Botley West Solar Farm

Environmental Statement

Volume 1

Chapter 6: Project Description

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Glossary

Term	Meaning
The Applicant	SolarFive Ltd
Cable Corridor	Areas identified for the interconnecting cables (33kv and 275kv) for which there remains optionality in terms of the specific route to be followed – see also Technical Glossary.
Cable Route	The installation route for interconnecting cables (33kv and 275kv) – see also Technical Glossary.
Central Site Area	The central part of the solar installation area for the Project, which extends across an area situated broadly between Bladon and Cassington, south of the A4095 and north of the A40
Construction Compound	Areas required temporarily during the construction phase of the Project, to facilitate the construction process.
Construction Period	The period of time required to build the Project, that would likely take 24 months
Cumulative Effects	The combined effect of the Botley West solar farm in combination with the effects from other proposed developments, on the same receptor or resource.
Decommissioning Period	Likely to commence two years before the end of the 42 year total DCO development period and is expected to be completed in that time. This period is expected to take 24 months
Designated heritage asset	A World Heritage Site, Scheduled Monument, Listed Building, Protected Wreck Site, Registered Park and Garden, Registered Battlefield or Conservation Area designated under the relevant legislation.
Development Plan	The adopted and emerging policies and land use proposals of the relevant Local Planning Authority.
Environmental Impact Assessment	The process of identifying and assessing the significant effects likely to arise from a project. This requires consideration of the likely changes to the environment, where these arise as a consequence of a project, through comparison with the existing and projected future baseline conditions.
Environmental Statement	The document presenting the results of the Environmental Impact Assessment process.
High Voltage Transformers	See Technical Glossary
Host Authority	Those authorities, defined under Section 43 of the 2008 Planning Act, within whose land area the Project is proposed to be situated. For Botley West Solar Farm these comprise; West Oxfordshire, Cherwell and Vale of White Horse District Councils, and Oxfordshire County Council.
Impact	Change that is caused by an action/proposed development, e.g., land clearing (action) during construction which results in habitat loss (impact).
Infrastructure Planning (Environmental Impact Assessment) Regulations 2017	EIA team to define
Inter-related Effects	Inter-related effects arise where an impact acts on a receptor repeatedly over time to produce a potential additive effect or where a number of separate impacts, such as noise and habitat loss, affect a single receptor.

Term	Meaning
Local Authority	A body empowered by law to exercise various statutory functions for a particular area of the United Kingdom. This includes County Councils, District Councils and County Borough Councils.
Main Project Substation	The project substation transforms electricity generated by the solar PV installation from high voltage to a higher voltage (275/400kV) for connection to the NG substation. This substation is crucial for managing and regulating the voltage levels of the electricity produced, ensuring efficient transmission while minimizing energy losses and enhancing the reliability of the renewable power supply.
National Policy Statements	The National Policy Statements for energy that are undergoing consultation.
Northern Site Area	The northern part of the solar installation area for the Project, which extends broadly from Rousham Gap in the north towards Woodstock in the south, and which is situated between the A4260 and the Dorn River Valley, near Tackley and Wootton.
Operational Period	The operational period of the Project, proposed for 37.5 years. October 2028 is the assumed date of connection and energisation of the Project for the purposes of EIA assessment.
Order Limits	The area of land encompassing the Project, required to enable the DCO development, and shown on the Site Location and Order Limits Overview (Figure 1.1)
Planning Act 2008	The primary legislation under which Nationally Significant Infrastructure Projects (NSIPs) are to be determined.
Power Converter Station	A power converter station converts electricity between Alternating Current (AC) and Direct Current (DC).
Preliminary Environmental Information Report	A report that provides preliminary environmental information in accordance with Regulation 12 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. This is information that enables consultees to understand the likely significant environmental effects of the project and which helps to inform consultation responses.
Project Site Boundary	The boundary for the Project that is encompassed within the Order Limits
Project Substation	See Technical Glossary
Receptors	A component of the natural or man-made environment that is affected by an impact, including people.
Scoping Opinion	Sets out the Planning Inspectorate's response (on behalf of the Secretary of State) to the Scoping Report prepared by the Applicants. The Scoping Opinion contains the range of issues that the Planning Inspectorate, in consultation with statutory stakeholders, has identified should be considered within the Environmental Impact Assessment process.
Secondary Project Substation	A secondary project substation is a facility that reduces the voltage of power from medium to low levels for efficient distribution to end users
Site	The area encompassed within the Order Limit comprising the Northern Area, Central Area, Southern Area and Cable Corridor.
Solar installation areas	Areas of above ground installation for the operational solar farm, comprising solar panels, power converter stations, substations, access tracks and associated above ground infrastructure.

Term	Meaning
Southern Site Area	The southern part of the solar installation area for the Project, which occupies land at Denman's Farm, situated south and east of Farmoor Reservoir and north of Cumnor.
Study area	This is an area defined for each environmental topic, which includes the Botley West Solar Farm Order Limits as well as potential spatial and temporal considerations of the impacts on relevant receptors. The study area for each topic is intended to cover the area within which an impact can be reasonably expected.
The Project	Botley West Solar Farm
Total DCO Development Period	The combined period of up to 42 years that is sought under the DCO, comprising the cumulative total of the construction, operational and decommissioning periods.

Abbreviations

Abbreviation	Meaning
AC	Alternating Current
AGL	Above Ground Level
BESS	Battery Energy Storage Systems
CoCP	Code of Construction Practice
DC	Direct Current
DCO	Development Consent Order
EDF	Électricité de France S.A.
EPC	Engineering, Procurement and Construction
ES	Environmental Statement
EVA	Ethyl Vinyl Acetate
FTE	Full-time Equivalent
GI	Green Infrastructure
HDD	Horizontal Directional Drilling
HV	High Voltage
MV	Middle Voltage
NETS	National Electricity Transmission System
NGET	National Grid Electricity Transmission plc
PCS	Power Converter Stations
PA 2008	The Planning Act 2008

Units

Term	Description
dB	Decibels
ha	Hectares
kV	Kilovolt
m	Metres
m2	Metre Squared (Area)
MVA	Megavolt Ampere
MW	Megawatt
MWe	Megawatts of Electrical Output
MWp	Megawatt-Peak

6 Project Description

6.1 Introduction

6.1.1 The Applicant seeks development consent, under the Planning Act 2008 (PA 2008), to construct, operate and maintain, and decommission a solar farm and associated infrastructure. The solar farm will have an anticipated generation capacity of approximately 840 MWe (AC output - total installed capacity approximately 936,000 kVA) (please see the ES Glossary for the definition of these terms **[EN010147/APP/6.1]**), providing secure and clean energy to the equivalent of approximately 330,000 homes. It is located in parts of the administrative areas of West Oxfordshire District Council (WODC), Cherwell District Council (CDC) and Vale of White Horse District Council (VWHDC) and is within the county of Oxfordshire. The project is called Botley West Solar Farm (the Project), with the name derived from the location of the grid connection point.

