voltalia

Chapter 2: Site Design and Evolution

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2 SITE DESIGN AND EVOLUTION

2.1 Introduction

2.1.1.1 This Chapter outlines the process undertaken by Voltalia UK Ltd (the Applicant) in selecting the area in which the Proposed Development is intended to be built ("the Site") as a potential location for a solar farm and Battery Energy Storage System (BESS) development, herein referred to as the Proposed Development, and articulates the design evolution process.

2.1.1.2 One of the principles of the Environmental Impact Assessment (EIA) process is that Site selection and project design should be an iterative and constraint-led process. This principle has been followed as part of the evolution of the Proposed Development. This has ensured that potential negative impacts, which may potentially result from the Proposed Development, have been avoided or minimised as far as reasonably practicable.

2.1.1.3 This Chapter of the EIAR has been prepared in accordance with Clause 2 of Paragraph 2 of Schedule 4 of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (the EIA Regulations) which requires a description of the reasonable alternatives considered, the reasons for selecting the chosen option, and a comparison of the environmental effects[1].

2.1.1.4 This Chapter is structured as follows:

- Need for the Proposed Development;
- Site Description and Environmental Context;
- Site Selection;
- Design Evolution; and
- Embedded Mitigation.

2.1.1.5 This Chapter draws on issues considered in more detail in the relevant technical chapters (**Chapters 6 to 15**). This Chapter does not pre-empt the conclusions of the later technical chapters but is intended to explain how potential environmental effects have informed the design of the Proposed Development.

2.1.1.6 The final design of the Proposed Development is described in **Chapter 3: Development Description** and is shown on **Figure 1.2** This Chapter is also supported by **Figures 2.1 (a - d)** which detail the key design iterations, described later in this Chapter.

2.2 Need for the Proposed Development

2.2.1.1 In order to meet the Scottish Government's target to achieve net zero by 2045, a rapid shift to increase renewable energy generation is required. The Scottish Government has outlined

[1] Scottish Government, (2017), The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017. [Online] Available at: https://www.legislation.gov.uk/ssi/2017/101/contents (Accessed 3 March 2025)

its ambition for the deployment of between 4 – 6 GW of solar power generating capacity by 2030[2]. The Proposed Development would therefore provide a substantial contribution towards these goals, through the addition of up to approximately 165 MW (AC) of generation capacity from the Solar Arrays. Additionally, up to approximately 80 MW of generation capacity from the BESS will provide additional grid balancing capacity to the electricity network, which is of great importance in an energy grid which is dominated by renewable generation stations.

2.2.1.2 The consequences of a "do nothing" scenario (in which the Proposed Development were not constructed) would be that this substantial contribution to green energy generation would not be realised.

2.3 Site Description and Environmental Context

2.3.1 Location

2.3.1.1 The Site is centred on grid coordinates National Grid Reference (NGR) 74514 71531. At the closest points, the Site boundary is approximately 50 metres (m) north of Oldhamstocks, and 7.8 kilometres (km) southeast of Dunbar.

2.3.1.2 The Site will occupy an area of approximately 184 hectares (ha) of land; the extent of which is shown in **Figure 1.1**. The Site is wholly contained within East Lothian Council local authority area.

2.3.1.3 The Site encompasses 20 agricultural fields, primarily utilised for arable and livestock farming in rotation. These fields are interspersed with areas of woodland, and the Site sits within a wider pastoral landscape.

2.3.1.4 The topography of the Site is centred on a ridge, rising to approximately 177 m above ordinance datum (AOD). The Site slopes to the north-northeast to approximately 85 m AOD, as well as sloping to the south down to approximately 128 m AOD at the southern boundary.

2.3.1.5 The nearby major transport routes are the A1Trunk Road and East Coast Main Line (ECML) railway route which pass the Site 0.9 km to the north-east.

2.3.1.6 There are several settlements surrounding the Site, including (but not limited to):

- Oldhamstocks, 0.42 km south of the Site;
- Bilsdean, 0.86 km east-northeast of the Site;
- Cockburnspath, 2 km east of the Site;
- Innerwick, 2.4 km north-northwest of the Site; and
- Dunbar, 7.8 km north-northwest of the Site.

