
EAST YORKSHIRE SOLAR FARM

**East Yorkshire Solar Farm
EN010143**

Environmental Statement

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3. Alternatives and Design Evolution

3.1 Introduction

- 3.1.1 This chapter of the Environmental Statement (ES) describes the consideration of alternatives and design evolution in relation to the Scheme. The need case for the Scheme and the reasons for the selection of the Site are also explained.
- 3.1.2 A **Design and Access Statement [EN010143/APP/7.3]** has been submitted as part of the DCO Application which explains how the proposed design for the above ground operational infrastructure responds to its local context and the design objectives for the Scheme. An **Outline Design Principles Statement [EN010143/APP/7.4]** has also been submitted as part of the DCO Application which explains the principles that have guided design so far and how these are to be secured in the DCO to guide the detailed design.

3.2 Legislation and Planning Policy

- 3.2.1 There is a legislative requirement to present alternatives where these have been considered by the Applicant. Regulation 14(2) of the Infrastructure Planning (Environmental Impact Assessment) (EIA) Regulations 2017 (Ref. 3-1) sets out what the Environmental Statement (ES) must include and refers to Schedule 4 of the EIA Regulations (Ref. 3-1) for additional information to be provided in the ES. Paragraph 2 of Schedule 4 of the EIA Regulations (Ref. 3-1) requires the ES to present “*A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects*”.
- 3.2.2 There is no general requirement in relevant national policy to consider alternatives. National Policy Statement (NPS) EN-1: Overarching National Policy Statement for Energy (Ref. 3-2) paragraph 4.4.1 and draft NPS EN-1 (Ref. 3-10) paragraph 4.2.9 state that “*as in any planning case, the relevance or otherwise to the decision-making process of the existence (or alleged existence) of alternatives to a proposed development is in the first instance a matter of law*” and from a policy perspective “*this NPS does not contain any general requirement to consider alternatives or to establish whether the proposed project represents the best option*”.
- 3.2.3 Paragraph 4.4.2 of NPS EN-1 (Ref. 3-2) and draft NPS EN-1 (Ref. 3-10) paragraph 4.2.9 do, however, highlight that in addition to the requirement under the EIA Regulations set out above there are other specific legislative requirements and policy circumstances which require the consideration of alternatives.
- 3.2.4 These include a requirement under the Habitats Directive, as transposed into UK law by the Conservation of Habitats and Species Regulations 2017 (Ref. 3-17), and in relation to avoiding significant harm to biodiversity and geological conservation interests as well as compulsory acquisition. Other policy requirements identified by NPS EN-1 are in relation to flood risk with

- the application of the Sequential Test, and development within nationally designated landscapes. Sections 5.3, 5.7 and 5.9 of NPS EN-1 (Ref. 3-2) explain these policy requirements. Paragraph 4.4.3 of NPS EN-1 (Ref. 3-2) states “*where there is a policy or legal requirement to consider alternatives the applicant should describe the alternatives considered in compliance with these requirements*”.
- 3.2.5 Paragraph 4.2.21 of Draft NPS EN-1 states that “*Given the level and urgency of need for new energy infrastructure, the Secretary of State should, subject to any relevant legal requirements (e.g. under the Habitats Regulations) which indicate otherwise, be guided by the following principles when deciding what weight should be given to alternatives:*
- a. *the consideration of alternatives in order to comply with policy requirements should be carried out in a proportionate manner*
 - b. *only alternatives that can meet the objectives of the proposed development need to be considered*”
- 3.2.6 It is not anticipated that the Scheme, with its proposed mitigation, will cause significant harm to biodiversity and geological conservation interests and nationally designated landscapes. **Chapter 8: Ecology, ES Volume 1 [EN010143/APP/6.1], the Habitat Regulations Assessment [EN010143/APP/7.11] and Chapter 10: Landscape and Visual Amenity, ES Volume 1 [EN010143/APP/6.1]** demonstrate this, presenting the likely effects of the Scheme on designated ecological sites and designated landscape areas.
- 3.2.7 The Site is however located partially within the Environment Agency's (EA) fluvial Flood Zone 2 and fluvial Flood Zone 3 and it includes areas of land which are also at medium and high risk of surface water flooding. Therefore, consideration of alternatives to meet this flood risk policy requirement is set out in section 3.6 and discussed further in section 3.7 of this chapter.
- 3.2.8 Notwithstanding this, draft NPS EN-1 (Ref. 3-10) paragraph 4.2.15 states that “*Applicants are obliged to include in their ES, information about the reasonable alternatives they have studied. This should include an indication of the main reasons for the applicant’s choice, taking into account the environmental, social and economic effects and including, where relevant, technical and commercial feasibility.*”
- 3.2.9 The Planning Inspectorate’s Advice Note 7: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements (Ref. 3-18) at paragraph 9.3 also refers to good ESs explaining “*the reasonable alternatives considered and the reasons for the chosen option taking into account the effects of the Proposed Development on the environment*”.
- 3.2.10 Taking into consideration the policy and legal requirements, as well as the iterative approach to the design, the following alternatives have been considered for the Scheme and are discussed in this chapter:
- a. Alternatives to the Solar PV Site;
 - b. Alternative routes for the Grid Connection Corridor;
 - c. Alternative layouts within the Solar PV Site; and
 - d. Alternative solar design technologies.

- 3.2.11 These alternatives are discussed alongside a summary of the need for the Scheme and the reasons the Applicant has selected the Site.
- 3.2.12 Consideration of ‘no development’ as an alternative to the Scheme has not been considered further. This is because ‘no development’ is not considered to be a reasonable alternative to the Scheme as it would not deliver the proposed additional electricity generation capacity proposed. NPS EN-1 (Ref. 3-2) at paragraph 4.4.3 states “*alternative proposals which mean the necessary development could not proceed can be excluded on the grounds that they are not important and relevant to the IPC’s (now Secretary of State) decision*”. Paragraph 4.2.21 in draft NPS EN-1 (Ref. 3-10) also states “*only alternatives that can meet the objectives of the proposed development need be considered*”. This does not however preclude the use of the ‘no development’ also referred to as a ‘do nothing’ scenario in certain technical chapters of the ES where this is required to present a future baseline condition in relation to the impact assessment.
- 3.2.13 Other energy generation schemes such as wind power, nuclear, coal or gas fired power stations have not been assessed, due to one or more of the following factors: their unsuitability to the Site, the timescales within which they could be delivered, and their ability (or not) to contribute to the UK’s need for low carbon electricity (in the case of coal or gas).
- 3.2.14 A ‘smaller development’ as an alternative to the Scheme has also not been considered further, as NPS EN-1 (Ref. 3-2) at paragraph 4.4.3 states that the decision maker: “*...should be guided in considering alternative proposals by whether there is a realistic prospect of the alternative delivering the same infrastructure capacity (including energy security and climate change benefits) in the same timescale as the proposed development*”. A smaller scheme would not deliver the same generation capacity or energy security and climate change benefit as the Scheme and would result in a higher unit cost, and as such would not represent a reasonable alternative.

3.3 Stakeholder Engagement

- 3.3.1 The Applicant has carried out statutory consultation in accordance with the Planning Act 2008 (Ref. 3-6) which is described in detail in the **Consultation Report [EN010143/APP/5.1]** submitted as part of the DCO Application.
- 3.3.2 **Table 3-1** below summarises the main matters raised in relation to alternatives at the statutory consultation stage and how these have been addressed.

