- R7.3.72 Within the study area, watercourses and the crossing, and re-crossing, of them need to be considered in the identification of a Preferred Route. The available spans for types of wood pole infrastructure considered (standard Trident and H Poles) ensure that as a result of the available separation distances, the watercourses do not form major constraints.
- R7.3.73 The hydrology in this area of Dumfries and Galloway has been heavily modified by man, primarily through the creation of the Galloway Hydro Electric Scheme in the 1930s. This scheme involved the creation of a number of dams and hydro electricity generating stations along the Water of Deugh. The two uppermost lochs formed by this project are Carsfad and Kendoon Loch, which sit within the route corridor study area. From a hydrological and routeing perspective, these features are treated as natural features.
- R7.3.74 Within the search area, sensitive watercourses include the Water of Deugh, and its major tributary, the Water of Ken. Both of these rivers are designated as 'At Risk'<sup>3</sup> under the Water Framework Directive (WFD), and are both designated Salmonid Rivers (that is they contain a population of Salmonid species).
- R7.3.75 A number of other watercourses in the study area, although smaller in size, are equally or at slightly less risk, and are also Salmonid rivers. These include, among others, the Black Water, Polmaddy Burn, Cummock Burn, Bow Burn, Polharrow Burn, Parrie Burn and the Muck Water.

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<sup>3</sup> Use of the term 'at risk' relates to a watercourse having 'bad' or 'moderate' chemical and ecological quality status

R7.3.76 A large number of other smaller watercourses, often tributaries of those outlined above, are also evident along the route corridor, but owing to their small size, and the span lengths possible by the overhead line, these are not generally considered to constitute constraints to the routeing.

## LAND USE AND FORESTRY

R7.3.77 The land use within the Study Area comprises a mixture of agricultural land, which is predominantly grazing, moorland and areas of commercial forestry. Interspersed with this are areas of settlement, infrastructure and watercourses and open water. New, and relevant, components of the local landscape are the proposed wind farms at Benbrack, Quantans Hill, Loch Urr and Margree, and the consented scheme at Blackcraig. Presence of these wind farms will often result in a fundamental change in land use, whereby areas of woodland can be felled entirely (or occasionally keyholed), leaving a largely moorland landscape, albeit with turbines present within it. A further landscape feature is the Blackcraig-Margree overhead 132kV overhead line proposed to pass through the study area with construction scheduled for 2014-2017.

R7.3.78 With regards to agricultural land, the whole of Scotland has been mapped by the Macauley Institute in terms of its capability for agriculture, with different categories identified dependent on the prevailing soil, climate and relief. The classifications within the study area include:

- The majority of the landscape is formed of Class 6.3, which is defined by the Macauley Institute as being *“Land capable of supporting only Rough Grazing due to intractable physical limitations; the semi-natural vegetation provides grazing of low value”*;
- Small areas of 6.2 are found interwoven with the commercial forestry. This land is defined as *“Land capable of supporting only Rough Grazing due to intractable physical limitations; the semi-natural vegetation provides grazing of moderate value”*;
- All other areas comprise either 5.3 or 5.2 classifications, with this land defined as *“Land capable of use as improved grassland; sward establishment presents no difficulties but physical limitations can cause maintenance problems”* (5.2), and *“Land capable of use as improved grassland and although the sward can be established, deterioration can be rapid due to a range of factors”*(5.3).

R7.3.79 The quality of the agricultural land is therefore of moderately low value as grazing land, and there is no evidence of Best and Most Versatile (BMV) land within the study area (classes 1, 2 and 3).

R7.3.80 Forestry and forestry operations are a characteristic component of the local landscape, and as is identified on the OS map for the area, some 40% of the study area is made up of this land use. This forestry is in various stages of rotation, with some areas recently felled and some reaching maturity, with all stages in between in evidence. Forestry presents a constraint in that in order to route through these areas, wayleaves of 80m are required to allow for wind- or age-felled trees falling without interrupting the lines. In addition, areas of adjoining forest up to existing ‘windfirm’ edges may be felled at the same time as the wayleave. This practice is undertaken to mitigate the impact of the line of consequential windblow resulting from the felling of the wayleave. Those areas outwith the wayleave are available for replanting, which can, with the correct design, provide landscaping mitigation for the straight line impact of the line through areas of forestry.

R7.3.81 The Holford Rules advocates avoiding areas of commercial woodland on the grounds that wayleaves are more visible given the wide ‘channel’ created through otherwise dense forestry areas.

## R8. APPLICATION OF THE SUBSTATION SITING METHODOLOGY

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### R8.1 SITING OF THE KENDOON NORTH COLLECTOR SUBSTATION

#### IDENTIFICATION OF BROAD STUDY AREA AND CONSTRAINTS (STAGES 1 AND 2)

- R8.1.1 The Loch Urr OHL route requires both a start point and an endpoint. Whilst the static start point is the Loch Urr wind farm substation, the location of the end point (the 'Kendoon North' collector substation) requires identifying. The collector substation needs to be located in proximity to the L7 section of the B&M route, and in a practical position taking account of the locations of the three wind farms which the substation is intended to serve (and their subsequent connections). Geographically, and taking account of the range of principal constraints, there are three sections of the OHL where such a connection could be made. These are shown on **Figure 9**, and discussed in more detail below.
- R8.1.2 An additional consideration (to the environmental and wider technical constraints) is the relative proportion of the entire route length that requires to be provided as either OHL or underground cable. Generally speaking, the further north the substation is sited along the L7 route, the longer the length of OHL requirement, and the further south along the L7 route the substation is, the longer the length of underground cable requirement.
- R8.1.3 The desire to minimise the combined length of new OHL and underground cable, whilst providing a geographically, technically and environmentally compliant route that takes account of the range of parameters that exist, is the background to finding the correct location for the collector substation.

#### Southern Section

- R8.1.4 The 'Southern Section' is the section of L7 OHL between the southern end of the L7 route (at Dalshangan) and the bridge over the River Dee at North Liggat. Within this area the following constraints pertinent to both the routeing of the OHL and underground cables and the siting of the substation are evident:
- Due to technical reasons, the proposed OHL would need to be located to the east side of the L7 OHL, meaning the proximity of the road and other landscape features would present a constraint to both the routeing of the wind farm connections and the substation;
  - Proximity to areas of private woodland, some of which contain private residences, is a constraint to routeing and substation siting in terms of both residential amenity and the woodland resource;
  - Private residences at White Crook, Dalshangan, Polmaddie, and Bardennoch would present a physical constraint to routeing and siting of the substation;
  - The Archaeologically Sensitive Area (ASA) to the west of the A713 would constrain this area;
  - Being sited close to the L7 route would mean the connections/substation would be in proximity to the Galloway Tourist Route and would result in the potential for a wirescape to be formed as well as multiple road crossings and general visual effects upon road users. In addition, this section is within the Regional Scenic Area;
  - There is a potentially material technical constraint in achieving an OHL route from Loch Urr to this part of the L7 OHL. The area around the existing Kendoon substation (including the Carse of Dundough) is constrained to such a high degree both technically and environmentally (and more so in the light of the proposed B&M connection) that accessing the southerly section of

the L7 route may in itself be unachievable. In addition, whilst potential exists to cross Kendoon Loch in proximity to the existing road bridge (assuming a northerly route past the Carse of Dundee for the OHL), the span lengths of the type of infrastructure proposed ensure that a crossing at this location would not be possible, even if analysis of all other constraints identified this as a potential route option; and

- In routeing to the south of the A713 bridge at North Liggat the cable routes would need to cross the river and find a route through the extensive constraints in this area.

R8.15 To site the substation in this area the approximate lengths of connecting infrastructure would be circa 30.3km, as shown on **Figure 9**. This infrastructure would comprise the following:

- Loch Urr OHL: A minimum of 17.8km and a maximum of 20.1km; and
- Quantans Hill and Benbrack underground cables (provided by the developer of these developments): A minimum of 10.2km and a maximum of 12.5km.

## Central Section

R8.16 The 'Central Section' lies between Carsphairn (approximately) and Polnaskie Bridge, which is located directly to the west of Benbrack wind farm, and broadly follows the corridor of the existing N-Route (and proposed B&M OHL). Within this area the following constraints, pertinent to the routeing of the OHL and underground cables, and the siting of the substation, are evident:

- The proximity of this area to the Galloway Tourist Route and the existing N-Route/proposed B&M route means that there is the potential for the creation of a wirescape to be created over parts of the Galloway Tourist Route;
- The section is entirely within the Regional Scenic Area, which presents a landscape constraint;
- Cultural heritage constraints exist in the form of an ASA between Lamford Hill and Benbrack Hill, albeit the Benbrack wind farm lies partly within this area;
- A general area of constraint exists around the Green Well of Scotland, where heritage, topographical and land use (woodland) constraints are known to exist; and
- Presence of woodland areas adjacent to the A713 at Brockloch present both technical and ecological (red squirrel) constraints to the routeing and siting.

R8.17 In siting the substation in this area the approximate lengths of connecting infrastructure would be as follows, and as shown on **Figure 9**:

- OHL: A minimum of 19.2km and a maximum of 27.6km; and
- Quantans Hill and Benbrack underground cables (provided by the developer of these developments): A total length of 11.1km.

## Northern Section

R8.18 The 'Northern Section' lies between Polnaskie Bridge and the New Cumnock substation, and follows the northerly section of the proposed B&M route. Within this area the following constraints pertinent to both the routeing of the OHL and underground cables and the siting of the substation are evident:

- The forestry area to the north of the A713 is a known area of ecological and ornithological constraint, with records showing evidence of black grouse and red squirrel habitat and occupation;
- Approximately the southern half of this sub-section lies at a minimum elevation of circa 310m and therefore above the elevation where only short lengths of OHL are desirable. In addition

large areas of the sub-section have slopes above 15 degrees, which again is above the maximum permitted for this type of structure;

- The landscape within this section is more diverse than other sections in terms of topography, with the steeply incised Glen Muck valley being a notable feature, as are the other features to the east of this. The L7 route follows a route which is tightly constrained in areas, and in such areas additional capacity for OHL routeing would be limited. Such circumstances would also be challenging in terms of siting the substation;
- A number of wind farms are planned in this area; these present both a technical and potentially legal constraint to the routeing/siting;
- Land use constraints, both in terms of forestry and agriculture are present through this area, with the area surrounding the L7 route constituting predominantly commercial forestry; and
- The L7 route crosses a number of minor watercourses, presenting constraints for OHL routeing, but more importantly for underground cables.

R8.1.9 In siting the substation in this area the approximate lengths of connecting infrastructure would be as follows, and as shown on **Figure 9**:

- OHL: A minimum of 19.2km and a maximum of 38.7km; and
- Quantans Hill and Benbrack underground cables (provided by the developer of these developments): A minimum length of 11.1km and a maximum length of 21.3km.

### **SUMMARY AND IDENTIFICATION OF THE DETAILED SEARCH AREA (STAGE 3)**

R8.1.10 The above analysis of the broad siting options identifies that the preferred location for the proposed substation lies somewhere between the A713 bridge at North Liggat, where the L7 route crosses the Water of Deugh and the A713 and B729, and at Polnaskie Bridge, adjacent to the Benbrack wind farm. This is referred to above as the 'Central Section' of the L7 route, and achieves the balance required in the following ways:

- Having a northerly limit of Polnaskie Bridge ensures that there is limited, or no, duplication of OHL and underground cables for all three wind farm connections, thereby reducing the potential for effects and ensuring the most cost-effective option is achieved. By going north of Polnaskie the route would also be routeing for long sections at above 300m aOD;
- By avoiding the section of L7 route south of the bridge at North Liggat, there is no need for either of the routes to cross the River Dee, nor to impinge upon landowner, cultural heritage or technical constraints in this area;
- By suggesting what is a relatively unconstrained linear area, there remains flexibility in detailed siting such that the most technically, environmentally and economically acceptable route can be identified; and
- Geographically, a point in the locale of Carsphairn represents the most logical point in that it reduces the overall length of (combined) OHL and underground connections.

R8.1.11 In defining this as the 'Detailed Search Area', the next stage is to define a preferred location for the substation based upon the more detailed constraints found in this area. This is undertaken below.

### **ENVIRONMENTAL ANALYSIS OF SEARCH AREA (STAGES 4 AND 5)**

R8.1.12 In addition to the review of general environmental constraints carried out above, the siting of the collector substation needing to be adjacent (or very close to) the L7 part of the B&M OHL route ensures a great deal can be understood about the detailed constraints surrounding this route from

the ES that accompanied the request for planning permission for the B&M development. In particular, valuable information can be discerned relating to ecology (including ornithology), cultural heritage and forestry. A synopsis of this information has been carried out for the Central section of the L7 route with reference to the general requirements of siting such a structure, and the information contained within the B&M ES.

R8.1.13 It is acknowledged with regard to the ecology and ornithology species survey results (and to a much lesser extent the habitat results) that these represent the baseline at the time of the survey and not an accurate baseline to be relied upon now. However, all of the results are between 6 and 9 years old and therefore provide a valuable indication of the potential for certain species or habitats to be present, and the likelihood that such a constraint may exist. Indeed, for the purposes of both routeing of the OHL and siting of the substation, this represents a more in-depth baseline than would normally be available at this stage.

R8.1.14 To aid the analysis of this section, it has been broken into five distinct sections, based upon broad geography and land cover for this 10km section of the study area. Each of these sections is identified on **Figure 10**, and analysed in turn in the tables below. For each section the known constraints and opportunities are identified, and an overall capacity provided based upon the following criteria and an indicative size for the substation of 100m x 80m.

- **No capacity** due to extent or sensitivity of identified constraints;
- **Low capacity** due to extent or sensitivity of identified constraints;
- **Moderate capacity** due to extent or sensitivity of identified constraints; and
- **High capacity** due to extent and/or sensitivity of identified constraints.

R8.1.15 Such a comparative analysis provides a mechanism by which a preferred location can be identified, whilst identifying other suitable areas should the subsequent routeing of the Loch Urr OHL identify that the preferred point is inaccessible.

### Central Section: Sub-section A

R8.1.16 This section runs for approximately 1.5km between North Liggat and the Green well of Scotland. The environmental constraints and opportunities identified across this section are as follows:

ENVIRONMENTAL CONSTRAINTS	
<b>Residential</b>	Proximity to housing at North Liggat and potential convergence of OHLs a potential issue here. Proximity to the settlement of Carsphairn a constraint.
<b>Heritage</b>	In siting a sufficient distance from housing at North Liggat, the substation would be in closer proximity to the Knockgray NIDL, increasing likelihood for setting effects. Lagwyne Cairn and field system is near to the proposed OHL route and represents a constraint.
<b>Ornithology</b>	Evidence of raptor flights along Water of Deugh corridor, including merlin, hen harrier and peregrine. Also evidence of swan and goose flight corridors along the watercourse.
<b>Recreational</b>	Proximity to the A713 and B729 could affect tourist visitors, especially given open character of the landscape and probable open visibility.
<b>Visual</b>	The landscape here is very open and moorland in character and owing to the location of the L7 route and proximity of properties at North Liggat, the substation would need to be up the slope from the roads, leading to probable open and extensive visibility.
<b>Hydrology</b>	Proximity to the Water of Deugh would lead to greater potential for effects upon the hydrological resource at the eastern end. In addition a number of minor watercourses descend Craig of Knockgray.



ENVIRONMENTAL OPPORTUNITIES	
<b>General</b>	A largely open and topographically subtle landscape, which presents flexibility in terms of siting near to the OHL. Not covered by any heritage, ecological or other designation, except overriding Regional Scenic Area.
<b>Landscape and visual</b>	Other than the overriding RSA designation, there are no landscape designations that would preclude routeing.
<b>Ecology</b>	There is limited evidence of protected species or valuable habitats in this area.

R8.1.17 The principal constraints in this area include the proximity to Carsphairn and individual dwellings at North Liggat, and the level of heritage constraints evident. In addition, the openness of the landscape ensures that any development here would be widely visible and would contrast with the open moorland. Set against this is the lack of general environmental designation and the lack of notable ecological constraint. On balance this sub-section is considered to have a **low capacity**. In areas absent of heritage features or where local topography or landscape features would allow views from sensitive locations to be screened, this would be **moderate**.

### Central Section: Sub-section B

R8.1.18 This section runs for approximately 570m and includes the area referred to on OS mapping as the 'Green Well of Scotland'. The environmental constraints and opportunities identified across this section are as follows:

ENVIRONMENTAL CONSTRAINTS	
<b>Forestry/land use</b>	Ancient woodland bordering the river valley sides (and relic valley side) is a constraint which has already been partly affected by the L7 section of the B&M OHL.
<b>Residential</b>	Proximity to residential and agricultural buildings will constrain substation siting here.
<b>Heritage</b>	There is a conglomeration of heritage assets within this local area, with this focussed around the property 'Bridge-end'. The majority of these assets appear, however, to be of limited value and would be sited some way south of the proposed substation and OHL.
<b>Ornithology</b>	Hen harrier and merlin, swan and goose, curlew, extensive moorland and woodland breeding birds all noted within this area.
<b>Ecology</b>	Extensive bat activity noted.
<b>Topographical</b>	The Polsue Burn runs at this location along a diverted course, and there is evidence of the previous river course to the east. The burn runs through an incised course, and there are steep slopes in a number of locations.
<b>Visual</b>	The Polsue Burn and the incised valley, along with the associated tree cover, creates an area of visual and character interest in what is otherwise a largely large scale landscape. Whilst existing man-made elements are visible, including dwellings and the existing N-Route, further visual change of an industrial nature could have an effect.
<b>Hydrology</b>	Proximity to the Polsue Burn would lead to greater potential for effects upon the hydrological resource. In addition there is a potential 1:200 year flood risk in this area.
ENVIRONMENTAL OPPORTUNITIES	
<b>General</b>	Not covered by any heritage, ecological or other designation, except overriding Regional Scenic Area.
<b>Landscape and visual</b>	The vegetation within this area presents a good extent of potential screening from areas within the Green Well.
<b>Ecology</b>	Other than bats, little protected species activity or other ecological constraint.

R8.1.19 This is a relatively unusual and unique part of the landscape, and contains extensive limitation in capacity as a result of heritage, ecology and a range of other constraints. In addition, topographical issues would mean siting of the substation would present both siting and access issues. On balance there would be **no capacity** in this location generally, with small pockets potentially containing **low**

**capacity** where detailed constraints could be avoided and where screening from nearby roads could be achieved.

### Central Section: Sub-section C

R8.1.20 This section runs for approximately 1.6km across the southern flank of Holm Hill, between the Green Well of Scotland and the commercial woodland area at Brockloch. The environmental constraints and opportunities identified across this section are as follows:

ENVIRONMENTAL CONSTRAINTS	
<b>Ornithology</b>	Some evidence of swan and goose flight corridors and curlew. Limited evidence of woodland or moorland breeding birds. Evidence of hen harrier flights.
<b>Recreational</b>	Proximity to the A713 could affect tourist visitors, especially given open character of the landscape and probable open visibility of the structure.
<b>Visual</b>	The landscape here is open and moorland in character and owing to the location of the L7 route, the substation would need to be up the slope from the roads, leading to some open and extensive visibility. Detailed design could limit visibility through cut and fill operations, and there are limited screening elements evident anywhere within this sub-section. Whilst the steeper slopes adjacent to the A713 would mean that from the road the central area of this sub-section would not be extensively visible, any development here would be at least partially visible from the surrounding areas.
ENVIRONMENTAL OPPORTUNITIES	
<b>General</b>	A largely open and topographically subtle landscape, which presents flexibility in terms of siting near to the OHL. Not covered by any heritage, ecological or other designation, except overriding Regional Scenic Area.
<b>Residential</b>	Proximity to housing at North Liggat and potential convergence of OHLs a potential issue here. Proximity to the settlement of Carsphairn a limited constraint.
<b>Heritage</b>	Limited heritage interest within this area, with only small numbers of identified features.
<b>Landscape and visual</b>	Other than the overriding RSA designation, there are no landscape designations that would preclude routeing.
<b>Hydrology</b>	There is limited hydrology constraint in this area and no flood risk.
<b>Ecology</b>	There is limited evidence of protected species or valuable habitats in this area, albeit potential bat roost trees are evident.

R8.1.21 From an environmental perspective, this area is largely absent of any documented constraint, with limited ecology, ornithology, heritage, landscape or hydrological constraint. However, this is a very open landscape, and visibility of any infrastructure would be available from the A713 Tourist Route, although this could be moderated through screening planting, detailed design and cut and fill operations. On balance there is considered to be a **moderate capacity** for siting in this area.

### Central Section: Sub-section D

R8.1.22 This section runs for approximately 1.65km and constitutes the south-western periphery of the Brockloch area of commercial woodland. The environmental constraints and opportunities identified across this section are as follows:

ENVIRONMENTAL CONSTRAINTS	
<b>Heritage</b>	A number of heritage assets, designated and undesignated, exist in proximity to, and within, the woodland area to the north of the road and also near to the A713. These are generally of low value and not extensive in their distribution, with the focus of activity being to the north of the area.

<b>Ornithology</b>	There is some evidence of ornithological interest around Brockloch, including raptors (goshawk and merlin), waterbirds (goose, curlew and lapwing) and within the commercial woodland there is evidence of woodland species, in particular in proximity to woodland tracks. Evidence of black grouse in northern extremity of woodland area.
<b>Ecology</b>	The woodland area is identified as Category B2 for red squirrel and there is some limited evidence of coning within the central part, near to the existing OHL. The woodland is also designated as a red squirrel priority woodland area.
<b>Recreational</b>	Proximity to the A713 could affect tourist visitors, especially given open character of the landscape and probable visibility of the structure.
<b>Forestry/land use</b>	In siting within a forested area, there would be some loss of forestry stock, although this is commercial evergreen woodland and therefore of limited value. Financial implications exist for loss of forestry stock.
<b>ENVIRONMENTAL OPPORTUNITIES</b>	
<b>General</b>	Not covered by any heritage, ecological or other designation, except overriding Regional Scenic Area.
<b>Residential</b>	There are a number of residential properties lying close to the A713 in this location, including at Brockloch, although these are to the south of the road and on the opposite side of the A713 and the closest property to the L7 route is nearly 270m.
<b>Landscape and visual</b>	The nature of forested areas ensures that a substation could potentially be sited such that it would be largely screened from all publicly accessible routes and areas. In addition, in terms of changes to landscape character the loss of commercial woodland areas would not realise notable effects.  Furthermore there is evidence that a new broadleaf woodland strip has been planted to the south of the existing N-Route line, which would provide future screening of this area from the road.
<b>Hydrology</b>	There is limited hydrology constraint in this area and no flood risk.
<b>Ecology</b>	The woodland has a low bat potential and there were very limited signs of bat activity noted in this area.
<b>Topography</b>	Topographically the area is relatively flat, although with slightly more variation to the north of the area on the flank of Brockloch Craig.

R8.123 Being an area of commercial woodland, the value of the landscape is relatively uniform and not of a particularly high status. There are a number of constraints to consider including heritage, ornithology, ecology and land use, although in no instance are the constraints of such a sensitive nature or extent that they would preclude siting of the substation. In addition, there are a number of benefits to selecting a commercial woodland area, such as screening, and the ability to manage the areas such that this is maintained in the long term, although the size of the structure proposed would not be able to be screened entirely. Subject to detailed siting investigation, this sub-section is considered to have at least a **moderate capacity**, where specific constraints could be avoided.

### Central Section: Sub-section E

R8.124 This section runs for approximately 3.7km across the open landscape between the commercial woodland at Brockloch and the commercial woodland at Campbells Hill. The environmental constraints and opportunities identified across this section are as follows:

<b>ENVIRONMENTAL CONSTRAINTS</b>	
<b>Residential</b>	There are a number of residential properties within this area, although they would be located on the opposite side of the L7 OHL to the substation. They would have clear views across the open landscape to the east, however.
<b>Heritage</b>	Large parts of the open landscape between Brockloch and Campbells Hill constitutes an ASA and is therefore constrained generally. In addition, a number of independent heritage assets are evident located near to the L7 OHL (including a Scheduled Monument). These are centred on Lamford and Meadowhead although there are some further south.