[2] Scottish Government (2023), "Announcement of Solar Ambition for Scotland", [Online], Available at: solar-ambition-for-scotland-28-october-2023.pdf, (Accessed: 20/05/2025)

2.3.1.7 An existing 400 kV overhead power line (OHL) runs across the northeastern portion of the Site.

2.3.2 Designations

Within and Adjacent to the Site

2.3.2.1 The following designated sites are located within the boundary of the Site:

- One Scheduled Monument (SM5891 Oldhamstocks Mains, enclosure);
- Oldhamstocks Conservation Area (CA288);
- Monynut to Blackcastle Special Landscape Area (SLA); and
- Two areas of Ancient Woodland (Cockit Hat Strip and unnamed long-established woodland).

2.3.2.2 An additional area of unnamed long-established woodland is immediately adjacent to the east of the Site.

Wider Site Surroundings

2.3.2.3 Nationally and internationally ecologically designated sites for nature conservation within 5 km of the Site include:

- Pease Bay Coast Site of Special Scientific Interest (SSSI), 1.7 km east;
- Barnes Ness Coast SSSI, 2.1 km;
- Lammermuir Deans SSSI, 3 km southwest;
- Pease Bridge Glen SSSI, 4.1 km southwest; and
- Woodhall Dean SSSI, 4.8 km west.

2.3.2.4 Nationally and internationally ecologically designated sites for ornithological features within 10 km of the Site include:

- Outer Firth of Forth and St. Andrew's Bay Complex Special Protection Area (SPA), 1.2 km northeast;
- St. Abb's Head to Fast Castle SPA, 7.4 km southeast; and
- Firth of Forth Ramsar Site and SPA, 8.5 km northwest.

2.3.2.5 The above mentioned ecologically designated sites are illustrated in **Figure 8.1a** and detailed further in **Table 8.4** of **Chapter 8: Ecology and Nature Conservation**

2.3.2.6 There are 8 scheduled monuments, 1 Garden and Designated Landscape (GDL), 1 Conservation Area and 19 Listed buildings (of which two are Category A Listed) within 1 km of the Site. These designated sites are shown in **Figure 7.2** and detailed in **Table 7.2**

2.4 Site Selection

2.4.1 Site Selection Considerations

2.4.1.1 The selection of an appropriate site, which has the potential to support a commercial solar farm is a complex process. It involves examining and balancing a number of environmental, technical, social and commercial issues. National Planning Policy Framework 4[3] (NPF4) Policy 11 sets out the key areas and issues that should be considered during the design of a proposed renewable energy development. NPF4 Policy 5 also provides further considerations pertinent to renewable developments, in particular regarding prime agricultural land.

2.4.1.2 The applicant first identified the area surrounding the Proposed Development in 2021, during a wider site selection exercise undertaken by the Applicant, throughout Scotland and the United Kingdom.

2.4.1.3 Due to its proximity to an already established and expanding capacity for connection to the National Grid, area of land, favourable topography, level of mean sunshine hours, and good accessibility via the A1, the coastal areas of East Lothian were selected as a key target for potential development.

2.4.2 The Site Selection Process

2.4.2.1 The Applicant completed a desk top assessment of all land within the region to screen sites to exclude as far as possible, internationally or nationally significant designations, receptors or assets. This assessment considered the East Lothian Local Development Plan.

2.4.2.2 As the Applicant was aware of the forthcoming offshore wind farms and their requirement to connect at or close to the existing Branxton Substation, further detailed assessment was undertaken to identify land within proximity of the substation. This was done in order to minimise the required cable route from the Proposed Development to the substation, thereby minimising transmission losses and reducing potential environmental impacts.

2.4.2.3 Landowners in this area were identified and approached to understand their willingness to accommodate a solar development. Following this the opportunity to develop a solar farm within the Dunglass Estate was presented and explored in greater detail by the Applicant.

2.4.2.4 The landowner of the Site worked with the Applicant to review the entire estate holding and determine the most suitable land for the purposes of a solar development. This involved assessing proximity of the point of connection, existing infrastructure (A1 and East Coast Main Line). Additional assessment of the wiser land holding included:

- A high-level appraisal of the differing agricultural land capability of potential sites;
- potential generating capacity of the potential sites; and

[3] Scottish Government (2023) 'National Planning Framework 4'. [Online]. Available at: https://www.gov.scot/publications/national-planning-framework-4/ (Accessed April 2025)

- proximity to the location of the agreed grid-connection point.

2.4.2.5 The land at Springfield Farm was selected as this area typically yielded fewer and lower grade crops than other areas within the wider estate, thereby minimising the area of prime agricultural land potentially affected by the Proposed Development.