Table 3-1. Matters raised in relation to alternatives at the statutory consultation stage

Consultee(s)	Main matter(s) raised	How have the matter(s) been addressed
Various section 42(1)(a), section 42(1)(d) and section 47	Concerns about the use of agricultural land for solar development. Solar development should be located on industrial land, brownfield sites,	Section 3.4 of this Chapter and the Statement of Need [EN010143/APP/7.1] explain the need for large scale ground mounted solar generation. Paragraph 3.2.14 of this chapter confirms it is not

Consultee(s)	Main matter(s) raised	How have the matter(s) been addressed
	commercial properties, car parks, adjacent to motorways and roofs.	<p>considered that small scale generation is a reasonable alternative to the Scheme but instead complements it.</p> <p>The Applicant has undertaken a review of the brownfield registers to identify any brownfield sites which may be suitable. As discussed in section 3.5 this has identified no brownfield sites that are of a suitable size and location for the Scheme.</p> <p>As part of the site selection process described in section 3.5 of this chapter the Scheme seeks to avoid the use of best and most versatile (BMV) agricultural land.</p> <p>On decommissioning, the agricultural land classification grading of soils will be unaltered from baseline conditions.</p>
Section 42(1)(a) Eastrington Parish Council	We strongly believe that utilising prime agricultural land of this magnitude and diverting its use from food production is unnecessary, especially considering the existence of numerous brownfield sites in closer proximity to Drax. For instance, Pollington Airfield and the nearby disused concrete factories could offer viable alternative locations.	<p>The Applicant's site selection process for the Scheme is detailed in Section 3.5. This explains the stages and the main considerations which have influenced the Applicant in how it has selected the land for the Scheme.</p> <p>For the Solar PV Site this has included avoiding environmental and land use constraints and taking into consideration other criteria such as topography; field pattern and arrangement; land use conflict which would identify suitable land for solar development, as well as land availability.</p> <p>The Applicant has undertaken a review of the brownfield registers to identify any brownfield sites which may be suitable. As discussed in section 3.5 this has identified no brownfield sites that are of a suitable size and location for the Scheme.</p>
Section 42(1)(a)	The Council is concerned that only a selective	The Applicant's site selection process for the Scheme is detailed in Section

Consultee(s)	Main matter(s) raised	How have the matter(s) been addressed
Spaldington Parish Council	<p>group of property owners have been approached to have the solar panel installed on their land. The Council was told all land owners with land in excess of 100 acres would be approached - we know this is incorrect as the Council is aware of multiple land owners with land in excess of 100 acres who have not been approached. This would, to the layperson, be a little suspicious that only supporters of the development have been approached. Can BOOM explain why there has been a selective approach and not to all with the appropriate amount of land?</p>	<p>3.5. This explains the stages and the main considerations which have influenced the Applicant in how it has selected the land for the Scheme.</p> <p>For the Solar PV Site this has included avoiding environmental and land use constraints and taking into consideration other criteria such as topography; field pattern and arrangement; land use conflict which would identify suitable land for solar development, as well as land availability.</p>
Section 42(1)(d) Section 47	<p>There is already a cable route with pylons on the other side of the river to us so why cannot that be used?</p> <p>Could existing Cable route with pylons on the other side of the river be used?</p>	<p>The River Derwent to the west of the Solar PV Site has several biodiversity designations including Ramsar, Special Protection Area (SPA) and Site of Special Scientific Interest (SSSI). Therefore, extensive works to cross these designations to place cabling to the west of the river and link into existing infrastructure has been avoided and was not considered an appropriate alternative; being in close proximity to these designations would potentially result in significant adverse effects on these designations.</p> <p>An underground cable route was also chosen to minimise the visual and landscape effects resulting from the Scheme. Using existing above ground infrastructure in the area is also not feasible without significant upgrades.</p>

Consultee(s)	Main matter(s) raised	How have the matter(s) been addressed
Section 42(1)(d)	We strongly feel it [the substation] should be repositioned on the opposite side of the railway (on the Rowlandhall Farm side) out of view and earshot of several surrounding properties and would be a much more sensible & considerate location.	Both Grid Connection Substations have been relocated to Solar PV Area 1c. The design evolution is discussed in Section 3.8 of this Chapter and the Design and Access Statement [EN010143/APP/7.3] .
Section 42(1)(d)	Surely large landowners like [REDACTED] could offer alternative land.	Section 3.5 of this chapter sets out the Applicant's approach to site selection. Agreement from landowners for their land to be used for solar development and minimising the number of landowners affected by the Scheme, were key requirements of the Applicant's approach to selection of the Solar PV Areas. The Applicant has therefore identified land within the refined area of search for the Solar PV Site which has a small number of land interests who have offered their land for the Scheme. Additional land offered by landowners at the non-statutory consultation stage has also been considered.
Section 42(1)(d)	This [the Solar PV development should] be in an area where there is no impact to residents and wildlife.	<p>The Applicant's site selection process for the Scheme is detailed in Section 3.5. This explains the stages and the main considerations which have influenced the Applicant in how it has selected the land for the Scheme.</p> <p>For the Solar PV Site this has included avoiding environmental and land use constraints like settlements and ecological designations and taking into consideration other criteria such as topography; field pattern and arrangement; land use conflict which would identify suitable</p>

Consultee(s)	Main matter(s) raised	How have the matter(s) been addressed
		land for solar development as well as land availability.
Section 42(1)(d)	Rowlandhall Farm has far more suitable easy access & line of sight for large vehicles and as one of the main beneficiaries of the solar farm we feel it would be only fair for them to have the substation sited on their side of the land rather than several properties not involved in the scheme having to look and listen to this installation.	A revised access location off Rowlandhall Lane is proposed to reduce impact of construction vehicles accessing the Solar PV Areas new Rowlandhall Farm. The substation previously proposed in Solar PV Area to the north of the railway is no longer being part of the Scheme proposals. Following consideration of feedback at Statutory Consultation, the substations are now located in Solar PV Area 1c.
Section 42(1)(d) Section 47	Why so far from Drax? Why can a location closer to Drax not be selected?	<p>Land closer to Drax has been considered as part of the site selection process for the Solar PV Site and also to confirm the Flood Risk Sequential Test has been met. Section 3.5 of this Chapter details the Applicant's site selection process. Land closer to Drax falls within the Initial Area of Search identified by the Applicant for the Solar PV Site but does not fall within the refined Area of Search the Applicant determined following further analysis of environmental constraints.</p> <p>As discussed in section 3.5 of this chapter the key factors for selecting the land for the Solar PV Site were the point of connection at Drax, the limited environmental and land use designations, excluding or limiting BMV agricultural land and considerations relating to land availability and assembly.</p>
	The Scheme should be relocated	The Applicant's site selection process for the Scheme is detailed in Section 3.5. This explains the stages and the main considerations

Consultee(s)	Main matter(s) raised	How have the matter(s) been addressed
Section 47	Could the sites be more clustered together to have one big site as opposed to multiple micro sites? Residents should have no more than two sides occupied by solar fields.	<p>which have influenced the Applicant in how it has selected the land for the Scheme.</p> <p>For the Solar PV Site this has included avoiding environmental and land use constraints and taking into consideration other criteria such as topography; field pattern and arrangement; land use conflict which would identify suitable land for solar development, as well as land availability.</p> <p>As discussed in section 3.5 of this chapter, the key factors for selecting the land for the Solar PV Site were the point of connection at Drax, avoiding environmental and land use constraints, excluding or limiting BMV agricultural land, and identifying areas with good access to the local road network, and considerations relating to land availability.</p> <p>There are some contiguous Solar PV Areas of the Scheme and some discrete Solar PV Areas as a result of land availability. All are in close proximity to one another and provide appropriate offsetting from residential properties that avoid enclosing residential receptors on more than two sides. Further details of the Applicant's design process are provided in the Design and Access Statement [EN010143/APP/7.3]</p>
Section 47	Can the panels occupy less area?	<p>The land identified within the Site is the land required to construct and operate the Scheme based on the solar technology proposed.</p> <p>As set out in section 3.8 below, the area of the Solar PV Site has been refined and reduced from that presented at Statutory Consultation.</p>

