Chapter 4: The Proposed Development

Preliminary Environmental Information Report

Volume 1

Steeple Renewables Project

Land at Sturton le Steeple, Nottinghamshire

4. Proposed Development

4.1 Introduction

4.1.1 This chapter provides a description of the Proposed Development. The physical characteristics of the Proposed Development are described alongside the proposed programme of works. The key activities that will be undertaken during the construction, operational (which includes maintenance) and decommissioning phases are included in this chapter. These phases will form the basis of each of the technical assessments included in this PEIR.

4.1.2 The Proposed Development is defined under sections 14(1)(a) and 15(2) of the Planning Act 2008 as a Nationally Significant Infrastructure Project (NSIP), as it comprises the construction of an onshore generating station in England exceeding 50 megawatts (MW). Associated development and other ancillary works are also proposed as part of the Proposed Development.

4.2 Rochdale Envelope

4.2.1 The Proposed Development comprises the installation of a ground-mounted solar photovoltaic (PV) electricity generation development with a capacity of over 50MW and associated development comprising of energy storage, grid connection infrastructure and all other infrastructure integral to the construction, operation and maintenance of the Proposed Development including access. As set out in **Chapter 2**, a series of project parameters (see **Figure 2.1 'Construction Phase Parameters Plan'** and **Figure 2.2 'Operational Phase Parameter Plan'**) have been drafted and used for assessments within this PEIR. This includes the current assumption for the purpose of the PEIR assessment work that the ground-mounted solar photovoltaic (PV) electricity generation capacity would be 400MW and the energy storage would be 200MW. As the environmental assessments progress these parameters plans will develop into an Indicative Site Layout which will form the basis for assessment within the subsequent ES.

4.3 Need for the Proposed Development

4.3.1 The case for the need for the Proposed Development is centred on its significant contribution to the three important national policy aims, which are:

- **Decarbonisation - achieving Net Zero by 2050 and the importance of urgently deploying zero-carbon generation assets at scale –** the Proposed

Development will provide a large-scale low carbon energy generating asset which is expected to be operational by the year 2029.

- **Security of supply – geographically and technologically diverse supplies** – the Proposed Development will provide the security of supply due to its large scale direct connection to the National Electricity Transmission System, meaning the power that is generates has a national benefit; the ability to complement other renewables and the efficient opportunity to integrate energy storage into the design of the Site to help balance electricity needs over the wider Grid system.
- **Affordability** – the Proposed Development will provide large scale generation at low cost which removes the market fluctuations from fossil fuel costs, which lead to energy prices rising for the end user.

4.3.2 The Proposed Development will therefore be a critical part of the evolution of the UK's portfolio of large-scale solar generation required to decarbonise its energy supply and provide secure and affordable energy supplies.

4.3.3 There are layers of International and National Policy and Reports which indicate the need for moving away from the use of fossil fuels for energy generation sources. The most recent of these is the Energy Security Strategy, 2022 which has indicated that the UK will need to increase its solar generation capacity five-fold by 2035. The details of these policies can be seen in **Chapter 5 'Planning Policy'** of this PEIR.

4.4 The Proposed Development

4.4.1 Solar PV and energy storage technologies are rapidly evolving. As a result, the project parameters are required to maintain the flexibility to allow the latest technology to be utilised at the time of construction.

4.4.2 The Proposed Development is likely to include the following infrastructure:

- Solar PV modules;
- PV module mounting infrastructure;
- Inverters;
- Transformers;
- Onsite underground cabling;

- Underground cabling to point of connection at existing substation at West Burton Power Station;
- Fencing and security measures;
- Access tracks and construction of new accesses onto the highway;
- Energy storage facility;
- Drainage infrastructure;
- A substation and control building; and
- Equipment facilitating the electrical connection to the existing Substation at West Burton Power Station.

4.4.3 During the construction phase, five or more temporary construction compounds will be required, as well as tracks to facilitate access to all parts of the Site.

