

2 Site Selection and Design Iterations

Contents

2.1	Introduction	2-1
2.2	Site Selection	2-1
2.3	Opportunities and Constraints	2-2
2.4	Design Principles	2-4
2.5	Proposed Development Design Iterations	2-5
2.6	Do-Nothing Scenario	2-11
2.7	Summary	2-11
2.8	References	2-12

This page is intentionally blank.

2 Site Selection and Design Iterations

2.1 Introduction

2.1.1 The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (Scottish Government, 2017) require that the EIA Report must include "*a description of the reasonable alternatives studied by the developer, which are relevant to the development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment*" (Regulation 5(2)(d)). In addition, Schedule 4 paragraph 2 of the EIA Regulations specifies that the EIA Report must include "*a description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.*"

2.1.2 This chapter provides a description of the site selection process and design iterations that were undertaken prior to arriving at the final design of the Proposed Development, which is described in detail in Chapter 3 (Proposed Development).

2.2 Site Selection

2.2.1 The Applicant is a consortium of over fifty mainly Shetland-based companies. Due to the nature of the Applicant, the Applicant was determined that the Proposed Development is located on the Shetland Islands to ensure that the benefits of renewable energy development are realised by the communities in Shetland.

2.2.2 The Shetland Islands have some of the best wind resources in the UK with capacity factors for existing wind farms far exceeding the averages achieved in England and Wales (30.9%) and mainland Scotland (35.2%) (BEIS, 2018). Burradale Wind Farm¹ which has been operational since 2001 has an average capacity factor of 52%, an increase of 16.8% compared to the estimated capacity factor for new developments in Scotland.

2.2.3 This position is supported by Shetland Islands Council's Local Development Plan (2014), within which the Council states that Shetland is well placed for the harnessing of renewable resources such as wind, wave and tidal energy and that the Council is committed to delivering renewable energy developments that contribute to the sustainable development of Shetland and optimise Shetland's renewable energy potential.

2.2.4 The Applicant undertook a constraints and opportunities review of the Shetland Islands to determine the most appropriate location for a large-scale wind farm development. This review included consideration of:

- Scottish Planning Policy (SPP) (Scottish Government, 2014);
- Shetland Islands Council's adopted planning policies and relevant supplementary guidance;
- international, national and local designated sites;
- transport facilities;
- operating airports;
- residential receptors; and
- other operational and consented but not built, wind farm developments or proposed wind farm developments where a planning application has been submitted but not determined.

¹ <https://www.burradale.co.uk>

- 2.2.5 The above process identified the Proposed Development site on north-west Yell (refer to **Figure 1.1**) as the site with the greatest potential for a large-scale wind farm development, with the minimal environmental constraints.

2.3 Opportunities and Constraints

Opportunities

- 2.3.1 The Proposed Development site benefits from a number of opportunities as a wind farm site, these include:

- status within planning policy;
- wind resource and topography;
- no ecological, ornithological or geological designations within the site boundary;
- limited cultural heritage resource;
- distance from residential receptors;
- does not lie within any national landscape designations;
- distance from aviation receptors; and
- minimal land use.

Planning Policy

- 2.3.2 The Proposed Development site falls within an area where a wind farm would be acceptable in principle under the Shetland Local Development Plan Onshore Wind Energy Supplementary Guidance (Shetland Islands Council, 2018).

- 2.3.3 Although classified within an Area of Significant Protection on account of the site's carbon rich soil/deep peat (refer to Map 2, Shetland Islands Council, 2018), wind farm development is permitted within such areas subject to demonstrating that *"any significant effects on the qualities of these areas can be substantially overcome by siting, design or other mitigation"*.

Wind Resource and Topography

- 2.3.4 The Shetland Islands have a very high wind resource and are one of the windiest locations in the United Kingdom. Burradale Wind Farm, which has been operational since 2001, has an average capacity factor of 52%², far exceeding the Scottish average for new wind farms of 35.2% (BEIS, 2018). The Applicant has aimed to capitalise upon this by maintaining a 3x5 spacing of the turbines through the design process.

- 2.3.5 The Proposed Development site is a largely open landscape with an undulating topography. The land to the west and north of the Proposed Development site falls away to the coastline, meaning that there is little in the way of topographical interference with the available wind resource.