Consultee(s)	Main matter(s) raised	How have the matter(s) been addressed
Section 47	<p>The Scheme should be located closer to Drax e.g. at the old airfield / brownfield sites.</p> <p>Please move the Scheme to run parallel to the M62</p>	<p>The Applicant’s site selection process for the Scheme is detailed in Section 3.5. This explains the stages and the main considerations which have influenced the Applicant in how it has selected the land for the Scheme.</p> <p>For the Solar PV Site this has included avoiding environmental and land use constraints and taking into consideration other criteria such as topography; field pattern and arrangement; land use conflict which would identify suitable land for solar development, as well as land availability.</p> <p>The Applicant has undertaken a review of the brownfield registers to identify any brownfield sites which may be suitable. As discussed in section 3.5 this has identified no brownfield sites that are of a suitable size and location for the Scheme.</p>
Section 47	<p>The length of the cable route is too long (goes too far from Drax)</p>	<p>The selection of the Grid Connection Corridor is set out in section 3.7 of this Chapter and the reasons for selecting the Solar PV Site are set out in section 3.5, explaining the two areas of search and criteria used by the Applicant to determine the distance for the Grid Connection Corridor.</p>

3.4 Need for the Scheme

- 3.4.1 The Scheme’s principal objective is to generate low-carbon electricity for an operational period of 40 years, to meet the UK’s growing need for low carbon electricity.
- 3.4.2 Decarbonisation is of global significance. The compelling need for global action to decarbonise continues to be reinforced. On 20 March 2023, the U.N. Intergovernmental Panel on Climate Change published its assessment of global climate change (Ref. 3-3). This advisory report concludes that the world is likely to pass a dangerous temperature threshold within the next 10 years, pushing the planet past the point of catastrophic warming — unless nations drastically transform their economies and immediately transition away from fossil fuels.

- 3.4.3 In May 2023, the World Meteorological Organisation (WMO) stated that the likelihood of one of the years between 2023–2027, and the five-year period as a whole, being the hottest on record was 98% (Ref. 3-4).
- 3.4.4 There is a growing body of UK energy and climate change international commitments, law, policy, and guidance which highlights an urgent need for new low carbon energy generation infrastructure, particularly from renewable sources such as solar.
- 3.4.5 Decarbonisation is a UK legal requirement. In June 2019, Government passed law to end the UK’s contribution to global warming by 2050: Net Zero (Ref. 3-5).
- 3.4.6 UK electricity demand is expected to double by 2050. Decarbonisation requires the electrification of energy which is currently sourced from fossil fuels (including gas, petrol and diesel) and the UK’s pathway to achieving Net Zero by 2050 must involve wider transitions outside of the power sector, including decarbonising transport, industry, agriculture and homes. In June 2023, the Committee on Climate Change (CCC) published their Progress Report to Government. The report stated that “*To achieve the NDC [Nationally Determined Contribution – 2030] commitment of at least a 68% fall in territorial emissions from 1990 levels, the rate of emissions reduction outside the power sector must almost quadruple.*” (Ref. 3-7).
- 3.4.7 Extensive electrification requires the major expansion of renewable and other low-carbon power generation to ensure that the UK is capable of securely meeting future electricity demand, and with a significantly lower carbon intensity. The decarbonisation of UK electricity generation is therefore vitally important to meet the UK’s legal obligations on carbon emissions and ensure sustainable energy resilience as per the British Energy Security Strategy 2022 (Ref. 3-13).
- 3.4.8 Alongside a drive for new energy generation the UK Government has committed to achieving decarbonisation of the energy sector by 2035 (Ref. 3-8).
- 3.4.9 Yet the CCC also stated in its June 2023 Progress Report (Ref. 3-7) that “*Some of the key planks of the UK Net Zero Strategy have substantial lead-times,*” implying that these “planks” may not make significant (if any) contributions to achieving the 2030 NDC.
- 3.4.10 The decommissioning of existing generation assets also increases the requirement to develop new low-carbon generation with urgency in order to “keep the lights on”.
- 3.4.11 Nuclear power has historically met circa 20% of UK electricity demand, but existing nuclear stations began to close in 2021. Only one existing plant (1.2 GW) is scheduled to remain operational beyond 2028. One new nuclear project (Hinkley Point C, funded and currently under construction) is scheduled to be commissioned in the late 2020s. At the time of writing, no others have yet secured full funding, and none have commenced nuclear construction. Therefore, none are likely to commission before the mid-2030s at the earliest. National Grid Electricity System Operator Limited’s Future Energy Scenarios report (2023) (Ref. 3-9) estimates that the first Sizewell C unit and / or the first small modular reactor in the UK are commissioned by 2034 at the earliest.

- 3.4.12 Only one UK coal station is currently still in operation. It is currently scheduled to close in September 2024. Carbon Capture Utilisation and Storage (CCUS) is a key plank under development to support Net Zero by facilitating the decarbonisation of the UK's thermal (carbon emitting) fleet, currently circa 42 GW (Ref. 3-9), decarbonising industry, producing low-emissions hydrogen, and delivering greenhouse gas removal technologies. Recent progress has been made towards bringing CCUS clusters forward by the end of the decade however Government recognises that the technology has not been delivered at scale and significant risks remain.
- 3.4.13 Hydrogen is another key plank, but its development is not yet guaranteed. Technological hurdles must be overcome, grid connection, funding and consents must be secured. Blue hydrogen relies on functional CCUS operating at GW-scale; pink hydrogen on abundant electricity from new nuclear facilities; and green hydrogen on abundant low-carbon electricity. Not all enablers to hydrogen production are yet guaranteed, but while the path to a low-carbon future is incredibly uncertain, much progress has already been made in the delivery of renewable generation facilities.
- 3.4.14 The UK has substantial renewable energy resources. Government is targeting 50 GW of offshore wind to be operational by 2030 to harness that resource and shield consumers from volatile international energy markets. But wind on its own is not sufficient and the 2023 draft NPS EN-1 (Ref. 3-10) states at paragraph 3.3.20 that "*a secure, reliable, affordable, net zero consistent system in 2050 is likely to be composed predominantly of wind and solar.*"
- 3.4.15 The development of large-scale solar in the UK (National Grid estimates up to 41.4 GW by 2030 rising to 91.2 GW by 2050) (Ref. 3-9) will provide an essential diversity to the UK's low-carbon generation portfolio, working with other technologies to deliver security of supply and value to UK consumers. The British Energy Security Strategy (April 2022) (Ref. 3-13) set an ambition of 70 GW of solar by 2035 (an increase of circa 55 GW from the current installed capacity).
- 3.4.16 Mission Zero, published in January 2023 by Rt Hon Chris Skidmore MP, Chair of government's Independent Review of Net Zero, finds that "*The benefits of net zero will outweigh the costs*" and believes that "*This is too important to get wrong*". Mission Zero recommends the "*Full-scale deployment of solar including a rooftop revolution to harness one of the cheapest forms of energy, increase our energy independence and deliver up to 70 GW of British solar generation by 2035*" (Ref. 3-14 [p8]).
- 3.4.17 Government's Powering Up Britain strategy, published in March 2023 (Ref. 3-15) concludes that "*We need investment at scale ... to rapidly rollout existing technologies ... at pace to meet our ambitions for decarbonising power and [lower] wholesale UK electricity prices*" [p9] and observes that "*a significant proportion of technologies we will need for 2050 are currently at the demonstration or prototype phase*". Powering Up Britain also concludes that an acceleration of the deployment of renewables is critical to the delivery of Government's plans: "*Our goal is to develop up to 50 GW of offshore wind by 2030 and to quintuple our solar power by 2035*" [p7], noting that 14 GW of solar was already installed in the UK at the time the Powering Up Britain report was written.