2.4.2.6 The outcome of this process identified that the Site provided the best balancing of competing constraints, including the continuance of higher quality land within the wider estate under agricultural use.

2.5 Design Evolution

2.5.1.1 The Proposed Development presented in the EIAR has undergone three main iterations since the presentation of the initial Scoping Layout to mitigate predicted adverse effects through design, as far as reasonably practicable. Design changes made as a consequence of the key constraints are considered to be mitigation which is 'embedded' in the design (see **Section 2.6**).

2.5.1.2 There have been 4 main design layouts. These are detailed in further below, and include:

- Scoping Layout (Figure 2.1a);
- Revised Layout (Figure 2.1b);
- Initial Application Layout (March 2025) (Figure 2.1c); and
- Final Application Layout (May 2025) (Figure 2.1d).

2.5.1.3 Each Site layout iteration was developed based on the following technical parameters and constraints:

- Visibility from sensitive receptors, including nearby properties, settlements and designated landscapes;
- Presence of sensitive habitats and protected species;
- Presence of sensitive ornithological species;
- Presence of watercourses, private water supplies and related infrastructure;
- Presence of cultural heritage features;
- Proximity to noise sensitive receptors;
- Ground conditions and topography; and
- Key recreational and tourist routes.

2.5.1.4 Constraints were identified through desk study, site survey and analysis. This included consideration of stakeholder feedback from statutory and non-statutory bodies, as well as members of the public, during the EIA process.

2.5.1.5 The key design iterations undertaken to reach the Final Application Layout are described in further detail in the following sub-sections, which demonstrate how the layouts have evolved throughout the EIA process.

2.5.2 Scoping Layout (August 2024)

2.5.2.1 The Scoping Layout (**Figure 2.1a**) was developed in the summer of 2024 by a multidisciplinary team, including the Applicant's engineering team, ecologists, cultural heritage specialists, and landscape and visual experts. The layout was presented to the ECU in the Scoping Report (**Technical Appendix: 4.1**) submitted in August 2024 and validated in November 2024. The Site comprised land covering approximately 184 ha, centred on NGR 74514 71531.

2.5.2.2 This initial layout optimised the output of the Proposed Development whilst reflecting the known constraints at the time, prior to conclusion of on-site surveys. The following key Design principles were adhered to in order to avoid and minimise impacts to identified environmental constraints:

- Application of buffers for known sensitive ecological habitats (e.g. Ancient Woodlands);
- Avoidance of known cultural heritage assets:
  - Application of 100 m buffer around scheduled monuments;
  - Avoidance of siting infrastructure within Oldhamstocks Conservation Area
- Adoption of 50 m minimum buffer from residential properties;
- 10.5 m buffer of watercourses visible on 50k OS mapping; and
- The siting of taller infrastructure (e.g. substation and BESS) in lower lying areas of the Site.

2.5.3 Revised Layout (January 2025)

2.5.3.1 Following the receipt of the Scoping Opinion (**Technical Appendix 4.2**) and completion of the first Public Consultation period (20 August to 17 September 2024), feedback received, combined with results of field survey results further informed the design of the Proposed Development. This layout iteration is shown in **Figure 2.1b**.

2.5.3.2 During the consultation period, the feedback received highlighted that the visual impact of the Proposed Development was a key consideration for the community and consultees. In response to this, a design workshop was held in November 2024 with technical specialists to explore how elements of the design, could be refined to address these concerns over the visual impact, and scale of the Proposed Development.

2.5.3.3 The key changes to the Scoping Layout that resulted in the Revised Layout are as follows:

- Removal of solar panels from Fields 18 and 19 in the northwest of the Site to mitigate heritage setting impacts on the scheduled monument and in recognition of concerns regarding views from properties at Oldhamstock Mains;

- Removal of all infrastructure in Field 10 to reduce the visual impact of the Proposed Development throughout the wider area, and to increase the buffer between the infrastructure of the Proposed Development and Oldhamstocks Village and Conservation Area;

- Removal of the panels in the southern portions of Fields 13 and 14, to remove the Proposed Development from the top of the ridge in that area, and subsequently increase the buffer between the Proposed Development's infrastructure and Oldhamstocks Village;

- Setting back panels in Fields 16 and 20 to reduce proximity to residential properties;

- Application of protected species buffers following results of ecological surveys; and

- Inclusion more detailed design features, including internal tracks and location of central inverters.