Ecological, Ornithological and Geological Designations

- 2.3.6 There are no ecological, ornithological or geological designated sites within the Proposed Development site boundary (refer to **Figures 6.3** and **7.1**).

Cultural Heritage Resource

- 2.3.7 There are no designated cultural heritage receptors within the Proposed Development site boundary. There are three designated sites within the 1 km of the Proposed Development site boundary, Burgi Geos promontory fort Scheduled Monument, Sellafirth Church C-Listed Building

² <https://www.burradale.co.uk/>

and Haa of Dalsetter C-Listed Building, none of which would experience direct impacts from the Proposed Development (refer to **Figures 9.1** and **9.2**).

- 2.3.8 There are a number of non-designated archaeological sites within the site boundary, however the majority of these, with the exception of ones on Hill of Markamouth and Fugla Field are associated with watercourses and waterbodies on site. Wind farm design aims to avoid watercourses and waterbodies where possible and therefore the non-designated archaeological sites do not generally provide a constraint to the design of the Proposed Development.

Residential Receptors

- 2.3.9 The remote location of the Proposed Development site means that the number of residential receptors which will be impacted, visually or acoustically, is limited (refer to **Figure 2.1**). The topography of the Proposed Development site and surrounding area also provides shielding of the residential receptors on the north-eastern coast of Yell. Similarly, although the Proposed Development will be visible from the western coast of Unst, visibility decreases rapidly with little visibility from the majority of Unst.

Landscape Sensitivity

- 2.3.10 There are no confirmed landscape designations within the Proposed Development site boundary. The Shetland Islands Council's Supplementary Guidance: Local Landscape Areas (Shetland Islands Council, 2014) which is currently draft and has not yet been approved, identifies a Local Landscape Area around the north and west coastline of Yell which partially enters the Proposed Development site boundary (Proposed Local Landscape Area 16: Gloup Voe to Bluemull Sound and Proposed Local Landscape Area 17: West Sandwick to Gloup Holm). The majority of the Proposed Development infrastructure remains outwith these proposed Local Landscape Areas (refer to **Figure 5.1.2**).
- 2.3.11 Shetland Islands Council (SIC) guidance on the capacity for wind farm developments within Shetland identify the site as being a moderately sensitive landscape with capacity for several small wind farms or one medium – large wind farm. The guidance recommends that wind farm development here should avoid effects on areas of sensitive vegetation and be sited away from the coastal edge or areas designated for their natural heritage value.

Aviation Receptors

- 2.3.12 The closest aviation receptors are Scatsta Airport 30 km south of the Proposed Development site and Saxa Vord radar 20 km to the north-east of the Proposed Development site (refer to **Figures 13.1** to **13.4**). Radar propagation modelling has demonstrated that turbines on the Proposed Development site would be completely screened by terrain from the Compass Head radar used at both Sumburgh and Scatsta airports and will have no effect on the performance of the radar.

Land Use

- 2.3.13 The Proposed Development site is currently used for sheep-grazing by the landowners. During operation the site will continue to be used for sheep-grazing with no restrictions bar controlled access to the substation and to areas of habitat management and restoration.

Constraints

- 2.3.14 Like any potential wind farm site, the Proposed Development site also has some environmental constraints which have been taken into consideration during the design iteration process. These are principally:
- ornithological receptors;
 - varying depths of peat across the site; and
 - numerous watercourses and waterbodies on the site.

Ornithology Receptors

2.3.15 The Shetland Islands are renowned for their bird life and have numerous European, national and local designations on land and at sea to protect birds. None of these designations cover the Proposed Development site, however some birds which are designated under Annex 1 of the EU Birds Directive use the Proposed Development site for nesting, breeding and feeding.

2.3.16 In order to understand the ornithological constraints of the site, the Applicant has undertaken surveys of two breeding seasons and one non-breeding season across the Proposed Development site. This identified nest locations and key habitats for protected species which were then considered during the design of the Proposed Development (refer to Chapter 6 Ornithology for further details).

Peat

2.3.17 The majority of the Proposed Development site is covered in peat of varying depths, from shallow peat of less than 1 m depth to pockets of peat greater than 4 m depth. Detailed peat probing across the site has mapped the peat depths, and minimising the infrastructure located on deep and/or unstable peat has been a key priority in the design of the Proposed Development (refer to Chapter 10 Geology, Peat, Hydrology and Hydrogeology for further details).