6.1.2 The Project has a total area of approximately 1,418 ha (see Volume 2, Figure 1.1 – 'Site Location and Order Limits Overview') **[EN010147/APP/6.4]**, with the installation of solar panels across approximately 839 ha. The solar farm, whilst a single project, does not comprise one single area of land; rather it is dispersed over a wide area, separated by roads, open land, woodland, rivers and settlements. For ease of description, the Applicant has broadly divided the Project into three main sites, linked together by common electrical infrastructure, including electrical cabling: the Northern Site Area, the Central Site Area and the Southern Site Area (see Figure 1.2) **[EN010147/APP/6.4]**.

6.1.3 The Project extends from an area of land in the north, situated between the A4260 and the Dorn River Valley near Tackley and Wootton (Northern Site Area), through a central section, situated broadly between Bladon and Cassington (Central Site Area), and connecting to a section further south near to Farmoor Reservoir and north of Cumnor (Southern Site Area), where the Project will connect to the National Grid transmission network (the Site Areas, as shown in Figure 1.2 **[EN010147/APP/6.4]**). The majority of the land proposed for the Project is currently used for arable crops, the majority of which is grown as livestock feed, or is otherwise down to pasture.

6.1.4 The Applicant will retain an agricultural land use beneath the proposed solar arrays and between the power converter stations and substations, and on areas of the Site that will remain undeveloped, such as the water meadows adjoining the River Evenlode. This continued agricultural use will be in the form of conservation grazing, primarily by sheep. The Applicant also proposes to introduce some small scale horticultural production areas, for use by community food growing groups. This grazing and horticultural use will be managed in a way that will support the Biodiversity Net Gains (BNG) expected for the Site which is currently approximately 70% Habitat BNG (refer to the Outline Landscape and Ecology Management Plan (oLEMP) **[EN010147/APP/7.6.3]**). An area of up to 30 hectares is being provided for community food groups within the areas shown as providing 'opportunities for enhancement' on the Landscape, Ecology and Amenities Plan **[EN010147/APP/7.3.3]**.

6.1.5 The consent being sought for the Project is a temporary one. Temporary consent is being sought for a 42-year period during which the solar farm will be constructed, operated and decommissioned. The building of the construction sites will commence after the DCO is granted during which time relevant Requirements will be discharged. It is estimated that construction will start in July 2026 and end in June 2028 plus a further 4 months leading up to NGET Connection to remove the remaining construction equipment and materials.

6.1.6 During the latter part of construction a period of 6 months will be required for PVDP testing and will commence to coordinate with the NGET Connection. The removal of the four main construction sites and installation of the remaining panels will also happen during this period.

6.1.7 An operational period of approximately 37.5 years is proposed. October 2027 is the current grid connection offer date, although this is likely to be amended to Q4 2028. October 2028 is therefore now the assumed date of connection for the purposes of EIA assessment. **Table 6.1** below provides a summary of the key project stages for EIA purposes.

Table 6.1: Assumed Project Stages

Project Stages	Assumed Duration	Assumed Date Range
Pre Construction enabling works (including construction compounds and associated accesses) and discharge of Requirements	3 months	Mar to June ‘26
Construction	24 months	July ‘26 to June ‘28
PVDP Testing	6 Months	May ‘28 to Oct ‘28
NG Commissioning	2 months	Sep ‘28 to Oct ‘28
Removal of Construction Compounds and equipment and build over with solar	2 months	July ‘28 to Oct ’28
Grid Connection Date		Oct ’28
Operation	37.5 years	Apr ’66
Decommissioning	24 months	Mar ’68
DCO Duration	42 years	Mar ’68

6.1.8 Decommissioning of the Project will be set out in the Decommissioning Plan, but is likely to start two years before the end of the 42 year period and is expected to be completed in that time. The majority of infrastructure associated with the development is intended to be removed. Chapter 18: Waste & Resources of the ES **[EN010147/APP/6.3]**, provides an overview of how this material will be treated/removed. However, to avoid unnecessary disruption, and/or for possible future use by the local network operator, it is intended to leave all 33kV and 275 kV cables where they have been laid in the public highway and where cables have been laid using horizontal directional drilling (HDD) – either under rivers, road, rail crossings, or existing landscape features. This is shown in Appendix 6.2: Cable Laying Methodology and Indicative HDD Crossing Locations **[EN010147/APP/6.5]**. The proposed

National Grid substation, if constructed in accordance with the appropriate powers in the Applicant's draft Development Consent Order (DCO), will also remain in place. The rest of the Site is then expected to continue in agricultural use, whether for grazing or crops, once returned to the landowners.

6.1.9 The Project's solar arrays will be connected by electrical cables within each of the Site Areas. The interconnecting cable routes between the Site Areas will largely follow the public highway, but some parts will cross land either leased by the Applicant or the subject of an easement agreement.

6.1.10 All of the electrical cables will be laid underground, but with two main exceptions. Firstly, where they cross areas of sensitive archaeology, the cabling will either be hung on frames beneath the solar arrays themselves or placed in protected ducting on the surface of the land. The second exception is where cabling crosses the Evenlode where cables will be laid in ducting underneath a farm bridge (although the Applicant has also assessed this crossing point being delivered through HDD as an alternative).

6.1.11 The cable routes between the Project Site Boundary will be laid within defined cable corridors. The cable corridors are shown in Volume 2, Figures 2.4A, 2.4B, 2.4C and 2.4D **[EN010147/APP/6.4]**).