- 3.4.18 There is therefore a pressing need to bring forward grid-scale solar, and it is important that these assets are brought forwards quickly due to the urgency of the need.
- 3.4.19 Solar generation is already a leading low-cost generation technology in the UK as set out in the Cost of Energy Report (Ref. 3-16) and is therefore a critical element of the plan to decarbonise the UK electricity sector. The national need for solar generation is urgent and the capacity required is significantly greater than the capacity of projects currently understood to be in development.
- 3.4.20 Solar addresses all important aspects of existing and emerging government energy policy. It will make a critical and timely contribution to decarbonisation and security of supply in the UK, will help shield consumer bills from volatile energy prices and international supply markets, and provides the potential to deliver biodiversity net gains through its development.
- 3.4.21 A **Statement of Need [EN010143/APP/7.1]** accompanies the DCO Application and sets out a detailed and compelling case as to why the Scheme is urgently required at the scale and location proposed.
- 3.4.22 In summary, the Scheme has a vital role to play on the world stage in the urgent response to tackle climate change.

3.5 Solar PV Site Selection

- 3.5.1 There are key considerations which typically influence the location of solar development. Some of these considerations are identified in section 3.10 of draft NPS for Renewable Energy Infrastructure (EN-3) (Ref. 3-19).
- 3.5.2 Notwithstanding this, the following sections explain the stages and the main considerations which have influenced the Applicant in how it has selected the land for the Solar PV Site.

Stage 1: Determining an Initial Area of Search

- 3.5.3 The first stage of selecting the Solar PV Site was to define an initial area of search. The following considerations influenced this:

Grid Connection

- 3.5.4 Proximity to an available grid connection with appropriate capacity is fundamental to the viability and deliverability of large-scale solar development. The Applicant was aware of the legacy of coal fired power stations in the East Yorkshire and North Yorkshire areas and undertook a search of available capacity within these areas. Following discussions with National Grid, the Applicant secured a point of connection to the national electricity transmission system at the existing National Grid Drax Substation, in Drax, North Yorkshire.

Irradiance and Topography

- 3.5.5 Irradiation levels from the sun and topography are key factors in the identification of appropriate locations for solar development. Large scale solar development on flat land helps to reduce visual intrusion and solar PV panels can be screened easily due to the land not being elevated and there being fewer areas surrounding it that are elevated. Flat land also limits the

shading between solar PV arrays and allows for easy construction of solar developments.

- 3.5.6 The Applicant initially identified East Yorkshire and areas of the neighbouring North Yorkshire as a suitable area within the UK to locate a large-scale solar development due to its good levels of irradiation and large areas of flat open land.
- 3.5.7 As shown in **Figures 10-9 to 10-55, ES Volume 3 [EN010143/APP/6.3]** the Solar PV Site is located on low lying land within a relatively flat landscape and is therefore optimal for a large-scale solar development.

Summary

- 3.5.8 An initial area of search from the proposed point of connection at the National Grid Drax Substation at Drax was established. The initial area of search was a 15 km search radius, which was considered by the Applicant to be the maximum radius from the point of connection that would be economically viable for a large-scale solar farm that would deliver the electricity generating capacity agreed with National Grid. This encompassed areas of North Yorkshire and East Yorkshire and is shown on **Figure 3-1, ES Volume 3 [EN010143/APP/6.3]**.

Stage 2: Refining the Area of Search

- 3.5.9 Given its size, the initial area of search was refined. This was achieved through the avoidance of environmental and land use constraints and taking into consideration other criteria which would identify suitable land for solar development.
- 3.5.10 The Applicant refined its initial area of search based on the following:
- a. Internationally and nationally designated biodiversity sites – these designations are afforded high protection in legislation and NPS EN-1 and draft NPS EN-3. Therefore, Special Areas of Conservation (SAC), SPA, Ramsar Sites, Sites of Specific Scientific Importance (SSSI) and National Nature Reserves (NNR) were avoided.
 - b. National landscape designations – Areas of Outstanding Natural Beauty and National Parks have the highest status of protection in relation to landscape and scenic beauty in NPS EN-1, draft NPS EN-1 and the National Planning Policy Framework (Ref. 3-20). These designations were considered but not identified in the initial area of search.
 - c. Green belt – As set out in NPS EN-1, draft NPS EN-1 and the NPPF section 13, there is a general presumption against inappropriate development that would affect the openness of the Green belt unless very special circumstances exist. The Green belt within the initial Area of Search was therefore identified and avoided.
 - d. Designated heritage assets – NPS EN-1 and draft NPS EN-1 identifies the presumption in favour of the conservation of designated heritage assets with the more significant the designated heritage asset the greater presumption in favour of its conservation should be. Scheduled monuments and Conservation Areas were identified and avoided. Other designated heritage assets such as registered parks and gardens, World Heritage Sites, and registered battlefields were not identified in the area of search.

- e. Proximity to dwellings/urban areas – draft NPS EN-3 expects solar PV infrastructure to minimise the potential for adverse impacts on visual amenity and from glint and glare upon residential properties. The need to avoid land use conflict led the Applicant to look at areas which avoided large urban areas within the initial area of search.
 - f. Forest/ Woodland – national inventory data for woodland was used to avoid areas of significant woodland including ancient woodland.
 - g. Flood Risk (Fluvial Flooding) – large areas of Flood Zone 3 were avoided to reduce the risk of infrastructure such as Grid Connection Substations and Field Stations, which are more flood sensitive than the solar PV arrays, being in areas at the highest risk of flooding.
 - h. Large areas of BMV agricultural land – although NPS EN-1 and draft NPS EN-3 do not prohibit energy infrastructure on BMV agricultural land (Grades 1, 2 and Subgrade 3a), these policies do expect the use of BMV to be minimised and justified if used. Defra's provisional Agricultural Land Classification (ALC) mapping (Ref. 3-21) was used to avoid large areas of BMV and identify large areas of relatively unconstrained non-BMV land within the initial area of search.
 - i. Accessibility – identifying suitable access for heavy goods vehicles (HGVs) and abnormal indivisible loads (AIL) is an important consideration as large equipment and construction personnel will need to access the Solar PV Areas. The Applicant considered the potential for HGV access preferring an area with good access to the strategic and local road network.
- 3.5.11 By avoiding environmental and land use constraints, excluding or limiting BMV agricultural land, and identifying areas with good access to the local road network, the north-eastern part of the initial area of search was identified as a suitable and proportionate search area. Linear features including the road network, the railway line to the south, the River Foulness to the east, and the River Derwent to the west were used to define the refined area of search, which is shown in **Figure 3-2, ES Volume 3 [EN010143/APP/6.3]**.

