

**Tillbridge Solar Project
EN010142**

**Volume 6
Environmental Statement
Chapter 4: Alternatives and Design Evolution
Document Reference: EN010142/APP/6.1**

**Regulation 5(2)(a)
Infrastructure Planning (Applications: Prescribed Forms and
Procedure) Regulations 2009**

**April 2024
Revision Number: 00**

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4. Alternatives and Design Evolution

4.1 Introduction

- 4.1.1 This chapter of the Environmental Statement (ES) describes the consideration of alternatives and the design evolution in relation to the Tillbridge Solar Project (hereafter referred to as 'the Scheme'). The reasons for the selection of the Principal Site are also explained.
- 4.1.2 An **Outline Design Principles Statement [EN010142/APP/7.4]** and a **Design and Access Statement [EN010142/APP/7.3]** have been submitted as part of the Development Consent Order (DCO) Application.
- 4.1.3 The **Design and Access Statement [EN010142/APP/7.3]** sets out the design principles that have been adopted to ensure that good design has been embedded within the Scheme from inception and to explain how the design has evolved having regard to local context, character, movement and nature.

4.2 Legislation and Planning Policy

- 4.2.1 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 4-1) sets out what the Environmental Statement (ES) must include and refers to Schedule 4 of the EIA Regulations (Ref 4-1) for additional information to be provided in the ES. Paragraph 2 of Schedule 4 of the EIA Regulations (Ref 4-1) 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.”*
- 4.2.2 There is no general requirement in relevant national policy to consider alternatives. Overarching National Policy Statement for Energy EN-1 (NPS EN-1) (Ref 4-2) paragraph 4.3.9 states that:
- “As in any planning case, the relevance or otherwise to the decision-making process of the existence (or alleged existence) of alternatives to the proposed development is, in the first instance, a matter of law. This NPS does not contain any general requirement to consider alternatives or to establish whether the proposed project represents the best option from a policy perspective.[...]”*
- 4.2.3 Paragraph 4.3.9 of NPS EN-1 (Ref 4-2) does however go on to highlight the specific requirements in respect of compulsory acquisition and habitats sites, and notes the NPS itself does not change those.

Biodiversity and Geological Conservation

- 4.2.4 These include a requirement under the Habitats Directive, as transposed into UK law by the Conservation of Habitats and Species Regulations 2017 (Ref 4-2), in relation to avoiding significant harm to biodiversity and geological conservation interests.

Flood Risk

- 4.2.5 Other policy requirements to consider alternatives identified by NPS EN-1 (Ref 4-2) are in relation to flood risk.
- 4.2.6 In respect of siting developments within areas of flood risk, paragraphs 5.8.6 to 5.8.12 of NPS EN-1 set out the relevant policy tests. These confirm the need to steer new development to areas at the lowest risk of flooding. Where this cannot be avoided, and there are no reasonable available sites in areas of lower risk, the Sequential Test (as outlined in Planning Practice Guidance on Flood Risk and Coastal Change Guidance (Paragraphs 023 and 024)) must be applied to site selection. This test requires a detailed process for the consideration of alternative sites that pose lower flood risk than that selected. If this cannot deliver an acceptable site the Exception Test (as outlined in Planning Practice Guidance on Flood Risk and Coastal Change Guidance (Paragraph 31]) must then be applied to confirm that the development will provide wider sustainability benefits to the community that outweigh the flood risk adopted, and that the development will be safe for its lifetime, and where possible will reduce flood risk overall.

Designated Landscapes

- 4.2.7 In respect of designated landscapes, Paragraph paragraphs 5.10.6 and 5.10.7 of NPS EN-1 (Ref 4-10) sets out the national policy protection afforded to designated landscapes with:

“National Parks, the Broads and Areas of Outstanding Natural Beauty (AONBs) have been confirmed by the government as having the highest status of protection in relation to landscape and natural beauty. Each of these designated areas has specific statutory purposes. Projects should be designed sensitively given the various siting, operational, and other relevant constraints.[...]”