<b>Ornithology</b>	Ornithological constraints exist in the form of raptors (merlin, peregrine, hen harrier, owl), waterbirds (golden plover, curlew) and the area around Lamford Hill contains evidence of extensive use by black grouse. Moorland breeding birds are also evident.
<b>Ecology</b>	There is evidence of areas of sensitive wetland habitat within this area, both on the western slopes of Lamford Hill and Benbrack Hill.
<b>Visual</b>	Large parts of the landscape between the areas of woodland is open and allows views from the A713 (and other minor roads) to both the east and west over long distances. Infrastructure (over and above that already present) would have the potential for additional effects.  The potential presence of the Benbrack wind farm could have cumulative effect issues with the development of the OHL and the substation.
<b>Hydrology</b>	A number of minor watercourses descend Benbrack and Lamford Hill and have the potential to be affected.
<b>Technical</b>	Benbrack wind farm presents a technical constraint due to both the siting of the substation, and the running of the OHL, needing to relate to the wind farm layout and boundaries.
<b>ENVIRONMENTAL OPPORTUNITIES</b>	
<b>General</b>	Not covered by any formal ecological or other designation.
<b>Residential</b>	Whilst a number of residential properties are evident in this area, there are large parts where no residences are present.
<b>Landscape and visual</b>	Other than the overriding RSA designation, there are no landscape designations that would preclude routeing.
<b>Topography</b>	Topographically the area is relatively flat, although with slightly more variation to the south of the area on the flank of Brockloch Craig.

R8.1.25 The principal constraints within this sub-section are the presence of the ASA and the range of other environmental issues, none of which are particularly sensitive or extensive in isolation, but which combine to create a comparatively high level of constraint. On balance the sub-section is considered to have a **low-moderate capacity**, although with this being a large sub-section there will be some variation in this between **moderate** and **low**.

## SUMMARY OF SUB-SECTION EVALUATION (STAGE 6)

R8.1.26 The analysis above indicates that of the five sub-sections considered, there is a range in their capacity dependent on a number of factors, all of which are pertinent to the siting of the substation, and as directed by the Holford Rules. This in no way takes account of the length of the required connections, but provides an evaluation based upon technical and environmental factors. The sub-sections can be rated in terms of their capacity as follows:

- 1=: Sub-section C (moderate capacity);
- 1=: Sub-section D (moderate capacity);
- 3=: Sub-section A (low to moderate capacity);
- 3=: Sub-section E (low to moderate capacity); and
- 5: Sub-section B (no capacity to low capacity).

R8.1.27 The analysis identifies that the preferred sub-section for the siting of the collector substation is either sub-section C or D, and within this, the higher areas of capacity are those towards the south of sub-section D and the northern end of sub-section C. Hierarchically there is then an equal preference for sub-sections A, and E, with the least capacity presented by sub-section B. Selecting sub-section C (northern end) or D (southern end) would mean the lengths of infrastructure required to connect the three wind farms would be approximately 11.1km of underground cable (Benbrack and Quantans Hill) and 23.4km (minimum) of overhead line.

- R8.128 In terms of defining a preference for either sub-section C or D, it is pertinent to look at the level of known environmental constraint, other than landscape and visual issues, which inevitably both locations will face. The open nature of sub-section C, in having no real environmental constraint in terms of ecology, heritage or hydrology, scores highly in this regard. Conversely, sub-section D, which contains known evidence of key species (red squirrel and black grouse), scores somewhat lower. On this basis, the preferred sub-section for the proposed Kendoon North Collector substation is sub-section C.
- R8.129 The precise location within sub-section C can be tentatively identified by further analysis of the constraints, although at this stage it is useful to retain some flexibility to the siting such that the routeing of the OHL can reflect this. The proposed indicative location of the substation is shown on **Figure 13**.

## R9. APPLICATION OF THE ROUTEING METHODOLOGY

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### R9.1 STAGE 2: IDENTIFICATION OF STRATEGIC ENVIRONMENTAL AND TECHNICAL CONSTRAINTS

R9.1.1 Having established the preferred broad location for the substation, and having identified within the baseline description the range of highest value (and lesser value) constraints, it is now possible to look at the potential route options that exist from the Loch Urr wind farm to the proposed collector substation in relation to these. **Figure 11** illustrates those areas of highest environmental value across the routeing area, which includes the following:

- Inventory Gardens and Designed Landscapes (GDLs);
- Non-Inventory Gardens and Designed Landscapes (NIDLs);
- Non-designated but Nationally Important Remains (NIRs);
- Special Areas of Conservation (SACs);
- Archaeologically Sensitive Areas (ASAs);
- National Nature Reserves (NNRs);
- Ancient and Semi-Natural Woodland (ASNW);
- Sites of Special Scientific Interest (SSSIs);
- Scheduled Monuments (SMs);
- Conservation Areas (CAs); and
- Listed Buildings (LBs).

R9.1.2 Also mapped are the following technical constraints, as described previously:

- Areas with a slope gradient of greater than 15 degrees;
- Areas above 300m elevation;
- Proposed (known) wind farm developments; and
- Proposed (known) grid connections.

R9.1.3 These constraints include those listed within the Holford Rules (Appendix B), and also a number of other constraints important in the context of the local landscape.

R9.1.4 Whilst the above form the documented constraints evident across the study area, perhaps the key component in a route's acceptability are those pertaining to potential landscape and visual effects. In identifying a preferred route, it is essential that landscape and visual effects are considered, and in line with EDP's general approach to the development of renewable energy, the routeing of the OHL has followed a landscape-led approach whereby the technical and environmental constraints are considered alongside those of landscape sensitivity and visual acceptability. The analysis of the landscape and visual issues is undertaken during the Route Corridor appraisal stage (Stage 4).

R9.1.5 This approach ensures all factors are considered, the highest areas of environmental value are avoided (or at the least addressed), and the routeing parameters advocated by the Holford Rules are applied.

## R9.2 CLARIFICATION OF BROAD STRATEGIC OPTION

R9.2.1 As discussed through the detailed analysis of the substation siting criteria, there is no scope to pursue a route that follows the Blackcraig and Margree line for its entire length from the A702, continuing across the Carse of Dundee, and continuing to follow the new L7 line to Brockloch. There are a variety of reasons for this, relating to both technical and environmental constraints. In summary these are as follows, and dictate the preference for routeing to the north of the Kendoon Loch:

- Due to technical reasons, the proposed OHL would require to be located on the eastern side of the L7 OHL, meaning the proximity of the road and other landscape features would present a constraint between Dalshangan and the A713 road bridge across the A713;
- Felling to areas of woodland (Cumnock Knowes, Lairds Hill), some of which contain private residences, would present a constraint in this area, as would further felling and ingress into the private woodland at Dalshangan Wood. The Blackcraig & Margree route avoided this section of woodland, although went as close to it as possible to avoid impacting upon the private residence at Dalshangan House;
- Further private residences at White Crook, Polmaddie, and Bardennoch would present a physical constraint to routeing;
- Being sited close to the L7 route would mean the connection would be in proximity to the Galloway Tourist Route and would result in the potential for a wirescape to be formed as well as multiple road crossings and general visual effects upon road users. In addition, the section is within the Regional Scenic Area; and
- There is a potentially material technical constraint in achieving an OHL route from Loch Urr to this part of the L7 OHL. The area around the existing Kendoon substation (including the Carse of Dundee) is constrained to such a high degree both technically and environmentally (and more so in the light of the proposed B&M connection) that accessing the southerly section of the L7 route may in itself be unachievable. In addition, whilst potential exists to cross Kendoon Loch in proximity to the existing road bridge (assuming a northerly route past the Carse of Dundee for the OHL) the span lengths of the type of infrastructure proposed ensure that a crossing at this location would not be possible, even if analysis of all other constraints identified this as a potential route option.

R9.2.2 The subsequent stage of the routeing process therefore looks to identify a route corridor which avoids the area to the south of the Carse of Dundee, and instead follows a route to the north of Kendoon Loch.

## R9.3 STAGE 3: HIGH LEVEL STRATEGIC OPTIONS AND ROUTE CORRIDORS

### INITIAL ROUTE CORRIDOR RESPONSE TO ENVIRONMENTAL BASELINE

R9.3.1 Based upon the constraints mapped on **Figure 11** and the distribution of landscape and other features, the broad routeing area can be subdivided into two broad sections; the 'eastern sub-section' between the wind farm and the Bridge of Ken and the 'western sub-section' between the Bridge of Ken and the collector substation. This approach has been adopted on the basis of the greater number of route options available over the eastern portion and the need to take a pragmatic approach to routeing.

R9.3.2 Across the eastern sub-section there are six route corridor options, which are illustrated on **Figure 13**. These corridors are distributed across the study area and pass through a variety of different land uses including wind farm, moorland and commercial forestry. This part of the study

area is extensively rural and contains little in the way of built development, save for isolated farmsteads and other dwellings. The number of routes is limited by the extensive areas above 300m aOD and the extent of slopes greater than 15 degrees.

- R9.3.3 The route corridor options generally fall into two categories; those that route to the north of the B&M wood pole route and those that route to the south of it.

## **Eastern Sub-section**

### **Route Corridors 1 and 2**

- R9.3.4 Route 1 routes south from the Loch Urr substation, and passes to the south and east of the Blackcraig wind farm. It then crosses the southern flank of Blackcraig Hill, before passing to the south of Troquhain Hill where it diverts to run in a northerly direction. The corridor passes to the north of Barscobe Loch before crossing the A702 near to Milnmark. After crossing the A702, the route travels north to Corseglass Hill and Lochinvar, before diverting westwards towards, and passing to the south of, Mackilston Hill. Upon meeting the proposed wood pole section of the B&M route, which the route would need to cross near to Glenhoul, the route continues northwards, following the route of the B7000, to Bridge of Ken where it transfers to the western sub-section.
- R9.3.5 Route Corridor 2 follows the same route as Corridor 1 until the A702, where it heads in a more south and westerly direction across Bogue Moor, before routeing northwards, passing to the east of Ardoch Hill and Barlaes Hill, and meeting again with Route Corridor 1 at Mackilston. From Mackilston the same route as Corridor 1 would be followed.

### **Route Corridors 3 and 4**

- R9.3.6 Route Corridor 3 routes from the Loch Urr substation, westwards towards the A702. The corridor then follows the A702 south-westerly towards the crossing point of the B&M connection between the Blackcraig and Margree wind farms. The corridor then follows the B&M route for approximately 3km before heading northwards and passing between Kilnair Hill and Greentop of Margree. The corridor then runs north-west across Clachandow Rig, before passing across the saddle between Bennan and Culmark Hill, and culminating at Bridge of Ken.
- R9.3.7 Route Corridor 4 follows the route of Route Corridor 3 until a point to the south-east of Hog Hill, where the route continues to follow the route of the B&M OHL. It follows this until a point near Butterhole Bridge, where the route runs north along the western flank of Culmark Hill to Bridge of Ken.

### **Route Corridors 5 and 6**

- R9.3.8 Route Corridor 5 is the most northerly of the route options; the landscape to the north of this being at too great an elevation, over a large area, to utilise the infrastructure proposed. From the substation, the route runs northwards towards the A702, crossing the road near to Castlefairn. From here the route continues to run north-westwards, broadly following the line of the Minnygryle Burn and the forest track to the north of this. On passing Minnygryle, the route continues north-westwards, passing to the north of Bennan. The topography and elevation in this area is such that only a narrow gap exists, between two areas of steeply sloping ground, where the route could potentially run. From here the route runs westwards towards Troston, to the south of Lochlee Hill and then onwards to Clachandow Rig. From here the route corridor follows the same alignment as Route Corridor 3, passing across the saddle between Bennan and Culmark Hill, and culminating at Bridge of Ken.
- R9.3.9 Route Corridor 6 is only a minor deviation on Route Corridor 5, with this at the beginning of the corridor. The corridor follows a more northerly alignment, with the aim of avoiding the



conglomeration of heritage assets around Castlefairn. In doing so, the route then travels up, and then traverses across, the southern flank of Glencrosh Hill.

## **Western Sub-section**

### **Route Corridor 1**

R9.3.10 This corridor starts at the Bridge of Ken, from where it crosses the Water of Ken, before routeing through the woodland on the southern flank of Marscalloch Hill and following the broad alignment of the B729 towards Knockgray Park. Upon reaching North Liggat, the corridor follows the line of the B&M L7 tower route until it reaches the proposed substation location at Brockloch. In doing so it passes along the western flank of the Craig of Knockgray, passes through the Green Well of Scotland and along the lower slopes of Holm Hill.

### **Route Corridors 2 and 3**

R9.3.11 After leaving High Bridge of Ken, the route passes across the flank of Craig of Knockgray, towards 'Furmiston' and Marbrack. At Marbrack, the corridor continues north-west until it reaches the Benloch Burn, which it broadly follows before heading more westwards towards, and to the north of, the Green Well of Scotland. The corridor then passes around the southern flank of Holm Hill before re-joining the route of the B&M L7 route and culminating at Brockloch.

R9.3.12 Route Corridor 3 follows the same route as Route Corridor 2, but instead of passing to the south of Holm Hill, at the junction of the Polsue Burn and the Benloch Burn, the route heads northwards and around the north of Holm Hill. It then follows the eastern edge of the commercial woodland at Brockloch before re-joining the line of the B&M L7 route.

## **R9.4 STAGE 4: APPRAISAL OF ROUTE CORRIDORS**

R9.4.1 Having defined the range of route corridors within which the connection could be located, it is necessary to appraise these corridors against the environmental and technical constraints identified. Whilst the route corridors have endeavoured to avoid the mapped strategic constraints, there will inevitably be some conflict with these, and it is part of this stage to identify to what extent this is the case, and to identify on this basis the relative 'best fit' route. As described above, a key component of routeing an OHL, both with reference to the Holford Rules and in terms of general acceptability in planning terms, pertains to landscape and visual issues, including those of residential amenity.

R9.4.2 The appraisal stage therefore focusses on these issues, but also considers the potential conflicts with other mapped constraints (heritage and ecology for example) and takes account of overall route length as one of the defining criteria. In addition, and in the light of the proximity to the proposed Blackcraig and Margree connection, a review will be undertaken against the detailed survey information available from this project.

R9.4.3 To understand the landscape and visual constraints that exist across the potential corridors, a review of the routeing corridors has been undertaken that looks at the key landscape and visual issues as defined within the current guidance on this topic and recognised landscape character and visual amenity assessment processes. A broad scale landscape analysis has also been undertaken, and this is presented on **Figure 12**.

R9.4.4 The different appraisal principles to be adopted for the route corridor appraisal can therefore be classified as follows:


- Landscape quality;

- Visual amenity;
- Residential amenity;
- Potential route length;
- Environmental designations; and
- Land use and forestry.

R9.4.5 Throughout the appraisal process those parts of the Holford Rules which are applicable to the different appraisal principles are encompassed within the general review.

## Landscape Quality

R9.4.6 This principle draws on information contained within documented landscape character assessments and landscape designations (at all levels) with this supplemented by site work focussed on the individual route corridors. The review will include reference to traditional landscape character assessment processes and will refer to the sensitivity gradient proposed to be used within the LVIA for the proposal, which are tabulated as follows:

Category	Landscape Receptor Sensitivity Criteria
<b>Very High</b>  <b>Very Low</b>	<ul style="list-style-type: none"> <li>• Nationally designated/valued countryside and landscape features or areas.</li> <li>• An absence of landscape detractors whereby there exists a largely undeveloped landscape; particularly relevant where no existing overhead lines are present.</li> <li>• Areas where landform is such that overhead lines would be visible or prominent in the landscape or would dominate skylines i.e. exposed areas with wide intervisibility.</li> <li>• Smaller, more intimate scale landscapes where change would be more evident and landscape features are found in greater number and/or are of greater quality.</li> <li>• A wide distribution of characteristic landscape features which are sensitive to loss individually or collectively.</li> </ul>
	<ul style="list-style-type: none"> <li>• Undesignated countryside and landscape features or areas</li> <li>• Presence of many landscape detractors that already rode the landscape character; particularly relevant where existing overhead lines are present, but where there is no risk of the creation of a wirescape.</li> <li>• Areas where landform is such that overhead lines would have limited intervisibility and would be able to be assimilated into the landscape context without forming prominent or dominant elements i.e. valley landscapes.</li> <li>• Larger scale landscapes where change would be less evident and where structures of large linear scale would be more acceptable.</li> <li>• Landscapes where features are found in lesser number and/or are of lesser quality.</li> <li>• A limited distribution of characteristic landscape features which are less sensitive to loss individually or collectively.</li> </ul>

R9.4.7 Whilst the level of designation and documented protection form a key component of the definition of sensitivity, it is also relevant to consider the particular attributes of OHLs to which a landscape may or may not be sensitive. This includes their linear nature, and ability to affect a potentially wider area; their visual prominence resulting from their height relative to other landscape or built features; or the fact they are manmade structures within what might be a largely exposed or undeveloped landscape situation. This approach not only reflects the Holford Rules but also the new Landscape Institute guidance that advocates the adoption of sensitivity criteria based upon both inherent landscape value and also the susceptibility of a receptor to the type of change (development) proposed.

R9.4.8 In utilising a comparative sensitivity for the landscapes subject to routeing as defined above, the review will address the hierarchical approach proposed by the Holford Rules 1 and 2, whereby areas

of highest amenity value should be avoided. It further reflects Rules 4 and 5, which discuss the routeing of OHLs relative to ridges, skylines and general topography.

## Visual Amenity

- R9.4.9 This principle looks at the potential visibility of the OHL from rights of way, highways, local areas of tourist activity or areas of settlement, and considers the change in view that might result from the proposed OHL and how this could affect the general amenity within the study area. This review accords with the 'Further Notes' to the Holford Rules, which states that routes should '*Minimise the visual effect perceived by users of roads and public rights of way, paying particular attention to the effects of recreational, tourist and other well-used routes.*'
- R9.4.10 When considering potential changes to views, 'perceptibility studies' undertaken as part of the Blackcraig and Margree grid connection (by the author of this Routeing Consultation Document) established that the nature of views, i.e. whether the elements were 'backclothed' or 'skylined', has a considerable impact on the extent of change experienced, and at what distance. The conclusions drawn for a similar type of infrastructure (single-circuit flat formation wood pole line) were as follows:
- 1.5km is the outer limit of 'normal' perceptibility (the distance beyond which the casual observer is likely to be unaware of the presence of an OHL of this type) when the OHL and support structures are fully backclothed (this is the perceptibility distance represented within the visibility mapping);
  - 2.5km is the absolute limit of perceptibility when the OHL and support structures are fully backclothed; and
  - 6km is the outer limit of visibility when the OHL and support structures are seen fully skylined.
- R9.4.11 These distances provide a basis to understand the likely 'perceptibility' of the route. In many cases, although the OHL and support structures are theoretically visible (on the basis of the bareground digital terrain), the perceptibility of these will be appreciably diminished. The visual review undertaken subsequently has been carried out on the basis of assumed visibility; the moderating effects of 'perceptibility' will also be considered. These, in addition to the screening provided by the extensive areas of commercial forest and other woodland, will often serve to appreciably mitigate the presence of an OHL of the size proposed within the landscape.
- R9.4.12 As with any material subjected to the elements on a consistent basis, wood pole structures suffer weathering and subsequent colour variations over time. The colour of the poles at the point of construction is a dark brown colour, which fades over time to a more silver-grey, and appreciably lighter, colour. The rate of change of colour will depend heavily on the prevailing weather conditions and to some degree on the type of timber and timber treatment that is used. The perceptibility distances outlined above are considered representative at the point of construction when the poles retain the darker brown colouration. Over time, as the poles age and fade in colour, the effectiveness of backclothing is likely to reduce (depending upon the colour of the prevailing backclothing landscape or landscape feature). This is to some measure compensated by a reduction in visibility of skylining when the poles have acquired a paler colour. On balance it is considered that the wood pole component of the OHL will gradually become more perceptible over the life of the line, although this change in perceptibility is difficult to predict and is subject to variation depending on lighting, backclothing/skylining and many other factors.

## Residential Amenity

- R9.4.13 SPEN take a precautionary approach to the potential effects upon private residences and in line with the Holford Rules adopt an offset to these which avoids "*routeing close to residential areas as*

*far as possible on grounds of general amenity*”, and that in rural areas they “*avoid as far as possible dominating isolated houses, farms or other small-scale settlements*”. SPEN adopt a standard 100m radius minimum offset to all private residences, and where possible route a greater distance than this from individual or groups of properties. These offsets are shown on **Figure 12**.

R9.4.14 The comparative exercise will look at the total number of private residences within the route corridor being appraised. Those corridors with fewer properties will score higher.

### **Potential Route Corridor Length**

R9.4.15 Within the context of the distribution of environmental and technical constraints, it is desirable to keep the length of the OHL as short as practicable. This concurs with Holford Rule 3, which states that ‘*Other things being equal, choose the most direct line, with no sharp changes of direction and thus with few angle towers.*’ A shorter route corridor will therefore score better than a longer route when being appraised as part of a comparative exercise.

### **Other Environmental Designations**

R9.4.16 The range of other key environmental designations will be reviewed for each corridor in terms of the level of conflict with them. Whilst every effort has been made to avoid these key constraints in the selection of route corridors, it is inevitable that on occasion there will be some conflict. The level of conflict, and the level of designation, will form the basis of the appraisal carried out and will determine the acceptability of such conflict.

### **Land Use and Forestry**

R9.4.17 The Holford Rules are specific in stating that OHLs should route alongside areas of woodland/forestry, and that ‘*Where possible [routes should] follow open space and run alongside, not through woodland or commercial forestry, and consider opportunities for skirting edges of copses and woods*’. The Forestry Commission guidelines on routeing through woodlands provides the following guidance where such a route is unavoidable:

- Avoid areas of landscape sensitivity;
- Avoid the line of sight of important views;
- Be kept in valleys and depressions;
- Not divide a hill into two similar parts where it crosses over a summit;
- Cross skyline or ridges where they drop to a low point;
- Follow alignment diagonal to the contour as far as possible; and
- Be inflected upwards in hollows and downwards on ridges.

### **Technical Considerations and Buildability**

R9.4.18 The route corridors will be appraised against the technical constraints for the Trident Line design, which includes the following aspects:

- Extent of route corridor above 300m aOD;
- Extent of route corridor with slopes equal to, or greater than, 15 degrees;
- Number of road and watercourse crossings; and
- Proximity and integration with existing and proposed infrastructure.

## ROUTE CORRIDOR APPRAISAL

R9.4.19 With reference to the route corridors illustrated on **Figure 13**, the table below provides an appraisal of the corridors against the appraisal principles defined above. For each corridor a discussion is provided for each of the principles, and following this broad appraisal, a preferred corridor will be identified.