Stage 3: Selecting the Solar PV Areas Within the Refined Area of Search

- 3.5.12 Within the refined area of search, the Applicant used the following criteria to identify the Solar PV Areas:
- a. Topography – flat fields were preferred to reduce visual intrusion and the likelihood of elevated areas being near for views into the Solar PV Site; making construction easy; and reducing shading;
 - b. Field pattern and arrangement – open fields of a regular shape were preferred to avoid vegetation removal during construction. A land assembly of larger fields also means offsets from field edges, to protect vegetated boundaries, as well shading, can be reduced;
 - c. Land use conflict – avoiding existing non-agricultural businesses and areas with local plan allocations for other types of development or extant planning permissions and

- d. Land availability – the Applicant sought to identify land that was available by identifying landowners willing for their land to be used for the Scheme; identifying landholdings with minimal landownership to minimise the number of landowners affected by the Scheme; and avoiding unregistered land due to uncertainty of ownership.
- 3.5.13 Section 3.10 of draft NPS EN-3 (Ref. 3-5) recognises that agricultural land will need to be used for large scale solar schemes, but that preference should be given to using brownfield land and non-agricultural land. These land types were identified within the refined area of search by checking the local authority brownfield register and local knowledge. No suitable areas of brownfield or non-agricultural land which would be able to form part of the Solar PV Site were identified within the search area.
- 3.5.14 At the time the Applicant was selecting the Solar PV Site, additional land was offered immediately south of the refined area of search by one of the landowners of the Solar PV Areas in the refined area of search. The Applicant considered this land against its selection criteria and this land, now Solar PV Site 3c, was included. Additional land offered by landowners at the non-statutory consultation stage was also considered as part of site selection. The land offered was adjacent west of the Solar PV Area 2a (**see Figure 1-2, ES Volume 3 [EN010143/APP/6.3]**) and immediately to the north of areas Solar PV Areas 1a, 1b and 1e. Following the non-statutory consultation, discussions were held with these landowners and areas regarded as suitable, considering the above site selection considerations, were identified. Solar PV Areas 1g and 1h were included in the Solar PV Site following these discussions. After the statutory consultation was held, further discussions with the landowners were held and it was determined that, of the three landowners, two landowners had land which could be used for ecological mitigation. Following a review of the Scheme design and the ecological mitigation requirements the Applicant determined that Solar PV Areas 1g and 1h were required for ecological mitigation, as shown on **Figure 2-3, ES Volume 3 [EN010143/APP/6.3]**. The Applicant confirmed with its industry leading ornithological expert that this land was of an appropriate size and location to provide mitigation for Golden Plover and Pink Footed Geese and is in discussions with Natural England to agree this.

Alternative Areas to the Solar PV Site Considered

- 3.5.15 Solar PV Areas 2a, 2c and 3a are wholly within Flood Zone 2 (medium risk) and other Solar PV Areas 2d and 3b are partly located within this zone. There are limited areas of Flood Zone 3 (high risk) in relation to the River Foulness, within the north-west of the Solar PV Site, and in relation to Fleet Dyke, within the western area of the Solar PV Site (**see Figure 9-4, ES Volume 3 [EN010143/APP/6.3]**). Given this flood risk context, in accordance with flood risk policy the Applicant is required to confirm the application of the Sequential Test as part of site selection. The Applicant has therefore considered alternative land areas identified to be at low risk from all sources (fluvial, groundwater and surface water) of flooding within the refined area of search to confirm if there are reasonably available and suitable areas at lower risk of flooding. This is set out in the Sequential Test Report provided in **Annex C of Appendix 9-3 Flood Risk Assessment, ES Volume 2 [EN010143/APP/6.2]**.

3.5.16 None of the alternative areas to the Solar PV Site identified at low risk from all sources of flooding were considered reasonably suitable and available for solar PV infrastructure. This therefore confirms the Applicant has identified land within the Solar PV Site in accordance with the Sequential Test policy requirements. In addition, Solar PV Area 1e and Solar PV Area 2a both include areas of Flood Zone 3. The Applicant has therefore applied the Sequential Test within these Solar PV Areas to the Scheme layout. To meet the Sequential Test within the Solar PV Site the Applicant is committed to ensuring more vulnerable infrastructure like the Grid Connection Substations and the Field Stations are outside areas at high risk of flooding.

Summary

3.5.17 The Applicant has identified land for the Solar PV Site which includes flat large fields in agricultural use owned by a small number of land interests, who offered their land for the Scheme. This includes Solar PV Area 3c which is outside but adjacent to the refined area of search but was offered by the landowner who owns other Solar PV Areas within the refined area of search and meets the site selection criteria.

3.5.18 In summary, the main reasons for selecting the Solar PV Site are that the land chosen:

- a. is within a suitable distance from the identified point of connection;
- b. is not located within internationally and nationally designated biodiversity sites and is not located within or close to areas of national or locally designated landscape value.
- c. is not located within designated Green belt;
- d. utilises significant amounts of low grade, non BMV agricultural land;
- e. avoids direct physical impact on designated heritage assets;
- f. has good transport access for construction being in close proximity to the A614 and A163;
- g. has topography which meets the requirements of the Scheme to efficiently generate significant amounts of electricity;
- h. has limited land use conflicts in terms of displacement of existing non agricultural businesses; and
- i. is available to the Applicant during the period of construction and operation of the Scheme.

3.5.19 The Applicant has also confirmed that it has identified land for the Solar PV Site in accordance with the Sequential Test policy requirements.

3.6 Selecting the land for the Interconnecting Cable Corridors, Grid Connection Corridor, Site Accesses and Ecology Mitigation Area and consideration of alternatives

3.6.1 The following sections explain the reasons for selecting the land for the Interconnecting Cable Corridor, Grid Connection Corridor, Ecology Mitigation Area and Site Accesses and, where relevant, how the selection of this land meets flood risk policy.

Interconnecting Cable Corridors

- 3.6.2 The Interconnecting Cable Corridors will accommodate the cabling required to transfer electricity between the transformers/switchgears at the Field Stations and one of the two Grid Connection Substations in Solar PV Area 1c and Solar PV Areas together.
- 3.6.3 The selection of these corridors has considered the technical requirement for the cable routing to be a direct route between the Solar PV Areas and the Grid Connection Substations to avoid losses in transmission. Avoiding environmental designations and other land use conflicts has also been a key determining factor.
- 3.6.4 Where practicable, the Applicant is proposing to route the cables inside these wider corridors along field edges or cables will be run in the roadside to minimise disturbance to agricultural land.
- 3.6.5 With the exception of flood risk, the Interconnecting Cable Corridors selected avoid environmental designations. Solar PV Areas 2a, 2c and 2d are within Flood Zone 2. Alternative corridors which would avoid Flood Zones 2 and 3 would not provide a direct route between the Solar PV Areas themselves and between the Solar PV Areas and the Grid Connection Substations. For Solar PV Area 2a an alternative route avoiding Flood Zone 2 would require a route to the north and then east travelling to the south of Willitoft. This would require several road and PRow crossings and would not have the potential benefit of co-locating Interconnecting Cables and Grid Connection Cables in the same trench along the Grid Connection Corridor which the proposed Interconnecting Cable Corridor links into. For the Interconnecting Cable Corridor between Solar PV Area 2c and Solar PV Area 2d an alternative route avoiding Flood Zone 2 would require crossing a PRow and either Spaldington Golf Course or the anaerobic digestion plant and wind turbine development to the east. These alternatives were not therefore considered by the Applicant further.

Ecology Mitigation Area

- 3.6.6 An Ecology Mitigation Area is proposed north-east of the Solar PV Site (**Figure 1-3, ES Volume 3 [EN010143/APP/6.3]**). This is to be managed to provide good quality habitat for overwintering and migratory bird species. This land was selected as it is adjacent to the Solar PV Site and is considered suitable to provide mitigation for the loss of land (which is being used for solar PV infrastructure) which is currently functionally linked to the international designated sites of the Lower Derwent Valley SPA/Ramsar and Humber Estuary SPA/Ramsar, this is further discussed in the **Habitats Regulations Assessment [EN010143/APP/7.12]** and **Chapter 8: Ecology, ES Volume 1 [EN010143/APP/6.1]**. Parts of the Ecology Mitigation Area lie within Flood Zone 3 however its proposed use is a water compatible use (see **Appendix 9-3, Flood Risk Assessment, ES Volume 2 [EN010143/APP/6.2]**) and therefore is an appropriate use in Flood Zone 3.

Site Accesses

- 3.6.7 Construction and operational accesses, such as new access routes or measures to provide better visibility splays are proposed (see **Figure 1-3, ES Volume 3 [EN010143/APP/6.3]**). These were selected following the development of the Applicant's access strategy and in response to consultation feedback. Some areas of this land are within Flood Zone 2

however it is not possible to locate these in areas at a lower risk of flooding due to the need for their location in relation to the public highway.