- 4.2.8 In respect of the application of the above policy tests, paragraph 4.3.22 of NPS EN-1 (Ref 4-2) provides direction for the Secretary of State as to the weight that should be attached to alternatives, given the critical national priority (CNP) for new energy infrastructure stating that:

“the consideration of alternatives in order to comply with policy requirements should be carried out in a proportionate manner; and only alternatives that can meet the objectives of the proposed development need to be considered.”

- 4.2.9 Despite the fact that national planning policy does not set out a general requirement to consider alternatives, there is an obligation to provide a description of alternatives considered and an indication of the main reasons for the option chosen, within the ES per section 14 of the EIA Regulations

2017 (Ref 4-1). Paragraph 4.3.15 of NPS EN 1 (Ref 4-2) confirms this requirement stating that Applicants are obliged to include in their ES:

“...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.”

Summary

- 4.2.10 It is not anticipated that the Scheme, with its proposed mitigation, will cause any significant adverse effects to biodiversity and geological conservation interests once mitigation measures have been implemented. This is confirmed within **Chapter 9: Ecology and Nature Conservation** of the ES [EN010142/APP/6.1]. **Appendix 9-12: The Habitat Regulations Assessment Report** of the ES [EN010142/APP/6.2] verifies that the Principal Site does not include ‘European sites’ protected for their species or habitats. ‘European sites’ protected by the Habitat Regulations (Special Areas of Conservation and Special Protection Areas). **Appendix 9-12: The Habitat Regulations Assessment Report** of the ES [EN010142/APP/6.2] confirms that there will be no significant effects on European Sites either from the construction, operation and decommissioning of the Scheme or in combination with other plans or projects.
- 4.2.11 **Chapter 12: Landscape and Visual Amenity** of the ES [EN010142/APP/6.1] sets out the environmental effects of the Scheme upon landscape. **Paragraph 12.6.40** confirms that neither the Study Area or the Order limits is designated landscape and confirms therefore that there are no adverse effects.
- 4.2.12 The Scheme is not located within or in close proximity to any designated landscape (National Park, the Broads or AONB) and as such, there is no need to consider alternatives in accordance with NPS EN-1 paragraph 5.10.7 (Ref. 4-2).
- 4.2.13 With respect to flood risk, the Principal Site is at a low risk of flooding from any source with no further work on alternatives considered necessary. **Appendix 10-3: Flood Risk Assessment** of the ES [EN010142/APP/6.2] sets out how the Sequential Test has been applied and flood risks effects are set out in **Chapter 10: Water Environment** of the ES [EN010142/APP/6.1].
- 4.2.14 Part of the Cable Route Corridor extending from the National Grid Cottam Substation to Marton is located in Flood Zone 3 associated with the catchment of the River Trent. Other parts of the Cable Route Corridor to the north-east of Marton comprising tributaries of the River Till are also located within Flood Zone 3. It is not possible to connect the Scheme to the National Grid Cottam Substation without going through Flood Zone 3 with no alternative being available. The works associated with the Cable Route Corridor involve laying a cable underground. These works will be resilient to flood risk and can be undertaken without increasing the risk of flooding elsewhere. Further information, including detail of how the development passes the Sequential and Exception tests, is set out within the **Planning Statement** submitted alongside the DCO application [EN010142/APP/7.2] and **Appendix 10-3: Flood Risk Assessment** of the ES [EN010142/APP/6.2].

