

APPENDIX 4.6: DESIGN STATEMENT

A. INTRODUCTION

This Design Statement describes the design principles that have informed the development of the proposed Viking Wind Farm.

B. SITE DETAILS

The proposed wind farm site is located on the central Shetland mainland, extending approximately 9km to the south and 8km to the north of the village of Voe, and at its widest point extending approximately 11km from east to west. It is split into four quadrants: Delting (in the north-east part of the site); Collafirth (north-west); Nesting (south-west); and Kergord (south-east), bounded by main or local roads.

The site consists largely of open moorland with very little standing vegetation above heather height. The ground is mainly blanket bog and peat of varying thickness.

The site is under a variety of ownership, tenancy and crofting arrangements.

The application is for a total of 150 turbines each with a nominal capacity of 3.6MW. Of the total planning application area, 1.68% would be affected during the construction phase, and post construction 1.35% would be affected (314 hectares and 252 hectares respectively).

C. DESIGN PRINCIPLES

The underlying design principle has been to design a wind farm that achieves an appropriate balance between identified technical and environmental constraints and requirements.

Technical requirements

The wind farm design is constrained by the following technical requirements or aspirations:

- To maximise energy output by locating turbines in exposed positions with the greatest wind speed; minimising array effects between turbines; and maximising the capacity of the site;
- to minimise work on areas of difficult ground conditions;
- to meet manufacturers specified track surface gradients, horizontal and vertical alignments and radii, and turbine separations;
- to facilitate construction efficiency;
- to minimise infrastructure costs;

- to retain a degree of flexibility for a ‘design and build’ contract;
- to minimise traffic loads on public highways from importation of stone by identifying sufficient borrow pit resources within the site;
- to minimise volume of peat excavated by employing design and engineering solutions based on floated road construction; and
- to accommodate transportation access constraints.

Environmental requirements

Baseline studies were completed to identify any significant environmental constraints, and this identified that the design should consider:

- Landscape and visual effects;
- effects on ecology including birds;
- noise and vibration effects;
- effects on cultural heritage;
- effects on soil and water;
- effects on roads, traffic and transportation;
- effects on local air quality and climate;
- socio-economic effects;
- effects on telecommunications and aviation; and
- effects on recreation and tourism.

For details of how these topics were addressed during the course of design and assessment, please see chapters 8 to 19 of the Environmental Statement.

D. LANDSCAPE AND VISUAL DESIGN PRINCIPLES

The design strategy for the key elements of the proposed wind farm development incorporated the following objectives;

- To generate a turbine layout which creates a clear statement of the function of the development through a form which relates to the purpose of the wind farm, i.e. wind generation;
- to minimise, by layout design and location, potentially adverse impacts upon sensitive and nationally important landscapes (e.g. the Shetland National Scenic Area) and historic and designed landscapes (e.g. Lunna House);
- to minimise, by layout design and location, potentially adverse impacts upon sensitive visual receptors, notably settlements in close proximity to the proposals (e.g. Aith, Brae, Voe and Laxo);
- to create a wind farm of a size and density that reflects the scale and nature of the landscape in which it is located;

- to relate the turbine layout to the particular landform of the site and surroundings;
- to regard the composition from key viewpoints as an important factor in layout design, to achieve, as far as possible, a simple, balanced composition in terms of the overlap relationship between turbines and skyline effects;
- to pay attention to detailed design issues, including turbine colour, siting, design and form of the control building, and alignment of access tracks to ensure they relate as far as practicable to local landscape character;
- to locate temporary construction operations including borrow pits and construction compounds, ensuring mitigation proposals are in place to facilitate effective restoration so as to minimise potential landscape and visual effects on the local and wider area; and
- to create a design that takes account of the relevant national, regional and local policy and guidance.

The aim of the design optimisation process has been to minimise potential impacts upon sensitive landscapes and visual receptors and to create a turbine layout which is, as far as practicable bearing in mind other site constraints, proportional to the landform of the site and adjacent areas and which seeks to achieve a balanced arrangement of the turbines with the surrounding landform and skyline as seen from key receptors.

E. DESIGN SOLUTION

The design solution includes:

- 150 wind turbines, with a maximum blade tip height of 145m;
- on-site borrow-pits;
- on-site control rooms connected to all turbines via underground cabling;
- dedicated site accesses which will largely avoid villages and settlements;
- landscape measures (developed in collaboration with project ecologists) in terms of heath and peat bog reinstatement and native woodland planting where appropriate(as detailed in Chapter 10 and Appendix 10.9).

The design solution meets the technical requirements and these are balanced against environmental constraints, including those to reduce potential adverse impacts upon sensitive landscape and visual receptors, and reduce impact on migrating and breeding birds in the study area. The design process has resulted in a significant reduction in the number of turbines proposed (particularly in the Collafirth quadrant) and reduction in the appearance of bunching of turbines when seen from key viewpoints.

Key landscape and ecology proposals involve the extensive restoration of blanket bog and the reintroduction of native scrub species, with associated ecological and landscape benefits.

The ecological, soil and water constraints have been addressed by adopting best practice techniques for all construction and operational works to ensure water and soil quality is not

impacted within the study area. For more detail please see the relevant chapters of the Environmental Statement.