Watercourses and Waterbodies

2.3.18 The Proposed Development site contains numerous watercourses and waterbodies, including the Gossa Water which is the raw water supply for the population of Yell. These watercourses and waterbodies have been surveyed by the Applicant and, where possible, the design of the Proposed Development infrastructure has minimised the number of watercourse crossings required (refer to Chapter 10 Geology, Peat, Hydrology and Hydrogeology for further details).

2.3.19 The Applicant has worked closely with Scottish Water to ensure that impacts to the catchment of Gossa Water, and therefore to the raw water supply, are avoided and minimised, and this has been a key consideration during the design process.

2.4 Design Principles

2.4.1 Taking into consideration the above constraints and opportunities, the following principles were adopted during the design iterations undertaken by the Applicant to ensure that the final design of the Proposed Development was the most suitable for the site:

- maximising wind yield and maintaining adequate spacing between turbines;
- avoiding peat of greater than 2 m depth where reasonably practicable;
- a minimum buffer of 1 km being maintained around residential dwellings in the surrounding area and the proposed turbines;
- a minimum buffer of 50 m being maintained around watercourses and disturbance limited to within the Gossa Water Catchment (as per best-practice guidance);
- respecting the constraints of geomorphological features;
- application of a 500 m buffer between turbines and known breeding locations of Annex 1 birds and provision of passageways between turbines to the sea for Annex 1 birds taking into consideration the ornithological consultation responses received at Scoping;
- maintaining a 200 m buffer around listed buildings and scheduled monuments;
- ensuring that the Proposed Development is compatible with other planned and consented wind farms on Yell; and
- avoiding inconsistent turbine spacing, such as relatively large gaps, outliers or excessive overlapping turbines to minimise visual confusion and ensure a balance / compact array from key views.

2.4.2 The design opportunities and constraints are shown on **Figure 2.1**.

2.5 Proposed Development Design Iterations

2.5.1 Following the selection of the site location (refer to Section 2.2 above) the Applicant has undertaken multiple design iterations of all aspects of the Proposed Development including the site boundary, the turbine layout and the infrastructure layout. This Section describes the principal design iterations that have been undertaken as the Applicant has sought to maximise the number of turbines on the site, whilst minimising the environmental effects of the constraints identified above.

2.5.2 Throughout the design process and the different iterations, the Applicant has always considered a maximum turbine height of 200 m. This tip height is in line with current industry standards and available modern turbine models.

Layout A

2.5.3 The initial site boundary and turbine layout were designed to maximise the capacity of the area. The site boundary stretched from the north coast of Yell to the RSPB Lumbister nature reserve in the south, and from the west coast of Yell to the the Dalsetter Hill Road (known locally as the Old Cullivoe Road). Within this boundary 63 turbines were placed, taking into consideration the environmental constraints known at the time, namely watercourse and waterbodies, residential receptors and the Schedule Monument of Burgi Geos (refer to **Figure 2.2**).

2.5.4 Layout A was submitted with the EIA Scoping Opinion Request to the Scottish Government's Energy Consents Unit (ECU) in October 2017.

Layout B

2.5.5 Following submission of Layout A to ECU as part of the EIA Scoping Opinion Request, concerns were raised by Scottish Natural Heritage (SNH) and the Royal Society for the Protection of Birds (RSPB) regarding the proximity of turbines to East Mires and Lumbister Site of Special Scientific Interest (SSSI) designated for breeding birds, in particular red-throated divers (*Gavia stellate*), dunlin (*Calidris alpine schinzii*) and snipe (*Gallinago gallinago*) and to the RSPB reserve of Lumbister.

2.5.6 The Applicant addressed these concerns by reducing the number of turbines to 50, pulling the development north, away from the SSSI and RSPB reserve, giving Layout B (refer to **Figure 2.2**). This layout continued to aim to maximise the number of turbines within the area, taking into consideration watercourses and waterbodies present in the area. Layout B was re-submitted to ECU in February 2018 with a request for an updated EIA Scoping Opinion.

Layout C

2.5.7 Following receipt of the EIA Scoping Opinion, initial consultation with the local community through the Community Liaison Group and the public exhibitions, and the provision of the initial environmental survey baseline the Applicant reviewed the design of the turbine locations. This took into consideration:

- a 500 m buffer surrounding identified Annex 1 bird nests;
- avoiding peat deeper than 2 m depth where possible;
- increasing the distance between Cullivoe and Haa of Houlland and the turbines; and
- the removal of turbines from the Farmed Settled Lowland and Coast Landscape Character Area (LCA).