**Table R9.1: Route Corridor Appraisal**

Landscape Quality	Visual Amenity and Residential Amenity	Ecology, Archaeology, Land Use and Forestry	Technical
<b>Eastern Sub-section</b>			
<b>ROUTE CORRIDOR 1 (circa 21km in length)</b>			
<p>The route passes mainly through the Foothills with Forest LCA, which is considered (in this area) to have a moderate sensitivity to OHL development due to the existing presence of manmade detractors.</p> <p>The western end of the corridor does, however, pass through a more sensitive landscape where a lack of manmade features presents a higher quality and more diverse landscape.</p> <p>The corridor does not pass through any designated landscape areas.</p>	<p>The corridor does not pass close to any recreational receptors or areas where a heightened sensitivity to such structures in a general sense exists.</p> <p>The corridor does cross the A702 and would be a visible feature when crossing the road. It also passes near a number of minor rural roads.</p> <p>The corridor crosses the Southern Upland Way (SUW) near to Mackilston Hill, and goes on to follow the minor road between Kendoon and Bridge of Ken.</p> <p>The corridor is only moderately sensitive in terms of effects upon visual amenity, although does pass through the area with the greatest extent of minor roads and footpaths.</p> <p>The corridor passes in close proximity to a small number of residential dwellings, most notably at Lochinvar Lodge, Milnmark, Mackilston and Kendoon. Detailed routeing could provide the necessary offsets to these.</p>	<p>The corridor does not pass through any areas of statutory ecological designation. However, there is evidence of wide use of Lochinvar by waterbirds, which are likely to use this waterbody in association with the River Dee valley to the west.</p> <p>It would be visible from a number of heritage assets, but not at close proximity. The corridor includes the Corseglass School ruin.</p> <p>To cross the River Ken at Bridge of Ken, any route would need to pass through an area of ASNW.</p> <p>The route corridor does contain a number of areas of commercial forestry, notably at Drummanister (FC owned) and Corseglass Hill (private forestry area). Generally the corridor passes through a landscape characterised by open moorland which is variously grazed by livestock or left fallow.</p>	<p>The corridor passes in part through areas over 300m and contains areas with slopes over 15 degrees. Detailed routeing could avoid these areas.</p> <p>The route requires to cross the proposed B&amp;M route near to Mackilston Hill, which is a serious technical challenge to routeing.</p>
<b>ROUTE CORRIDOR 2 (circa 21km in length)</b>			
<p>The route passes mainly through the Foothills with Forest LCA, which is considered (in this area) to have a moderate sensitivity to OHL development due to the existing presence of manmade detractors.</p> <p>The western end of the corridor does, however, pass through a more sensitive landscape where a lack of manmade features, and a number of locally prominent high points, presents a higher quality and more diverse landscape.</p> <p>The corridor does not pass through any designated landscape areas.</p>	<p>The corridor does not pass close to any recreational receptors or areas where a heightened sensitivity to such structures in a general sense exists.</p> <p>The corridor does cross the A702 and would be a visible feature when crossing the road. It also passes near a number of minor rural roads.</p> <p>The corridor crosses the SUW near to Ardoch Hill, and goes on to follow the minor road between Kendoon and Bridge of Ken.</p> <p>The corridor is only moderately sensitive in terms of effects upon visual amenity, although does pass through the area with the greatest extent of minor roads and footpaths.</p> <p>The corridor passes in close proximity to a small number of residential dwellings, most notably at Milnmark, Barlaes, Mackilston and Kendoon. Detailed routeing could provide the necessary offsets to these if a more suitable route cannot be identified.</p>	<p>The corridor does not pass through any areas of statutory ecological designation. However, there is evidence of wide use of Lochinvar by waterbirds, which are likely to use this waterbody in association with the River Dee valley to the west, and therefore cross the route corridor.</p> <p>It would be visible from a number of heritage assets, but not at close proximity.</p> <p>To cross the River Ken at Bridge of Ken, any route would need to pass through an area of ASNW.</p> <p>The route corridor does contain a number of areas of commercial forestry, notably at Drummanister (FC owned). Generally the corridor passes through a landscape characterised by open moorland which is variously grazed by livestock or left fallow.</p>	<p>The corridor passes in part through areas over 300m and contains areas with slopes over 15 degrees. Detailed routeing could avoid these areas.</p> <p>The route requires to cross the proposed B&amp;M route near to Mackilston Hill, which is a serious technical challenge to routeing.</p>

Landscape Quality	Visual Amenity and Residential Amenity	Ecology, Archaeology, Land Use and Forestry	Technical
<b>ROUTE CORRIDOR 3 (circa 16km in length)</b>			
<p>The route passes mainly through the Foothills with Forest LCA, which is considered (in this area) to have a moderate sensitivity to OHL development due to the existing presence of manmade detractors.</p> <p>In this regard the corridor contains extensive tracts of commercial forestry, passes adjacent to the Blackcraig wind farm and follows in part the A702. It also lies in close proximity to the proposed Margree wind farm and the proposed B&amp;M grid connection.</p> <p>The western end of the corridor passes through a more sensitive open moorland landscape.</p>	<p>The corridor does not pass close to any recreational receptors or areas where a heightened sensitivity to such structures in a general sense exists.</p> <p>The corridor does follow and cross the A702 and any route would be a visible feature when crossing the road. Otherwise it passes far from most of the minor roads in the locale.</p> <p>The corridor crosses the SUW to the north of Culmark Hill, and then follows westwards to the Water of Ken.</p> <p>The corridor is only moderately sensitive in terms of effects upon visual amenity, and passes through extensive areas of woodland, which could screen the line from many views. However, cumulative effects of multiple lines passing through forestry would be a consideration.</p> <p>The corridor passes in close proximity to a small number of residential dwellings, most notably at Blackmark and Culmark. Detailed routeing could easily provide the necessary offsets to these.</p>	<p>The corridor does not pass through any areas of statutory ecological designation.</p> <p>It would be visible from a number of heritage assets, but not at close proximity.</p> <p>To cross the River Ken at Bridge of Ken, any route would not need to pass through an area of ASNW.</p> <p>Approximately two thirds of the corridor passes through commercial forestry, including the forest areas of Craighmuie Moor, Blackmark, Corriedoo, Margree and Stroan Hill, all of which are areas of private woodland. The B&amp;M route passes through this corridor and existing wayleaves and forest planning would require consideration in this regard.</p> <p>The western end of the route passes through open grazed moorland.</p>	<p>The corridor passes in small part through areas over 300m and contains areas with slopes over 15 degrees. Detailed routeing could avoid these areas.</p> <p>The corridor in part follows the route of the B&amp;M grid connection and will require to address this through detailed routeing studies.</p>
<b>ROUTE CORRIDOR 4 (circa 15km in length)</b>			
<p>The route passes mainly through the Foothills with Forest LCA, which is considered (in this area) to have a moderate sensitivity to OHL development due to the existing presence of manmade detractors.</p> <p>In this regard the corridor contains extensive tracts of commercial forestry, passes adjacent to the Blackcraig wind farm and follows in part the A702. It also lies in close proximity to the proposed Margree wind farm and the proposed B&amp;M grid connection.</p> <p>The western end of the corridor passes through a more sensitive open moorland landscape.</p>	<p>The corridor does not pass close to any recreational receptors or areas where a heightened sensitivity to such structures in a general sense exists.</p> <p>The corridor does follow and cross the A702 and any route would be a visible feature when crossing the road. Otherwise it passes far from most of the minor roads in the locale.</p> <p>The corridor crosses the SUW at Butterhole Bridge Hill, and then follows north-westwards to the Water of Ken.</p> <p>The corridor is only moderately sensitive in terms of effects upon visual amenity, and passes through extensive areas of woodland which could screen the line from many views. However, cumulative effects of multiple lines passing through forestry would be a consideration.</p> <p>The corridor passes in close proximity to a small number of residential dwellings, most notably at Blackmark, Marskaig and Bridgemark. Detailed routeing could provide the necessary offsets to these.</p>	<p>The corridor does not pass through any areas of statutory ecological designation.</p> <p>It would be visible from a number of heritage assets, but not at close proximity.</p> <p>To cross the River Ken at Bridge of Ken, any route would need to pass through an area of ASNW.</p> <p>Approximately two thirds of the corridor passes through commercial forestry, including the forest areas of Craighmuie Moor, Blackmark, Corriedoo, Margree, Gleshimmeroch Hill and Stroan Hill, all of which are areas of private woodland. The B&amp;M route passes through this corridor and existing wayleaves and forest planning would require consideration in this regard.</p> <p>The western end of the route passes through open grazed moorland.</p>	<p>The corridor passes in small part through areas over 300m and contains areas with slopes over 15 degrees. Detailed routeing could avoid these areas or ensure only short lengths were utilised.</p> <p>The corridor in part follows the route of the B&amp;M grid connection and will require to address this through detailed routeing studies.</p>

Landscape Quality	Visual Amenity and Residential Amenity	Ecology, Archaeology, Land Use and Forestry	Technical
<b>ROUTE CORRIDOR 5 (circa 14km in length)</b>			
<p>The route passes mainly through the Foothills with Forest LCA, which is considered (in this area) to have a moderate sensitivity to OHL development due to the existing presence of manmade detractors.</p> <p>In this regard the corridor contains extensive tracts of commercial forestry, and is near to the A702. It also lies in close proximity to the proposed Margree wind farm and the proposed B&amp;M grid connection.</p> <p>The section of the corridor immediately to the north of the substation is a more settled and densely populated area, with a higher inherent landscape quality.</p>	<p>The corridor does not pass close to any recreational receptors or areas where a heightened sensitivity to such structures in a general sense exists.</p> <p>The corridor does cross the A702 near to Crooks Hill and any route would be a visible feature when crossing the road. Otherwise it passes far from most of the minor roads in the locale.</p> <p>The area where the corridor crosses the road is a particularly sensitive area, containing a notable number of residential dwellings, areas of protected woodland and heritage features.</p> <p>The corridor crosses the SUW north of Culmark Hill, and then follows westwards to the Water of Ken (following route corridor 3 and 4).</p> <p>The corridor has an elevated sensitivity in terms of effects upon visual amenity, particularly in the area immediately to the north of the substation. The sensitivity reduces to the west where the corridor passes through extensive areas of woodland which could screen the line from many views.</p> <p>The corridor passes in close proximity to a notable number of residential dwellings, including those on Beech Drive, Craigmuaie, Minnygryle, Troston and Culmark. Detailed routeing could provide the necessary offsets to the majority of these.</p>	<p>The corridor does not pass through any areas of statutory ecological designation.</p> <p>In terms of heritage assets, the area around Castlefairn contains a number of Scheduled Monuments and other heritage assets, all of which, owing to other constraints, may be in close proximity to an eventual route solution within this corridor.</p> <p>To cross the River Ken at Bridge of Ken, any route would not necessarily need to pass through an area of ASNW. There are further areas of ASNW at Castlefiarn, however detailed routeing could avoid these.</p> <p>The corridor passes through two principal areas of commercial forestry; those at Minnygryle and Lochlee Hill, both of which are private areas of forestry.</p> <p>The western end of the corridor passes through open grazed moorland.</p>	<p>The corridor passes in small part through areas over 300m and contains a number of areas with slopes over 15 degrees. These steep slopes are concentrated in the area to the north of the A702 at Castlefairn, and also along the Minnygryle Burn.</p> <p>Detailed routeing could avoid the majority of these areas; however this may be difficult in and around Castlefairn.</p> <p>Areas above 300m and slope constraints lead to a number of pinch points within the corridor.</p>
<b>ROUTE CORRIDOR 6 (circa 15km in length)</b>			
<p>The route passes mainly through the Foothills with Forest LCA, which is considered (in this area) to have a moderate sensitivity to OHL development due to the existing presence of manmade detractors.</p> <p>In this regard the corridor contains extensive tracts of commercial forestry, and is near to the A702. It also lies in close proximity to the proposed Margree wind farm and the proposed B&amp;M</p>	<p>The corridor does not pass close to any recreational receptors or areas where a heightened sensitivity to such structures in a general sense exists.</p> <p>The corridor does cross the A702 near to Castlefairn and any route would be a visible feature when crossing the road. Otherwise it passes far from most of the minor roads in the locale.</p> <p>The area where the corridor crosses the road is a particularly sensitive area, containing a notable number of residential dwellings, areas of protected woodland and heritage features.</p> <p>The corridor crosses the SUW north of Culmark Hill (as for corridors 3, 4 and 5), and then follows westwards to the</p>	<p>The corridor does not pass through any areas of statutory ecological designation.</p> <p>In terms of heritage assets, the area around Castlefairn contains a number of Scheduled Monuments and other heritage assets, all of which, owing to other constraints, may be in close proximity to an eventual route solution within this corridor.</p> <p>To cross the River Ken at Bridge of Ken, any route would not necessarily need to pass through an area of ASNW. There are further areas of ASNW at Castlefairn, however detailed routeing could avoid these.</p> <p>The corridor passes through two principal areas of commercial forestry; those at Minnygryle and Lochlee</p>	<p>The corridor passes in small part through areas over 300m and contains a number of areas with slopes over 15 degrees. In passing to the north of Castlefairn, the majority of the steeper slopes in the area are avoided.</p> <p>Detailed routeing could avoid the majority of these areas; however</p>



Landscape Quality	Visual Amenity and Residential Amenity	Ecology, Archaeology, Land Use and Forestry	Technical
<p>grid connection.</p> <p>The section of the corridor immediately to the north of the substation is a more settled and densely populated area, with a higher inherent landscape quality.</p>	<p>Water of Ken (following route corridor 3, 4 and 5).</p> <p>The corridor has an elevated sensitivity in terms of effects upon visual amenity, particularly in the area immediately to the north of the substation. The sensitivity reduces to the west where the corridor passes through extensive areas of woodland which could screen the line from many views. In and around Castlefairn, and primarily to avoid steep slopes, the corridor passes along the highly visible flank of Brown Hill.</p> <p>The corridor passes in close proximity to a notable number of residential dwellings, including those on Beech Drive, Craigmuaie, Minnygryle, Troston and Culmark. Detailed routeing could provide the necessary offsets to the majority of these.</p>	<p>Hill, both of which are private areas of forestry.</p> <p>The western end of the corridor passes through open grazed moorland.</p>	<p>this may be difficult in and around Castlefairn.</p> <p>Areas above 300m and slope constraints lead to a number of pinch points within the corridor.</p>
<b>Western Sub-section</b>			
<b>ROUTE CORRIDOR 1 (circa 9km in length)</b>			
<p>The route corridor passes through a number of different LCTs, including Narrow Wooded Valley, Southern Uplands, Southern Uplands with Forest and Upper Dale. These LCTs have a generally elevated sensitivity to the development of an OHL, due either to their upland character or intimate scale. The exception to this is the Upper Dale, which already contains the existing N-Route OHL and the proposed B&amp;M OHL.</p> <p>The landscape encompassing the corridor is generally more complex than that within the eastern sub-section, in that there is more diversity of topography, land use, settlement pattern and land cover.</p> <p>It is also a landscape which contains a number of existing detractors, such as small scale overhead lines, the road, solar</p>	<p>The corridor passes close to the village of Carsphairn, a local tourist centre, which also contains the Carsphairn Heritage Centre. In addition, the corridor is contiguous, in part, with the A713 Galloway Tourist Route.</p> <p>In crossing the Water of Ken near to High Bridge of Ken, it will be visible by people who stop at this popular location. The corridor also runs consistent with the B729, and any route would be visible from at least parts of this rural route.</p> <p>In terms of general and wider visibility, the valley in this area already contains the N-Route and the proposed B&amp;M route OHLs so is somewhat desensitised to further OHL development. This is however a popular tourist area and this is a consideration.</p> <p>The corridor has an elevated sensitivity in terms of effects upon visual amenity, particularly in the area around Carsphairn and Knockgray. The sensitivity reduces to the west where the corridor passes along the line of the A713 and consistent with the existing N-Route.</p> <p>The corridor passes in close proximity to a number of residential dwellings, including Muirdrochwood, Marscalloch, Burnfoot, those at North Liggat and Green Well of Scotland. Detailed routeing could provide the necessary offsets to the majority of these.</p>	<p>The corridor does not pass through any areas of statutory ecological designation. There is, however, evidence of ornithological interest within the Water of Deugh valley generally.</p> <p>In terms of heritage assets, the area around Carsphairn contains a number of heritage assets, including the Green Well of Scotland and a number of Scheduled Monuments. In addition, the corridor contains the NIDL at Knockgray which is a key consideration to the detailed routeing.</p> <p>To cross the Poklsue Burn at Green Well of Scotland, any route would need to pass through an area of ASNW.</p> <p>The corridor passes through a single area of commercial forestry; that at Glenshimmeroch Hill, which is an area of FC woodland.</p> <p>The majority of the rest of the corridor consists of open grazed moorland and is unremarkable within the locale.</p>	<p>There are few areas over 300m within this corridor and few areas where slopes exist at 15 degrees or above. There are technical constraints in terms of crossing watercourses (Water of Ken and Polsue Burn) and also crossing roads.</p>

Landscape Quality	Visual Amenity and Residential Amenity	Ecology, Archaeology, Land Use and Forestry	Technical
development and built development.			
<b>ROUTE CORRIDOR 2 (circa 9.1km in length)</b>			
<p>The route corridor passes through a number of different LCTs, including Narrow Wooded Valley, Southern Uplands, Southern Uplands with Forest and Upper Dale, although largely within the Southern Uplands.</p> <p>These LCTs have a generally elevated sensitivity to the development of an OHL, due either to their upland character or intimate scale. This is potentially to be eroded within the Southern Uplands LCT due to the nearby proposal for Quantans Hill wind farm.</p> <p>The landscape encompassing the corridor is generally more complex (especially the eastern part) than that within the eastern sub-section, in that there is more diversity of topography, land use, settlement pattern and land cover.</p>	<p>The corridor does not pass close to any formal recreational receptors or areas where a heightened sensitivity to such structures in a general sense exists. It is also separated visually from the A713 over the majority of its length.</p> <p>In crossing the Water of Ken near to High Bridge of Ken, it will be visible by people who stop at this popular location.</p> <p>In terms of general and wider visibility, in passing over higher ground at Marbrack, any route would be more visible than a route passing along the B729.</p> <p>The corridor has in part an elevated sensitivity in terms of effects upon visual amenity, particularly in the area around Marbrack. The sensitivity reduces to the west where the corridor passes along the line of the A713 and consistent with the existing N-Route.</p> <p>The corridor passes in close proximity to a number of residential dwellings, including Muirdrochwood, Marscalloch, Burnfoot, those at North Liggat and Green Well of Scotland. Detailed routeing could provide the necessary offsets to the majority of these.</p>	<p>The corridor does not pass through any areas of statutory ecological designation. There is, however, evidence of ornithological interest within the Water of Deugh valley generally.</p> <p>In terms of heritage assets, the corridor avoids the main heritage assets at Knockgray and Green Well of Scotland.</p> <p>The corridor passes through a single area of commercial forestry; that at Glenshimmeroch Hill, which is an area of FC woodland.</p> <p>The majority of the rest of the corridor consists of open grazed moorland and is unremarkable within the locale.</p>	<p>There are few areas over 300m within this corridor and few areas where slopes exist at 15 degrees or above, particularly at the western end around the Benloch and Polsue Burns.</p> <p>There are technical constraints in terms of crossing watercourses (Water of Ken and Polsue Burn) but not in crossing roads.</p>
<b>ROUTE CORRIDOR 3 (circa 9.3km in length)</b>			
<p>The route corridor passes through a number of different LCTs, including Narrow Wooded Valley, Southern Uplands, Southern Uplands with Forest and Upper Dale, although largely within the Southern Uplands.</p> <p>These LCTs have a generally elevated sensitivity to the development of an OHL, due either to their upland character or intimate scale. This is potentially</p>	<p>The corridor does not pass close to any formal recreational receptors or areas where a heightened sensitivity to such structures in a general sense exists. It is also separated visually from the A713 over the majority of its length.</p> <p>In crossing the Water of Ken near to High Bridge of Ken, it will be visible by people who stop at this popular location.</p> <p>In terms of general and wider visibility, in passing over higher ground at Marbrack any route would be more visible than a route passing along the B729.</p> <p>The corridor has in part an elevated sensitivity in terms of effects upon visual amenity, particularly in the area around Marbrack. The sensitivity reduces to the west where the</p>	<p>The corridor does not pass through any areas of statutory ecological designation. There is, however, evidence of ornithological interest within the Water of Deugh valley generally.</p> <p>In terms of heritage assets, the corridor avoids the main heritage assets at Knockgray and Green Well of Scotland.</p> <p>The corridor passes through a single area of commercial forestry; that at Glenshimmeroch Hill, which is an area of FC woodland.</p> <p>The majority of the rest of the corridor consists of open</p>	<p>There are few areas over 300m within this corridor and few areas where slopes exist at 15 degrees or above, particularly at the western end around the Benloch and Polsue Burns.</p> <p>There are technical constraints in terms of crossing watercourses</p>

Landscape Quality	Visual Amenity and Residential Amenity	Ecology, Archaeology, Land Use and Forestry	Technical
<p>to be eroded within the Southern Uplands LCT due to the nearby proposal for Quantans Hill wind farm.</p> <p>The landscape encompassing the corridor is generally more complex (especially the eastern part) than that within the eastern sub-section, in that there is more diversity of topography, land use, settlement pattern and land cover.</p>	<p>corridor passes along the line of the A713 and consistent with the existing N-Route.</p> <p>The corridor passes in close proximity to a number of residential dwellings, including Muirdrochwood, Marscalloch, Burnfoot, those at North Liggat and Green Well of Scotland. Detailed routeing could provide the necessary offsets to the majority of these.</p>	<p>grazed moorland and is unremarkable within the locale.</p>	<p>(Water of Ken and Polsue Burn) but not in crossing roads.</p>

## Summary of Route Corridor Appraisal

R9.4.20 The above review of route corridors sets out the detail of each route corridor with reference to the range of principles against which the acceptability of a route corridor is judged. It is clear from this review that whilst many of the corridors can be rated similarly against one or more of the principles, there are some corridors that 'score' better against either one or more areas. It is therefore necessary to look at a comparison between them to ascertain which corridor has the greatest potential in identifying a route. The table below 'ranks' the corridors (1-6) against each of the principles investigated, with a lowest combined rank score being the best..

**Table R9.2: Comparative Route Corridor Appraisal: Eastern Sub-section**

Routeing Principle	Corridor 1	Corridor 2	Corridor 3	Corridor 4	Corridor 5	Corridor 6
Landscape	5=	5=	1=	1=	3=	3=
Visual	6	5	2	1	4=	4=
Residential	4	3	1=	1=	5=	5=
Ecology/Archaeology	4	3	1=	1=	5	6
Land use & Forestry	2	1	6	5	3=	3=
Technical Issues	4	3	1	2	6	5
Corridor Length	5=	5=	3	4	1	2
<b>Total Score</b>	<b>30</b>	<b>30</b>	<b>15</b>	<b>15</b>	<b>27</b>	<b>28</b>

R9.4.21 For the eastern sub-section – that is the section east of the Water of Ken – there are two clear favourites in terms of compliance with the potential constraints, these being Route Corridors 3 and 4, which have the same score. There is then a distinct separation in terms of preference to Corridors 1, 2, 5 and 6, all of which score considerably less well. The main reasons for Corridors 3 and 4 being preferred at this stage are as follows:

- The corridor contains limited areas above 300m, and limited areas of slope constraint;
- Impact upon settlements and private residences would be limited, with only a few isolated properties within the corridor;
- Whilst the corridor contains areas of forestry, there is the potential to take advantage of the forestry wayleave corridor proposed for the B&M route. Additionally, carefully planned forestry management could see large parts of the line screened from local areas;
- The corridor contains a landscape of a generally limited quality in terms of designation. There are no Inventory or Non-inventory sites within it, and no other protected landscape areas; and
- The corridor does not pass through any ASAs, nor does it contain extensive areas of cultural heritage importance.

**Table R9.3: Comparative Route Corridor Appraisal: Western Sub-section**

Routeing Principle	Corridor 1	Corridor 2	Corridor 3
Landscape	1	2	2
Visual	1	2	2
Residential	3	2	1
Ecology/Archaeology	2	2	2
Land Use and Forestry	3	1	1
Technical Issues	1	2	2
Corridor Length	1	2	3

Routeing Principle	Corridor 1	Corridor 2	Corridor 3
Total Score	12	13	13

R9.4.22 Turning to the western sub-section, there is much less distinction between the route corridors, and whilst Corridor 1 scores the best, Corridors 2 and 3 would represent suitable alternatives. The main reasons for Corridor 1 being preferred are as follows:

- In passing to the south of the Craig of Knockgray, and within what is already a modified landscape, the corridor is located away from the area to the north of this high ground that is largely unspoilt;
- In remaining within the lower level landscape, the route will be less visible than a route that passes across the open moorland around Marbrack;
- The corridor contains no areas above 300m, and limited areas of slope constraint; and
- The route corridor is a direct route, and the shortest of the options, and a corridor that utilises the existing corridor of the B&M connection.

## R9.5 STAGE 5: CONSIDERATION AND APPRAISAL OF DETAILED ROUTEING OPTIONS

R9.5.1 Following the identification of the Preferred Route Corridor (for both the eastern and western sub-sections), the next stage is to identify how within these corridors the Preferred Route itself would be aligned. This does not necessarily require the identification of a single route linking the Loch Urr substation to the proposed Kendoon North substation, rather it identifies a range of options (such as these exist) that will be appraised for their suitability based upon more detailed constraints as were considered during the identification of the preferred corridor.

R9.5.2 The routeing has followed the sequential process outlined in the Holford Rules and supplementary guidance (included at **Appendix 1**). It is not possible to avoid every individual constraint within the search area, even during the detailed routeing stage, but with careful consideration as to the location and level of the constraint, a Preferred Route through the landscape can be identified. This approach has been the driver in seeking to find the appropriate balance between the technical requirements and potential environmental effects of the route.

R9.5.3 The identification of a number of route options for each sub-section has enabled a balanced view to be taken of which route should be preferred on the basis of the known environmental constraints and the requirements of the Holford Rules and other guidance.