Grid Connection Corridor

- 3.6.8 As described in **Chapter 2: The Scheme, ES Volume 1 [EN010143/APP/6.1]**, the Grid Connection Corridor links the Solar PV Site Grid Connection Substations in Solar PV Area 1c to the National Grid Drax Substation, near Drax Village in North Yorkshire.
- 3.6.9 **Table 3-2** below summarises the criteria and key considerations which the Applicant considered in determining the proposed Grid Connection Corridor.

Table 3-2. Grid Connection Corridor considerations

Criteria	Considerations
Operational and engineering requirements	<ul style="list-style-type: none"> • Point of connection at National Grid Drax Substation; • Optimising routing so the cable can be laid in a straight line or in shallow curves so that the cable can be pulled through the ducting efficiently; • Use of land to the north of the River Derwent to allow the cable to follow the line of the river channel and provide limited diversions; and • Requiring space to undertake the works to lay the cable (e.g. pits and construction compounds).
Planning and environmental constraints ¹	<ul style="list-style-type: none"> • Proximity to residential properties in local settlements including Wressle, Hemingbrough, Asselby, Howden, Barmby on Marsh and Long Drax; • Proximity to other land uses such as businesses and other existing and proposed infrastructure (e.g. Loftsome Bridge Water Treatment Works, overhead lines and the Scotland to England Green Link 2 (SEGL2) project); • Avoidance of international and nationally designated biodiversity sites, in particular avoiding impacts on the River Derwent SSSI and SAC close to the hamlet of Brackenholme; • Proximity to nationally or locally designated landscapes; • Proximity to public rights of way; • Proximity of designated heritage assets; • Flood risk; • Sensitivity of watercourse crossings required for the River Derwent and the River Ouse and the Environment Agency’s requirements for watercourse crossings; and • Avoiding where possible BMV agricultural land and minimising disturbance to agricultural land.

¹ Drawn from national and local policy requirements.

Criteria	Considerations
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Other land use and land ownership constraints	<ul style="list-style-type: none">• Minimising the number of affected landowners;• Following field edges in order to minimise possible disturbance for the landowner when farming or using land for other purposes; and• Following the road network to minimise the number of landowners affected where possible and reducing interaction with the rail network, utilities and other infrastructure such as the existing National Grid infrastructure and its proposed infrastructure.
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3.6.10 The Grid Connection Corridor has been designed to avoid, where practicable, sensitive receptors such as habitat designations, residential and commercial properties, heritage assets and to minimise the number of affected land interests. It has been subsequently refined based upon ongoing studies and surveys as well as feedback from consultees.

3.6.11 The majority of the Grid Connection Corridor is located within areas of high fluvial/tidal flooding (Flood Zone 3) and medium risk of fluvial/tidal flooding (Flood Zone 2) (see **Figure 9-4, ES Volume 3 [EN010143/APP/6.3]**) and therefore flood risk policies discussed in **Annex B of Appendix 9-3 Flood Risk Assessment, ES Volume 2 [EN010143/APP/6.2]** are applicable to this part of the Site. As discussed in section 3.5, the National Grid Drax Substation has capacity and availability to accept the electricity generated by the Scheme. The point of connection identified by, and provided to, the Applicant by National Grid and the majority of the land surrounding it is located within Flood Zones 2 and 3. The identification of the Grid Connection Corridor considered the flood risk context and confirmed that a corridor outside Flood Zones 2 and 3 was not possible and there are no reasonable alternatives in Flood Zone 1 that would provide a direct route between the Solar PV Site and the Point of Connection. Areas of the Grid Connection corridor within Flood Zone 3 were also unable to be avoided by using Flood Zone 2 land. On this basis, alternatives to the Grid Connection Corridor have not been considered further.

3.7 Alternative routes within the Grid Connection Corridor

3.7.1 There are potential route options provided for within the Grid Connection Corridor to avoid and minimise potential impacts on the River Derwent SSSI and SAC close to the hamlet of Brackenholme.

3.7.2 The Grid Connection Corridor crosses and lies adjacent to the nationally and internationally designated River Derwent SAC/SSSI. The Grid Connection Corridor partially runs through the very northern part of the SAC/SSSI to the south of Construction Compound D shown on **Figure 2-3 ES Volume 3 [EN010143/APP/6.3]**.

3.7.3 The Scheme has allowed for three options for cable routing in this area.

3.7.4 Option 1 involves the cable routing north of the SAC/SSSI, and north of Hagthorpe Hall using trenchless crossings (Horizontal Directional Drilling

(HDD)) to place the cable in a south-westerly direction into the field south of the A63. This avoids any interface with the SAC/SSSI west of the river channel. This is illustrated as HDD 4 on **Figure 2-4 ES Volume 3 [EN010143/APP/6.3]**.

- 3.7.5 Option 2 proposes a trenchless crossing underneath the SAC/SSSI, drilling from within the field directly north of the SAC/SSSI and into the existing access track beyond the SAC/SSSI boundary. The receiving pit for the HDD will not exceed the width of the access track, keeping a minimum 2 m below ground level under trees to avoid damage to the deepest roots. Onward cabling would be installed within the access track as described in Option 3. Option 2 would avoid the need for any clearance of woodland.
- 3.7.6 Option 3 involves the cable installation along the track from the proposed access point off the A63 to the field to the north and south. This option would comprise break-out of the track's subbase, then open cut cable trenching along the access track using handheld tools and potentially soil vacuum to minimise any potential impacts to tree roots. Soil/excavated material would be stored within the temporary compound area in the agricultural field to the north. As with Option 2, this option would avoid the need for any clearance of woodland.
- 3.7.7 All three options would result in no permanent loss of qualifying habitat or special interest features within the SAC/SSSI boundary and there would be no impact on habitat for which the River Derwent SAC/SSSI is designated for or functionally dependent upon (**see Chapter 8: Ecology, ES Volume 1 [EN010143/APP/6.1]**). For all options, indirect impacts would be controlled through standard mitigation measures applied within the **Framework Construction Environmental Management Plan (CEMP) [EN010143/APP/7.7]**. The mitigation outlined in the Framework CEMP would also prevent any potential effects on the groundwater and therefore associated habitats dependent on groundwater.

3.8 Evolution of the Order limits and Alternative Layouts within the Solar PV Site

- 3.8.1 The Scheme has undergone several stages of design evolution which has resulted in changes to its layout and the Order limits.
- 3.8.2 This process of design evolution has been informed by ongoing environmental assessments, engineering and design considerations, as well as engagement with stakeholders.
- 3.8.3 The purpose of this section is to summarise the evolution of Order limits and the alternative layouts considered for the Scheme to date. **Table 3-3** below summarises the evolution of the Order limits and the main design layout changes for the Solar PV Site. The following Figures provided in **ES Volume 3 [EN010143/APP/6.3]** illustrate the changes in terms of land area:
- Figure 3-3** – Site Boundary for EIA Scoping and non-statutory Consultation;
 - Figure 3-4** – Site Boundary for Statutory Consultation; and
 - Figure 3-5** – Order limit changes following Statutory Consultation.

