2 Site Selection & Design Iteration

Contents

2.1	Introduction	2-1
2.2	Background	2-1
2.3	Site Selection and Alternatives	2-1
2.4	Design Process	2-2
2.5	Summary	2-5

This page is intentionally blank.

2 Site Selection & Design Iteration

2.1 Introduction

2.1.1 This Chapter provides a description of the site selection process and design iterations that were undertaken prior to arriving at the final design which is described in Chapter 3.

2.2 Background

2.2.1 The Applicant proposes to construct the Proposed Development within the South Ayrshire Council (SAC). The principles of the EIA process, that site selection and project design should be an iterative constraint-led process, have been followed as part of the Proposed Development. This has ensured that potential negative impacts, as a result of the Proposed Development, have been avoided or minimised as far as reasonably possible.

2.3 Site Selection and Alternatives

2.3.1 In accordance with Schedule 4 (2) of the EIA Regulations, reasonable alternatives (in terms of project design, technology, location, size and scale and characteristics) of the Proposed Development have been considered. The Energy Consents Unit of the Scottish Government (ECU) agree that only if an applicant has considered alternative sites, either in a national or local authority context, would Scottish Ministers expect such studies to be provided in an EIA report. Alternative sites have not been considered in the case of the Proposed Development and so the matter is not considered further in the EIA Report.

2.3.2 The main alternatives including design, turbine specification, location, size and scale have been considered for the Proposed Development. This Chapter explores these options and explains how the final design of the Proposed Development has evolved.

Location

2.3.3 The Proposed Development is located approximately 4.8 km south of Straiton, 11.3 km south-west of Dalmellington and 17.4 km east of Girvan in South Ayrshire, at site centre British National Grid (BNG) NS 37546 00527.

2.1.1 In order to identify a suitable site, the following technical and environmental factors that influence the feasibility of a potential wind farm were taken into account:

- No international or national statutory designations for landscape and nature conservation in or within close proximity of the turbine area of the site;
- Initial desk-based studies and onsite wind data suggest that there is likely to be sufficient wind resource, and the site is available for wind energy development;
- Suitable terrain and topography for a wind energy development;
- Available options to connect the Proposed Development to the electricity grid;
- Good access from public road network particularly for longer blades which allows consideration of larger turbines to make best use of the expected wind resource;
- Potential to use and upgrade much of the existing forestry track on both the northern and western access options; and
- Reasonable distance away from nearest residential properties and settlement.

2.4 Design Process

Design Principles

2.4.1 In EIA, the identification of constraints should continue throughout the design process as more detailed surveys reveal additional constraints to development. In this way, the findings of the technical and environmental studies can be used to inform the design of a development, and hence achieve a 'best fit' within the environment of the Proposed Development.

2.4.2 The main landscape and visual design principles and other considerations that were identified comprised of the following:

- A balanced group of turbines when seen from key receptors in the surrounding landscape;
- Consideration of cumulative landscape and visual impacts from the Proposed Development and from key views in the surrounding area;
- Proximity to and visibility from residential properties and settlements; and
- Visibility from Merrick Wild Land Area (WLA).

2.4.3 The Applicant adopted the following principles during the design iteration process to ensure the final design of the Proposed Development was the most suitable for the site:

- Avoided locating turbines on the highest points of the site to minimise visibility;
- Limited the proximity to the closest residential receptors;
- Limited impact on peatland where possible;
- Respected other environmental constraints;
- Maximised the potential electricity generation and storage of renewable energy; and
- Utilised existing infrastructure (tracks) as far as practicably possible.