R9.5.4 The combination of the alignment identified, the technical approach adopted and the physical form of the OHLs are considered to offer the best opportunity for SPT to comply with its obligations as the Transmission Licence holder in meeting its Schedule 9 commitments whilst providing the required connections for the proposed wind farms.

R9.5.5 The Holford Rules provide the overarching guidance on routeing OHLs, with perhaps the most pertinent rule being that the OHL should, where possible, follow the most direct line. In terms of further guiding the detailed routeing of the OHL, the following more detailed issues require consideration:

- Ensure a general fit with, and use of, localised topography where possible;
- Consider at all times the visibility of the route and avoid local high points;
- Ensure the route considers offsets and views from residential properties;
- Ensure route crosses roads and watercourses perpendicular to these features;

- Ensure a minimum offset to proposed and existing turbines of 121m (Blackcraig) and 137.5m (Margree);
- Ensure offsets to existing and proposed electrical infrastructure of 40m;
- Minimum offsets to watercourses; and
- Avoidance as far as is practicable other identified environmental constraint.

R9.5.6 The consideration of the route options has been informed by the data available from desk study, site survey and professional judgement and through early consultation with a number of key stakeholders. Parts of the study area have relatively detailed information available from recent EIA studies completed by the individual developers of the proposed wind farms and OHLs, and this information has been obtained and referred to as part of this routeing exercise.

R9.5.7 The routeing options identified within the eastern and western sub-sections are illustrated on **Figure 14** and described in detail below.

## DETAILED ROUTEING OPTIONS

### Eastern Sub-Section

R9.5.8 The eastern sub-section runs from the Loch Urr wind farm to High Bridge of Ken. The sub-section is in the region of 15.3km in length, and passes through a variety of landscapes including open moorland, commercial forestry and recently felled forestry. The route remains distant from any areas of settlement, and is largely limited to upland or semi-upland areas. The route follows one broad alignment, although a number of alternative routeing options were considered at **Blackmark**, **Corriedoo** and **Bridgemark**. These options are described subsequently as part of the description of the Preferred Route.

R9.5.9 From its start point at the Loch Urr substation the route runs northwards for approximately 1km, passing to the west plantation woodland at Craigmue Moor, before passing westwards around the northern flank of Fell Hill at circa 250m aOD. In passing through the open areas to the west of the woodland, the route passes across the steep slopes in this area, whilst benefitting from the screening that retained areas of forestry would provide. Having turned westwards, the route continues through areas of plantation woodland, which are heavily fragmented by numerous minor watercourses, before routeing towards the communication mast to the south of Blackmark. From this point the route heads further westwards, following the line of a drystone wall (the route running to the south of this), into the lower lying valley containing the Blackmark Burn. By this stage the route has run for circa 2.7km.

R9.5.10 An alternative option, the **Blackmark Option**, was considered whereby the route, instead of routeing towards the communication mast to the south of Blackmark, heads in a more northerly direction towards the farmstead at Blackmark, passing circa 100m to the south of this property. Again the route would pass through fragmented plantation forestry, but would sit at a lower elevation than the Preferred Route alignment described above, and would reach the valley further to the north than the option described above.

R9.5.11 On balance it was considered the more southerly option represented the better option in terms of the routeing criteria, in particular due to potential issues of residential visual amenity (the proximity to Blackmark) and general visual issues, with the route passing alongside the A702 for a greater distance.

R9.5.12 Upon reaching the river valley, the route enters a landscape characterised by the watercourse, and its associated riparian vegetation and marsh areas, and rough grazing land that contrasts distinctly with the dark bands of commercial woodland beyond, on the north-western flank of Fell Hill and

- Benneeve. The route alignment, from where it enters the river valley at approximately 270731, 585411, follows the line of a drystone wall that runs to the east of the Blackmark Burn, in a south-western alignment. This wall is readily identifiable upon OS mapping and on the ground, and forms a natural line upon which to base the route. The wall also ensures a natural delineation between the river corridor and the areas of forestry. At approximately 270088, 584925, the forestry extends to the wall and the route would pass through this to retain sufficient distance from the watercourse. Some forestry felling would be required, although it appears that this woodland contains mature stock which is approaching felling age.
- R9.5.13 From this section of woodland, the route continues to follow the alignment of the drystone wall, at all times running to the east of the Blackmark Burn. The forestry in this area has recently been felled, and the line would therefore route through an open landscape, although one in which it would be backclothed by the rising ground beyond. The drystone wall terminates at approximately 269268, 584177, at Marion's Knowe, where it meets an area of existing plantation woodland and the A702. The section within the valley is circa 1.9km, and the total route length to this point 4.8km.
- R9.5.14 Upon reaching this area of woodland, the route would remain to the south of the A702, and would require the felling of the block of woodland immediately adjacent to road's southern boundary. After continuing for a further c.325m, the route once again emerges into an open area, opposite the entrance to the forestry at Whitecairn Hill, which also serves as the proposed entrance to the Margree wind farm. The route then crosses the access track into Loch Howie, to the east of the road, before entering the Forestry Commission woodland at Corriedoo. At this point the route crosses the road, and heads in a westerly, and then northerly direction, towards the route of the Blackcraig and Margree grid connection.
- R9.5.15 An alternative option exists here, the **Corriedoo Option**, whereby instead of crossing the road as identified above, the route continues southwards through the Forestry Commission woodland, until it meets the crossing point of the Blackcraig and Margree route. The two routes would then run alongside each other (40m apart) until they diverge to the east of Butterhole Bridge. This option would ensure a single crossing point of the A702 (for the Blackcraig and Margree, and Loch Urr routes) thereby providing a potentially more rational solution to the routeing of both lines when considered together. It would also result in proportionately less forestry felling in the area to the west of the road. On balance the northerly route is considered preferable on account of the absence of a localised area of wirescape where the two lines would cross the road together.
- R9.5.16 From the point at which the route starts to run alongside the Blackcraig and Margree route, it heads in a north-westerly direction, crossing the Regland Burn, before following the valley of this around the northern flank of White Cairn Hill. In following this alignment it remains low in the landscape, thus reducing potential visibility. It crosses the south-western flank of Shield Willie Hill to the Margree substation at 268006, 584987. To the immediate south-east of the Margree substation, the route terminates (using terminal H poles), before running underground, under the access track for the substation, before re-emerging, again onto terminal H poles, immediately to the north-west of the substation. Whilst the use of heavier duty poles than normal would be required to facilitate this solution, in the context of the substation infrastructure and the existing Blackcraig and Margree route, this is not considered to prohibitive.
- R9.5.17 From the Margree substation, the route passes between Knochdolloch and Kirk Rig and traverses the southern flank of Hog Hill before exiting the forest south of Kilnair. The route then crosses the open ground on a minor spur on the Rigs of Glenshimmeroch, the route devised to avoid a minor watercourse and adjacent dyke, and the southerly extending forestry area at Kilnair Hill. The route then ascends into the forest, passing across a saddle between Craigencorr Hill and Glenshimmeroch Hill, and following a fold in the landscape towards Butterhole Bridge. At this location the route diverges from the Blackcraig and Margree route, and runs on a more northerly

- direction, crossing the minor road (and Southern Upland Way which at this point are one and the same) to the immediate north of Butterhole Bridge.
- R9.5.18 From Butterhole Bridge the route heads north-west, running through the open moorland landscape which typifies this area, to the north of the Black Water, and to the south of the farmstead and block of forestry at Marskaig. At this juncture the route runs in close proximity to the footpath linking the Southern Upland Way to the Youth Hostel at Blackwater Bridge, at its closest point being circa 30m distant. After passing to the south of Marskaig (the dwelling sitting circa 120m from the route) the route continues north-north-west, around the southern flank of Culmark Hill, broadly following the 220m contour. The route passes to the north of the shelterbelt woodland at Garryaird, and then passes through the subtle topographical fold between Bell's Craig and Shiel Hill.
- R9.5.19 From Bell's Craig, the route runs in a more westerly direction, to the west of a drystone field boundary, and across the more improved grassland to the west of the High Bridge of Ken. The route then descends onto the river plain, before crossing the river circa 50m north of the bridge. Crossing the Water of Ken in this area is a challenge to routeing on account of the band of Ancient Semi-Natural Woodland (ASNW) that borders the western side of the river and also the steep slopes which provide parts of the western flood bank. Both the steep slopes and the ASNW form only a narrow strip some 20m to 180m wide, but the ASNW (unlike the slopes) is continuous ensuring the route cannot take advantage of a natural break.
- R9.5.20 As a result, the route passes through one of the narrower areas of ASNW immediately north of the bridge. This area is consistent with an area where slopes are not above 15 degrees in gradient, and therefore whilst some loss of ASNW will arise, this is minimised alongside the technical constraints present. An alternative option, the **Bridgemark Option**, was considered, whereby the route followed a more northerly route from a point between Marskaig and the Garryaird shelterbelt, routeing northwards towards, and to the north of, the Bridgemark farmstead. The route would then pass around the farm, before descending to the river plain, and crossing through a narrow band of ASNW at point 262143, 590579. Whilst this option would result in a marginally reduced extent of ASNW loss, the increased length and potential effect upon Bridgemark farmstead, alongside the greater forestry loss to the west of the river, ensures the previously described option is preferred.

## Western Sub-Section

- R9.5.21 The western sub-section runs from High Bridge of Ken to the Kendoon North substation. The sub-section is in the region of 9.5km in length, and passes through a variety of landscapes including open commercial forestry, open moorland and riparian habitat. The route runs in relatively close proximity to the settlement of Carsphairn, and a number of other individual dwellings, and runs through what is an elevated upland, but broad, valley. The route follows one broad alignment, with no alternative options evident.
- R9.5.22 From the B729, the route passes to the north of the road through an area of Forestry Commission owned plantation woodland on the south-western flank of Marscalloch Hill. This woodland contains mature commercial spruce and larch species, and as such has an unusual appearance with areas of markedly different colouration. The route runs between the road and the forest track that runs on a similar alignment to the road, but some 130m upslope. In following an alignment that runs as close to the road as possible, forestry losses are minimised by limiting the sterilised areas between the OHL and the forestry track to the north. In other words, any forestry left between the road and the OHL would otherwise be sterilised as it would be inaccessible from the internal forestry track. When passing through this forestry the route runs within 130m of the dwelling at Marscalloch.
- R9.5.23 On exiting the forestry at Nether Loskie, the route continues to run parallel to the B729, avoiding Nether Loskie dwelling by 100m (based upon Royal Mail address data), and runs for circa 1.1km on this alignment. The route passes circa 150m from the dwelling at Kensglen, and in following this



- route passes through largely semi-improved grazing land, which remains unimproved in some areas. A new agricultural enterprise, which includes a ground-mounted solar panel and various sheds and buildings, located between Kensglen and Burniston, is avoided by the OHL route. At grid co-ordinate 259711, 592042, the route diverts south-westwards and crosses the Water of Deugh perpendicular to the course of the river, which at this point is approximately 30m wide. The length of available spans for this infrastructure type ensures the river can be crossed in a single span.
- R9.5.24 Once on the south bank of the river, the OHL would follow the course of the river, offset a minimum of 50m, north-westwards for circa 1.1km, before reaching the private woodland at Cumnock Knowes. The route then passes through the eastern extremity of the woodland block, requiring a wayleave of some 190m in length. The route then exits the forest and then crosses again the Water of Deugh perpendicular to the river's course. The OHL would cross to a point near to Andrew's Knowe, to the south of the B729. It is envisaged that a pole would be located atop an elevated drumlin feature in this area, which will allow the route to then pass across the bend of the river known as Dalbonniton Pool to another raised drumlin feature, circa 180m to the west. This routing may require the removal of the small block of woodland immediately south of the road.
- R9.5.25 In routeing in this way, the OHL will avoid a number of key constraints in the area, including the Knockgray Park NIDL, which lies to the north of the B729, and also the extensive area of open, unspoilt, moorland to the north of the Craig of Knockgray. In remaining within the more settled valley landscape, where overhead lines of all scales are present in some number, the areas where such infrastructure would be inconsistent with the defining character are avoided.
- R9.5.26 From the Water of Deugh, the route continues north-westwards, crossing again the B729, until it reaches the line of the proposed B&M L7 OHL some 500m to the north at North Liggat. From here the route follows the L7 route, at an offset of 40m, for circa 1.5km until it reaches the Green Well of Scotland. This part of the route passes across an area of open moorland, of uniform appearance and habitat, used only for animal grazing. It is well separated from both the settlement of Carsphairn and the A713 tourist route, and would, in any event, appear as a distinctly smaller structure than the proposed L7 OHL and the existing N-Route OHL.
- R9.5.27 On reaching the Green Well of Scotland, the L7 route uses a spur of elevated ground to cross the valley and requires to do so to achieve the necessary overfly of this feature. On-site investigation identified an area circa 120m to the north-east of the L7 OHL where there is a natural break in the ASNW on the eastern slopes of the valley. There is also a 'softening' of the gradient in this location, allowing a route to be identified for the wood poles which descends from the moorland area onto the river plain. From here, the route would cross the river perpendicular to its course, and follow a course to the north of the feature identified on 1:25,000 OS maps as 'Willie's Cave'.
- R9.5.28 After climbing the western side of the valley, the OHL would then continue to follow the line of the L7 OHL until it reaches the woodland at Brockloch some 1.75km to the north-west. As for the landscape between the Water of Deugh and the Green Well of Scotland, the character of the landscape here is dominated by a uniform moorland character of limited habitat diversity, used only for animal grazing. The substation location, at grid co-ordinate 254449, 596006, is set within the commercial woodland at Brockloch, and sits directly adjacent to the L7 OHL.

## **R9.6 STAGE 6: IDENTIFICATION AND APPRAISAL OF THE PREFERRED ROUTE**

- R9.6.1 The total length of the Preferred Route, taking account of the alternative options as described in the previous section, is 24.68km. This route is to be adopted as the Preferred Route for the purposes of consultation and until such time as this is revised to form the Proposed Route. The Preferred Route has been identified following a systematic process of addressing the range of technical, environmental and economic constraints within the study area and in line with the guidance

provided by the Holford Rules (and their appendices) and the routeing strategy identified for use on this project.

- R9.6.2 In passing through an environment that contains little in the way of urban settlement or population, and in this sense has a predominantly rural character, the Preferred Route, as per any new infrastructure development of nearly 25km in length, will result in a number of potential residual environmental effects. In following the systematic and hierarchical routeing process adopted, the extent of residual effects has been minimised as far as possible. The principal residual effects of the Preferred Route, as described above, and illustrated on **Figure 15**, are summarised below with reference to the area of the environment potentially affected.

### **Forestry and Woodland**

- R9.6.3 There will be forestry loss through the provision of a wayleave in a number of areas, including at Craigmuir Moor Blackmark, within the Blackmark Burn valley, at Corriedoo and alongside the A702. Given the extent of commercial forestry within the route corridor, some loss is unavoidable, and this has been minimised where possible. At Marscalloch Hill, the mixed larch/sitka spruce woodland on the southern flank of the hill will be affected by the route.
- R9.6.4 Further loss is required where the route runs alongside the Blackcraig and Margree OHL, although this is hugely limited in comparison to if the route were passing through areas of untouched forestry. In this regard, the OHL would pass through many areas identified within the B&M route as 'Windthrow Felling outwith the 80m wayleave'.
- R9.6.5 The route would require minimal loss of a narrow strip of ASNW at High Bridge of Ken, and also a small amount of ASNW at the Green Well of Scotland.

### **Residential Amenity**

- R9.6.6 The route would pass in close proximity to a number of residential properties, with the closest (running east to west) being those at Marskaig (150m), Knowehead (160m), Marscalloch (138m), Nether Loskie (100m), Kensglen (166m), Burniston (116m) and Cumnock Knowes (144m). Importantly, these are all outwith the minimum offset used by SPEN when routeing overhead lines (100m), and in the context of a route that is nearly 25km in length, this level of potential effect on residences is limited. Furthermore, proximity to dwellings is not the only factor to consider; even though these properties may be close to the OHL, there may be screening, topography or other factors which result in any effects experienced being of a limited magnitude.

### **Hydrological Issues**

- R9.6.7 The route identified will pass in close proximity to a number of named minor watercourses, including Blackmark Burn, Loch Skae Burn, Regland Burn, Margree Burn, Black Water and Furniston Lane. In addition, the route will need to cross a number of tributaries of these watercourses, and a larger number of unnamed watercourses and drains. It will also require to cross the Water of Ken (at High Bridge of Ken) and the Water of Deugh (at Green Well of Scotland and Cumnock Knowes), as well as running alongside the Water of Deugh for circa 2km. The EIA will undertake a detailed assessment of the potential effects upon these watercourses and will propose mitigation that will be designed to reduce the extent of any effects.

### **Ecology and Ornithology**

- R9.6.8 The Preferred Route avoids all known ecological and ornithological designations located within the study area, including the SSSIs at Cleugh and Loch Doon, and the SACs located to the west of, and just outside, the study area. The route does pass through an area defined as an Important Bird

Area, with this consistent with the Galloway Forest Park, although care has been taken to route the line through lower sensitivity habitat in this area.

- R9.6.9 In terms of woodland, the route avoids the majority of the Ancient Semi Natural Woodland within the study area, but will require a minor loss near to High Bridge of Ken. Given the extent of ASNW in and around this area, some loss is inevitable in securing a technically and more generally environmentally compliant route.
- R9.6.10 In terms of commercial woodland, the route passes through a number of these areas, including some that are defined as Red Squirrel Priority Woodland (RSPW) areas. This includes the woodland at Marscalloch Hill and Brockloch, where wayleave corridors through the woodland will result in some loss. In adopting suitable mitigation measures, however, this loss will not cause undue harm to squirrel populations. Furthermore, the extensive distribution of RSPW within the study area means that some impact upon these areas to some degree is highly likely.

## Landscape and Visual

- R9.6.11 The route design has been carried out with potential landscape and visual effects being an overriding consideration, both at the detailed routeing and broad corridor search stages. Such effects have been minimised for the route selected by routeing within forestry areas, where the route will remain screened from views in many areas, in particular where it descends from the Loch Urr wind farm substation to the Blackmark Burn. Furthermore, the route has avoided areas of large settlement or designation, avoided key tourist facilities and sought to take advantage of areas where there is already some degradation in landscape character. The following paragraphs identify areas along the route where landscape and/or visual effects are anticipated, or where key effects have been avoided.
- R9.6.12 Routeing the OHL within the valley of the Blackmark Burn will have the dual effect of ensuring that the route is not as widely visible as it would be if passing over elevated moorland, and it will also be a backclothed feature for those most likely to view it i.e. users of the A702. The scale of the landscape in this location is such that the small scale of the proposal would not dominate the defining character evident.
- R9.6.13 Moving further west, the route follows the Blackcraig and Margree route, thereby ensuring that any landscape and visual effects (pertaining to both OHLs) are contained within a single corridor. Although the tower types proposed are a different specification than the B&M route, they are similar in size and appearance in a general sense, and therefore compliant with Holford Rule 6. In addition, the increase in effect presented by the proposed OHL will be limited relative to the effects of the Blackcraig and Margree route i.e. the development of OHLs would be an accepted principle in the local landscape.
- R9.6.14 The route will be visible from sections of the Southern Upland Way, which is unavoidable given the delineation of this route. It will also be visible from a number of minor roads, including the A702 and B7000. Care has been taken, however, to ensure backclothing of the route, and sensitive design where the route would be visible, for example where it exits the forest at Glenshimmeroch Hill and where it crosses the Water of Ken at High Bridge of Ken.
- R9.6.15 In a broader sense, routeing the OHL through the mixed forest/moorland landscape to the south-west of Culmark Hill and Meikle Bennan avoids the presence of such infrastructure within the open moorland evident within the area to the north-east of these hills. This area contains an area of open moorland currently unaffected by manmade objects, save for small scale electrical lines and occasional residential dwellings.
- R9.6.16 In routeing along the valley of the Water of Deugh, a route that passes to the north of the Craig of Knockgray is avoided. This area, as for the area described in the paragraph above, is currently

unaffected by manmade objects, which if present here would result in detrimental effects on landscape character. The landscape surrounding the Water of Deugh contains many features which indicate a settled landscape where wood poles, albeit of a smaller scale, and other features such as buildings and roads, are more common.

- R9.6.17 Finally, in following a route consistent with the L7 OHL route, the route is passing along a corridor where such infrastructure, of a larger and more dominant scale, is already present (and proposed). This reduces the level to which the proposed OHL constitutes an unacceptable addition to the local landscape, which is already partially desensitised to such development.

## R10. NEXT STEPS

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### R10.1 STAGE 7: CONSULTATION AND REFINEMENT

R10.1.1 For developments of this nature, it is considered best practice to undertake consultation on the Preferred Route prior to identification of the Proposed Route upon which the EIA will be carried out. Whilst this Routeing Consultation Document takes account of all known environmental constraints in identifying a Preferred Route, more locally available information, or that provided by statutory consultees, can be invaluable in finalising the route detail.

R10.1.2 This document forms the main method by which consultation occurs at the early stages of the project, and in order to capture the widest range of possible consultations, this document will be issued to all those consultees listed in Section R1.1. In addition, public exhibitions will be held during this stage so that the local population can discuss the project with members of the project team.

### R10.2 STAGE 8: IDENTIFICATION OF PROPOSED ROUTE

R10.2.1 At the conclusion of the consultation process, a 'Proposed Route' will be selected by SPT after consideration of:

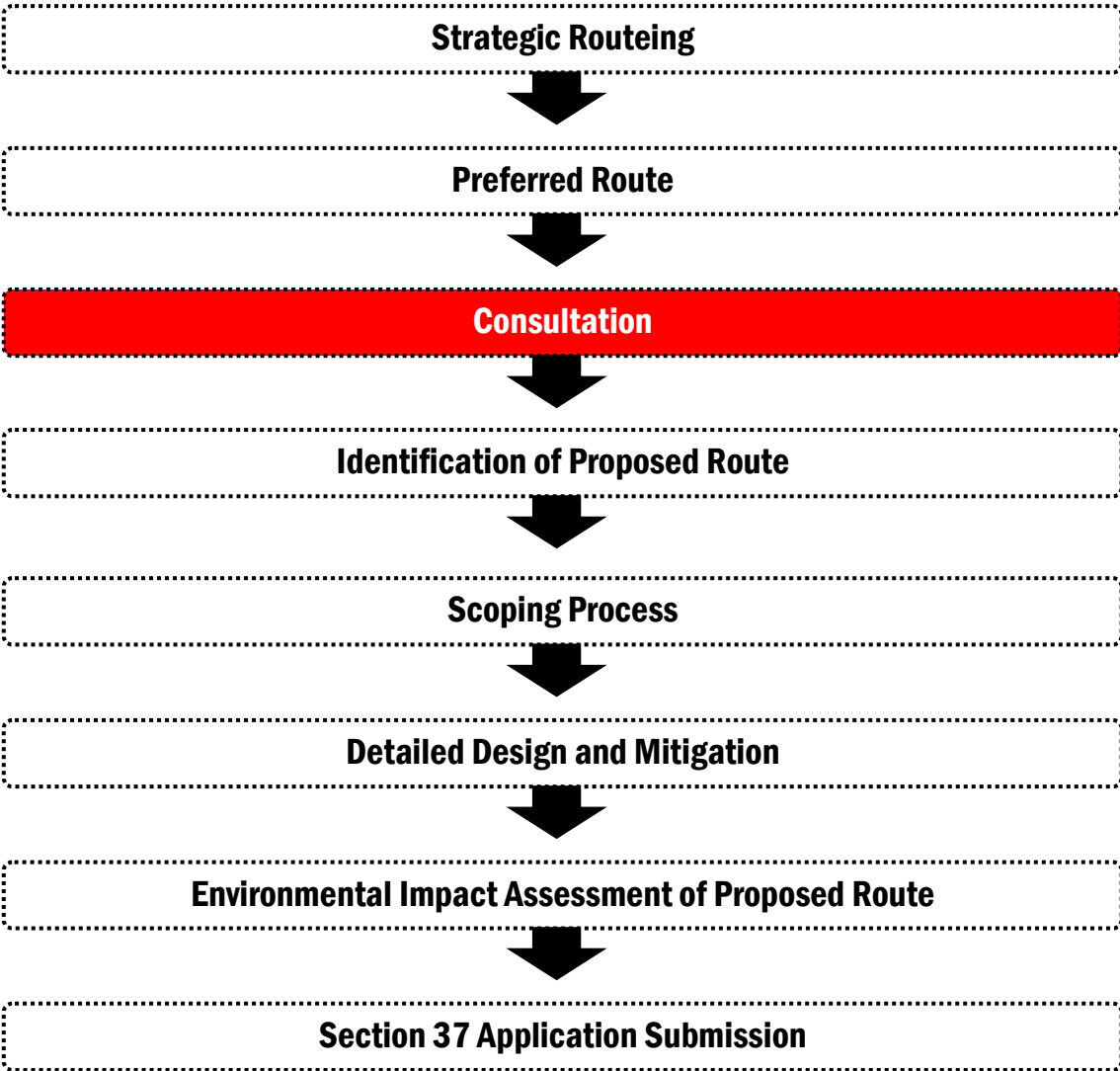
- All the comments and responses made by statutory and other interested parties during the consultation process;
- The appraisal of options considered; and
- Having regard to all other matters SPT consider relevant.