2.5.8 Turbines were removed from the far north (North Neeps) and from the far north-east (Sandwater Hill) areas so that the Proposed Development is not within the Farmed Settled Lowland and Coast LCA. This also improved the views of the turbines from viewpoints on Unst as the turbine array appeared more cohesive and less fragmented along the North Neeps peninsula.

- 2.5.9 The removal of the northern turbines had the additional benefit of increasing the distance between turbines and the residential properties at Gloup and Haa of Houland from where visibility of the Proposed Development decreased due to the intervening Hill of Bakkanalee and Sandwater Hill.
- 2.5.10 Turbines were also removed from the Fiogna Field area and Muckle Bratt-houll area in the east to increase the distance between the residential properties at Cullivoe and the turbines. This ensured that maximum shielding of the turbines was achieved by the hills of Moss Houll and Tittynans Hill.
- 2.5.11 In the centre of the site, turbines were removed from the 500 m buffer placed around known nesting sites of Annex 1 bird species to minimise disturbance impacts during operation to these species.
- 2.5.12 Layout C also aimed to remove as many turbines as possible from areas modelled as having more than 2 m depth of peat, whilst still maintaining a 3x5 spacing of the turbines in order to limit impacts to their operating capacity.
- 2.5.13 These changes to the turbine layout reduced the number of turbines from 50 in Layout B to 31 in Layout C (refer to **Figure 2.3**).

Layout D

- 2.5.14 Layout D built on the design of Layout C and continued to consider impacts to Annex 1 birds, taking into consideration the added information from hydrology surveys which identified numerous summit pool complexes across the site.
- 2.5.15 The turbine adjacent to Burn of Blackies Glen and the turbine next to Cullig Mires (both in the north-west of the site) were removed from the design to permit Annex 1 birds nesting in the centre of the site turbine free passage to the west coast of Yell. Similarly, the turbine located to the west of Omand's Dale was also removed to create a turbine free passage between Flongna Field and Knowe of Thistledale north to Gloup Voe and the north coast of Yell.
- 2.5.16 Numerous summit pool complexes were identified on the Hill of Vigon so the turbine previously near the summit was relocated north, outwith this area. Micro-siting also occurred to the turbines near Little Bratt-houll and Grud Waters to remove them from the summit pool complexes.
- 2.5.17 Further micro-sighting of other turbines occurred following the removal and movement of the turbines described above to maintain the 3x5 spacing of the turbines.
- 2.5.18 These changes reduced the turbine numbers from 31 in Layout C to 29 in Layout D (refer to **Figure 2.4**).

Layout E

- 2.5.19 Layout E continued to fine-tune the layout with turbines being micro-sited to improve the predicted capacity of the Proposed Development and to remove and reduce potential effects (refer to **Figure 2.5a**).
- 2.5.20 For example, it was noted that the turbines to the east of Knowe of Thistledale were within the 50 m watercourse buffer, so they were micro-sited out with the buffer. The turbine located between Burn of Thistledale and Burn of Hildigill was very close to a summit pool complex so was micro-sited to the east outwith the complex.
- 2.5.21 The turbine numbers remained at 29 for Layout E and this was put forward within the Gatecheck 1 Report (refer to Appendix 4.4).
- 2.5.22 An initial access track layout and potential locations for the substation and borrow pit search areas were designed on the basis of this turbine layout, taking into consideration the topography and the environmental constraints of the site. In addition, the turbine numbering was fixed from 1-29. This layout underwent detailed peat probing to determine the depth of peat at the exact locations of the infrastructure (refer to **Figure 2.5b**).