6.1.12 Within the cable corridors shown, there are four locations where alternative cable routes are possible. It is necessary to retain flexibility in these locations until more design information is available to identify a narrower and more precise cable corridor. Within these areas the Applicant will continue to carry out further engineering investigations, landowner discussions and design work, which will be balanced against the environmental information reported in the ES, in order identify a smaller and preferred cable corridor within the existing cable corridor area. These four locations are shown on Figures 5.1 to 5.5 of Volume 2 of the ES **[EN010147/APP/6.4]**. These are:

- Northern Site between the Oxfordshire Way, and B4027, south east of Wootton;
- Area between the Northern and Central Sites on land to the east of Woodstock and in the vicinity of the Bladon roundabout on the A44;
- Central Site on land east of Burleigh Wood and around Bladon Heath; and
- Land between the Central and Southern Sites east and south of Eynsham around the Swinford Bridge;

6.1.13 For the purposes of this ES, the Applicant has assessed on a reasonable worst-case basis the full area(s) of land covered by the cable corridors (shown in Volume 2, Figures 2.4A, 2.4B, 2.4C and 2.4D **[EN010147/APP/6.4]**). This approach ensures that irrespective of the final cable route location, the ES will have sufficiently reported on the likely significant effects arising from the placing of the cable route anywhere within the cable corridor. In the four locations where there is potential for the cable corridor to be reduced, all of the potential cable route corridors have been assessed within those areas, and these effects are reported on within the specialist topic chapters. The Applicant will therefore have the available relevant environmental information in respect of the cable corridor on the whole, as well as the more specific environmental

information required to make an informed judgement as to the likely significant effects arising from any individual cable route corridor. More information on the alternatives considered by the Applicant is set out in Chapter 5: Alternatives Considered **[EN010147/APP/6.3]**.

6.1.14 An illustrative masterplan of the Project is also provided at Figure 2.1A, 2.1B, 2.2A, 2.2B, 2.2C 2.2D and 2.3 in Volume 2 **[EN010147/APP/6.4]**. These show the development within the Order Limits and includes the proposed solar array layout, associated electrical infrastructure, existing landscape and watercourse features, new landscaping proposals, existing and proposed infrastructure, including public rights of way and permissive paths. In addition, the Applicant has produced a series of other plans to show the following aspects of the Project:

- Temporary Facilities Plan **[EN010147/APP/7.3.4]** – showing those parts of the project that will be required during the construction phase;
- Operational Development Plan **[EN010147/APP/7.3.2]** – showing the infrastructure that will be built and used during the operational phase of the Project;
- Landscape, Ecology and Amenities Plan **[EN010147/APP/7.3.3]** – a plan showing what the detail of what sits beneath and around the proposed solar arrays and other infrastructure during the operational phase, and which also gives an indication of what the site will look like after decommissioning;

6.1.15 Other plans produced include:

- Site Construction Compound Accesses Plans **[EN010147/APP/7.3.1]** – showing the detail design of the vehicular access points serving the four main site compounds; and
- Site compound plans and elevations **[EN010147/APP/7.3.6]**.

6.1.16 The Project will connect to a new National Grid Electricity Transmission (NGET) system, via a new National Grid 400kV substation, to be located close to the existing National Grid 400kV line that runs between Cowley in Oxford, westwards to Walham, in Gloucestershire (see paragraphs 6.4.24 to 6.4.28 for further detail).

6.1.17 To date, for assessment purposes, in addition to the plans described above, three groups of factors have formed the basis for environmental assessment:

- Operational Development Parameters, as secured in the Outline Layout and Design Principles Document **[EN010147/APP/7.7]**, and
- Project Mitigation Measures and Commitments Schedule **[EN010147/APP/6.5]**

6.1.18 The Operational Development Parameters have been set for the physical components of the Project. This approach aligns with the 'Rochdale Envelope' principles identified in Chapter 4, Section 4.3. These parameters are described for relevant operational development in **Table 6.2** below and in the accompanying narrative. This allows the Applicant some design flexibility post consent, but at the same time ensures the Project is robustly assessed.

6.1.19 The Outline Layout and Design Principles **[EN010147/APP/7.7]** adopted by the Project have also been used for assessment purposes. These should be read alongside the Operational Development Parameters. The Outline Layout Design Principles describes the spatial aspect of the design and layout of the Project i.e. the non-operational development, aspects such as buffer distances.

6.1.20 Finally, the environmental assessment process also assumes that certain mitigation measures are embedded within the Project, and these are set out in Appendix 6.1: Project Mitigation Measures and Commitments Schedule **[EN010147/APP/6.5]**.

6.2 Changes to the Project since the PEIR

In response to ongoing assessment and refinement of the Project by the Applicant, and in response to feedback from the statutory consultation phase, the Applicant has made the following key changes to the Project since the production of the PEIR in November 2023.

6.2.1 below outlines the changes made to the Project since the PEIR, with the reasoning behind the changes and description.

Table 6.2: Table outlining changes to the Project since the PEIR

Change	Reason	Comment
1. Total Site Area	Adjustment to the Project Site Boundary. These Project Site Boundary changes, whilst minor in nature, have been the subject of further targeted consultation across June and July 2024.	The following comprise the main changes to the red line project boundary that have been made since the PEIR: 1. Minor adjustments arising from Land referencing detail and Illustrative masterplan red line; 2. Inclusion of some vehicular access visibility splays; 3. New Vehicular access serving the Northern Site, to enable construction traffic to access the northern most fields; 4. Heath Lane Crossing, south of Bladon, has been reintroduced following further optimisation of the cable routes to allow for a 33kV cable run (this was previously included at Scoping Stage then withdrawn for the PEIR); 5. Other 33kv crossing points to ensure connection between various parts of the site; 6. Woodstock Road and Bladon Roundabout cable route corridor widening and Site Compound orientation, with omission of western cable route option near to Park View development; 7. Swinford Bridge cable corridor adjustment to omit the sensitive designated meadows to the west of the bridge and include different land to the east; and 87. Various access widening and visibility splay changes to provide for safe vehicular access.
2. Reduction in installation area	Area has been reduced to cater for potentially important archaeology; layout refinements; allowance for increase foraging corridors for bats	Total reduction in installation area is 45.01 ha (now 839.20ha, inc NGET substation). Northern Site Area – from 266.09 to 247.50 ha. Central Site Area – from 571.57 to 545.41 ha Southern Site Area – from 47.02 to 46.20 ha (including NGET main substation)