2.4.4 All site constraints are discussed in more detail in Chapter 3 and are shown in Figure 3.1 and 3.2. The technical and environmental constraints identified assist in positioning the turbines so that they can capture the maximum energy possible within a suitable area. It is important to note that the identification of a constraint does not necessarily result in the exclusion of that area from the potential development envelope; rather it means that careful thought and attention was paid to the constraint and the design altered appropriately. The key constraints considered during the design process included:

- Topography;
- Landscapes and visual constraints;
- Presence of ornithology, protected habitats and species;
- Ground conditions (including peat);
- Presence of watercourses, private water supplies and related infrastructure;
- Presence of cultural heritage features;
- Location of residential properties – potential impacts on residential visual amenity, proximity to noise sensitive receptors; and potential for shadow flicker effects;
- Aviation;
- Key recreational and tourist routes;
- Forestry; and

- Presence of power lines, pipelines and telecommunications links.

2.4.5 The identification of constraints continued throughout the design evolution process as more detailed surveys refined the development envelope.

2.4.6 A description of how the various environmental and technical disciplines have contributed to the design through detailed assessment is described below. Information in respect of the survey work undertaken is provided in the technical chapters of this EIA Report.

Layout Evolution

2.4.7 Twenty-three design iterations for the Proposed Development were proposed, with Layout W being the final iteration. The key evolutions to the layout have been highlighted below:

2.4.8 Layout A was the initial layout (shown in Figure 2.1) with 12 turbines up to 200 m to tip height to based on known site constraints at the time.

2.4.9 Layout C (shown in Figure 2.1) was developed following Scoping and took into account the findings of initial environmental surveys and feedback from wider consultees. The site boundary remained the same and included the same number of turbines as previous iterations. However, the northern most turbines were relocated to avoid areas identified as being deep peat.

2.4.10 Layout E (shown in Figure 2.1) was the first iteration to reduce the number of turbines from twelve to ten following Scoping and took into account the findings of initial environmental surveys. This iteration was the first attempt to create a northern and southern cluster of turbines within the site. A turbine was consequently removed from both the central region of the site and the far south western extent of the site.

2.4.11 Layout I (shown in Figure 2.1) moved one of the southern region turbines to the track alongside an existing forestry track to the south of the main developable area in order to utilise existing infrastructure. This left one fewer turbine located within the southern cluster of turbines, with it being pulled back from the south western area of the site.

2.4.12 Layout J sees the northern cluster of turbines moved further south, merging the cluster back into the southern region to minimise potential noise impact on the property at Knockskae. The number of turbines is still consistent with 'Layout I' and can be seen in Figure 2.2. The movement of tracks further south, and to avoid creating new water crossings to the west of the site, increases the distance of tracks within the site boundary.

2.4.13 Layout N (shown in Figure 2.2) moved turbines in order to increase capacity to 11 by allowing one additional turbine to be included in this design iteration, while still maintaining watercourse buffers, an appropriate distance from noise receptors, and maintaining turbine locations outwith areas of deep peat. Design input from landscape architect (throughout) including draft visualisations from key receptors, helped to ensure turbine layouts minimised landscape and visual effects, including in the Merrick WLA.

2.4.14 Layout Q (shown in Figure 2.2) sees the number of turbines reduced from eleven to nine to minimise visual impacts, increase distance from woodland buffers (minimising ecological impacts) and further reducing the potential noise impacts.

2.4.15 Layout S (shown in Figure 2.2) sees the renumbering of turbines to T1 to T9 for clarity. The tip heights of turbines T4, T5 and T6 are reduced to 180 m to further minimise landscape and visual effects within the Girvan Valley and from Straiton. The remaining turbines are at 200 m tip height (T1 – T3 and T7 – T9).

2.4.16 Layout U (shown in Figure 2.3) sees the site boundary updated to include the northern and western access tracks. Both access routes have been assessed and will be included in the planning application, but only one route will be taken forward.

2.4.17 Layout V (shown in Figure 2.4) is the Design Chill Layout. The Northern access route is modified to follow the forestry access track currently under construction. The new forestry access track is due to be complete by time of the planning application. If the Northern access route is taken forwards

as the preferred option, the forestry track will be utilised by the Proposed Development, with upgrades made as required.

2.4.18 Layout W (shown in Figure 2.5) is the Design Freeze Layout. This is the final iteration which has very minimal changes from the Design Chill Layout. Three turbine locations (T4, T7 and T8) and track layout has been adjusted marginally to account for topography, deep peat, visual impact and buildability.