Table 3-3. Evolution of the Order limits and main design layout iterations for the Solar PV Site

Stage	Order limits configuration and proposed layout	Consultation which influenced the proposed layout at this stage	Design evolution
EIA Scoping Layout (August 2022) and Non Statutory Consultation layout (September 2022)	<p>The boundary of the Solar PV Site represented the maximum extent of land being considered at the EIA Scoping and Non-Statutory Consultation stages. The layout consisted of 16 areas of land, some contiguous, covering approximately 1,173 hectares (ha).</p> <p>The Grid Connection Corridor – a 500 m wide corridor.</p> <p>No detailed layout was explored at this stage.</p>	<p>Discussions with landowners and National Grid.</p> <p>Consultation with Statutory Environmental Bodies as part of the EIA Scoping process including Natural England, Environment Agency and Historic England</p> <p>The land assembled was chosen prior to extensive consultation and therefore was not influenced by other stakeholders.</p>	<p>The EIA Scoping Layout was produced with limited data from desk based and preliminary environmental surveys. It was an initial boundary of land assembled by the Applicant for the Solar PV Areas taking into account known planning and environmental constraints and other factors as discussed in section 3.3. The land assembled was informed by meetings with landowners and National Grid regarding the point of connection.</p> <p>Design principles at this early stage which influenced the extent of land identified included:</p> <ul style="list-style-type: none"> • Minimising the requirements for new built structures and therefore protecting landscape and visual amenity by making a commitment to reuse existing buildings (agricultural barns and a derelict dwelling in Solar PV Area 1e also known as Johnson’s Farm) for an operations and maintenance hub; • Flexibility in the type of mounting structures which therefore have varying land take; • The existence of large field sizes and contiguous blocks of land with existing screening to generate the output required; and • A 500 m wide Grid Connection Corridor to provide flexibility.

Stage	Order limits configuration and proposed layout	Consultation which influenced the proposed layout at this stage	Design evolution
Statutory Consultation Layout (May 2023)	<p>Solar PV Site - the Solar PV Site comprised 18 Solar PV Areas totalling 1,275 ha.</p> <p>Interconnecting Cable Corridors</p> <p>Grid Connection Corridor - this was an approximate 100 m wide corridor which widened and narrowed as required to avoid sensitive receptors.</p> <p>The Site Boundary at this preliminary stage is shown on Figure 3-4, ES Volume 3 [EN010143/APP/6.3] and the preliminary design is illustrated in Figure 2-3 of the PEI Report.</p>	<p>Discussions with landowners and other key stakeholders including National Grid; Network Rail, East Riding of Yorkshire Council, North Yorkshire County Council, and Selby District Council planning officers; East Riding of Yorkshire public rights of way (PRoW) officer; Environment Agency; East Riding Lead Local Flood Authority; Friends of the Lower Derwent Valley Conservation Trust</p> <p>Non-statutory consultation feedback.</p>	<p>The layout of the Solar PV Areas was developed as part of a strategic masterplanning process with the outcome of baseline ecology, landscape and visual, heritage, flood risk and access surveys and consultation feedback influencing this.</p> <p>Solar PV Areas 1g and 1h were incorporated into the Scheme after EIA Scoping and non-statutory consultation because of feedback from landowners in the vicinity of the Solar PV Site. This feedback identified this land was available and with few constraints adjacent to the Solar PV Site and the land offered the ability to have flexibility for designing the single axis tracker solar PV arrangement and for providing more ecological and archaeological mitigation areas.</p> <p>At this stage the Scheme incorporated the following design principles:</p> <ul style="list-style-type: none"> • The protection of existing and proposed utility assets within the Solar PV Site – this involved providing a buffer where no solar development would exist for the proposed SEGL 2 cabling; an existing National Grid Gas pipeline; and the existing overhead electricity lines. • Provision of offsets/buffer zones from residential properties, local roads and settlements such as Gribthorpe, Willitoff and Spaldington to respond to the existing landscape character and views and to reduce visual impact.

Stage	Order limits configuration and proposed layout	Consultation which influenced the proposed layout at this stage	Design evolution
			<ul style="list-style-type: none">• Locating the highest structures, the two proposed Grid Connection Substations, in areas that already have robust boundary vegetation providing screening.• Provision of offsets to PRow throughout the Scheme to retain the existing character of the routes as far as possible. These offsets include 15 m from the centre of the PRow to the perimeter fence where solar infrastructure lies on one side of the PRow. Where PRow have solar infrastructure located on both sides, offsets have been increased to 20 m each side of the centre line of the PRow. Solar PV panels are also located 5 m from the perimeter fence. Battery Energy Storage System (BESS) will be located away from PRow where possible.• Providing an anticipated distance of no less than 250 m between residential receptors and Field Stations, BESS and Grid Connection Substations.• Where practicable locating structures such as the Field Stations, Grid Connection Substations and BESS, which require the removal of top soils and creation of hard standing, on non BMV agricultural land.• Provision of offsets (undeveloped buffers) from existing vegetation to ensure their retention of at least 10 m from woodlands, individual trees and hedgerows with trees and at least 5 m from hedgerows without trees.

Stage	Order limits configuration and proposed layout	Consultation which influenced the proposed layout at this stage	Design evolution
Order limits and Application Layout	The Order limits comprise 1,276.5 ha and include the Solar PV Site (966.4 ha); Interconnecting Cable Corridors; Grid Connection Corridor (maintaining a 100 m wide corridor	Landowner discussions Statutory consultation	<ul style="list-style-type: none"> • Provision of offsets from watercourses and ponds of at least 10 m. • All ponds present within the Site will be retained. • Utilising as far as practicable existing farm tracks and field openings as the preferred routes for construction access. • Increasing accessibility and connectivity with the provision of two permissive paths linking existing PRow and providing circular routes. • Avoiding sensitive solar PV infrastructure, such as Grid Connection Substations and Field Stations within Flood Zone 3, which are areas of the highest flood risk. • The arrangement of the BESS is to be located within individual Solar PV areas (decentralised) rather than a centralised location. • Creation of green infrastructure and a Wetland Wildlife Zone to provide biodiversity net gain (BNG) and increase habitat connectivity, enhance landscape condition and improve visual amenity. <p>Following the Statutory Consultation, the Applicant’s design team considered the feedback provided to this consultation period as well as feedback provided through ongoing engagement with key consultees. The design principles used</p>

Stage	Order limits configuration and proposed layout	Consultation which influenced the proposed layout at this stage	Design evolution
(October 2023)	which widens and narrows as required to avoid sensitive receptors); Ecology Mitigation Area (107.9 ha); and Site Accesses.	<p>feedback from local community, section 42 organisations and ongoing engagement with consultees and stakeholders.</p> <p>Ongoing environmental surveys and assessments</p>	<p>for the PEI Report layout were maintained but the following changes to the layout were made:</p> <p><u>Solar PV Site</u></p> <ul style="list-style-type: none"> • The removal of the BESS in response to statutory consultation feedback. • Removal of the existing storage barns proposed to be used during construction and operation located east of Gribthorpe which were in Solar PV Area 1g. This change has been in response to concerns regarding increased crime and operational traffic travelling through the hamlet of Gribthorpe to existing storage barns proposed to be used during operation of the Scheme. • Removal of solar PV infrastructure in Solar PV Areas 1g and 1h following discussion with the landowners and feedback regarding the scale of the Scheme. This land is proposed as the Ecology Mitigation Area providing mitigation for Golden Plover and Pink Footed Geese as required by the Habitats Regulation Assessment (HRA) [EN010143/APP/7.12]. • Small area of additional land included in Solar PV Area 1a to allow an internal track to avoid veteran trees and provide a route through the Solar PV Areas for construction traffic to address feedback regarding construction traffic on local roads.

Stage	Order limits configuration and proposed layout	Consultation which influenced the proposed layout at this stage	Design evolution
<hr/>			<ul style="list-style-type: none">• Removal of an area of land proposed for grassland planting from the landscaping for Solar PV Area 1e. This provides further set back of the Scheme from residential dwellings in Spaldington and retaining the land in arable agricultural use in response to feedback on the loss of agricultural land and the scale of the Scheme.• Providing additional landscaping to the south and west of a property in Spaldington with a sensitive receptor and committing to offsetting of Field Stations and Grid Connection Substations from the boundary of this property.• Provision of additional landscaping in Solar PV Area 2e in response to feedback received to screen views from a property located immediately to the south along Spaldington Lane.• Removal of the southern parts of Solar PV Area 2g and Solar PV Area 3c. This was following discussions with National Grid's SEGL2 project team and in response to feedback relating to loss of agricultural land and scale of the Scheme. This removes some areas of BMV agricultural land from the Scheme which can remain in arable farming use. This also reduces the extent of the Scheme's interface with the SEGL2 project.