- 4.2.15** The Planning Inspectorate's Advice Note 7: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements (Ref 4-3) at paragraph 9.3 also states that the Planning Inspectorate considers a good ES is one that “...*explains the reasonable alternatives considered and the reasons for the chosen option taking into account the effects of the Proposed Development on the environment*”.
- 4.2.16** Summary of Alternatives considered Taking into consideration the policy and legal requirements, as well as the iterative approach to the evolution of the design of the Scheme, the following alternatives have been considered for the Scheme are considered in this chapter:
- a. Alternatives to the Principal Site including site size
 - b. Alternative routes for the Cable Route Corridor to derive a shared corridor with the other developers;
 - c. Alternative layouts within the Principal Site; and
 - d. Alternative solar design technologies.
- 4.2.17** These alternatives are discussed alongside the reasons the Applicant has selected the Principal Site.
- 4.2.18** Consideration of a ‘no development’ scenario as an alternative to the Scheme has not been considered further. This is since ‘no development’ is not considered to be a reasonable alternative to the Scheme given the urgent and critical need to deliver CNP. This is discussed in Section 4.4 of this Chapter.
- 4.2.19** Other energy generation processes such as wind power, nuclear, coal or gas fired power stations have not been assessed due to a number of factors. This includes their unsuitability for the Principal Site, the timescales within which they could be delivered, and their ability (or not) to contribute to the UK’s urgent and critical need to decarbonise the energy sector.
- 4.2.20** Whilst the Principal Site does not fall within a designated landscape, it is located close to a local landscape designation/feature (Lincoln Edge/Cliff) designated as an Area of Great Landscape Value (AGLV). In addition, an area of Area of Outstanding Natural Beauty lies further to the east beyond the AGLV, which could also be affected by the siting of wind power within the location. In view of this, wind power, due to the height of turbines would be less suitable due to potential landscape and visual effects upon the local, but important landscape designation and areas of designated landscape.
- 4.2.21** Nuclear power does form part of the government’s plans to deliver a sustainable and balanced energy sector with energy delivered by a mix of sources as outlined in the British Energy Security Strategy (Ref 4-4). However, as an energy source, this cannot be deployed quickly. Solar can be deployed quickly and provide a renewable and clean form of energy before the nuclear market is able to significantly contribute towards the country’s energy needs.
- 4.2.22** Coal has not been considered further since this form of energy generation does not align with reducing greenhouse gas emissions and is restricted by national planning policy (Ref 4-4).

4.2.23 A smaller development as an alternative to the Scheme has also not been considered further. This is due to the urgent need to deploy large scale renewable energy projects in accordance with NPS EN-1 (Ref 4-2) and having regard to paragraph 4.3.23 of NPS EN-1, which states that:

“The Secretary of State 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, climate change, and other environmental benefits) in the same timescale as the proposed development.”

4.2.24 A smaller development would not deliver the same level of benefits associated with the Scheme in terms of electricity generation, energy security or climate change benefits and is therefore not considered a reasonable alternative given the established need to deploy large scale renewable energy projects endorsed by NPS EN-1 (Ref 4-2). It is also likely that through reduced economies of scale that a smaller scheme would incur higher costs therefore not being a reasonable alternative from a commercial perspective.

4.2.25 The Applicant has a grid connection offer from National Grid Electricity System Operator Limited (NGESO) to connect the Scheme to a spare bay at the National Grid Cottam Substation as set out within the **Grid Connection Statement** submitted alongside the DCO application [EN010142/APP/7.5]. Paragraph 4.11.1 of NPS EN-1 recognises that network connection is an important site selection consideration for applicants and at paragraph 4.11.12 confirms that the Secretary of State in making a decision should be satisfied that *“appropriate network connection arrangements are/will be in place for the given project.”* The Scheme has an agreed network connection. It has been designed to ensure that an efficient and effective use is made of the grid connection capacity. This is alongside an associated BESS system supporting the electricity generation plant to store energy in times of low demand and to provide electricity when demand is higher. In this regard, reducing the size of the scheme would result in an inefficient use of the available and secured grid connection capacity at a time when there is a CNP to deploy renewable and low-carbon energy generating infrastructure.

4.3 Stakeholder Engagement

4.3.1 A non-statutory consultation in relation to the Scheme was undertaken between May to July 2022 as set out in the **Consultation Report** submitted alongside the DCO application [EN010142/APP/5.1]. This included the holding of a series of collaboration workshops where presentations were given including details of early environmental assessments and site selection work that had been carried out.