R10.2.2 Following refinement, and identification of the Proposed Route, SPT will issue a Scoping Request to the Scottish Ministers under Regulation 7 of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000, as amended 2008, for a Scoping Opinion on the information to be included within the Environmental Statement that SPT intends to prepare. The Scoping Request will set out the proposed structure and content of the Environmental Statement and identify the potential effects on the environment of the Proposed Route.

R10.2.3 Following receipt of a Scoping Opinion from the Ministers, further detailed studies will be undertaken to define the Proposed Route, which will be taken forward for the preparation of the Section 37 applications and the Environmental Impact Assessment (EIA). The Environmental Statement, which reports the findings of the EIA, will provide a detailed visual and environmental assessment of the Proposed Route and will include all appropriate mitigation measures. Computer aided techniques will be used to assist the evaluation of the visual effects of the Proposed Route.

R10.2.4 The Environmental Statement (ES) will report on all the likely significant environmental effects arising from the construction and operation of the proposed overhead lines. The ES will incorporate relevant information from this document and the consultation process. Following further detailed environmental and technical assessment, it may identify local deviations from the 'Proposed Routes' in order to mitigate local effects.

R10.2.5 The flow diagram below illustrates this process of route identification and assessment, and identifies the stage reached to date.



## R11. CONSULTEES AND CONTACT INFORMATION

R11.1.1 The following table identifies the consultees who have been/will be included in this consultation process. This list seeks to provide a wide range of consultees and stakeholders with the opportunity to understand the proposals and the reason for them. SPT actively seeks comment from all stakeholders to inform this project.

**Table R11.1: Consultees Included in this Consultation Process**

Consultee Name
<b><i>Tier 1: Statutory Consultees (provided with paper copies of all documentation)</i></b>
Dumfries and Galloway Council
Historic Scotland
Scottish Natural Heritage
SEPA
<b><i>Tier 2: Non Statutory (provided with leaflet and CD copy of documentation)</i></b>
Association of Salmon Fishery Boards
Forestry Commission Scotland
Marine Scotland
Ministry of Defence
Royal Society for the Protection of Birds
Scottish Government Library
Scottish Water
Scottish Wildlife Trust
The Coal Authority
West of Scotland Archaeology Service
<b><i>Tier 3: Other Consultees (leaflet only)</i></b>
Architecture and Design Scotland
British Horse Society
British Trust for Ornithology Scotland
BT
Civil Aviation Authority
Defence Infrastructure Organisation
DEFRA
Dumfries and Galloway Badger Network
Dumfries and Galloway Bat Group
Dumfries and Galloway Raptor Study Group
Game & Wildlife Conservation Trust
Garden History Association
GTC
Health and Safety Executive
Independent Power Networks
John Muir Trust

Consultee Name
Mountaineering Council of Scotland
National Air Traffic Services
National Farmers Union
National Grid (Prev Transco)
National Trust for Scotland
Network Rail
Nuclear Safety Directorate (HSE)
OfCom
RAF
Ramblers Association (Scotland)
Red Squirrels in Scotland- South West Scotland
Rivers and Fisheries Trusts for Scotland
Royal Commission on Ancient & Historic Monuments
Scottish Badgers
Scottish Outdoor Access Network (SOAN)
Scottish Rights of Way and Access Society (ScotWays)
Shell UK Ltd
Sustrans Scotland
The Crown Estate
The Woodland Trust
Transport Scotland
Visit Scotland

R11.1.2 In undertaking this consultation, those organisations identified within Tier 1 will be provided with copies of this consultation document, whilst those in Tier 2 will receive CD versions of the report. The remaining organisations and landowners will be sent an 'Information Leaflet' which contains the core information within this document and provides details of where to obtain further information.

## R11.2 WHO TO CONTACT

R11.2.1 If you would like to comment on any aspect of this scheme, please contact:

### Loch Urr and Kendoon North Project Manager

Ochil House  
 10 Technology Avenue  
 Hamilton International Technology Park  
 Blantyre  
 G72 0HT

R11.2.2 Or alternatively, please email us at:

[LochUrrKendoonNorth@scottishpower.com](mailto:LochUrrKendoonNorth@scottishpower.com)

R11.2.3 SPT would seek comment and responses on the 'Preferred Route' described within this Routeing Consultation Report by 30<sup>th</sup> September 2015. These should be made to the addresses provided above, or at the Consultation Events detailed below.



R1124 Copies of this document are also available to download at:

[www.spenetworks.co.uk/pages/community\\_consultation.asp](http://www.spenetworks.co.uk/pages/community_consultation.asp)

R1125 There will be a Public Exhibition explaining the 'Preferred Route' in more detail, at which staff from SPT and their consultants will be available to discuss the project as a whole or any specific elements of this. This exhibition will take place as follows:

- 18<sup>th</sup> August 2015 - Lagwyne Village Hall, Carsphairn - 1400-2000 hrs.
- 19<sup>th</sup> August 2015 - Glencairn Memorial Hall, Moniaive - 1300-1900 hrs.

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## **R12. FIGURES SUPPORTING THIS DOCUMENT**

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R12.1.1 The following figures are provided in support of this Routeing Consultation Report.

**Figure 1: Study Area Context**

**Figure 2: Form of the Proposed Kendoon North Substation**

**Figure 3: Form of the Proposed Overhead Line**

**Figure 4: Landscape Designations**

**Figure 5: Landscape Character Areas**

**Figure 6: Nature Conservation Designations**

**Figure 7: Cultural Heritage Constraints**

**Figure 8: Other Constraints**

**Figure 9: Broad Blackcraig and Margree L7 Route Sections**

**Figure 10: Detailed Substation Siting Constraints**

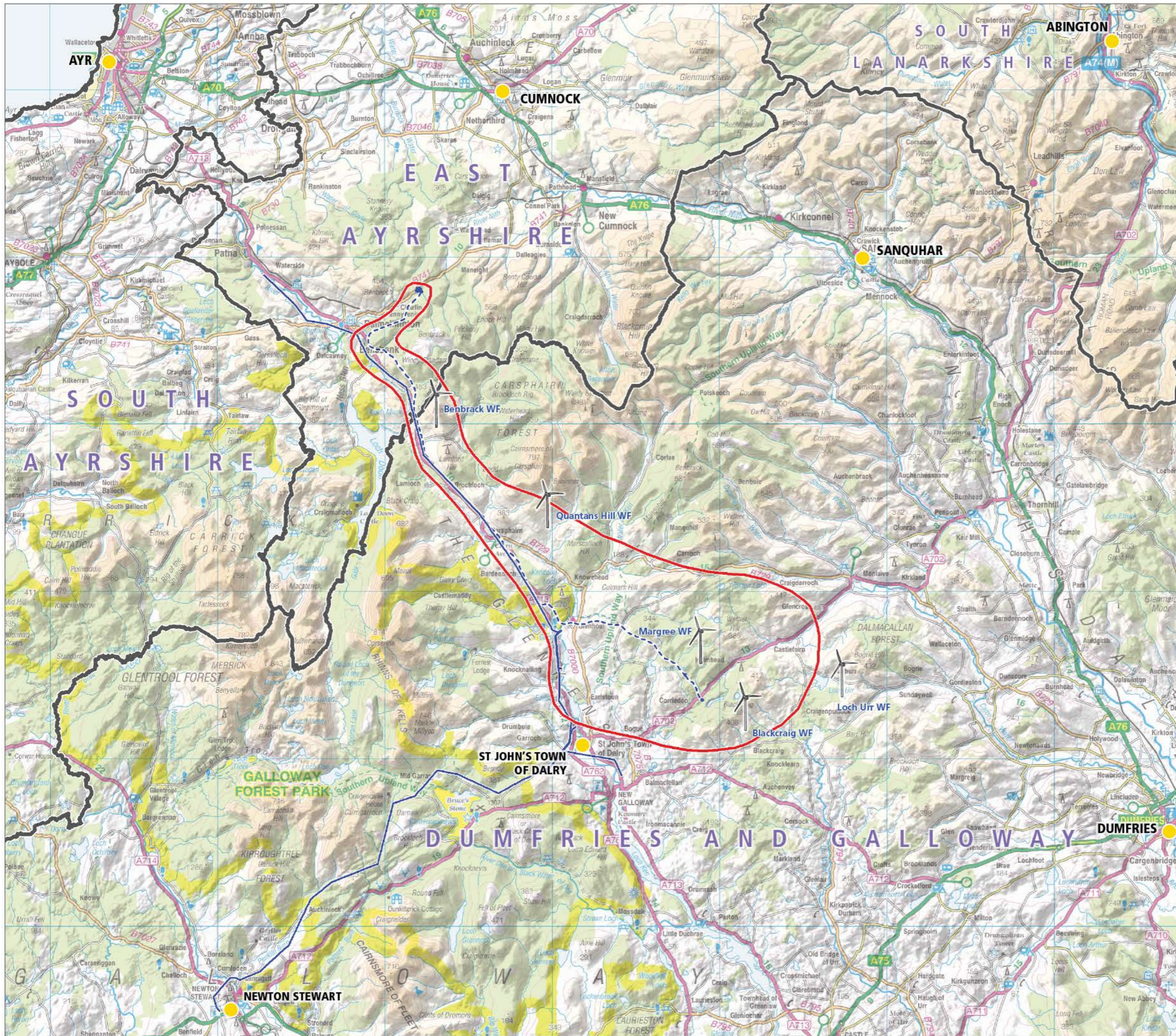
**Figure 11: Strategic Constraints to Routeing**

**Figure 12: Landscape Analysis**

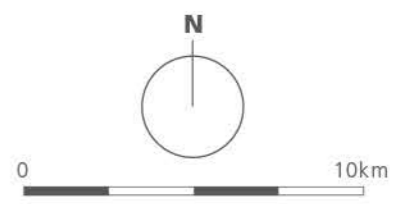
**Figure 13: Preliminary Route Corridors**

**Figure 14: Preferred Route Corridor and Route Options**

**Figure 15: The Preferred Route**



-  Study Area
-  Key Wind Farms Within Study Area
-  Existing N-Route and R-Route OHLs
-  Proposed Blackcraig and Margree Grid Connection
-  Local Authority Boundary



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client  
**ScottishPower EnergyNetworks**

project title  
**Proposed 132kV Overhead Line  
 Between Loch Urr and Kendoon**

drawing title  
**Figure 1: Study Area Context**

date	15 OCTOBER 2013	drawn by	CA
drawing number	EDP 2018/10	checked	CM
scale	1:220,000 @ A3		



**Note:** These illustrations indicate the type of substation that is proposed, rather than indicating how, exactly, the proposed Kendoon North Substation would appear. They should therefore be treated as indicative of the proposals only.



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**Figure 2: Form of the Proposed  
 Kendoon North Substation**

date	11 JUNE 2015	drawn by	CA
drawing number	EDP.2018/53	checked	CM
scale	NA		



Trident single pole, vertical insulators



Trident single pole, 'trident' insulators



Trident 'H' pole turning pole



Trident 'H' pole straight-line pole



Trident single and 'H' poles in moorland setting



Trident 'H' turning pole in moorland setting



Trident single and 'H' poles passing through forestry



Trident single poles in lowland setting with lattice towers



Trident single poles in lowland setting, with wind farm



Trident single and 'H' poles passing through forestry & moorland



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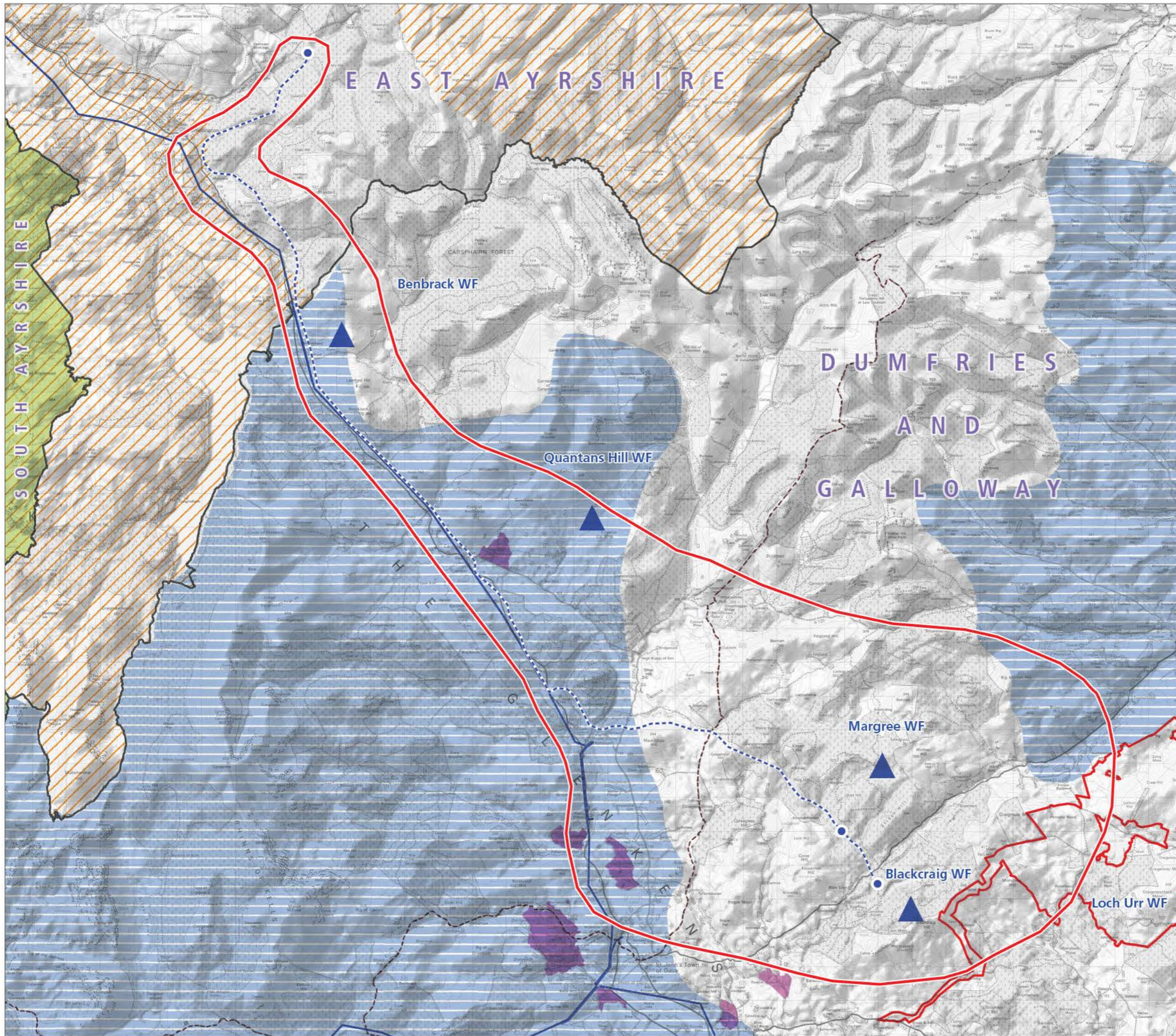
project title






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drawing title

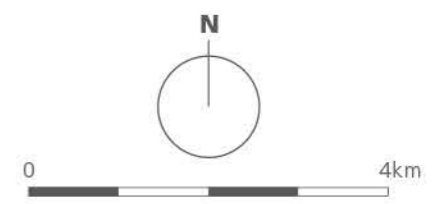
**Figure 3: Form of the Proposed  
Overhead Line**

date 05 DECEMBER 2013 drawn by CA  
drawing number EDP 2018/18 checked CM  
scale NA



-  Study Area
-  Proposed Wind Farm Boundaries Within Study Area
-  Key Wind Farms Within Study Area
-  N-Route and R-Route OHLs
-  Proposed Blackcraig and Margree Grid Connection
-  Local Authority Boundary

- Landscape Considerations
-  Regional Scenic Area
  -  South Ayrshire Scenic Area
  -  Ayrshire Sensitive Landscape Character
  -  Non-inventory Designed Landscape
  -  Southern Upland Way



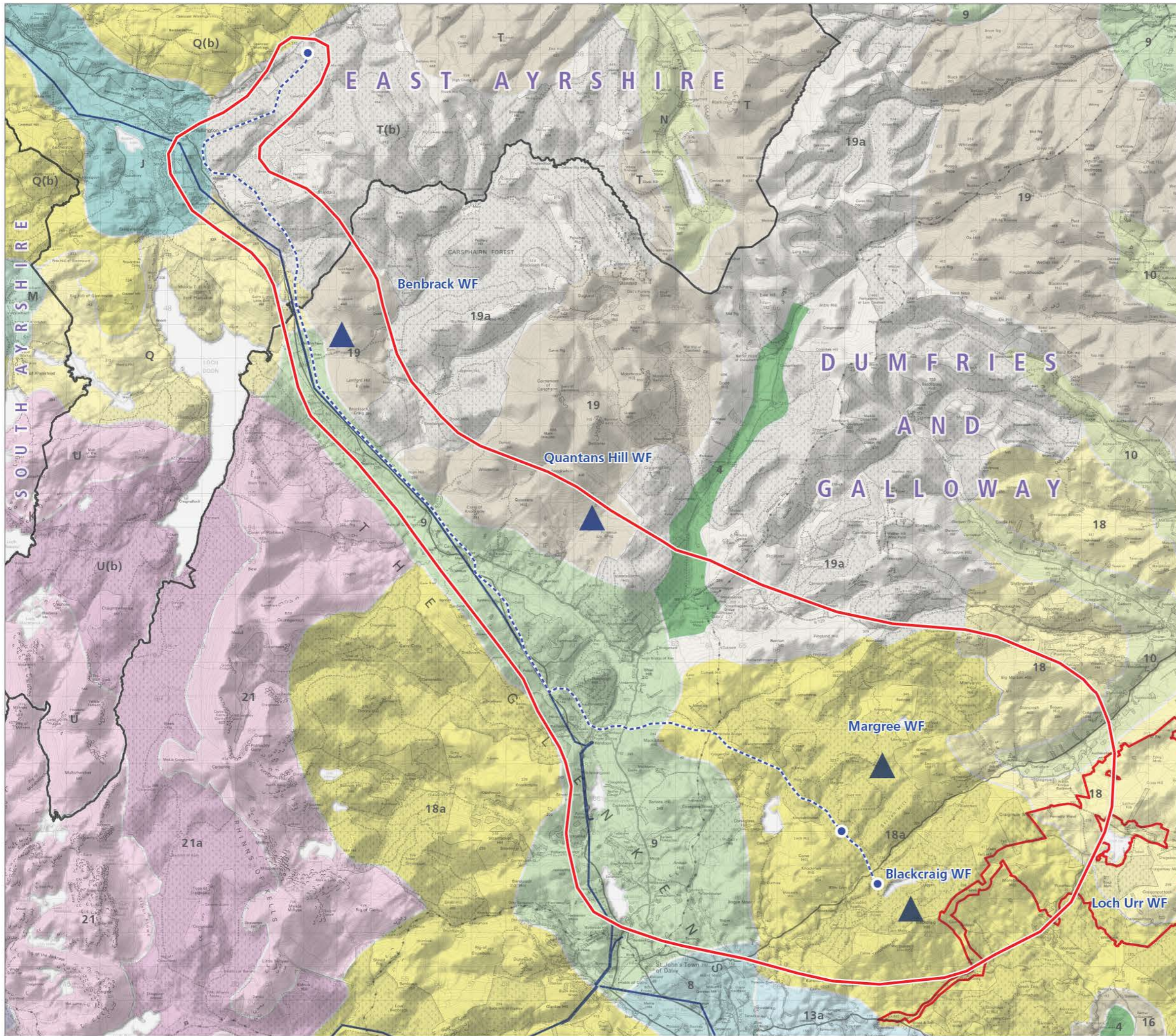
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project title  
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drawing title  
**Figure 4: Landscape Designations**

date	15 OCTOBER 2013	drawn by	CA
drawing number	EDP 2018/09	checked	CM
scale	1:110,000 @ A3		



- Study Area
- Proposed Wind Farm Boundaries Within Study Area
- ▲ Key Wind Farms Within Study Area
- Existing N-Route and R-Route OHLs
- Proposed Blackcraig and Margree Grid Connection
- Local Authority Boundary

**Landscape Character**

	4	Narrow Wooded Valley
	8	Flooded Valley
	9	Upper Dale
	10	Upland Glens
	13a	Drumlin Pastures
	16	Upland Fringe
	18	Foothills
	18a	Foothills with Forests
	19	Southern Uplands Type
	19a	Southern Uplands with Forest
	21	Rugged Granite Uplands
	21a	Rugged Granite Uplands with Forest
	J	Upland River Valleys
	M	Intimate Pastoral Valley
	N	Upland Glen
	Q	Foothills
	Q(b)	Foothills with Forestry
	T	Southern Uplands
	T(b)	Southern Uplands with Forestry
	U	Rugged Granitic Uplands
	U(b)	Rugged Granitic Uplands with Forestry

Dumfries and Galloway LCA

Ayrshire LCA

**edp**

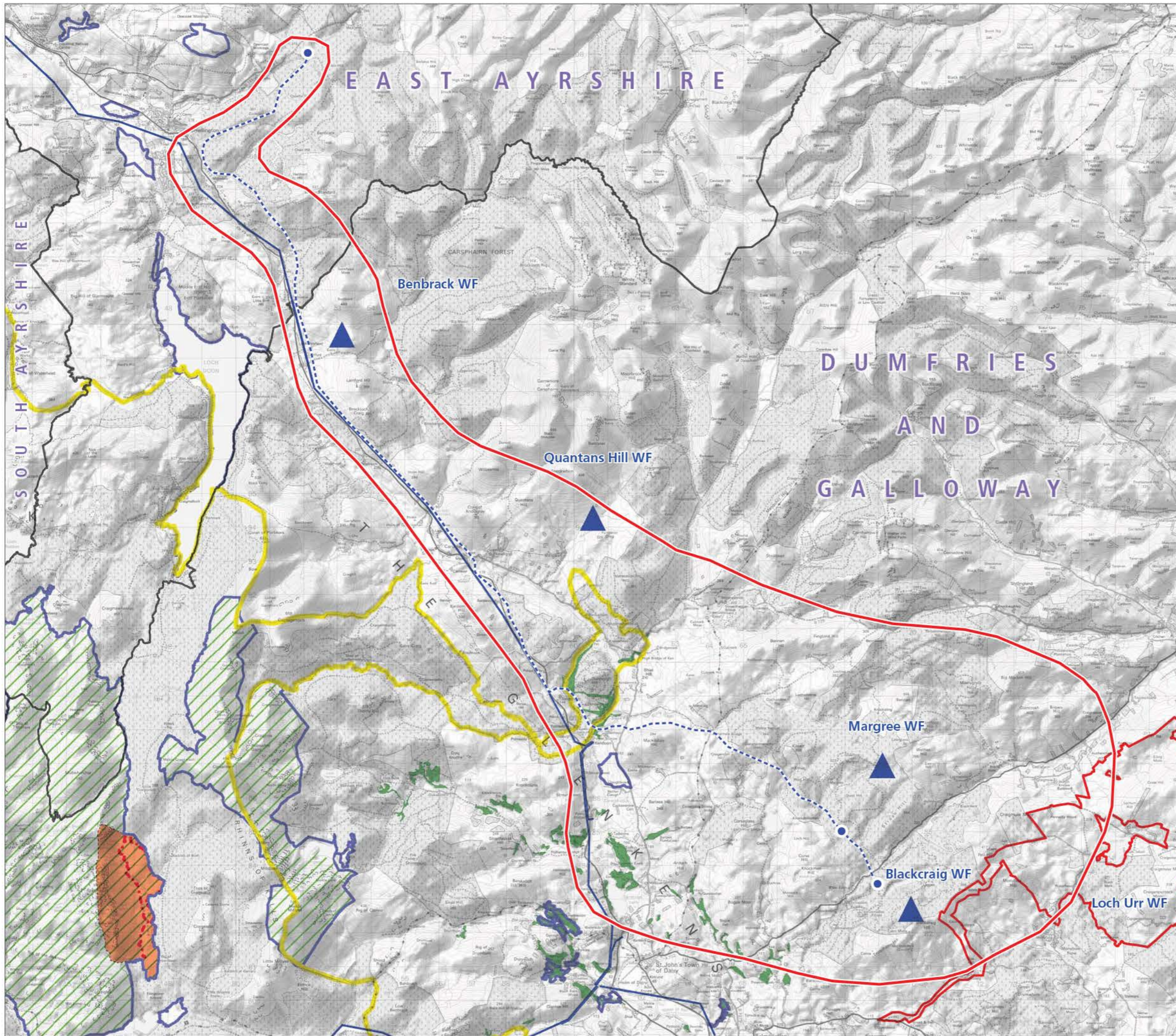
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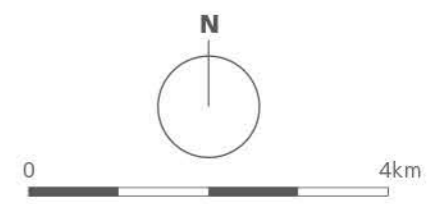
drawing title  
**Figure 5: Landscape Character Areas**

date	15 OCTOBER 2013	drawn by	CA
drawing number	EDP 2018/08	checked	CM
scale	1:110,000 @ A3		