Change	Reason	Comment
	(see Ecology chapter); allowance for a consistent buffer from residential properties (two areas were less than the minimum buffer of 25m originally proposed by the Applicant.	
3. Repositioning of electrical infrastructure	Three secondary substations have been moved to improve its screening, reduce visual impact, and to move it away from sensitive receptors.	These changes are now recorded on the illustrative masterplans. **[EN01047/APP/6.4]**.
4. Lowering of Solar Panel arrays	The overall panel height has been lowered by 30cm, with the high edge reduced from 2.5m to 2.2m. This has been done to reduce environmental impacts, in particular landscape and visual Impact.	This change will reduce visual impact effects and reduce or avoid issues of the setting of heritage assets. The panel heights will still allow for sheep grazing.
5. Retention of Agricultural use through introduction of Conservation Grazing	To manage the land for BNG purposes and to allow for continued food production through farming sheep.	The Applicant sees the benefits of retaining the land in agricultural use to provide a food production resource, as well as having the advantage of effectively managing the land to deliver high levels of BNG. The Outline Landscape and Ecology Management Plan (oLEMP) **[EN010147/APP/7.6.3]** has been produced and sets out the principles of the management of the land.
6. Refinement of Cable Corridors	The Applicant has reduced the number of cable route options for certain crossings. These cable routes have been removed after consideration of landowner consultations, environmental impacts, technical matters and financial considerations	The Applicant has introduced a new set of plans which are designed to show the latest cable corridor areas. These should be read in conjunction with the updated masterplan drawings as part of the Environmental Statement. The cable corridors are considered in further detail in Chapter 5: Alternatives Considered of the ES **[EN010147/APP/6.5]**.
7. Accommodation of sensitive archaeology	The panel layout has been adjusted to accommodate	The masterplan now shows gaps in the solar array layout where the Applicant's archaeology evaluations to date have revealed potentially important archaeology. A Written Scheme of Investigation is being advanced, in liaison with the County

Change	Reason	Comment
	potentially important archaeology	Archaeologist, to agree the details. The areas removed from the installation layout will assist in the BNG assessment and provide increased openness in Green Belt terms.
8. Landscape adjustments	Following further information on site sensitivities e.g. archaeology, key views, adjustments to layout etc, some further adjustments have been made to the landscape proposals to protect and improve visual amenity.	In some areas where the Applicant had proposed woodland planting in the Northern Site, it became apparent that this might damage potentially important underground archaeology. In that case the orientation of the woodland belt was changed to protect the archaeology and other consequential adjustments made to planting nearby to ensure the same level of visual amenity was preserved or improved.
9. Confirmation of the BNG results	With the overall site dynamics changing (see adjustments to layout referred to at point 1 above) and our ongoing improvement in knowledge about the Site and ability to accommodate conservation grazing throughout, the Applicant has now been able to identify the proposed new habitats in order to calculate the anticipated gain expected to be achieved above the baseline position.	Please refer to the Ecology Chapter 9, and Appendix 9.13: Biodiversity Net Gain Assessment **[EN010147/APP/6.5]**
10. Accommodation of new flood alleviation pond north of Cassington	To hold/divert the current surface water runoff that occasionally causes parts of Cassington to flood in heavy or prolonged downpours.	The Applicant is proposing a betterment to the existing adverse effects that the village of Cassington suffers from surface water flooding, by creating a pond feature in the landscape that will hold off and absorb the worst effects of run-off.- See details in Hydrology and Flood Risk Chapter 10
11. Improvement to Community Benefits	Whilst there is no direct planning policy requirement, the Applicant is introducing a mechanism whereby electricity energy costs will be reduced in the region. The Applicant is also increasing its annual	The details of the delivery mechanism for both of these benefits is set out in the Socio-economic Chapter 15 and related appendices.

Change	Reason	Comment
	contribution to a Community Benefit Fund from £50,000-00 to £200,000-00 per annum.	
12. Connection date	As described at paragraph 6.1.6 above, October 2027 is the current grid connection offer date (as reflected in the PEIR), but this is likely to be amended to the beginning Q4 2028.	October 2028 is therefore now the assumed date of connection for the purposes of EIA assessment.

6.3 Construction of the Project

6.3.1 The construction of all aspects of the Project is subject to the final Project design and potential environmental constraints. Construction is expected to last approximately 24 months, plus a period for testing and commissioning. The indicative start date for construction is dependent on when the necessary consents are granted, but is likely to be the end of Q2 2026. The following are the main construction activities:

- Site preparation;
- Establishment of the perimeter fence and main construction compound(s)
- Delivery of construction material, plant and equipment to site;
- Solar PV module and associated infrastructure construction, comprising;
  - Delivery of components to site
  - Erection of module mounting structures
  - Installation of modules and Power Converter Stations (PCS)
  - Trenching and installation of electric cabling
  - Transformer foundation excavation and construction
  - Testing and commissioning
- Landscaping and other environmental enhancements.

Construction Control Mechanisms

6.3.2 An Outline Code of Construction Practice (oCoCP) **[EN010147/APP/7.6.1]** has been produced to accompany this Environmental Statement (ES). In accordance with the mitigation hierarchy, where adverse effects cannot be avoided, the ES topic chapters set out how the mitigation measures contained within the oCoCP, and other management plans, will provide the necessary controls to minimise those adverse effects. The ES chapters then assess any

residual likely significant adverse effects that may arise where those mitigation measures are implemented.