4.4.4 The proposed area for the cable infrastructure is shown on **Figure 2.1 'Construction Phase Parameter Plan' and Figure 2.2 'Operational Phase Parameter Plan'**, with two cable connections proposed; one from the northern area of the western section of the Site and the second from the northern part of the eastern area. The cable infrastructure will provide a connection to the existing substation located at the West Burton Power Station site.

4.4.5 In areas around the solar arrays and on other parts of the Site, shown on **Figures 2.1 and 2.2** as biodiversity mitigation areas, opportunities for landscaping, biodiversity enhancements and habitat management will be explored and further information is provided within the relevant technical sections of this PEIR. Detail on each aspect forming the Proposed Development is set out below.

Solar PV Modules

4.4.6 Solar PV modules/panels convert sunlight into electrical current (as direct current (DC)). Individual modules/panels are typically 2.3m long and 1.1m wide and typically consist of a series of mono-crystalline cells which make up each panel (66 or 72 cells per panel). The module frame is typically built from anodised aluminium.

4.4.7 Each module could have a DC generating capacity of between 400-650watts (W), or more depending on advances in technology.

4.4.8 The number of modules required at the Proposed Development will be highly dependent upon the final layout, following the design process. **Figure 2.1 '**

Construction Phase Parameter Plan' and **Figure 2.2 'Operational Phase Parameter Plan'** of this PEIR set out the parameters for the Proposed Development.

4.4.9 The modules are fixed into a mounting structure in groups known as "strings". This mounting structure will use a fixed panel system where the panels are fixed in one position and one angle.

4.4.10 The number of modules which will make up each of the string is not yet known. Various factors will help to inform the number and arrangement of modules in each string, and it is likely some flexibility will be required to accommodate future technology developments.

Module Mounting Structures

4.4.11 Each row of modules will be mounted on a rack supported by galvanised steel poles driven into the ground. Various mounting structures are available however, driven poles are currently expected to be the most likely foundation solution. Between each string of panels there are likely to be an average separation distance of approximately 2.6m to maximise generation and allow sufficient access for maintenance.

4.4.12 The panel modules are likely to be mounted on structures with an upper height of a maximum of 3.6m Above Ground Level (AGL).

Inverters

4.4.13 Inverters are required to convert the DC electricity generated by the PV modules into alternating current (AC) which allows the electricity to be exported to the National Grid. Inverters are sized to deal with the electrical output from strings of PV modules.

4.4.14 Central inverters are large capacity inverters with ratings above 1MW. Due to their size, they are located in a central location surrounded by the solar cells to which they are connected. The unit itself tends to be containerised with associated control and switchgear equipment within a maximum height of 3m. Compared with string inverters, central inverters tend to offer better efficiencies and economies of scale for PV installations exceeding 20MW.

4.4.15 String inverters are much smaller units with a rating normally above 100kW and tend to be better suited for smaller multi-MW installations.

Transformers

4.4.16 Transformers are required to control the voltage of the electricity generated across the Site and efficiently transmit the power to the Proposed Development substation. A number of transformers of various sizes and voltages will be needed and will be located throughout the Site.

4.4.17 The transformer units will have a maximum height of 3m AGL.

Cabling

4.4.18 Onsite electrical cabling is required to connect the PV modules to inverters and the inverters to the transformers onsite. Higher rated cables are then required between the transformers and the Proposed Development substation, and between the Proposed Development substation and the energy storage facilities onsite. This is likely to be underground cabling. Extra high voltage cables will then be required to export all of the electricity produced by the Proposed Development to the existing 400kV substation located within the existing West Burton Power Station site.

4.4.19 Data cables will also be installed, typically alongside electrical cables in order to allow for the monitoring of the development during operation.