2.5.4 Initial Application Layout (March 2025)

2.5.4.1 The Initial Application Layout (March 2025), (**Figure 2.1c**) comprised solar panels to generate up to 165 MW, 96 BESS units, and associated infrastructure.

2.5.4.2 A summary of the changes made to the Scoping Layout to arrive at the Initial Application Layout are described below:

- Removal of solar panels from Field 5 to mitigate cultural heritage setting impacts on views between Scheduled Monuments SM5891 and SM5892;

- Removal of solar panels from Field 11 to reduce cultural heritage impacts on the Oldhamstocks Conservation Area, minimize infrastructure near the core path north of Oldhamstocks, and create a visual buffer between open space users and the solar panel areas;

- Provision of detailed layout of the infrastructure present within the Substation and BESS Compound; and

- Development of habitat mitigation plans, and identification of areas without infrastructure to be utilised for enhancement, such as wildflower meadows. Details also developed for enhancement to existing hedgerows and provision of new hedgerows across the Site.

2.5.5 Final Application Layout (May 2025)

2.5.5.1 The Final Application Layout (May 2025) (**Figure 2.1d**), which is the subject of this EIAR, comprises solar panels with a generating capacity of up to 165 MW (AC), 40 BESS units, and associated infrastructure.

2.5.5.2 The Initial Application Layout (March 2025) was presented to the general public during the Second round of public consultation held between 3rd of March and 30th March 2025, alongside an in-person consultation event held in Oldhamstocks Village Hall on the 13th of March 2025. Following this consultation further refinements to the design were carried out.

2.5.5.3 The key design changes made to the Initial Application Layout (March 2025) culminating in the Final Application Layout (May 2025) are as follows:

- An increase of the distance between the closest solar panels in Field 16 and the existing field margins to increase the set back from Oldhamstocks Main and Oldhamstocks Mains Cottage. This results in a minimum buffer from the main garden areas of both properties of approximately 60 m from the nearest solar panels in the Proposed Development.

- The number of BESS units included as part of the Proposed Development was reduced to 40, which would provide a generating capacity of up to 80 MW. This reduction also resulted in a reduction in the number of associated items of electrical infrastructure (such as MV transformers) required in the BESS compound. Full details of these components can be found in **Chapter 3: Development Description**.

- The number of central inverters included in the Proposed Development was reduced to 16. Furthermore, several of these inverters have been re-located in order to provide greater separation between them and nearby receptors;

- A re-alignment of the Customer Substation and BESS compound was undertaken, shifting it approximately 150 m west. This was done to remove this electrical infrastructure from areas at potential risk from flooding. In addition, solar panels were removed from the northern portion of Field 20 to remove them from an area of potential flood risk.

- Throughout the site, several minor changes were made to the location of solar panels in order to avoid the placement of infrastructure within SEPAs Riparian Zone Buffers. Where infrastructure was unable to be removed from these buffer areas, a specific assessment is provided in **Chapter 9: Water resources**.

2.6 Embedded Mitigation

2.6.1.1 Mitigation measures for the Proposed Development have been embedded in its design to minimise adverse significant effects, including measures to avoid sensitive ecological habitats, cultural heritage assets and impacts on the visual setting of the surrounding area and features within it. These embedded measures have shaped the Proposed Development and reflect an iterative design process.

2.6.1.2 The following good practice construction measures and site specific management plans are also considered to be embedded mitigation measures. These measures are discussed in further detail later in this EIAR, and include:

- A Construction Traffic Management Plan;

- A Construction Environment Management Plan (CEMP) ;

- A Landscape and Biodiversity Management Plan (LBMP); and

- A Scheduled Monument Protection Plan.

2.7 Conclusions

2.7.1.1 In order to meet Scottish Government targets on achieving net zero by 2045, a rapid shift to renewable power generation is required. The Proposed Development presents the opportunity to make a substantial contribution to this goal.

2.7.1.2 In designing the Proposed Development, various environmental, technical, and economic factors were all considered in the iterative design process. These were informed through a variety of baseline surveys and consultation with a range of stakeholders.

2.7.1.3 The Final Application Layout design assessed in this EIAR is considered to successfully balance the Proposed Development's renewable energy generation potential, whilst taking key environmental and engineering factors into account through changes to the design of the Proposed Development made through the EIA process.