Temporary Construction Compounds

6.3.3 There will be four main temporary construction compounds to serve the Site, one in the Northern Site Area (measuring approximately 200m x 200m), two in the Central Site Area (measuring approximately 100m x 200m) and one in the Southern Site Area (measuring approximately 100m x 200m) (see Temporary Facilities Plan **[EN010147/APP/7.3.4]** and details of Site Compound plans and elevations **[EN010147/APP/7.3.6]**). The construction compounds will be used to receive and log all materials received into the Site and from which materials will be distributed, either directly from the compound itself into the internal site areas adjacent, or from the construction compounds, back out onto the adjoining highway network to access other parts of the Site. All compounds have been carefully sited in order to minimise potential adverse environmental impacts. Topsoil and subsoil will be stripped from such areas and stored on site for replacement following the completion of construction works. Each compound will have fencing and permeable hard standing, offices, welfare facilities and generators to supply electricity.

6.3.4 Once construction is complete, the temporary construction compounds will used as additional solar installation areas and any related infrastructure.

Temporary Field Compounds

6.3.5 In addition to the main site compounds, there will be a need to construct a number of temporary ‘satellite’ compounds within each of the three main Site Areas and along the interconnecting cable route corridors. These will help to provide more conveniently located and distributed storage and welfare facilities during construction. These will be subservient to the main construction compounds in scale and function, and will be suitably fenced off and secured. They will be temporary and move regularly to suit the construction phasing. These compounds may also act as areas that can actively monitor and manage active crossing points over existing PRoW or other crossing points during construction.

6.3.6 The temporary field compounds will be returned to their previous use upon completing construction or used for solar installations.

Horizontal Directional Drilling (HDD)

6.3.7 Horizontal Directional Drilling (HDD) is proposed to be employed as a construction method for laying underground cables when it is not feasible to use the ‘open cut’ method to cross obstacles such as hedges, rivers, railway lines, public rights of way, roads and sensitive archaeological or ecological areas. HDD is ideal for navigating challenging soil conditions and landscapes, allowing cables to be installed under these obstacles with minimal environmental disruption and without disturbing existing utilities such as water, gas, and electric lines.

6.3.8 HDD is a trenchless method used to install underground cables along a predetermined arc-shaped path. This technique involves:

- Drilling a pilot hole and gradually enlarging it;
- Inserting a wire through the conduit, possibly with the aid of compressed air; and
- Laying the cable using a cable laying machine.

6.3.9 The process requires temporary compounds to be created at both the entrance and exit holes of the drilling sites. The dimensions of these compounds typically vary based on available land and field boundaries, but it is expected that an 'Entrance Hole Compound' will typically comprise an area of approximately 30m x 75m and include the following components:

- Control Office
- Power Generator
- Slurry Pump
- Water Pump
- Cutting Settlement Pit
- Slurry Mixing Tank
- Cuttings Separation Equipment
- Water Tanks
- Drill Rig Area
- Gate and Fence

6.3.10 An Exit Hole Compound will typically comprise a smaller compound of approximately 30m x 25m, and include the following components:

- Cutting Settlement Pit
- Drill Pipes
- Construction Equipment
- Spares Equipment
- Pipe Rollers
- Gate and Fence

6.3.11 The burial depth of the cables ranges from a minimum of 1.5 meters to a maximum of 30 meters, to be determined in accordance with relevant regulations and the detailed profile design of HDD post consent.

6.3.12 Volume 3, Appendix 6.2: HDD Methodology and Indicative Crossing Locations **[EN010147/APP/6.5]**, sets out the methodology for HDD in more detail, as well as establishing indicative crossing locations, of which there are up to 12.

6.4 Operation and Maintenance of the Project

6.4.1 During the operational phase, activity on the Site will be minimal and will be restricted principally to continued agricultural use, landscape and ecology management, equipment/infrastructure maintenance and servicing, including cleaning and replacement of any components that fail, and monitoring to ensure the continued effective operation of the development. Operational and maintenance staff (amounting to approximately 19 FTE per year), may require access to the Site during daylight hours, seven days a week. The undeveloped areas of the Site are designed and managed to enhance the landscape and ecological value of the area. Agreement has been reached in principle with a number of organisations to manage and operate small scale food production areas, and for all other parts of the site to be given over to conservation grazing.

6.4.2 The key components of the Project comprise the following:

- Retained agricultural use of the land for conservation grazing, and with some areas given over to horticulture;
- Solar PV Modules;
- PCS (inverters, transformers and supporting equipment);
- High Voltage Transformers, including switchgear;
- Onsite cabling (33kV and 275kV);
- National Grid Electricity Transmission (NGET) 400kV substation;
- Fencing, security cameras and lighting;
- New vehicular accesses from the public highway and internal maintenance tracks;
- New green infrastructure including trees and hedgerows and other planting measures to enhance biodiversity; and
- New footpaths and cycleways.

6.4.3 For clarity, the Project does not incorporate any battery storage. Energy generated by the Project will be stored, as required, by Battery Energy Storage Systems (BESS) that are connected to the Grid elsewhere, including the EDF 50MW BESS located at Cowley substation.

6.4.4 Maximum and, where relevant, minimum design parameters have been set for the above development components within which the detail will evolve.

6.4.5 The following section provides further detail on the main components of the Project.

6.4.6 The Project components used for assessment purposes in this ES are summarised in **Table 6.3** below. The 'Parameter Range' describes possible deviations or approximate ranges in the detail, to allow for the assessment of 'worst case' scenarios for the purposes of the 'Rochdale Envelope', as certain elements will not be known in detail until the Project is procured. Where necessary the design parameters used will be set out within individual chapters within the ES. It is the likely worst case parameter that is used to identify

relevant environmental impacts and then to assess the significance of any environmental effect to ensure a robust assessment.