4.3.2 The non-statutory consultation was held at the pre-scoping phase with the **Scoping Opinion** submitted alongside the DCO application [EN010142/APP/6.2] received from the Planning Inspectorate on 4 November 2022. The Planning Inspectorate supported a description of alternatives within the Environmental Statement in accordance with Schedule 4 (2) of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (Ref 4-1). Consultation responses feeding

into the **Scoping Opinion** of the ES [EN010142/APP/6.2] that referred to alternatives are set out in **Table 4-1** below:

Table 4-1: Matters raised in relation to alternatives at the scoping stage

Consultee	Main matter(s) raised	How have the matter(s) been addressed
Natural England	<p>Consideration on the implications for Best and Most Versatile (BMV) agricultural land. In this regard, Natural England sought an assessment of alternatives as to why the preferred site option has been chosen and to set out details of layout alternatives illustrating consideration of alternative layouts to achieve a high-quality design having regard to local landscape character and distinctiveness.</p>	<p>The site selection process described in Section 4.5 (stage 2) confirms that Grade 1 and 2 BMV agricultural land was excluded from further consideration within the initial 15km search area based on provisional Agricultural Land Classification (ALC) mapping from Natural England. The indicative layout of the Principal Site as shown in Figure 3-1: Indicative Principal Site Layout Plan of the ES [EN010142/APP/6.3] has also been iterated to minimise impacts on BMV agricultural land having regard to the results of the ALC survey completed in relation to the Principal Site. The site selection process set out in Section 4.5 describes how landscape impacts were considered early within the design process with the Order limits of the Principal Site informed by an initial assessment informed by a walkover survey of landscape and visual effects. Consideration of alternative layouts with respect to landscape is described in more detail within the Design and Access Statement submitted alongside the DCO application [EN010142/APP/7.3].</p>
Lincolnshire County Council (LCC)	<p>In relation to agricultural land impacts size and scale are key factors which in the opinion of the Council require a sufficiently broad search area for the assessment of alternative locations to be sufficiently robust.</p> <p>Therefore, LCC considered that a Lincolnshire wide alternative assessment should be applied which at a minimum it considered should scope in connection to alternative National Grid connection points which are available in</p>	<p>The site selection process described in Section 4.5 (stage 2) was based upon a 15km radius search from the Point of Connection. This was considered in commercial terms, the greatest distance that the Scheme could be located from the National Grid Cottam Substation without having an adverse impact upon the commercial feasibility of the Scheme. Paragraph 2.10.24 of NPS EN-3 (Ref 4-2) confirms that choosing a site based on available grid export capacity and the distance of the Site to the point of connection is a key factor that influences site selection and design. On this basis, the 15km site selection criteria from the available point of connection at National Grid Cottam Substation</p>

Consultee	Main matter(s) raised	How have the matter(s) been addressed
	<p>Lincolnshire with specific consideration of agricultural land impacts. Without prejudice to that higher level assessment, LCC also asked the Applicant to indicate the main reasons for selecting the chosen option. LCC stated, that in this case this should include alternative site layouts (and indeed reduced MW as necessary) to reflect the location of known BMV land within the site.</p>	<p>adopted is sufficiently broad beyond which a greater distance would make the Scheme unviable due to the costs associated with the construction of the cable route corridor. The site selection process undertaken ensured the adoption of a systematic approach to identify the Principal Site with reduced environmental constraints and a minimisation of the loss of BMV land.</p> <p>In terms of consideration of agricultural land impacts, footnote 62 to paragraph 181 of the NPPF (Ref 4-7) does state that:</p> <p><i>“Where significant development of agricultural land is demonstrated to be necessary, areas of poorer quality land should be preferred to those of a higher quality. The availability of agricultural land used for food production should be considered, alongside the other policies in this Framework, when deciding what sites are most appropriate for development.”</i></p> <p>The development of the Scheme is necessary to deliver a large renewable energy project that is of critical national importance as set out by NPS EN-1. Alternative sites were considered as set out in Sections 4.5 but these were not suitable or not available with it being necessary to develop the Scheme on agricultural land</p> <p>Agricultural land quality was a key consideration in the Applicants site selection process. Grades 1 and 2 BMV agricultural land was excluded from further consideration within the initial 15km search area for the Scheme. This was based on provisional Agricultural Land Classification (ALC) mapping from Natural England. This resulted in the identification of an area of land for the Scheme</p>