Layout F

2.5.23 Following completion of the detailed peat probing shown on **Figure 2.5b** and the hydrology survey, the Proposed Development design was reviewed to identify where infrastructure in Layout E located on deep peat could be moved to shallower peat. Feedback was also received from Scottish Water on the turbine layout following submission of the Gatecheck 1 Report. The following amendments were made (as shown on **Figures 2.6a** and **2.6b**):

- T1 – the turbine and crane pad were moved east by approximately 40 m away from the peat measuring over 2 m depth which were on the western side of the crane pad.
- Access track between T1, T2 and T3 – the access track between T1 and T2 was straightened and the access track between T1 and T3 removed with a linkage instead provided directly between T2 and T3. This removed the track which passed through areas of peat greater than 2 m depth north of T3.
- T3 –the turbine and hardstanding were moved south-east to accommodate the new access track link between T2 and T3 and to avoid deeper peat to the south of the original location of T3.
- T4 – the majority of the turbine and crane pad were found to be on an area of peat ranging from 1.5-3 m in depth. The turbine and crane pad were therefore moved to the east away from the areas of deep peat to shallower areas. Although this movement placed the turbine within an area of summit pool complexes it was felt that there would be greater adverse effects to the environment if the turbine were to remain in the deeper peat. The access track connecting T4 to T5 was amended to link to the new location of T4.
- T5 – the orientation of the crane pad T5 was altered slightly from a north-south direction to north-west to south-east direction to maximise shallower peat and to accommodate the revised access track to T4.
- T7 – the crane pad of T7 was found to be on a large area of peat up to 3 m depth. The crane pad was therefore rotated from having the turbine at the south point of the crane pad to the north point of the crane pad.
- T8 and T9 – minor adjustments were made to the orientation of the crane pads of T8 and T9 to allow for smoother access track connections.
- T12 – the turbine moved northwards by approximately 50 m to remove the crane pad from a summit pool complex.
- T13 – turbine T13 was moved approximately 70 m to the north-west and the orientation of the crane pad altered from running in a west-east direction to running in a north-south direction. This removed the turbine and the crane pad from areas of peat which measured up to 4 m in depth. The access track at the location T13 was then altered to accommodate this revised location.
- T14 – although the peat depths at T14 increased, the turbine was moved approximately 75 m to the north to increase its distance from Gossa Water (from 93 m to 172 m) and to locate the turbine outwith the Gossa Water catchment boundary provided by Scottish Water.
- Access track between T15 and T13 – in Layout E the access route to the northern turbines was via an access track between T19 and T24. However, the detailed peat probing found significant areas of deep peat along this route with greater than 4 m depth in some locations. Therefore a new connection between the southern and northern turbines was designed between T15 and T13 where the peat is shallower.

- T15 – the turbine and crane pad was found to be on peat depths of 3-4 m and so was moved approximately 70 m north on to an area of shallower peat.
- T16 – similar to T15, the southern edge of the crane pad of T16 was found to be in peat 2-4 m deep so the turbine and crane pad were moved 40 m north into shallower peat. The access track between turbines T15 and T16 was amended to reflect their change in location.
- T18 – the crane pad was found to be in very deep peat ranging from 1.5 m to over 4 m in depth. The turbine location was not changed but the crane pad was moved westwards so that it is orientated in a north-west to south-east direction in an area of shallower peat.
- Access track between T13 and T22 – following the relocation of the crane pad of T18 described above, the access track was also moved north into an area of shallower peat.
- Borrow pit search area adjacent to T19 – the southern part of the borrow pit search area was located in deeper peat (up to 3 m depth) so the search area was moved to the north-east towards shallower peat.
- Access track between T19 and T24 – as mentioned above, this access track was found to be in very deep peat and was therefore removed from the design. An alternative access between T15 and T13 was added.
- T20 – the crane pad of T20 was re-orientated slightly to the south to permit the re-design of the junction for the site access track.
- T21 – the turbine was found to be located in peat 2-3 m deep and was therefore moved south by approximately 20 m into shallower peat.
- T22 – the turbine was moved westwards by approximately 60 m so that the turbine foundations would be located in peat of less than 1 m depth.
- T23 – the turbine was located on the edge of a summit pool complex so was moved 40 m eastwards and the crane pad re-orientated to a north-south direction. This had the additional benefit of removing the crane pad from the small watercourses which previously entered the north section of the crane pad.
- Access track between the Old Cullivoe Road and T25 – this access track (designed solely for use in emergencies) was removed from the design due to it being located on deep peat and requiring a watercourse crossing.
- Old Cullivoe Road to T24 – following the removal of the emergency access track detailed above a new section of access track was added between the Old Cullivoe Road and T24 solely for emergency purposes.
- T25 – the orientation of the crane pad was moved slightly south for T25, away from an area of 2-3 m deep peat on the top north-eastern corner of the crane pad.
- Borrow pit search area adjacent to T25 – the borrow pit search area immediately to the west and east of T25 were removed from the design due to deep peat and the numerous field drains passing through them.
- Borrow pit search area north of T25 – following the removal of the borrow pit search areas detailed above, this borrow pit search area was expanded to cover a larger area.
- T27 – the turbine and crane pad were located on deep peat (1.5 – 4 m depth) and were therefore moved approximately 60 m north to an area of shallower peat. This had the additional benefit of ensuring the turbine was located outwith the 500 m Annex 1 bird buffer.