Table 6.3: Operational Development Parameters

Project Component	Parameter range
Total Installation area for solar arrays – Northern Site Area (exc. 275kV corridor route)	Approx. 247.3 ha
Total Installation area for solar array – Central Site Area (exc. 275kV corridor route)	Approx. 545.2ha
Total Installation areas for solar array – Southern Site Area	Approx. 46 ha (with NGET substation) Approx. 50 ha (without NGET substation)
Indicative Number of Solar PV Modules	Range from 1,800,000 to 2,200,000 PV modules
Watts peak (Wp)	1200 to 1375 MWp
Indicative Solar PV Module Dimensions	Width (m) 1.1 to 1.4 m
	Length (m) 2.1 to 2.4 m
	Depth (m) 0.03 to 0.04 m
	Area (m^2) 2.3 to 3.5 m^2
Indicative Slope of Solar PV Modules from Horizontal	12 to 18 degrees
Height of Solar PV modules above ground level	0.8 m at lower edge 2.20 m at higher edge when land is flat 2.30m at higher edge when land is not flat
Indicative Solar PV Module Colour	Dark blue or dark grey or black
Frame type	Anodized Aluminium Alloy
Indicative Number of Pyranometers (used to measure solar irradiance) Note: these are devices that are small and typically mounted onto the frame of the arrays or adjacent on freestanding poles no higher than 1.9m AGL	50-60
Indicative Table Width (incl. Ridge Break) East/West Width	3 m to 22 m
Indicative North/South separation distance (m) between tables	1.5 m to 3 m (to allow for gradients and overshadowing effects)
Indicative East/West separation distance (m) between tables	0.25 m to 0.50 m
Indicative Mounting Structure Material	Galvanized steel fixed tilt

Project Component	Parameter range
Minimum distance between solar array field fence boundary and table areas (m)	Minimum 7.0 m and in some locations up to 100 m Minimum distance between residential property boundary and table areas is approximately 25 m
Indicative Foundation Type	Driven piles or screw piles
Indicative total number of piles	780,000 to 1,600,000
Depth of piles below ground level (m)	1.0 m to 3.0 m
Power Converter Stations (PCS) - number, sound power levels, and total installed capacity of invertors	156 no. PCS units Sound power levels - approximately 92 dB Total installed capacity approximately 936,000 kVA (total apparent power in AC)
Power Converter Station (PCS) - dimensions	Height (m) 2.7 – 3.5 m
	Length (m) 12.0 – 14.0 m
	Width (m) 2.2 – 2.9 m
Applicant Main Project Substation - number, dimensions and sound power output	1 no. Applicant Main Substation with 2 HV transformers
	Length (m) – Approx. 156
	Width (m) – Approx. 63
	Height (m) – 11
	Sound power output – 93 dB(A)
Applicant Secondary Project Substations - number, dimensions and sound power output	6 no. Applicant Secondary Substations - 5no with 1 HV Transformer and the 6th housing two MV Transformers. Total Max MVA rating will be 1000.
	Length (m) 12 – 18 m
	Width (m) 6 – 10 m
	Height (m) 4.0 m – 6.0 m (inc. isolator) Sound power output – variable 73-86 dB(A)
Indicative Transformer Foundation Dimensions	Length (m) 19 – 22.0m
	Width (m) 18 – 21m
	Height (m) 0 – 1.0 m
Indicative Transformer Colour	Grey
DC Cables from Solar PV Modules to Inverters	DC string cables in the mounting structure, DC collection cables in underground trenches (unless on sensitive archaeology in which case to be laid on surface) Depth: between approx. 0.40 and 0.80 m

Project Component	Parameter range
AC Cables from Transformers to Secondary Substation (HV Transformer) (33/275kV)	Depth: Roadways: 0.75 – 0.85 m Fields: 0.90 – 1.2 m Footpaths, verges, uncultivated land: 0.70 – 0.90 m
NGET substation (approx)	87m x 30m footprint of main building (Gas Insulated) 12m height of main building (colour – dark green) 12.5m height of landing gantry 2.3 to 3.8ha site area requirement Sound Power Level – 95 dB(A)

Solar PV Array Areas

6.4.7 The proposed solar PV modules convert solar irradiance (light) into direct current (DC) electricity. They are designed to maximise the absorbency of the sun's rays and minimise solar glare. The individual solar PV modules within the Site are likely to consist of dark blue, and/or dark grey and / or black, photovoltaic (PV) cells. A range of alternative PV technologies is developing rapidly and may be available at the time of construction, therefore the solar PV modules are not limited to a particular type of PV cell. At the highest point the modules will be 2.2m and at the lowest point the modules will be 0.8m. The arrays are intended to be fixed, not rotating.

6.4.8 The Project will be constructed in line with manufacturing standards for PV modules (IEC TS 63126:2020, IEC 62548 and IEC 61215-1:2021, or relevant future standards), which require that modules be functional over a wide range of temperatures, humidity and UV radiation. Manufacturing standards also require consideration for extensive weather (such as hailstorms) and extreme thermal fluctuations. The list below identifies the main components of the solar panels.

6.4.9 During the operational phase, as components approach their design life, there will be an evaluation to determine if the components require maintenance and/or replacing. It is not anticipated that wholescale maintenance or replacement would be required. The Outline Operational Management Plan (oOMP) **[EN010147/APP/7.6.2]** sets out routine maintenance regimes, monitoring of degradation of the modules and other equipment over time, and planned replacement of equipment as necessary.

Main Components of Solar Panels

- Solar photovoltaic cells - Silicon
- Toughened Glass (front and rear)
- Extruded Aluminium frame
- Toughened rear glass

- Junction box - diodes and connectors

Solar PV Module Mounting Structure

6.4.10 The solar PV modules will be mounted on a metal framework. This is likely to be formed using a mix between galvanised steel and aluminium, supported by galvanised steel piles or screws driven into the ground by an impact piling or screwing rig, to a depth of approximately 1.0 to 3.0m. The module structure will either have one or two legs at each end, but for assessment of 'worst case scenario' we are assuming two legs at each end.

Medium Voltage (MV)Transformers

6.4.11 Medium Voltage (MV) Transformers (1kV/33kV) are required to control and increase the voltage of the electricity generated across the Solar PV Tables before it reaches the High Voltage transformer.

Power Converter Stations (PCS)

6.4.12 MV Transformers (1kV/33kV) and switchgear will be housed in one unit known as a PCS). There will be 156 PCS located within the solar PV installation area. The dimensions of a PCS are up to 14m long and up to 3.5m high. Inverters might also be located within the PCS. Sound levels are expected to be 67 dB (10 m distance) as a worst case (for details please refer to Chapter 13: Noise and Vibration of the ES **[EN010147/APP/6.3]**).

High Voltage (HV) Transformers

6.4.13 High Voltage (HV) Transformers (33/275 kV) are required to increase the voltage of the electricity coming from the MV Transformers and to connect the three main solar sites with the High Voltage Transformers (275/400kV) and the NGET substation. In total, there are likely to be two HV Transformers (33/275 kV) and six High Voltage Transformers (275/400kV). The dimensions of a HV transformer are approximately 18m long and 6m high.