-  Study Area
-  Proposed Wind Farm Boundaries Within Study Area
-  Key Wind Farms Within Study Area
-  N-Route and R-Route OHLs
-  Proposed Blackcraig and Margree Grid Connection
-  Local Authority Boundary

- Nature Conservation Designations
-  Ramsar Site
  -  Special Area of Conservation (SAC)
  -  Site of Special Scientific Interest (SSSI)
  -  National Nature Reserve (NNR)
  -  Ancient Woodland Inventory (AWI)
  -  Important Bird Areas (RSPB)



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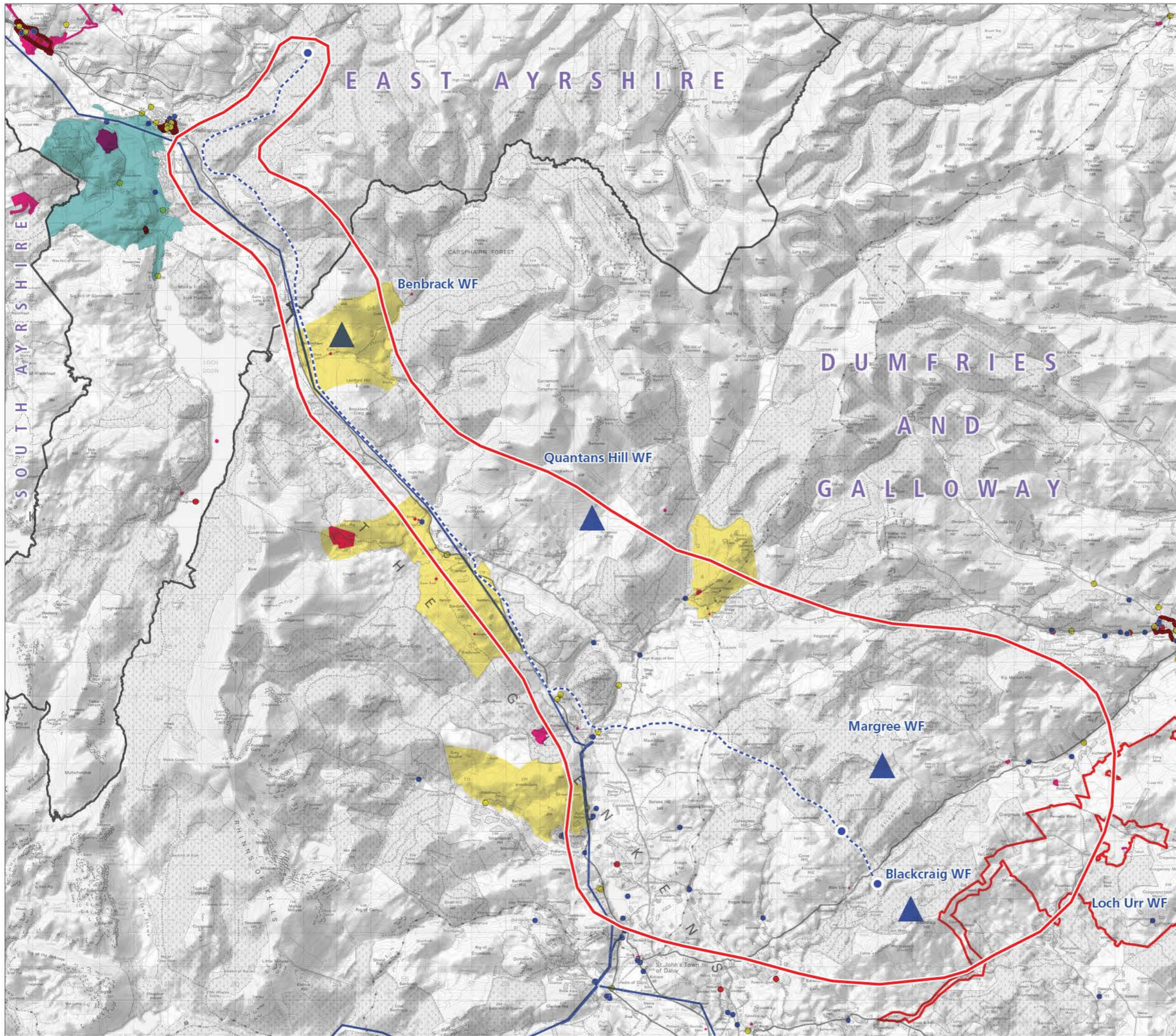
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project title  
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drawing title  
**Figure 6: Nature Conservation  
 Constraints**

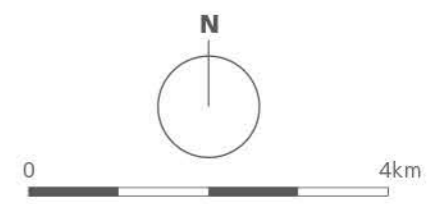
date	15 OCTOBER 2013	drawn by	CA
drawing number	EDP 2018/11	checked	CM
scale	1:110,000 @ A3		





- Study Area
- Proposed Wind Farm Boundaries Within Study Area
- ▲ Key Wind Farms Within Study Area
- N-Route and R-Route OHLs
- Proposed Blackcraig and Margree Grid Connection
- Local Authority Boundary

- Cultural Heritage Features
- Listed Building (A, B and C)
  - Scheduled Monument
  - Garden and Designed Landscape
  - Conservation Area
  - Archaeologically Sensitive Area (Dumfries and Galloway)



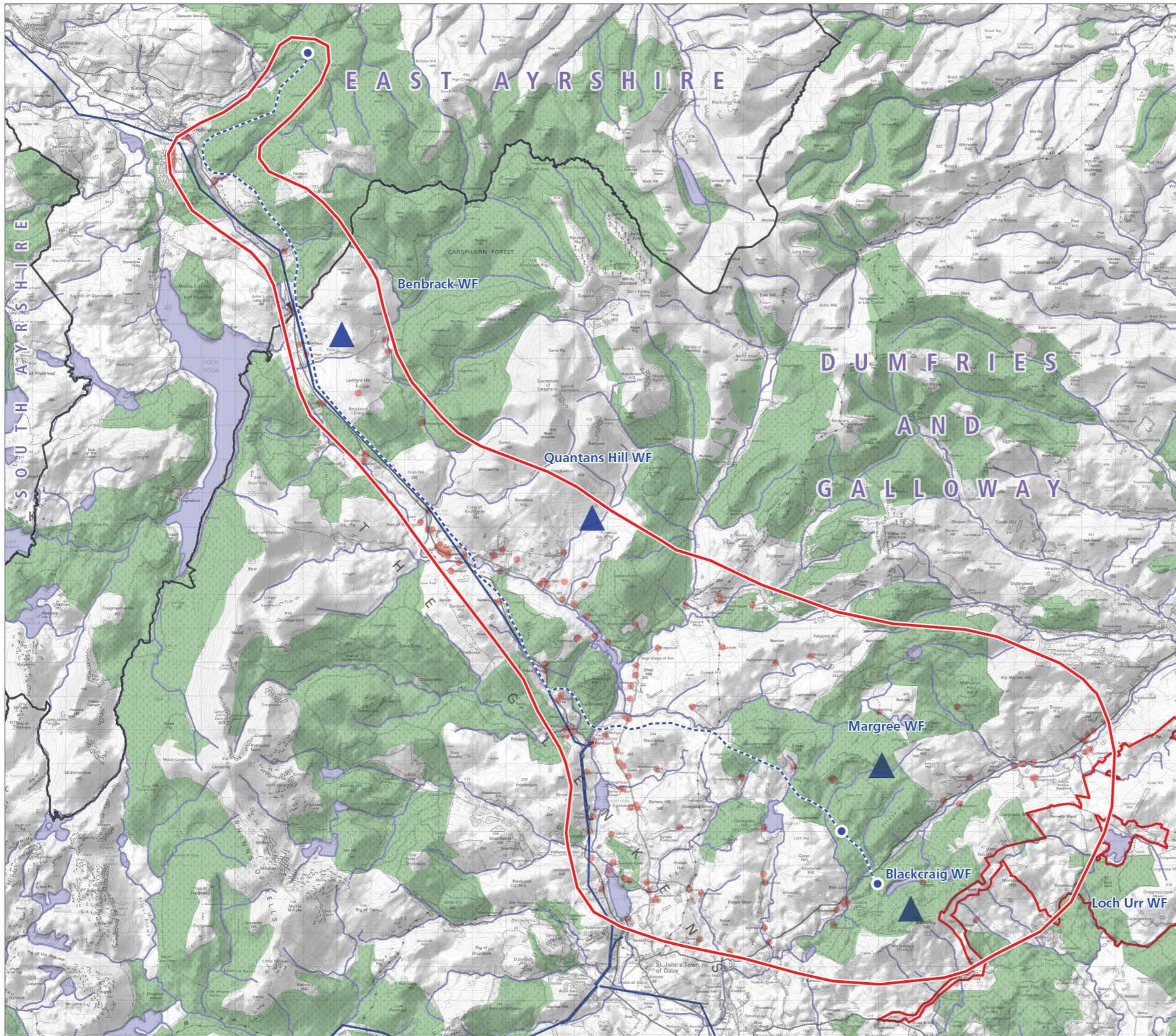
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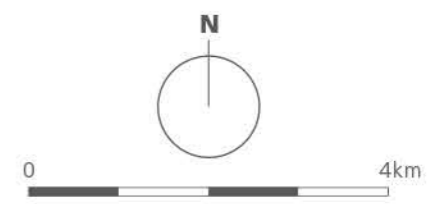
drawing title  
**Figure 7: Cultural Heritage  
 Constraints**

date	15 OCTOBER 2013	drawn by	CA
drawing number	EDP 2018/12	checked	CM
scale	1:110,000 @ A3		



-  Study Area
-  Proposed Wind Farm Boundaries Within Study Area
-  Key Wind Farms Within Study Area
-  N-Route and R-Route OHLs
-  Proposed Blackcraig and Margree Grid Connection
-  Local Authority Boundary

- Other Constraints
-  Principal Watercourses
  -  Waterbodies (Lochs and Lochans)
  -  Forest and Woodland
  -  Residential Buffers (100m)



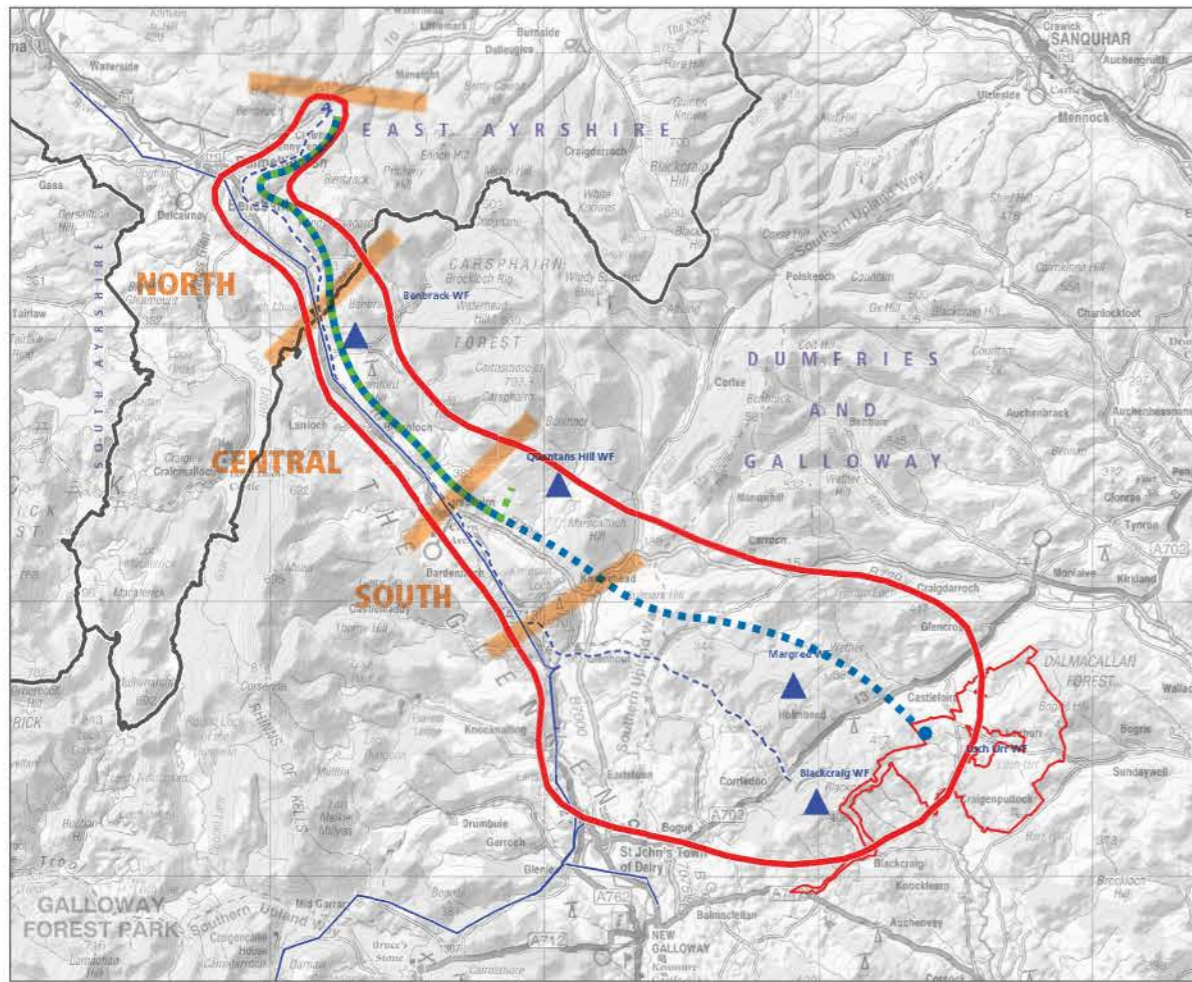
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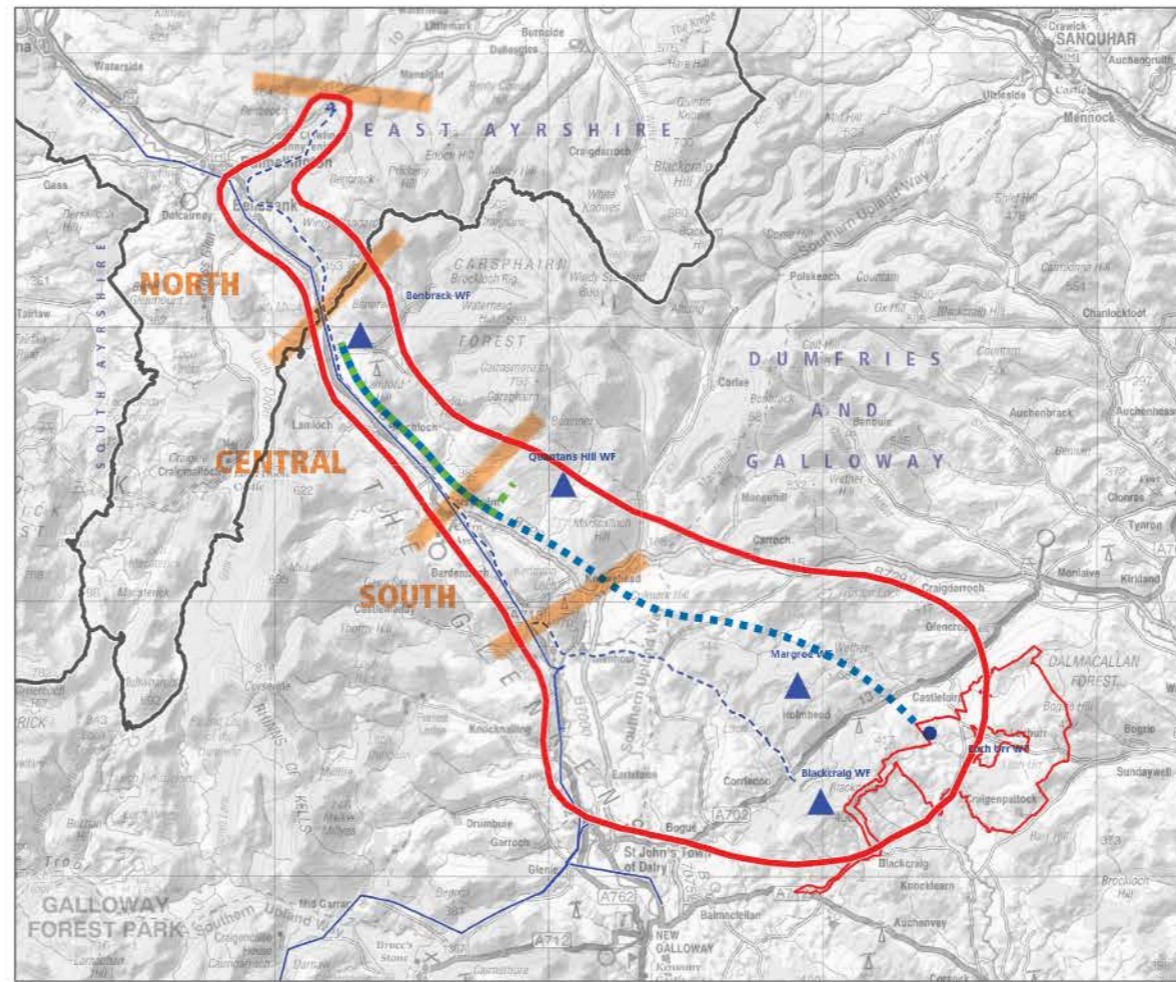
project title  
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drawing title  
**Figure 8: Other Constraints**

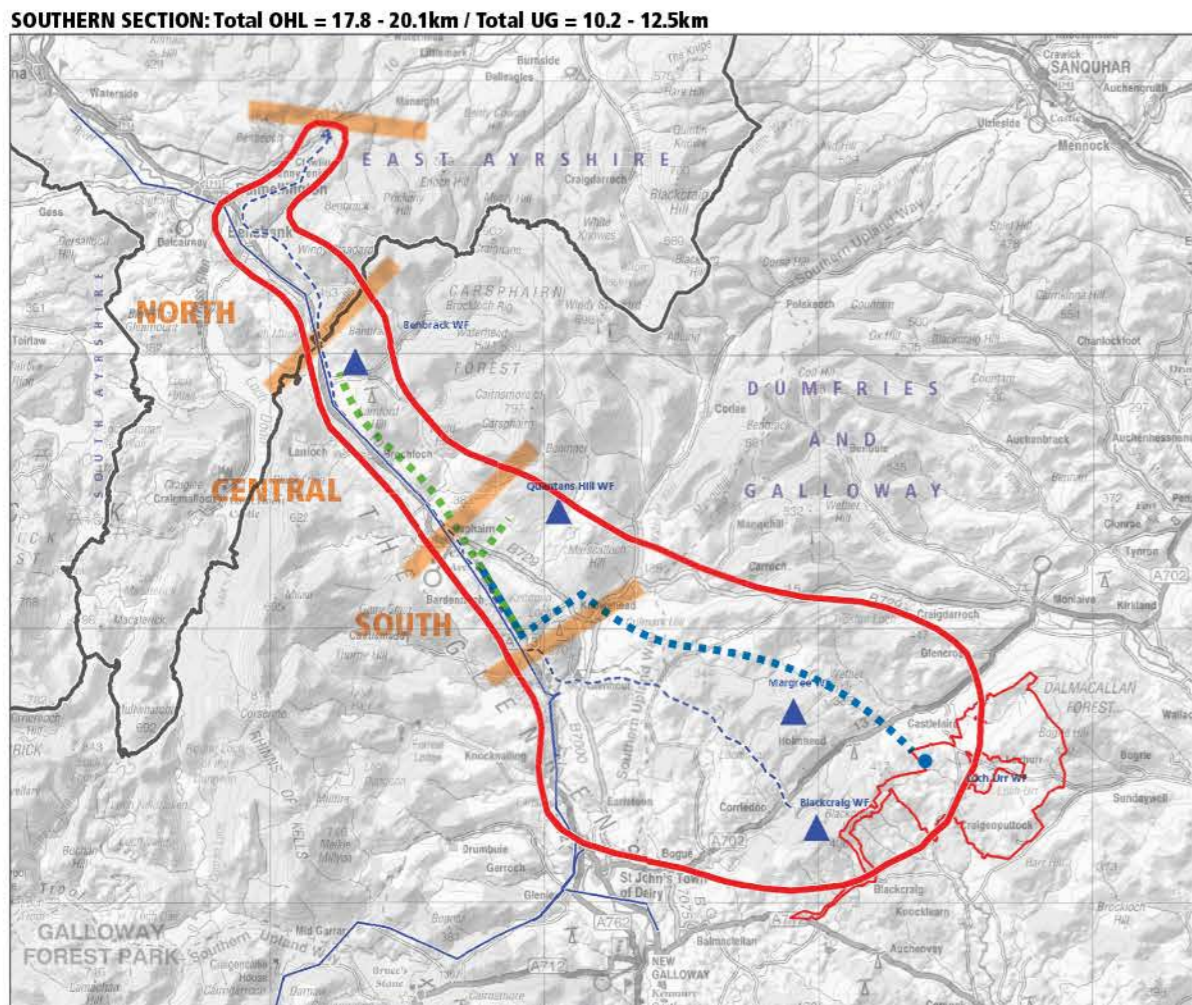
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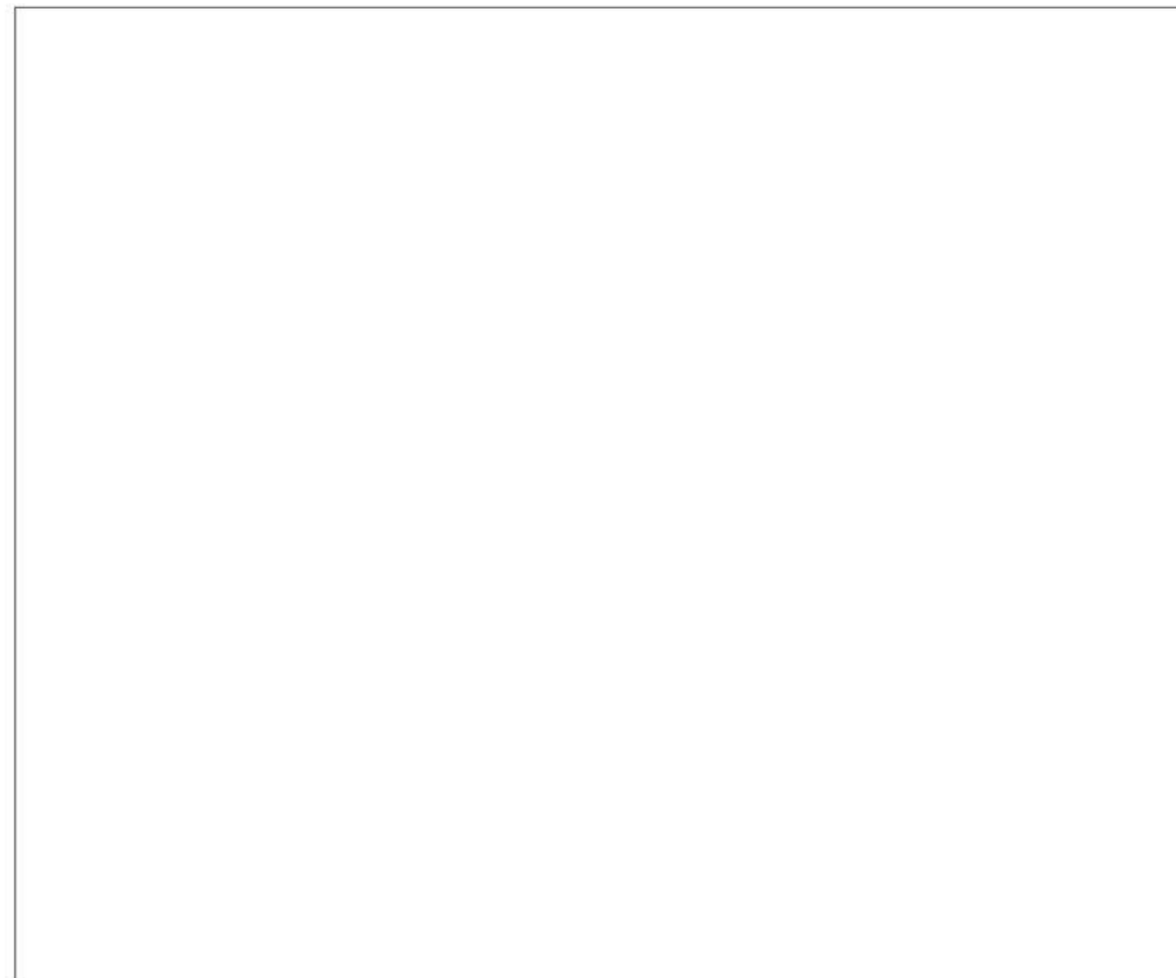
**NORTHERN SECTION: Total OHL = 19.2 - 38.7km / Total UG = 11.1 - 21.3km**