- Access track between T28 and T29 – the access track between T28a and T29 in Layout E crossed multiple watercourses and drains. The track was therefore re-designed and moved to the west. This re-location requires a bigger crossing of the Burn of Hildigill, however this was deemed to have fewer environmental effects than crossings of multiple watercourses.
- T29 – the re-design of the access track described above resulted in the re-orientation of the crane pad of T29 from a west-east direction to a north-south direction.

Layout G

2.5.24 Following the number of changes made in Layout F, a detailed engineering review was undertaken to ensure the proposed design was feasible from a construction and operation perspective. This review led to the following alterations (refer to **Figures 2.7a** and **2.7b**):

- Access track between T1, T2 and T3 – the design of the access track in Layout F meant that there would be three crossings of the Burn of Vigon, two between T2 and T3 and one between T1 and T2. The access track was therefore re-designed to create one track leaving T2 which splits to lead to T1 and T3 after the Burn of Vigon so that only one crossing would be required. This also decreased the slope of the track and allowed the track to follow a similar gradient round the Hill of Vigon.
- T1 and T2 – to permit the change in access track described above, the crane pads and track leading to T1 and T2 were re-orientated slightly to ensure smooth curvature of the track.
- Borrow pit search area at T1 - the borrow pit search area at T1 was re-designed so that it follows the contours of the hillside rather than cutting directly into the hill.
- Construction compound near T6 – the Applicant identified a requirement for a temporary construction compound in the north-western section of the site and identified a suitable location to the north of T6.
- T7 – Although the crane pad of T7 had been re-orientated to reduce the volume of peat to be excavated, it was determined that this would not permit the safe delivery and erection of the turbine components so it was returned to its original location.
- Access track between T12 and T13 – this track was straightened slightly to decrease its length and the sharpness of the bends.
- T13 – the location of the crane pad and blade laydown area were switched to place the crane pad further from the access track.
- Substation – an indicative location for the substation was identified on the north side of the access track between T16 and T19.
- Borrow pit search area at T19 – the borrow pit search area was moved to the north away from a number of small watercourses.
- Borrow pit search area at T23 – the borrow pit search area to the west of T23 was moved approximately 110 m closer to T23 to an area with shallower peat (from depths 1-2 m to depths of less than 0.5 m).
- Potential borrow pit search areas adjacent to the Old Cullivoe Road were removed from the design to minimise traffic along the Old Cullivoe Road and the transportation distance for aggregate.
- Emergency access – the emergency access between T24 and Old Cullivoe was slightly re-aligned to provide a shorter distance and better connectivity.

- Junction of the access track from T23 to T23 – it was determined that the location of this junction in Layout F had two main watercourses and numerous drains and the environmental effects could be minimised by moving the junction south away from the watercourses.
- Borrow pit search area at T25 – the borrow pit search area at T25 was increased to provide a greater search area for aggregate on site.
- T28 – the crane pad of T28 was slightly re-aligned and a satellite temporary construction compound placed adjacent to the crane pad.
- T29 - the crane pad for T29 was re-orientated to the east to avoid a summit pool complex.
- Access track between T28 and T29 – the access track was re-aligned to move the watercourse crossing of Burn of Hildigill further to the east and to accommodate the change in crane pad location detailed above.
- Borrow pit search area at T29 – a small borrow pit search area was created near T29 in an area of shallow peat to provide required aggregate for this section of the Proposed Development and minimise transportation distances.
- Borrow pit search area near Sellafirth – the borrow pit search area near Sellafirth was decreased in size to exclude areas of peat between 1.5-3 m depth. The search area was also brought adjacent to the access track to minimise transportation requirements.

Layout H

2.5.25 Layouts F and G created the significant movement of some areas of infrastructure away from the areas where detailed peat probing had previously been undertaken. The Applicant therefore decided that additional detailed peat probing should occur at the new locations. This detailed peat probing led to the following changes, giving rise to Layout H (refer to **Figures 2.8a** and **2.8b**):

- T26 – slight movement of turbine and crane pad to the north.
- T28 – movement of the turbine and crane pad approximately 70 m north to an area with peat of less than 2 m depth.