Electrical Cabling

6.4.14 Onsite electrical cabling is required to connect the solar PV tables to the combiner boxes and from combiner boxes to the inverters at the PCS as DC cabling system, and then to the transformers on site as AC, MV and HV cabling systems. Higher rated cables are then required between the transformers and the secondary substation (HV transformer) within the electrical compound.

DC Cables

6.4.15 DC cabling between modules and combiner boxes within each of the installation areas will be, fixed to the mounting structure underneath the arrays, and also laid in trenches underground (unless the latter approach would affect areas of archaeological sensitivity in which case they will be laid on the surface, suitably protected). The DC cable from combiner boxes to inverters will be set approximately 0.4 to 0.8 m underground. All above ground cables

will be routed through conduit and racking secured to the solar PV module mounting structures.

AC Cables

6.4.16 AC cables from the inverters to the substation will be routed through underground cable trenches. The proposed corridor route of the AC cables is shown on the cable corridor plans in Volume 2 Figures 2.4 A, B, C & D.

6.4.17 As mentioned at 6.1.12, there are four cable corridor option areas along the cable corridor route where several cable routes are possible. These are focused on: i) an area adjoining the Northern Site, in the vicinity of the Oxfordshire Way, south east of Wootton; ii) land to the east of Woodstock and near the Bladon roundabout on the A44; iii) land east of Burleigh Wood and around Bladon Heath Wood; and iv) on land east and south of Eynsham, around the Swinford Bridge River Thames crossing. Along each of these sections of the cable corridor option areas the Applicant will continue to undertake an evaluation to determine a preferred and narrower cable route corridor. Within the Environmental Statement the four cable option areas have been environmentally assessed in full, with environmental information also being available in respect of each cable route corridor within the cable corridor, and these effects are reported on within the specialist technical Chapters.

6.4.18 The cable route from the first 33/275kV transformer in the Northern Site Area to the High Voltage Transformers (275/400kV) in the Southern Site Area is approximately 24.6km in length. Approximately 14.6km is located on farmland, most of which falls within the Project site, 7.5km is located in public highway, and approximately 2.5km within trenchless crossings, such as those located under rivers, the railway line, main highway corridors, or under hedgerow and tree belt features.

6.4.19 Within trenches the AC cables between the transformers and the Project substations will be buried at the following approximate depths:

- Roadways: approximately 0.75 - 0.85 m;
- Agricultural land: approximately 0.91 - 1.2 m;
- Footpaths, verges, uncultivated land: approximately 0.75 - 0.85 m; and
- Depth under railway and river crossings - to be determined, but to be in accordance with relevant regulations - likely to be 5 m.

Landscaping

6.4.20 As a core principle, existing landscape features are intended to be retained and the removal of hedgerows has been avoided as far as practicable. Where it is necessary to cross hedgerow and tree belt features with cabling, or to allow vehicular access, existing gaps have been used in that landscape feature or if not available, HDD or pipe-ramming laying methods are used. In the case of a vehicular access, there are some locations where an existing field access will be widened. In the event that no reasonable alternative was found for a crossing for a cable route then the minimum width of hedge has been removed and where possible replaced. A crossing schedule had been produced

detailing planned crossing point by location, method and if applicable length of hedgerow lost **[EN010147/APP/7.3.9]**).

6.4.21 Landscape mitigation is embedded in the overall project design and has been formulated to minimise potential landscape and visual impacts and maximise enhancement of landscape features, landscape character and biodiversity of the Site. An Illustrative Masterplan in Figure 2.1 of Volume 2 **[EN010147/APP/6.4]** has been presented being informed by experience of similar projects and good practice guidance relating to retention and enhancement of woodlands, trees and hedgerows. The landscape masterplan includes opportunity to create new habitats such as hedgerows, tree planting woodland and meadows in keeping with the characteristics of the host landscape character types.

6.4.22 Planting and management of grassland, hedgerows, trees and areas of scrub is proposed across the Site for landscape, visual and biodiversity mitigation and enhancement. Areas under and around the panels will develop vegetation that will be managed by conservation grazing. Conservation grazing entails lower levels of stocking than traditional commercial sheep farming, and a regenerative approach to soil management which also supports the management of areas that deliver the Project BNG target. In areas not affecting power generation vegetation growth will be facilitated to improve biodiversity.

Earthworks

6.4.23 Earthworks on the Site (e.g., transformer, substation and access foundation excavations) may result in a small surplus of material within areas of the Site. This material is intended to be reused in landscaping and restoration of the Site during and after construction and is not intended to be exported.

6.4.24 A new water body will also be created just north of Cassington within the former array area to allow surface water run-off to be intercepted before it reaches the village, as a way to reduce the extent of flooding that occasionally occurs in the village. This is being proposed as a design betterment, to alleviate an existing problem, and not in mitigation of the Project impacts themselves.

Grid Connection

6.4.25 The Project will connect to the National Grid transmission system via a new National Grid 400kV substation to be located close to the existing National Grid 400kV line that runs between Cowley and Walham. Discussions have been ongoing with NGET regarding the location for their substation, based upon their own assessment and evaluation work. Whilst, at the time of writing this ES, a final decision has yet to be taken by NGET, it is likely that the NGET substation will be located in one of two possible locations:

1. On land within the Applicant's control, at its Southern Site, at the western most extremity, south of the Farmoor Reservoir.
2. On land near the Applicant's Southern Site, to the west of and adjoining that Site, south of the Farmoor Reservoir.

6.4.26 For assessment purposes, the Applicant assumes that the NGET substation will be within the Applicant's Site, as described in Option 1 above, and powers will be taken to consent that substation as part of the Applicant's DCO. To cater for the eventuality that NGET decides not to locate their substation within the Applicant's Site, then the Applicant has additionally assessed:

- an alternative location, assumed to be close to the Southern Site at its western end, on a cumulative basis, with NGET seeking any necessary consents and permissions; and
- the substitution of solar panels for the substation on the land referred to in Option 1 above.