Stage	Order limits configuration and proposed layout	Consultation which influenced the proposed layout at this stage	Design evolution
			<ul style="list-style-type: none">• The removal of the proposed bird hide in the ecological enhancement area in Solar PV Area 1e (previously referred to as the Wetland Wildlife Zone) in response to feedback.• The relocation of the Grid Connection Substation in Solar PV Area 3b to Solar PV Area 1c in response to feedback regarding concerns of noise impacts at nearby residential receptors at Brind and along Rowlandhall Lane.
			<u>Grid Connection Corridor</u>
			<ul style="list-style-type: none">• Additional land close to Wood Lane near Wressle was included to provide flexibility in this area following consultation with the landowner.• Inclusion of new land at Brackenholme to accommodate a new Horizontal Directional Drilling (HDD) as the preferred route to avoid the River Derwent SAC and SSSI following feedback from Natural England. This is explained further in section 3.7 above.• Additional HDD for crossing an unnamed drain south of Babthorpe in response to feedback from the Ouse and Derwent Internal Drainage Board.• Following ongoing engagement with Drax Power Station regarding the area for the Grid Connection Corridor and methods of construction for the grid connection cabling, additional land was included south of Pear Tree Avenue to

Stage	Order limits configuration and proposed layout	Consultation which influenced the proposed layout at this stage	Design evolution
			<p data-bbox="1267 389 2063 454">provide flexibility for installing the cable and where practicable avoiding Drax Power Station's infrastructure.</p> <p data-bbox="1216 480 1429 507"><u>Site Accesses</u></p> <p data-bbox="1216 533 2096 707">Following a review of the access strategy for the Scheme's construction and operation, additional land was included in the Order limits for construction and operational accesses, traffic management and movement of abnormal loads. This included the following additions to the Order limits:</p> <ul data-bbox="1216 735 2089 1262" style="list-style-type: none"><li data-bbox="1216 735 2051 839">• Inclusion of carriageways at access points to enable pavement tie in and reinstatement works as well as any temporary traffic signals and verge maintenance.<li data-bbox="1216 868 2089 1007">• Inclusion of alternative construction access into Solar PV Area 3c off Rowlandhall Lane. This has been included to address concerns regarding suitability of access for HGVs via an access in Newsholme, adjacent to Beech Farm.<li data-bbox="1216 1035 2069 1139">• Amendments for access for HGV and abnormal loads as well as associated reinstatement, pavement and verge maintenance works.<li data-bbox="1216 1168 2089 1262">• Inclusion of access through the Drax Power Station site to provide vehicular access to the National Grid Drax Substation. <p data-bbox="1216 1291 2096 1391">Other small areas of the Order limits were removed to minimise the Scheme affecting land interests. The additions and reductions to the Order limits are shown in Figure 3-5, ES</p>

Stage	Order limits configuration and proposed layout	Consultation which influenced the proposed layout at this stage	Design evolution
			<hr/> Volume 3 [EN010143/APP/6.3]. The proposed landscape masterplan is provided in the Framework Landscape and Ecological Management Plan [EN010143/APP/7.14] and the Design and Access Statement [EN010143/APP/7.3] .

3.9 Alternative Solar Design Technologies

3.9.1 As described in **Chapter 2: The Scheme, ES Volume 1 [EN010143/APP/6.1]**, the parameters of the DCO will maintain some degree of design flexibility to allow the latest technology to be utilised at the time of construction. Notwithstanding this, several design options in relation to the solar technology have been considered and the preferred options identified taking into consideration environmental effects, the Scheme's requirements, and need for optimal functionality.

3.9.2 The following sections summarise the alternative technologies considered throughout the design process.

Solar PV Panel Technology

3.9.3 The Solar PV Site comprises elements such as the solar PV panels and the Field Stations in which transformers, switchgear and inverters are located.

3.9.4 At the EIA Scoping Stage and early stage of design development three types of solar PV panels and their electricity production were considered:

- a. Option 1: Fixed south facing solar panels – these panel arrays remain static and is the most common technology used at solar PV facilities in the UK to date. The typical panel height for this arrangement is 2.5 to 3.5 m above ground;
- b. Option 2: East-west single axis tracker solar panels – these solar panels track the sun's position throughout the day. The tracking system tilts the solar panels around a horizontal north-south axis thus tracking the sun's movement from east to west. The panels are at their maximum height during early morning and late evening and lie horizontal during the peak of the day. The panels are also stored in a horizontal position over night. The maximum height of panels at full tilt would be 3.5 m and the maximum height of panels when horizontal would be 2.3 m; and
- c. Option 3: East-West fixed solar panels – typically installed in a triangular arrangement with one panel facing east and the other facing west. The typical panel height for this arrangement is 2.5 to 3.5 m above ground.

3.9.5 The East-West fixed solar panels were discounted as the arrangement would have a lower biodiversity net gain, compared to other options by removing the space between the arrays reducing the amount of light reaching the ground under panels. The east-west fixed panels also require a greater amount of construction traffic due to the larger volume of panels required.

3.9.6 Fixed south facing solar panels, whilst most commonly used in solar facilities to date in the UK, are set at the height they are installed and compared to the changing orientation and height of east west tracker panels, were considered to likely have a greater potential impact in terms of landscape and visual amenity in the context of the Scheme.

3.9.7 The preferred option taken forward to Statutory Consultation was the east-west single axis tracker solar panels. These provide a lower panel height during most of the day and at night therefore potentially having a lower visual and landscape impact when compared to the other options.

Grid Connection Corridor Cabling

- 3.9.8 The preliminary design and EIA Scoping Report considered both an overhead and underground cable connection to the substation. The overhead cable would have been economically beneficial compared to an underground cable and easier to maintain but it was considered to have permanent adverse impacts on landscape and visual amenity which could be avoided through burying the cable. In addition, they are more vulnerable to weather events with storm/wind damage or trees falling on them. Therefore, a decision was made to opt for an underground cable connection.

Arrangement of Field Stations – Transformers, Switchgear and Inverters

- 3.9.9 Field Stations are solar PV infrastructure consisting of inverters, transformers, and switchgear which will be distributed throughout the Solar PV Areas. There are currently three options for the delivery of the inverter, transformer and switchgear at each Field Station:
- a. Option 1 – This option proposes the transformer, inverter and switchgear are to be enclosed in a single containerised unit referred to as a ‘Field Station Unit’;
 - b. Option 2 – This option is for the transformer and switchgear to be housed together in a single containerised unit (referred to as ‘Field Substations’), with the inverter provided separately as string type (mounted parallel to the array or more likely at the end of each solar PV frame); or
 - c. Option 3 – The transformer and switchgear are each to be housed in separate containerised units with inverters provided as either string-type (as per Option 2); or centralised (within protective housing or containerised units).
- 3.9.10 All three options will have differences in land take and landscape and visual amenity due to the varying massing of each option configuration. The Applicant is proposing to retain the flexibility of implementing any of the three options due to the variety of ways suppliers provide this equipment. This flexibility is provided for in the **draft DCO [EN010143/APP/3.1]**. The parameters of all three options have therefore been assessed and presented ensuring that the worst case is considered within this ES as set out in **Chapter 5 EIA Methodology, ES, Volume [EN010143/APP/6.1]**.

3.10 References

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