Other Site Infrastructure

Site Access & Site Tracks

2.1.2 The proposed access to the site has not varied throughout the design process. It is proposed that the blade components will be transported into to King George V (KGV) Dock, Glasgow. All other components will be landed at the Port of Ayr and continue to the proposed site entrance. The blade components would be moved from KGV Dock to the site under escort. The public road network would be utilised for the majority of the delivery route. Both the northern and western delivery routes are consistent up to Cloyntie and separate to approach from the north and west. Both routes have been identified and assessed however, only one route to the site will be progressed and utilised. This will be decided prior to construction. Both the northern and western routes include road sections off the public road network and will utilise existing infrastructure (e.g. forestry tracks) where possible.

2.1.3 All access tracks have been designed to follow routes which do not include excessive gradients in order to ensure the safe delivery of turbine components and associated parts.

Borrow Pits

2.4.19 Borrow pits are required as a source of rock to be used in the construction of the tracks, hardstandings and foundations. Potential locations for the borrow pits were identified based upon a review of geological mapping and site reconnaissance. The location of each was considered and refined with respect to the site infrastructure and environmental constraints.

2.4.20 During design optimisation, the locations of infrastructure and track design was refined in order to minimise the volume of earthworks and cut and fill required to construct the Proposed Development. The total number and size of borrow pits was selected to meet the estimated volume of rock required to construct the tracks, hardstandings and foundations.

2.4.21 If the Proposed Development was consented, further intrusive geotechnical investigation would be carried out to identify which of the five borrow pit locations would yield the required quality of rock for each aspect of the infrastructure. It is likely that not all five borrow pits would be needed, but this gives flexibility in case there is low yield identified at any location.

Temporary Construction and Gatehouse Compounds

2.4.22 The temporary construction and gatehouse compounds have been located with the aim of limiting the effects on sensitive habitats and deep peat. Steep areas have been avoided to reduce the requirement for cut and fill. The construction and gatehouse compounds have also been located for practical purposes; to control traffic entering the site, to be located close to the turbines and to facilitate construction of the substation and energy storage facility.

Substation and Energy Storage Facility

2.4.23 The substation and energy storage facility will be located to the south-east of the site and on land which avoids sensitive habitats, areas of deep peat and steep slopes.

Micrositing

2.4.24 In order to be able to address any localised environmental sensitivities, unexpected ground conditions or technical issues that are found during detailed intrusive Site investigations and construction, it is proposed that agreement is sought for a 50 m micrositing allowance around windfarm infrastructure. The technical assessments (presented in Chapters 6 to 17) have considered

the potential for micrositing and it is considered that the proposed infrastructure could be microsited within 50 m without resulting in potential new effects. During construction, the need for any micrositing would be assessed and agreed with the onsite Environmental Clerk of Works (ECoW).

2.5 Summary

2.1.4 The EIA Report is based on the final layout selected for the Proposed Development, as described in detail in Chapter 3. The final layout comprises 9 turbines at heights of 180 m (T4, T5 and T6) and 200 m (T1, T2, T3, T7, T8 and T9) and two proposed access routes (only one to be utilised), crane hardstandings, substation and energy storage facility, construction and gatehouse compounds, borrow pit search areas and one permanent meteorological mast.

2.5.1 The final Proposed Development layout has been informed by a robust design iteration process, taking into account potential environmental, landscape and visual impacts and their effects, physical constraints, and health and safety considerations. The information used to inform the design iteration process included baseline data, review of preliminary visualisations, ongoing impact assessments and wind yield optimisation.

2.5.2 The EIA process has been an iterative one, so that potential effects identified throughout the EIA and design process could be avoided and overall impacts of the Proposed Development avoided or reduced.

2.5.3 The assessment of potential effects of the Proposed Development is addressed in Chapters 6 to 17 of the EIA Report. The residual effects after mitigation and good practice have been applied are provided in each relevant technical chapter and are summarised within Chapter 19.