4.4.20 The proposed connection point for the Proposed Development is the existing 400kV substation located within the existing West Burton Power Station site. The exact route for the cable route to connect the Proposed Development to this substation is still being determined, however as shown on **Figure 2.1 'Construction Phase Parameter Plan' and Figure 2.2 'Operational Phase Parameter Plan',** large areas of cabling are not required due to the proximity of the Site to the West Burton Power Station site. All of the new cabling will be laid underground in trenches or ducting. At certain points along the route, it will be necessary to drill past 'obstacles' such as roads. There will be no new above ground power lines for the cabling.

4.4.21 More detail on the extents and locations of the cable routes will be provided within the subsequent ES.

Fencing and Security Measures

4.4.22 A fence will enclose the operational areas of the Proposed Development. The fence is likely to be approximately 2.4m AGL in height. Pole mounted closed circuit television (CCTV) system, which will face towards the Site and away from any land outside of the Site will also be deployed around the perimeter of the Site. These

cameras will be mounted on poles of 3.5m AGL in height located within the perimeter fence.

4.4.23 It is likely that lighting on sensors for security purposes will be deployed around the energy storage facility and potentially at any other pieces of critical infrastructure. No areas of the Site are proposed to be continuously lit during the operational phase of the Proposed Development.

Access Tracks

4.4.24 Two primary points of access will be taken from Gainsborough Road and Station Road, which will respectively serve the eastern, and western portions of the Site, leading to the primary construction compounds shown at Figure 2.1 'Construction Phase Parameter Plan'. After materials for the Proposed Development have arrived at the primary construction compounds, they will then be distributed to the 'secondary' construction compounds and then throughout the Site via various access tracks, the locations of which are yet to be confirmed. Some of these tracks will require crossings of the existing highway network and other routes. Full details of the internal access tracks and vehicle routing will be provided in the ES, following further liaison with key highways consultees.

4.4.25 The new access tracks within the Site will likely be made of crushed aggregate.

Energy Storage Facility

4.4.26 A BESS forms part of the Proposed Development and it is currently assumed this would have a storage capacity of approximately 200 MW. The energy storage is proposed to be located in the northern extent of the eastern section of the Site, as indicated by **Figures 2.1 and 2.2**. The energy storage system would have a maximum height of 2.9m AGL.

4.4.27 The energy storage system will include batteries. Further, inverters and system controllers are likely to be within the energy storage system, however, its final design will be set out in the subsequent ES.

4.4.28 A 4m high barrier of suitable mass and density surrounding the BESS facility only will be incorporated as part of the Proposed Development, as an embedded acoustic mitigation measure.

Substation and Control Building

4.4.29 The Proposed Development's substation will consist of electrical infrastructure such as the transformers, switchgear and metering equipment required to facilitate

the export of electricity from the Proposed Development to the National Grid. The maximum height of the main substation is proposed to be 11m AGL, which has increased since the scoping submission that set out a maximum height of 2.4m AGL. However, this only relates to a small element of the substation componentry, with the majority of the built form likely to be at the same height as the previous Scoping stage parameters. There may also be smaller sub-station control rooms distributed throughout the Site, that would have a maximum height of 2.4m AGL.

4.4.30 The substation forming the Proposed Development is also expected to include a control building which will include office space and welfare facilities as well as operational monitoring and maintenance equipment. The control building is likely to have a maximum height of 4.5m AGL.

Electricity Export Connection to National Grid

4.4.31 The electricity generated is expected to be exported via a connection from the Proposed Development to an existing substation at the West Burton Power Station site.

4.5 Indicative Timescales for the Proposed Development

4.5.1 Indicative timescales for the construction and operation of the Proposed Development that have been assumed for the purpose of the assessment are as follows:

- It is currently anticipated that (subject to the necessary consents being granted) construction work will commence, at the earliest in the year 2027, and will run for 24-months. This assumes that the Proposed Development will be built in a single phase, which is considered to give rise to the worst-case scenario for the purpose of the assessment. Construction in a single phase, rather than multiple phases spaced over longer timescales, would result in higher peak traffic volumes and a greater number of construction activities being undertaken concurrently (generating noise, dust etc.) The subsequent ES will set out further detail on the construction programme of the Proposed Development.
- It is currently anticipated that the earliest the Proposed Development will commence commercial operation is the year 2029.; and
- The operational life of the Proposed Development is to be up to 40 years and decommissioning is therefore estimated to take place no earlier than the year 2069. Decommissioning is expected to span approximately 18 months – two

years and will be undertaken in one phase, to account for the worst-case scenario. A 24-month decommissioning phase has been assessed in this PEIR.