Consultee

Main matter(s) raised

How have the matter(s) been addressed

shown as Grade 3, with only the completion of an ALC surveys being able to confirm whether any of the Principal Site contained BMV land. Previously developed land was also considered. These land types were identified by checking the local authority brownfield register. No suitable or available areas of brownfield or non-agricultural land which could form a contiguous Principal Site was identified.

Following this, as part of the iterative design evolution of the Scheme and using the results of the ALC survey completed in relation to the Principal Site, the Order limits have been iterated to minimise impacts on BMV land. This has involved not locating substations, which will comprise hardstanding, which could remain following decommissioning. In addition, the Applicant removed an area of Grade 3a land which was located on the western extent of the Principal Site from the Scheme as part of the design evolution of the Scheme, reducing the amount of affected BMV land by 11ha.

The remaining BMV land comprises mostly small, isolated areas, which due to their small size are likely to only be farmable alongside the lower grade surrounding land and not in isolation thereby rendering these areas unviable to remain in agricultural use. Although the Scheme is long term, it will be temporary with requirement 20 in the **draft DCO [EN010142/APP/3.1]** securing a time limited consent for 60 years. On this basis and in accordance with **Chapter 15: Soils and Agriculture** of the ES **[EN010142/APP/6.1]** there will be no adverse significant impacts with respect to the loss of BMV land. This is because areas of solar PV, Solar Stations, BESS, access tracks, biodiversity zones

Consultee

Main matter(s) raised

How have the matter(s) been addressed

and sensitive archaeological sites, can be restored to agricultural use by the landowner at decommissioning, with all structures removed and stored topsoil returned. The Scheme will result in the potential change of use of 0.08% of the Principal Site currently in arable use to woodland. It is likely that at decommissioning the woodland proposed as part of the Indicative Site Layout Plan (**Figure 3-1** of the ES **[EN010142/APP/6.3]**) will be of good quality through being managed ecologically in accordance with the LEMP, to be approved by requirement 7 of the draft DCO **[EN010142/APP/3.1]**. Whilst this is a potential permanent loss of 0.08% of BMV land, it is not significant and will be replaced by woodland, which will have beneficial ecological and landscape impacts.

Section 4.5 discusses availability of the grid connection at National Grid Cottam Substation with respect to site selection and paragraph 4.2.28 of this chapter explains the need to make the most efficient use of the available grid connection capacity through the design of the Scheme. Given the CNP to deliver low carbon and renewable electricity infrastructure, it would not be appropriate to reduce the capacity or size of the Scheme given national need and given that there are no significant effects derived with respect to BMV land.

Fillingham Parish Council

Fillingham Parish Council confirm that as required by the EIA Regulations and Overarching National Policy Statement for Energy, consideration of alternatives is required by the Applicant. Reference is made to the EIA Scoping Report which indicated that the ES

As set out in NPS EN-1 Ref 4-2) there is not a general requirement to consider alternatives and that where they are considered such assessments should be proportionate reflecting the CNP for the delivery of renewable energy Schemes in accordance with the UK's net zero goals. The consideration of alternatives has been undertaken in line with the requirements of