Layout I

2.5.26 At this time, the Applicant had undertaken consultation with Scottish Water on the potential effects of the Proposed Development on the Gossa Water catchment. Scottish Water had confirmed that while it was pleased to see that the number of turbines within the Gossa Water catchment had reduced significantly from the design provided at scoping (Layouts A and B), it would like to see the Proposed Development infrastructure moved further away from Gossa Water where possible.

2.5.27 In addition, the Applicant had been in consultation with Scottish Power regarding the location of the substation on site and this required the re-location of the substation.

2.5.28 This consultation led to the following changes (shown in **Figures 2.9a** and **2.9b**):

- T12 – re-location of the crane pad to the north of the turbine instead of the south to increase the distance between the infrastructure and the Gossa Water and tributaries to the Gossa Water.
- T14 – relocation of the crane pad outwith the Gossa Water catchment so that instead of being orientated west –east towards the turbine, the crane pad is orientated north-east to south-west.

- Access track to T14 – removal of the access track between T12 and T14 (located within the Gossa Water catchment) and the creation of a spur leading to T14 from the access track between T12 and T13 (outwith the Gossa Water catchment).
- Substation – re-location of the substation to the south of the access track between T16 and T19.
- Construction compound near the A968 – the Applicant identified a requirement for a construction compound near the A968 junction with the Old Cullivoe Road.

Layout J

2.5.29 Following the revisions undertaken for Layout I, the Applicant undertook another engineering review of the design which altered the following (refer to **Figures 2.10a** and **2.10b**):

- Crane pads - the crane pad areas required for the turbines need to be slightly wider than previous designs.
- Substation - movement of the substation to the north of its location in Layout I, providing a shorter connection distance for the access track.
- Met mast – location of a met mast opposite the substation and the provision of a spur of access track to the met mast.
- Site boundary – re-drawing of the site boundary to match Layout J.

Conclusion

2.5.30 Layout J is the layout that has been taken forward as the design for the Proposed Development within this EIA Report. Further design work may be required following the detailed ground investigations which will take place post-consent. In this regard, a micro-siting allowance of up to 100 m in all directions is being sought in respect of each turbine and its associated infrastructure in order to address any potential difficulties which may arise in the event that preconstruction surveys identify unsuitable ground conditions or environmental constraints that could be avoided. Any variation of between 50 m and 100 m shall only be permitted following the prior written approval of Shetland Islands Council in consultation, where relevant, with aviation consultees, Scottish Water, Scottish Environment Protection Agency (SEPA) and/or Scottish Natural Heritage (SNH). It is proposed that the final positioning of all infrastructure be agreed through an appropriately worded planning condition.

2.6 Do-Nothing Scenario

2.6.1 Should the Proposed Development as described in Chapter 3 (Proposed Development) not be consented (the “do-nothing scenario”), it is anticipated that the Proposed Development site will not alter from the current baseline described above and in Chapters 6-16.

2.7 Summary

2.7.1 The final layout has been informed by a robust EIA and 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 consultation responses received, baseline data and the impact assessment undertaken.

2.7.2 The final layout comprises 29 turbines of up to 200 m tip height, and their associated infrastructure, as shown in **Figure 1.2a-e**.

2.7.3 The Proposed Development layout is considered to represent the most appropriate design, taking into account potential environmental impacts on their effects, physical constraints, and health and safety considerations, while maximising the generating capability of the site.

2.8 References

BEIS (2018). *The Renewables Obligation for 2019/2020*. Available at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/747218/2019-20-renewables-obligation-level.pdf

Scottish Government (2017). *The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017*. Available at: <http://www.legislation.gov.uk/ssi/2017/101/made>

Shetland Islands Council (2009). *Landscape Sensitivity and Capacity Study for Wind Farm Development on The Shetland Islands*. Available at:

<https://www.shetland.gov.uk/developmentplans/documents/ShetlandIslandsCouncilLandscapeSensitivityStudyFinalReport.pdf>

Shetland Islands Council (2014). *Shetland Local Development Plan*. Available at:

https://www.shetland.gov.uk/planning/documents/ShetlandLocalDevelopmentPlanAdopted26_09_2014.pdf