4.6 Phases of Development

Construction Phase

4.6.1 As set out above, the construction phase is anticipated to last up to 24-months but will be dependent on the final design, and outcomes of the traffic assessment which will be set out in the subsequent ES. The types of construction activities that may be required include (but are not limited to):

- Importing of construction materials;
- The establishment of the construction compounds – these will likely move over the course of the construction process as each section is built out;
- Creation of a new access points for the Site;
- Installing the security fencing around the Site;
- Importing the PV panels and the energy storage equipment;
- Erection of PV frames and modules;
- Digging of cable trench and laying cables for connection to the West Burton Power Station substation;
- Installing transformer cabins;
- Construction of onsite electrical infrastructure for the export of generated electricity; and
- New habitat creation.

Construction Traffic Management Plan

4.6.2 An outline Construction Traffic Management Plan (oCTMP) is being developed as part of the EIA which will guide the delivery of materials and staff onto the Site during the construction phase. The principles of the oCTMP will be available for comment as part of the consultation process (see Chapter 13 'Transport and Access') to ensure that the comments of local residents and stakeholders are taken into account in its development.

Temporary Construction Compounds

4.6.3 Two main 'primary' temporary construction compounds will be established close to the Site entrances (i.e., from Gainsborough Road, and Station Road, as set out

above) to receive the majority of materials for the Proposed Development. Smaller 'secondary' compounds would be located across the Site as the Proposed Development is built out, as indicated in Figure 2.1 'Construction Phase Parameter Plan'.

Temporary Roadways

4.6.4 Depending on weather conditions during construction, temporary roadways (e.g. plastic matting, or other temporary solutions) may be utilised to access parts of the Site.

Site Reinstatement and Habitat Enhancement

4.6.5 Depending on the season, work needed for habitat enhancement may start during or after construction is completed. A draft Landscape and Ecological Management Plan will be submitted as part of the subsequent ES. This document is being developed, and will set out the proposals for the land and how it will be managed through the operational life of the scheme. It is proposed that the lifetime of this scheme will be 40 years.

Operational Phase

4.6.6 During operation of the Proposed Development, human activity on the Site will be minimal and would be restricted principally to vegetation management, equipment maintenance and servicing, replacement of any components that fail and monitoring to ensure the continued effective operation of the Proposed Development.

Decommissioning Phase

4.6.7 The Proposed Development will be decommissioned at the end of its approved operational phase. All PV modules, mounting poles, cabling above 1m below ground (any cabling buried 1m+ below ground may not be removed at decommissioning), substation, energy storage equipment, inverters, transformers etc would be removed from the Site. These items would be recycled or disposed of in accordance with good practice and market conditions at the time. A Decommissioning Plan, to include timescales (24 months) and transportation methods would be agreed in advance with the Local Planning Authority. As requested through the EIA Scoping Opinion, an outline Decommissioning Plan will accompany the DCO application.

4.6.8 It is the intention that after the 40 years of operation, the whole Site will be available to revert to its current use and be used by the landowner for agricultural operations

of their choice and determined by the global markets at that time. This will include the areas that will have been used for biological mitigation over the lifetime of the Proposed Development. It is the intent that the permissive paths would also be closed to the public once the Proposed Development is decommissioned.

4.6.9 The effects of decommissioning are often similar to, or to a lesser magnitude than, the construction effects and will be considered where possible in the relevant sections of the ES. However, there can be a high degree of uncertainty regarding decommissioning as engineering approaches and technologies evolve over the operational life of the Proposed Development.