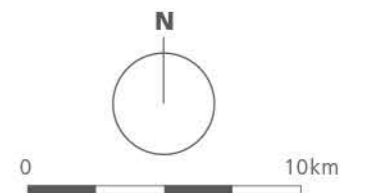
**CENTRAL SECTION: Total OHL = 19.2 - 27.6km / Total UG = 11.1km**



**SOUTHERN SECTION: Total OHL = 17.8 - 20.1km / Total UG = 10.2 - 12.5km**



- Study Area
- Proposed Wind Farm Boundaries Within Study Area
- ▲ Key Wind Farms Within Study Area
- N-Route and R-Route OHLs
- - - Proposed Blackcraig and Margree Grid Connection
- Local Authority Boundary
  
- Potential Routes and Substation**
- - - Underground
- - - OHL
- - - Either UG or OHL
- Substation



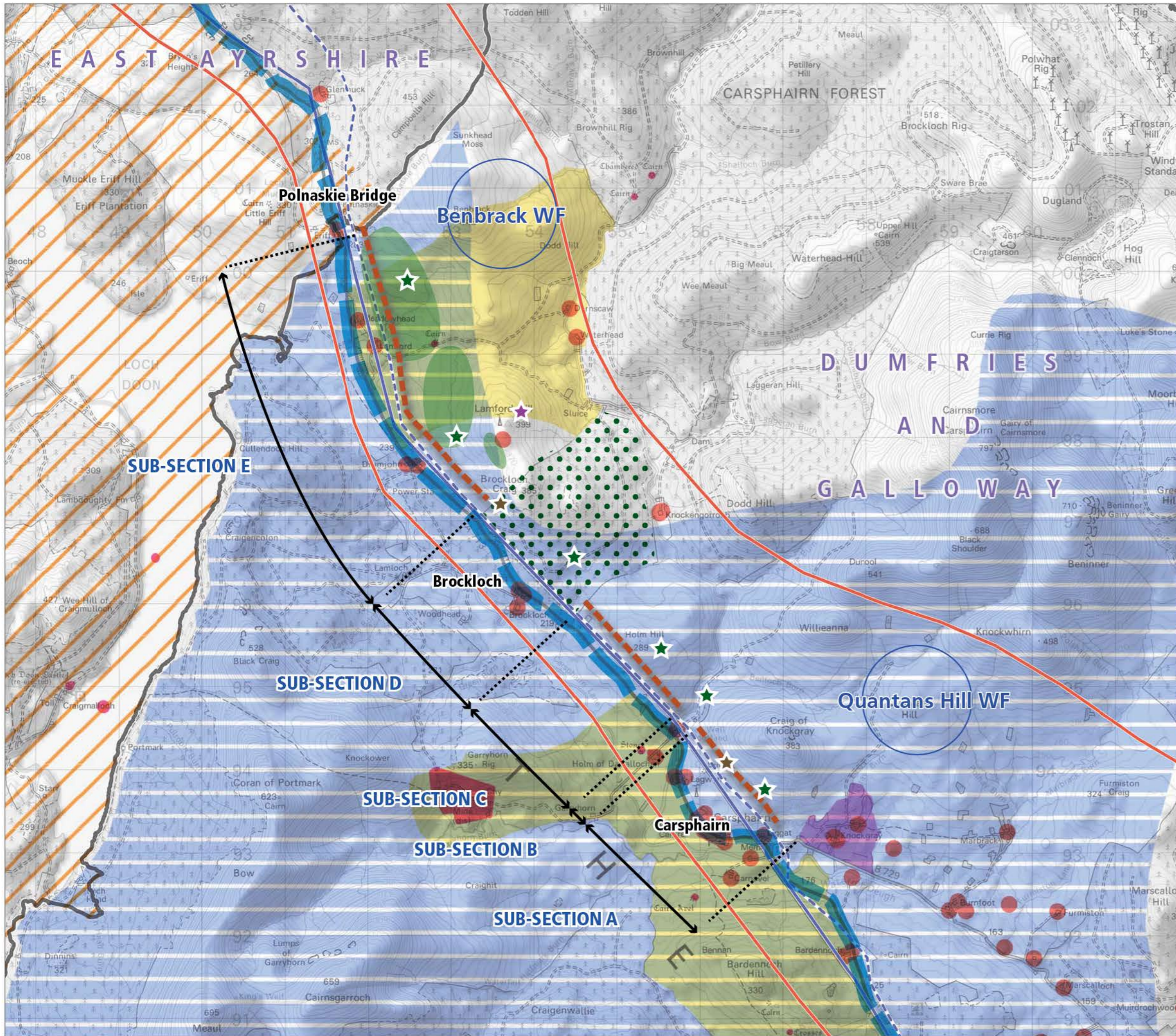
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drawing title  
**Figure 9: Broad Blackcraig and  
 Margree L7 Route Sections**

date	15 OCTOBER 2013	drawn by	CA
drawing number	EDP 2018/15	checked	CM
scale	1:275,000 @ A3		



**Study Area**

**Proposed Wind Farm Boundaries Within Study Area**

**Key Wind Farms Within Study Area**

**N-Route and R-Route OHLs**

**Proposed Blackcraig and Margree Grid Connection**

**Local Authority Boundary**

**Constraints**

- Regional Scenic Area
- Ayrshire Sensitive Landscape Character
- Non-inventory Designed Landscape
- Ancient Woodland Inventory (AWI)
- Scheduled Monument
- Archaeologically Sensitive Area (Dumfries and Galloway)
- Forestry Areas
- Residential Buffers (100m)
- Sensitive Habitats
- Black Grouse Noted Activity Area
- Ornithology Constraints
- Noted Heritage Assets
- A713 Tourist Route
- Visually Sensitive Area

0 2km

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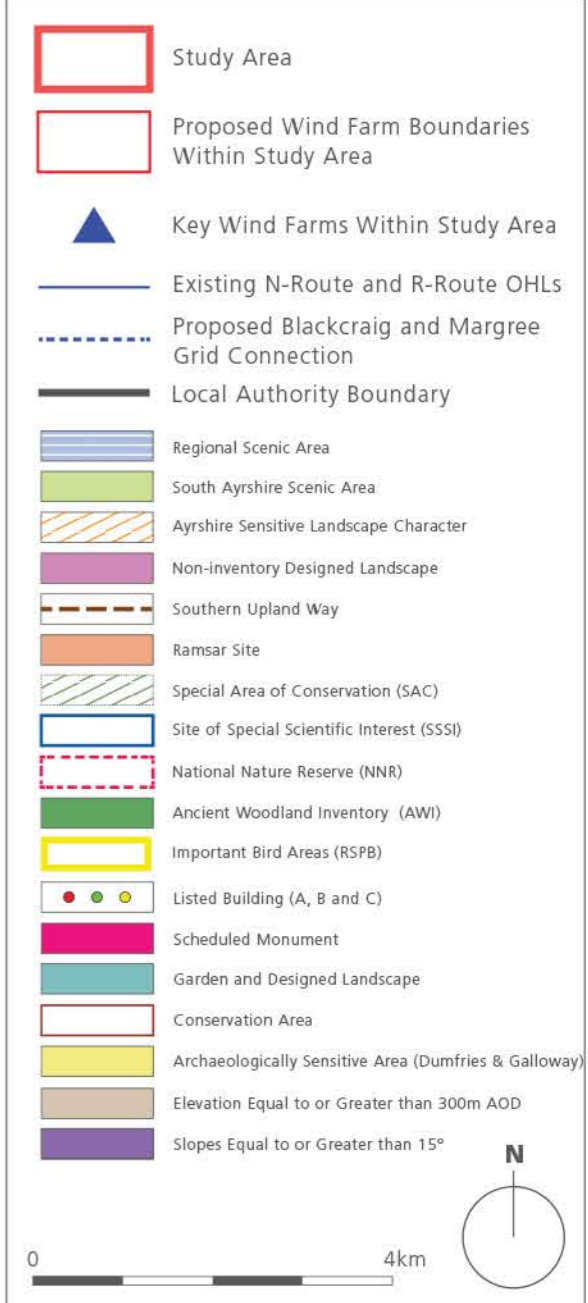
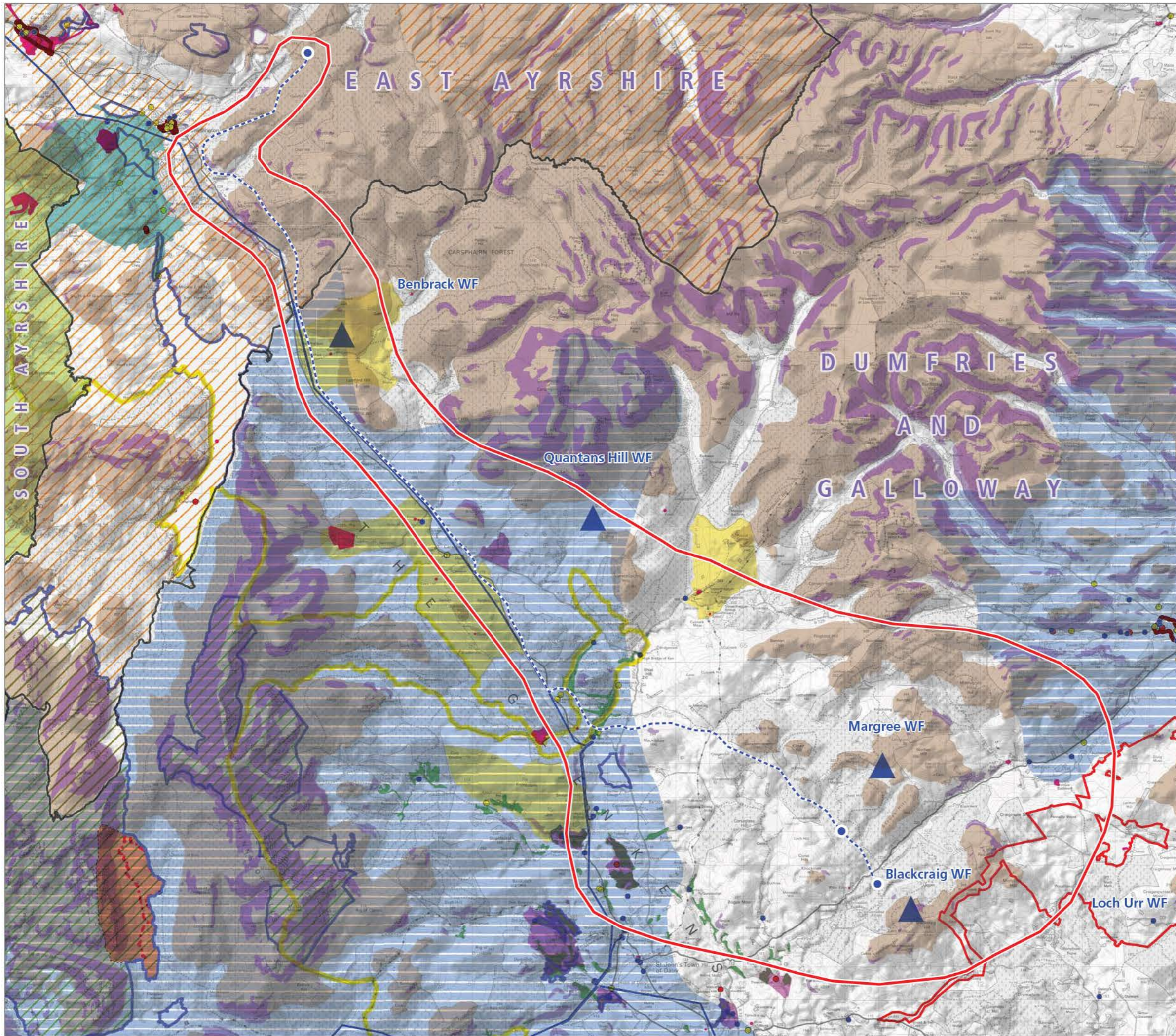
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drawing title  
**Figure 10: Detailed Substation  
 Siting Constraints**

date 15 OCTOBER 2013 drawn by CA  
 drawing number EDP 2018/16 checked CM  
 scale 1:45,450 @ A3



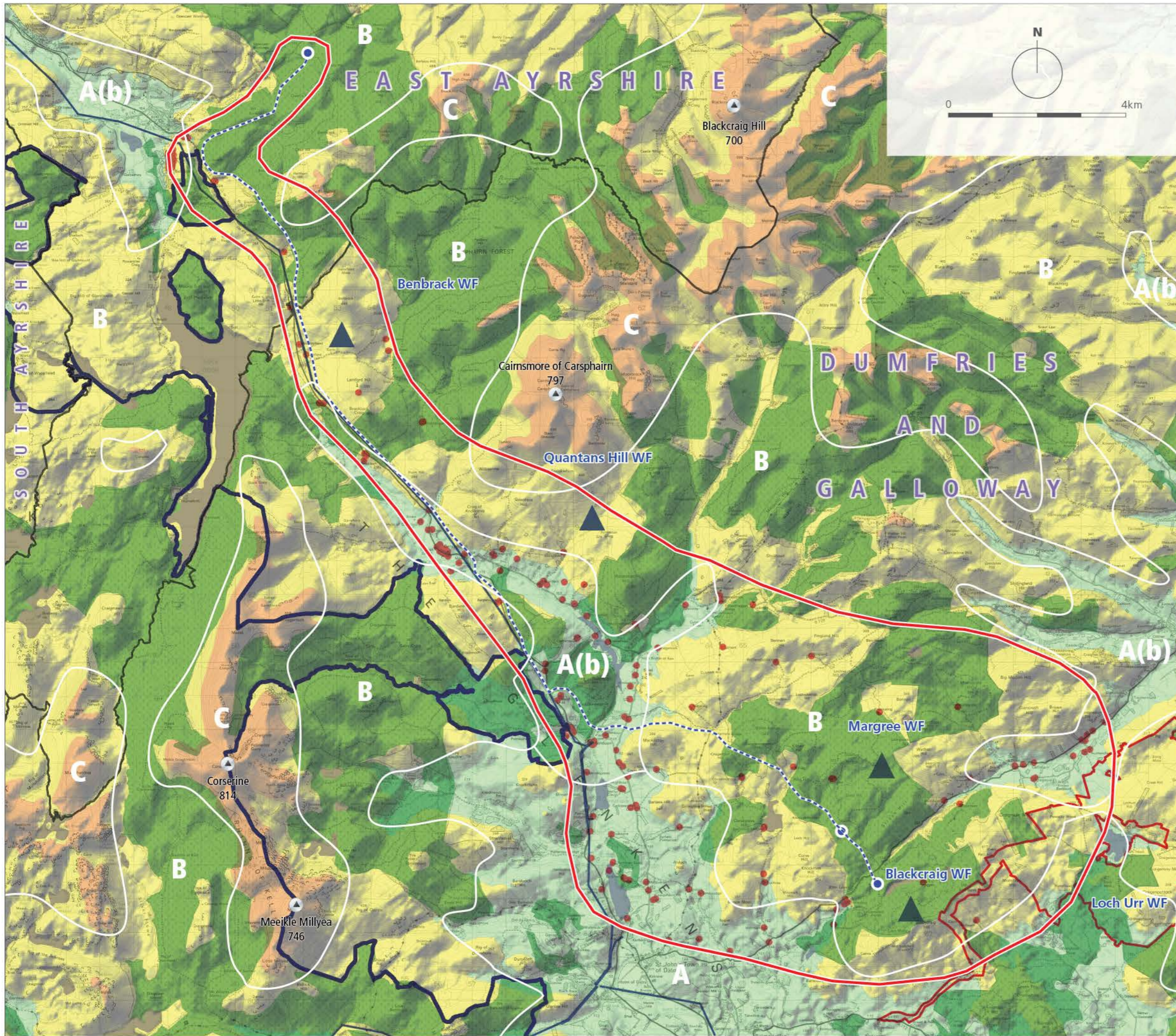
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client  
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project title  
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drawing title  
**Figure 11: Strategic Constraints  
 to Routing**

date	15 OCTOBER 2013	drawn by	CA
drawing number	EDP 2018/14	checked	CM
scale	1:110,000 @ A3		



**Legend**

- Study Area
- Proposed Wind Farm Boundaries as Labelled
- Key Wind Farms Within Study Area
- N-Route and R-Route OHLs
- Proposed Blackcraig and Margree Grid Connection
- Local Authority Boundary

**Topography and Landscape**

- Valleys/Glens (≤200m)
- Foothills/Low Mountains (200-500m)
- High Mountains (≥500m)
- Forestry and Woodland
- Waterbodies (Lochs and Lochans)
- Broad Landscape Characterisation
- Peaks (elevation in metres)
- Residential Buffers (100m)
- Galloway Forest Park Boundary

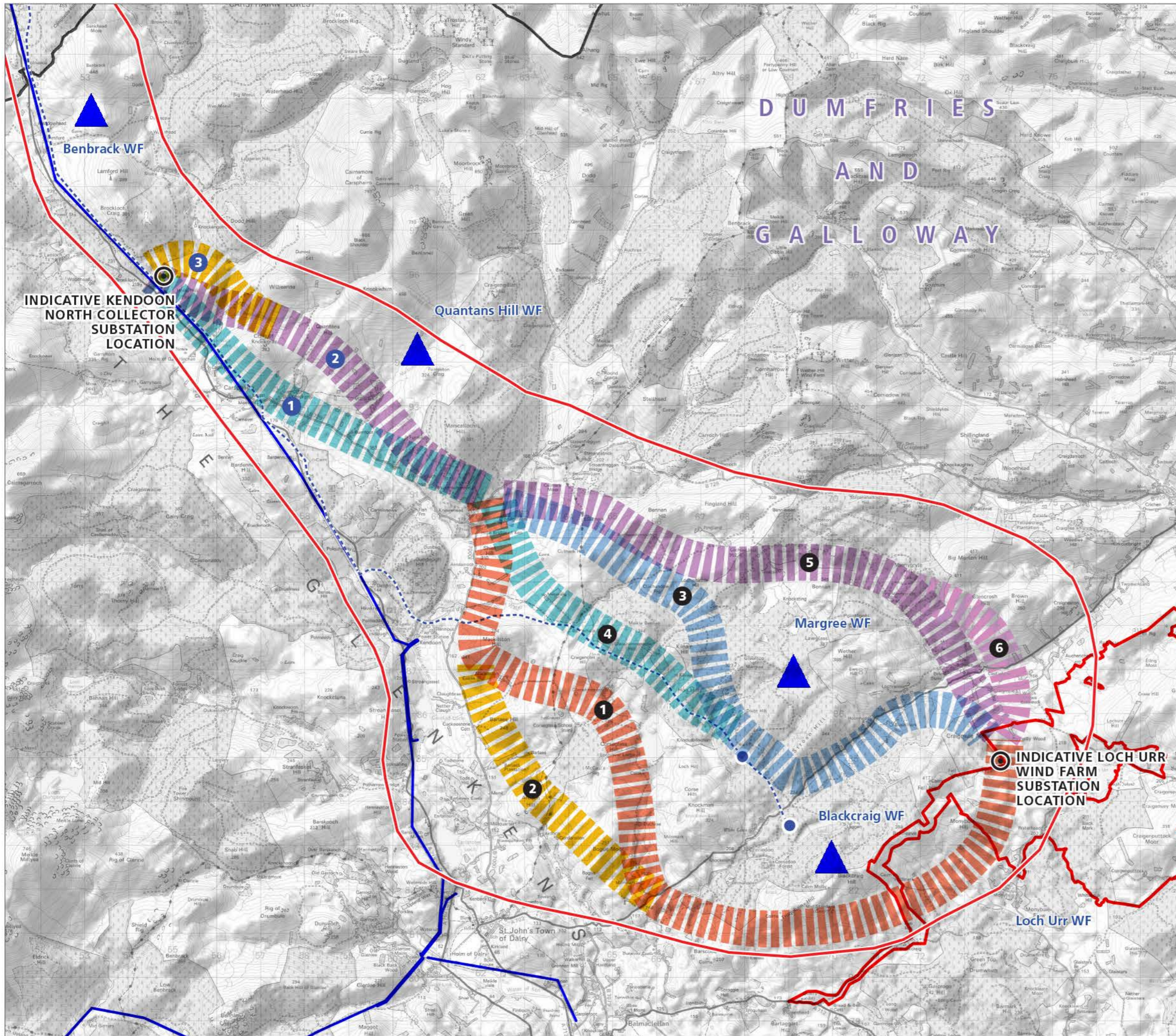
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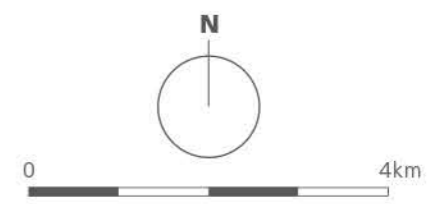
drawing title  
**Figure 12: Landscape Analysis**

date	15 OCTOBER 2013	drawn by	CA
drawing number	EDP 2018/17	checked	CM
scale	1:110,000 @ A3		



- Study Area
- Proposed Wind Farm Boundaries Within Study Area
- ▲ Key Wind Farms Within Study Area
- N-Route and R-Route OHLs
- Proposed Blackcraig and Margree Grid Connection
- Indicative Substation Locations

- Routing Corridor Options
- Eastern Sub-section**
- Route Corridor 1
  - Route Corridor 2
  - Route Corridor 3
  - Route Corridor 4
  - Route Corridor 5
  - Route Corridor 6
- Western Sub-section**
- Route Corridor 1
  - Route Corridor 2
  - Route Corridor 3