6.4.27 The area to be set aside for the NGET substation amounts to between 2.3ha to 3.8 ha. Within that area it is assumed that the substation itself will occupy a footprint of approximately 87m by 30m, with a likely maximum height of 12m, excluding connecting tower structures.

6.4.28 If the DCO powers are to be exercised, the substation is to be constructed by NGET in the Southern Project Site between the B4017 and the B4044, the precise design and position of the substation will be decided by NGET.

6.4.29 The three main Site Areas (see Volume 2, Figure 1.2 **[EN010147/APP/6.4]**) will be connected via 275kV underground cables. These 275kV cables are required to connect all the Project Sites with the main substation.

Site Access

6.4.30 Vehicles will access the Project Site either via existing field entrances or purpose-built new access roads. All vehicular access points to the Project Site are shown on the illustrative masterplan. All vehicular access points required for the construction phase (to the four main compound areas and other construction site accesses into other parts of the Project Site) have been designed in detail and can be found in the Site Construction Compound Accesses Plans **[EN010147/APP/7.3.1]**.

6.4.31 During construction, haul roads will be positioned to minimise impacts upon sensitive receptors. Where possible haul road routes will use existing unsurfaced tracks and field access points and where it is necessary to cross existing rights of way, these will be carefully managed to reduce, or avoid, adverse effects.

6.4.32 Internal maintenance roads, required for occasional access during the operational period, are likely to follow unsurfaced routes around the edges of each solar array field, with other internal maintenance routes, located at intervals between tables.

6.4.33 Whilst it is assumed that during construction and operation the maintenance roads and haul roads will be unsurfaced, using existing tracks and field access points., there may be a need to lay temporary Terrafirma matting or similar, particularly in areas of high vehicle usage, where heavy loads need to be transported, on saturated ground and/or to avoid or minimise damage to soil structure. Where the use of Terrafirma matting is considered to be inappropriate, then there may be targeted areas where use of Type 1 and/or Type 3 material will be laid. It is assumed that such areas will be limited in

extent and where required incorporate additional drainage measures, such as filter strips. Any soils arising from these works, will be placed in areas if low flood risk. The construction methodology of any such surfaced areas will be controlled by the Outline Code of Construction Practice **[EN010147/APP/7.6.1]**.

6.4.34 The final position and treatment of all internal maintenance roads, and any haul roads required during the construction phase, will be confirmed post consent and be the subject of approval via Requirements to be secured within the draft DCO, including the Construction Traffic Management Plan.

6.4.35 Chapter 12: Traffic and Transport **[EN010147/APP/6.3]**, and Chapter 17: Agricultural Land and Public Rights of Way **[EN010147/APP/6.3]**, describe and assess the effects of access in more detail.

6.4.36 A 'crossing schedule' is provided at **[EN010147/APP/7.3.9]**, and lists all crossing types (including vehicular access, but also cable crossings) and the obstacle over which the crossing passes.

Maintenance

6.4.37 The Outline Operational Management Plan **[EN010147/APP/7.6.2]** details operational mitigation measures. Where relevant, it also sets out the monitoring activities designed to demonstrate that such mitigation measures are carried out, and to measure their effectiveness. The Outline Operational Management Plan **[EN010147/APP/7.6.2]** also describes that regular planned maintenance of the Scheme will be conducted to optimise efficiency of the Scheme infrastructure, such as replacement of PV modules and inverters, when required.

Other Infrastructure

6.4.38 Fencing, lighting and security systems are also proposed to enclose and secure the main Project infrastructure components. The fencing will be for operational security purposes and may be up to 2.1 m in height. Lighting and CCTV will be installed too, but only within limited areas of the development, generally around the high voltage infrastructure for safety and security. **Table 6.4** below provides more details.

Table 6.4: Other Infrastructure Parameters

Other Infrastructure	Parameter range
Fencing	Length (km) Northern Site Area – Approximately 26.7 km Central Site Area – Approximately 70 km Southern Site Area – Approximately 8.8 km
	Height – 1.8 m to 2.1 m
CCTV	No. of CCTV cameras – 14 (two on each of the 6 no. Secondary Project Substations, and two on the Main Project Substation).
	Support Column Details - 100 mm box section galvanized steel column or wooden pole

Other Infrastructure	Parameter range
	Camera Height (m) – 3.0 m to 4.0 m
	Camera Position – 1m to 2m inside the fence boundary
	The CCTV cameras can operate as infrared, without the need for visible lighting, but also have emergency lighting fitted.
Lighting	For Solar PV Array and Transformers – combination of manually operated lighting and PIR motion sensor activated security / emergency lighting. No lights will be permanently switched on. Operated manually.
	Electrical Compound(s) - combination of Manually operated lighting and Passive infra-red (PIR) motion sensor activated security / emergency lighting. No lights permanently switched on.

6.5 Decommissioning and Enhancement

6.5.1 The consent being sought for the Project is a temporary one. Temporary consent is being sought for a 42-year period during which the solar farm will be constructed, operated and decommissioned. Decommissioning of the Project is also expected to last 24 months.

6.5.2 Other than all 33kV and 275 kV cables (where they have been laid in the public highway and where cables have been laid using horizontal directional drilling – either under rivers, road, rail crossings, or existing landscape features), and any NGET substation, all other solar PV array infrastructure including solar PV modules, mounting structures, cabling, inverters and transformers will be removed from the Site and managed in accordance with the waste hierarchy.

6.5.3 An Outline Decommissioning Plan **[EN010147/APP/7.6.4]**, including timescales and transportation methods, ecological and landscape enhancements and other environmental improvements, will be developed in consultation the local planning authority, local community and key stakeholders, to be prepared closer to the time of decommissioning. An Outline Decommissioning Plan **[EN010147/APP/7.6.4]** has been submitted alongside the DCO and forms an integral part of the DCO application. This is secured by way of Requirement in the draft DCO, and will inform the decommissioning Plan.

6.5.4 The Landscape, Ecology and Amenities Plan **[EN010147/APP/7.3.3]** illustrates what the Site might look like after the solar arrays and other infrastructure are removed.

6.6 References

HMSO (2008), The Planning Act 2008, Available at: https://www.legislation.gov.uk/ukpga/2008/29/pdfs/ukpga_20080029_en.pdf.