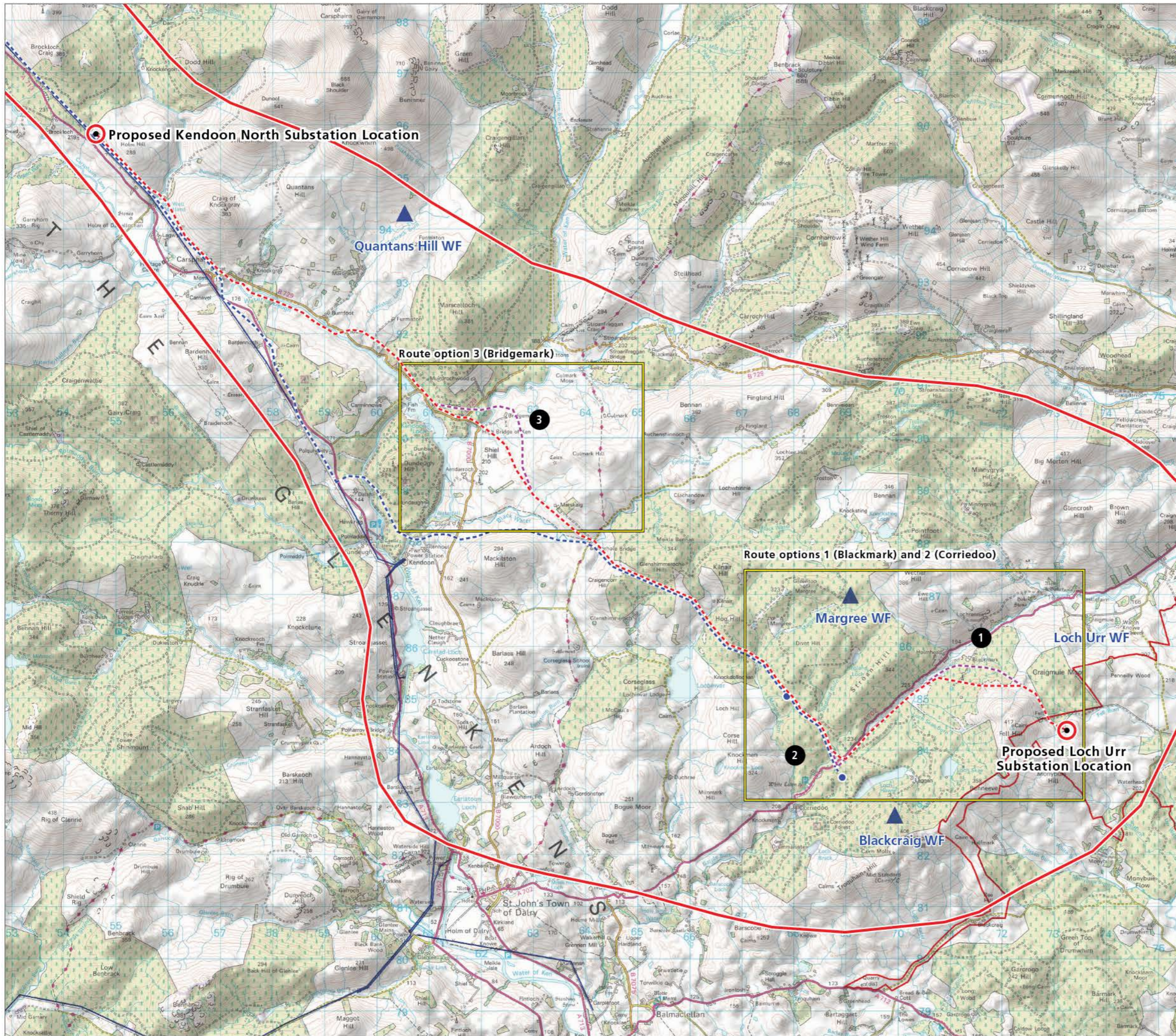
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client  
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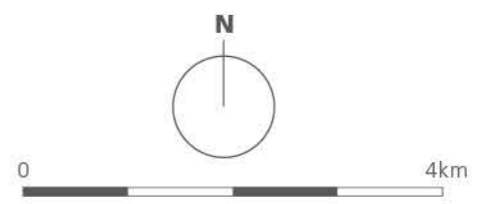
project title  
**Proposed 132kV Overhead Line Between Loch Urr and Kendoon**

drawing title  
**Figure 13: Preliminary Route Corridor Options**

date	06 DECEMBER 2013	drawn by	CA
drawing number	EDP 2018/19	checked	CM
scale	NTS @ A3		



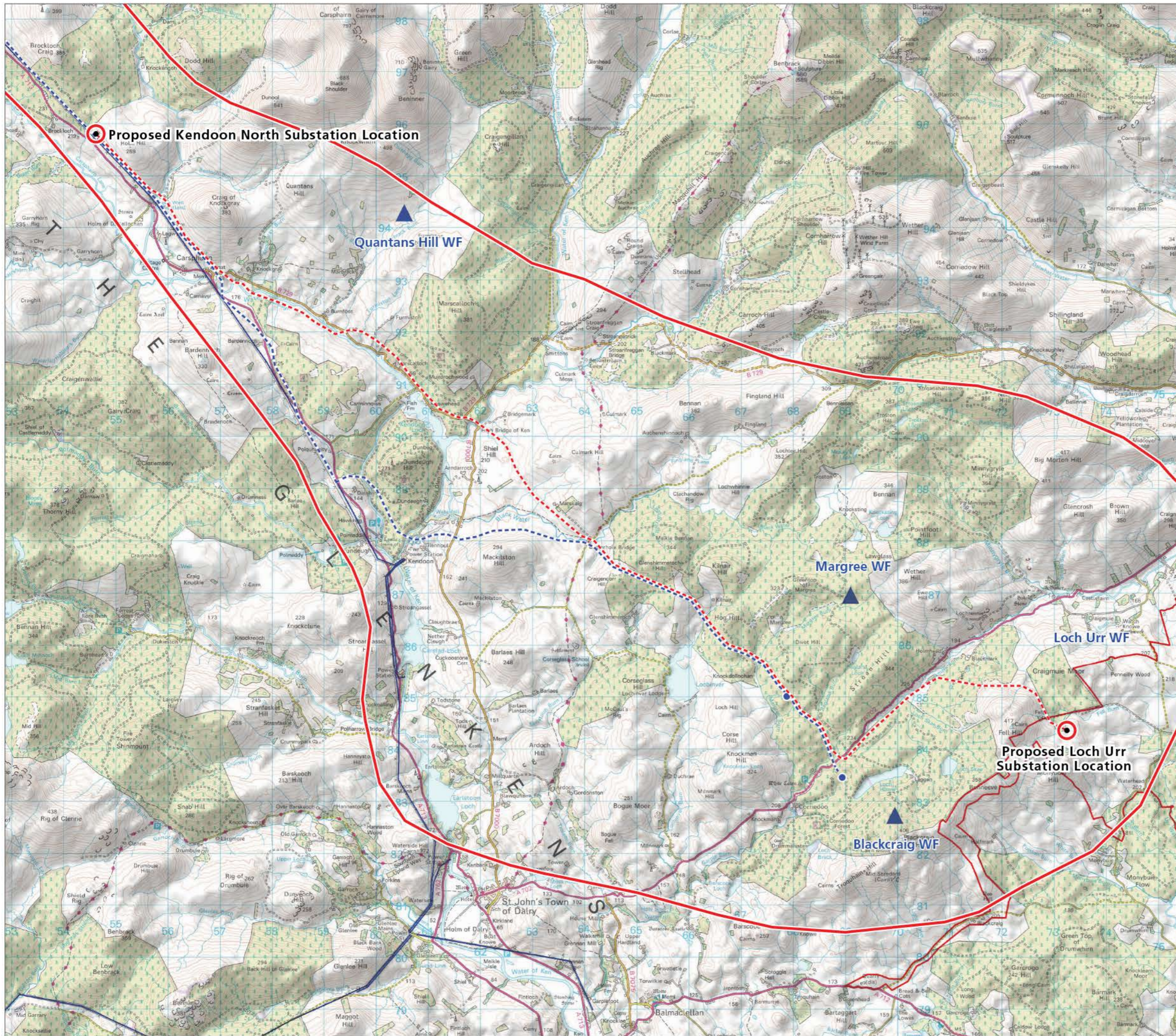
- Proposed Wind Farm Boundaries Within Study Area
  - ▲ Key Wind Farms Within Study Area
  - N-Route and R-Route OHLs
  - - - Proposed Blackcraig and Margree Grid Connection
- Elements of the Proposed Grid Connection
- · - · - Proposed 132kV Loch Urr Overhead Line Grid Connection
  - · - · - Grid Connection Options
  - ⊙ Proposed Substations as Indicated








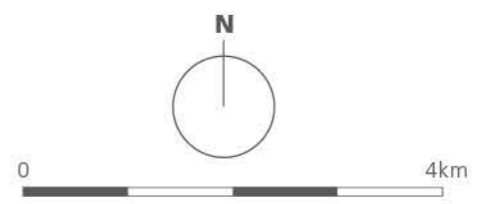
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client	ScottishPower EnergyNetworks		
project title	Proposed 132kV Overhead Line Between Loch Urr and Kendoon		
drawing title	Figure 14: Preferred Route Options		
date	30 MAY 2014	drawn by	CM
drawing number	EDP 2018/24	checked	CM
scale	NTS @ A3		





-  Proposed Wind Farm Boundaries Within Study Area
  -  Key Wind Farms Within Study Area
  -  N-Route and R-Route OHLs
  -  Proposed Blackcraig and Margree Grid Connection
- Elements of the Proposed Grid Connection
-  Proposed 132kV Loch Urr Overhead Line Grid Connection
  -  Proposed Substations as Indicated



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**ScottishPower EnergyNetworks**

project title  
**Proposed 132kV Overhead Line Between Loch Urr and Kendoon**

drawing title  
**Figure 15: The Preferred Route**

date	30 MAY 2014	drawn by	CM
drawing number	EDP 2018/23	checked	CM
scale	NTS @ A3		

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## **R13. APPENDIX 1: THE HOLFORD RULES : GUIDELINES FOR THE ROUTEING OF NEW HIGH VOLTAGE OVERHEAD TRANSMISSION LINES WITH NGC 1992 AND SHETL 2003 NOTES RULES 1-7**

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### **R13.1 THE HOLFORD RULES**

#### **RULE 1**

R13.1.1 **Avoid altogether, if possible, the major areas of highest amenity value, by so planning the general route of the line in the first place, even if the total mileage is somewhat increased in consequence.**

#### **Note on Rule 1**

a) Investigate the possibility of alternative routes, avoiding altogether, if possible major areas of highest amenity value. The consideration of alternative routes must be an integral feature of environmental statements. If there is an existing transmission line through a major area of highest amenity value and the surrounding land use has to some extent adjusted to its presence, particularly in the case of commercial forestry, then the effect of remaining on this route must be considered in terms of the effect of a new route avoiding the area.

b) Areas of highest amenity value require to be established on a project-by-project basis considering Schedule 9 to The Electricity Act 1989, Scottish Planning Policies, National Planning Policy Guidelines, Circulars and Planning Advice Notes and the spatial extent of areas identified.

R13.1.2 Examples of areas of highest amenity value which should be considered are

- Special Area of Conservation (NPPG 14);
- Special Protection Area (NPPG 14);
- Ramsar Site (NPPG 14);
- National Scenic Areas (NPPG 14);
- National Parks (NPPG 14);
- National Nature Reserves (NPPG 14);
- Protected Coastal Zone Designations (NPPG 13);
- Sites of Special Scientific Interest (SSSI) (NPPG 14);
- Schedule of Ancient Monuments (NPPG 5);
- Listed Buildings (NPPG 18);
- Conservation Areas (NPPG 18);
- World Heritage Sites (a non-statutory designation) (NPPG 18); and
- Historic Gardens and Designed Landscapes (a non-statutory designation) (NPPG 18).

## RULE 2

- R13.13 **Avoid smaller areas of high amenity value, or scientific interest by deviation; provided that this can be done without using too many angle towers, i.e. the more massive structures which are used when lines change direction.**

### Note on Rule 2

- a) Small areas of highest amenity value not included in Rule 1 as a result of their spatial extent should be identified along with other areas of regional or local high amenity value identified from development plans.
- b) Effects on the setting of historic buildings and other cultural heritage features should be minimised.
- c) If there is an existing transmission line through an area of high amenity value and the surrounding landuses have to some extent adjusted to its presence, particularly in the case of commercial forestry, then the effect of remaining on this line must be considered in terms of the effect of a new route deviating around the area.

## RULE 3

- R13.14 **Other things being equal, choose the most direct line, with no sharp changes of direction and thus with few angle towers.**

### Note on Rule 3

- a) Where possible choose inconspicuous locations for angle towers, terminal towers and sealing end compounds.
- b) Too few angles on flat landscape can also lead to visual intrusion through very long straight lines of towers, particularly when seen nearly along the line.

## RULE 4

- R13.15 **Choose tree and hill backgrounds in preference to sky backgrounds, wherever possible; and when the line has to cross a ridge, secure this opaque background as long as possible and cross obliquely when a dip in the ridge provides an opportunity.**

- R13.16 Where it does not, cross directly, preferably between belts of trees.

## RULE 5

- R13.17 **Prefer moderately open valleys with woods where the apparent height of towers will be reduced, and views of the line will be broken by trees.**

### Notes on Rules 4 and 5

- a) Utilise background and foreground features to reduce the apparent height and domination of towers from main viewpoints.
- b) Minimise the exposure of numbers of towers on prominent ridges and skylines.

c) Where possible follow open space and run alongside, not through woodland or commercial forestry, and consider opportunities for skirting edges of copses and woods. Where there is no reasonable alternative to cutting through woodland or commercial forestry, the Forestry Commission Guidelines should be followed (Forest Landscape Design Guidelines, second edition, The Forestry Commission 1994 and Forest Design Planning – A Guide to Good Practice, Simon Bell/The Forest Authority 1998).

d) Protect existing vegetation, including woodland and hedgerows, and safeguard visual and ecological links with the surrounding landscape.

## **RULE 6**

R13.18 **In country which is flat and sparsely planted, keep the high voltage lines as far as possible independent of smaller lines, converging routes, distribution poles and other masts, wires and cables, so as to avoid a concatenation or ‘wirescape’.**

### **Note on Rule 6**

a) In all locations minimise confusing appearance.

b) Arrange wherever practicable that parallel or closely related routes are planned with tower types, spans and conductors forming a coherent appearance. Where routes need to diverge allow, where practicable, sufficient separation to limit the effects on properties and features between lines.

## **RULE 7**

R13.19 **Approach urban areas through industrial zones, where they exist; and when pleasant residential and recreational land intervenes between the approach line and the substation, go carefully into the comparative costs of undergrounding, for lines other than those of the highest voltage.**

### **Note on Rule 7**

a) When a line needs to pass through a development area, route it so as to minimise as far as possible the effect on development.

b) Alignments should be chosen after consideration of effects on the amenity of existing development and on proposals for new development.

c) When siting substations take account of the effects of the terminal towers and line connections that will need to be made and take advantage of screening features such as ground form and vegetation.

### **Explanatory Note on Rule 7**

R13.1.10 The assumption made in Rule 7 is that the highest voltage line is overhead.

## **SUPPLEMENTARY NOTES**

a) Residential Areas

R13.1.11 Avoid routeing close to residential areas as far as possible on grounds of general amenity.

b) Designations of Regional and Local Importance

R13.1.12 Where possible choose routes which cause the least disturbance to Areas of Great Landscape Value and other similar designations of Regional or Local Importance.

c) Alternative Lattice Steel Tower Designs

R13.1.13 In addition to adopting appropriate routeing, evaluate where appropriate the use of alternative lattice steel tower designs available where these would be advantageous visually, and where the extra cost can be justified [Note: SHETL have reviewed the visual and landscape arguments for the use of lattice steel towers in Scotland and summarised these in a document titled Overhead Transmission Line Tower Study 2004].

## **R13.2 FURTHER NOTES ON CLARIFICATION TO THE HOLFORD RULES**

### **LINE ROUTEING AND PEOPLE**

R13.2.1 The Holford Rules focused on landscape amenity issues for the most part. However, line routeing practice has given greater importance to people, residential areas etc. The following notes are intended to reflect this.

a) Avoid routeing close to residential areas as far as possible on grounds of general amenity.

b) In rural areas avoid as far as possible dominating isolated houses, farms or other small-scale settlements.

c) Minimise the visual effect perceived by users of roads and public rights of way, paying particular attention to the effects of recreational, tourist and other well-used routes.

## **R13.3 SUPPLEMENTARY NOTES ON THE SITING OF SUBSTATIONS**

a) Respect areas of high amenity value (see Rule 1) and take advantage of the containment of natural features such as woodland, fitting in with the landscape character of the area.

b) Take advantage of ground form with the appropriate use of site layout and levels to avoid intrusion into surrounding areas.

c) Use space effectively to limit the area required for development, minimizing the effects on existing land use and rights of way.

d) Alternative designs of substations may also be considered, eg 'enclosed', rather than 'open', where additional cost can be justified.

e) Consider the relationship of towers and substation structures with background and foreground features, to reduce the prominence of structures from main viewpoints.

f) When siting substations take account of the effects of line connections that will need to be made.

## **R13.4 APPENDIX A TO THE HOLFORD RULES: INTERPRETATION OF THE HOLFORD RULES 1 AND 2 AND THE NOTES TO RULE 2 REGARDING THE SETTING OF A SCHEDULED ANCIENT MONUMENT OR A LISTED BUILDING**

### **INTERPRETATION OF THE HOLFORD RULES 1 AND 2**

#### **Introduction**

- R13.4.1 Rules 1 refers to avoiding major areas of highest amenity value, Rule 2 refers to avoiding smaller areas of high amenity value. These rules therefore require identification of areas of amenity value in terms of highest and high, implying a hierarchy, and the extent of their size(s) or area(s) in terms of major and smaller areas.
- R13.4.2 The NGC Notes to these Rules identify at Rule 1(b) areas of highest amenity value and at Rule 2(a) and (b) of high amenity value that existed in England circa 1992.

#### **Designations**

- R13.4.3 Since 1949 a framework of statutory measures has been developed to safeguard areas of high landscape value and nature conservation interest. In addition to national designations, European
- R13.4.4 Community Directives on nature conservation, most notably through Special Areas of Conservation under the Habitats and Species Directive (92/43/EC) and Special Protection Areas under the Conservation of Wild Birds Directive (79/409/EEC) have been implemented. Governments have also designated a number of Ramsar sites under the Ramsar Convention on Wetlands of International Importance (CM6464). Scottish Office circulars 13/1991 and 6/1995 are relevant sources of information and guidance. In addition, a wide range of non-statutory landscape and nature conservation designations affect Scotland.

#### **Amenity**

- R13.4.5 The term 'Amenity' is not defined in The Holford Rules but has generally been interpreted as designated areas of scenic, landscape, nature conservation, scientific, architectural or historical interest.
- R13.4.6 This interpretation is supported by paragraph 3 of the Schedule 9 to the Electricity Act 1989 (The Act). Paragraph 3 (1)(a) requires that in formulating any relevant proposals the licence holder must have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiological features of special interest and of protecting sites, buildings including structures and objects of architectural, historic or archaeological interest. Paragraph 3 (1)(b) requires the licence holder to do what he reasonably can do to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any flora, fauna, features, sites, buildings or objects.

#### **Hierarchy of Amenity Value**

- R13.4.7 Rules 1 and 2 imply a hierarchy of amenity value from highest to high.
- R13.4.8 Schedule 9 to the Act gives no indication of hierarchy of value and there is no suggestion of a hierarchy of value in either NPPG 5: Archaeology and Planning, NPPG 13: Coastal Planning, NPPG 14: Natural Heritage or NPPG 18: Planning and the Historic Environment. Nevertheless, designations give an indication of the level of importance of the interest to be safeguarded.

## Major and Smaller Areas

- R13.4.9 Rules 1 and 2 imply consideration of the spatial extent of the area of amenity in the application of Rules 1 and 2.

## Conclusion

- R13.4.10 Given that both the spatial extent in terms of major and smaller and the amenity value in terms of highest and high that must be considered in applying Rules 1 and 2, that no value in these terms is provided by either Schedule 9 to the Act, relevant Scottish Planning Policies or National Planning Policy Guidelines, then these must be established on a project-by-project basis. Designations can be useful in giving an indication of the level of importance and thus value of the interest safeguarded. The note to The Holford Rules can thus only give examples of the designations which may be considered to be of the highest amenity value.

## THE SETTING OF A SCHEDULED ANCIENT MONUMENT OR A LISTED BUILDING

- R13.4.11 The NGC note to Rule 2 refers to the setting of historic buildings and other cultural heritage features. NPPG 5: Archaeology and Planning refers to the setting of scheduled ancient monuments and NPPG 18: Planning and the Historic Environment refers to the setting of Listed Buildings.
- R13.4.12 None of these documents define setting.

## R13.5 APPENDIX B TO THE HOLFORD RULES: ENVIRONMENTAL AND PLANNING DESIGNATIONS – EXAMPLES OF DESIGNATIONS TO BE TAKEN INTO ACCOUNT IN THE ROUTEING OF NEW HIGH VOLTAGE TRANSMISSION LINES

### MAJOR AREAS OF HIGHEST AMENITY VALUE

- R13.5.1 In Scotland relevant national or international designations for major areas of highest amenity value include the following identified from Scottish Planning Policies and National Planning Policy Guidelines:
- Special Areas of Conservation (NPPG 14);
  - Special Protection Areas (NPPG 14);
  - Ramsar Sites (NPPG 14);
  - National Scenic Areas (NPPG 14);
  - National Parks (NPPG 14);
  - National Nature Reserves (NPPG 14);
  - Protected Coastal Zone Designations (NPPG 13);
  - Sites of Special Scientific Interest (NPPG 14);
  - Scheduled Ancient Monuments (NPPG 5);
  - Listed Buildings (NPPG 18);
  - Conservation Areas (NPPG 18);
  - World Heritage Sites (NPPG 18); and
  - Historic Gardens and Designed Landscapes (NPPG 18).

## **OTHER SMALLER AREAS OF HIGH AMENITY VALUE**

R13.5.2 There are other designations identified in development plans of local planning authorities which include areas of high amenity value:-

- Areas of Great Landscape Value;
- Regional Scenic Areas;
- Regional Parks; and
- Country Parks.

R13.5.3 The nature of the landscape in these areas is such that some parts may also be sensitive to intrusion by high voltage overhead transmission lines but it is likely that less weight would be given to these areas than to National Scenic Areas and National Parks.

## **FLORA AND FAUNA**

R13.5.4 Legislation sets out the procedure for designation of areas relating to flora, fauna and to geographical and physiogeographical features. Designations relevant to the routeing of transmission lines will include Special Area of Conservation, Special Protection Area, Sites of Special Scientific Interest, National Nature Reserves, Ramsar Sites and may also include local designations such as Local Nature Reserve.

## **AREA OF HISTORIC, ARCHAEOLOGICAL OR ARCHITECTURAL VALUE**

R13.5.5 Certain designations covering more limited areas are of relevance to the protection of views and the settings of towns, villages, buildings of historic, archaeological or architectural value. These designations include features which may be of exceptional interest. Of particular importance in this connection are:-

- Schedule of Ancient Monuments;
- Listed Buildings, especially Grade A and Grade B;
- Conservation Areas; and
- Gardens and Designed Landscapes included in the Inventory of Gardens and Designed Landscapes of Scotland.

## **GREEN BELTS**

R13.5.6 Generally the purposes of Green Belts are not directly concerned with the quality of the landscape.



## **R14. APPENDIX 2 – THE FORESTRY COMMISSION GUIDANCE ON ROUTEING TRANSMISSION LINES**

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R14.1.1 Route transmission lines to follow open space and to run alongside, not through, woodland.

R14.1.2 Where there is no alternative route; a power line through the forest should:

- Avoid areas of landscape sensitivity;
- Avoid the line of sight of important views;
- Be kept in valleys and depressions;
- Not divide a hill into two similar parts where it crosses over a summit;
- Cross skyline or ridges where they drop to a low point;
- Follow alignment diagonal to the contour as far as possible;
- Be inflected upwards in hollows and downwards on ridges.

R14.1.3 In the design of the transmission line corridor, the transmission line within forests should seem to pass through a series of irregular spaces. The forest should appear to meet across the open space in some places so that the corridor does not split the forest completely. The aim should be a corridor of varying character and width, swinging from one side of the line to the other, taking care to avoid irregular but symmetrical spaces. Exit points should be gently asymmetrical bell-mouths. Felling areas should be planned to link with and across the power line corridor and create greater irregularity.



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