Consultee	Main matter(s) raised	How have the matter(s) been addressed
	<p>would focus on alternative scheme layouts, sizing and design parameters. Fillingham Parish Council considers that this would appear to be a very narrow consideration of alternatives.</p> <p>The parish council goes on to state that the scale and potential impact of the proposal, the dimensions explored within the ES to consider alternatives should be significantly broadened, e.g. to what extent commercial and domestic rooftop solar development could contribute to the underlying objectives laid out in the Climate Change Act, which the proposed Tillbridge scheme aims to serve, or whether disaggregated solar development could be achieved without incurring the cumulative adverse impacts associated with displacing agricultural land (food production, employment, habitat destruction, visual amenity etc).</p>	<p>the EIA Regulations (Ref 4-1) and is presented in the remainder of this chapter.</p> <p>The site selection process considered the use of brownfield land as set out in Section 4.5.</p> <p>The Statement of Need submitted as part of the DCO application [EN010142/APP/7.1] sets out the need for the Scheme explaining that large-scale solar alongside other technologies is required to diversify the UK's low-carbon portfolio to meet its legal obligations to achieve net zero by 2050. Rooftop solar alone will not meet the urgent need for solar in the UK, for example not all households have roof space which is suitable for solar installation. It is not therefore an alternative which would meet the Scheme's objectives. Whilst rooftop solar is likely to contribute to decarbonisation, large-scale solar is an essential part of the future electricity system, that must be deployed where there is the natural resource, where land is available and suitable, and in proximity to available grid connection locations, such as the area local to the Scheme.</p>

- 4.3.3 The Applicant has carried out statutory consultation in accordance with the Planning Act 2008 (Ref 4-8) which is described in detail in the **Consultation Report** submitted as part of the DCO application [EN010142/APP/5.1].
- 4.3.4 **Table 4-2** below summarises the main matters raised with respect to alternatives at the statutory consultation stage and sets out how these matters have been addressed.

Table 4-2: Matters raised in relation to alternatives at the statutory consultation stage

Consultee(s)	Main matter(s) raised	How have the matter(s) been addressed
Section 42(1)(b) Bassetlaw District Council	Bassetlaw District Council request that the cabling route should take the least historically and environmentally sensitive route unless unavoidable and should include the necessary mitigation where appropriate.	<p>The site selection process as described in Section 4.5 used to identify the location of the Principal Site was informed by environmental and planning considerations to identify land with the least constraints. Consideration of heritage impacts formed a component of this exercise.</p> <p>Early optioneering defining the extent of the Cable Route Corridor from scoping was further iterated and informed by environmental and planning considerations to identify a corridor of land that had the least constraints. This is set out in Section 4.5. This has continued since the statutory consultation with further refinement and reduction of the extent of the Order limits.</p>
Section 42(1)(a) Lincolnshire Wildlife Trust (LWT)	LWT raise a potential concern is the impact on three roadside Local Wildlife Sites (LWSs) within the Cable Route Corridor.	<p>The site selection process described in Section 4.5 explains how the Principal Site was identified having regard to environmental and planning constraints, including LWSs.</p> <p>Iteration of the Order limits and indicative site layout has further sought to avoid impacts upon LWSs or where this is unavoidable to mitigate against these impacts. Section 4.8 sets out alternatives that have been considered for the Scheme design and location in respect of these LWSs and the design evolution of the Scheme is considered within the Design and Access Statement submitted alongside the DCO application [EN010142/APP/7.3]. Chapter 9: Ecology and Nature Conservation of the ES [EN010142/APP/6.1]</p>

Consultee(s)	Main matter(s) raised	How have the matter(s) been addressed
		assesses in detail impacts upon the LWSs as a result of the Scheme.
Section 42(1)(b), Nottinghamshire County Council (NCC)	NCC state that access via the Cottam power station railway track is no longer in use and ask this could not be used for transportation?	The potential to utilise railway for deliveries during the construction phase has been considered and excluded on the basis that, whilst the existing Cottam Power Station is served by a rail station, it is understood that this section of track is in a state of dis-repair (and is therefore not viable for use by the Scheme).
Section 42(1)(b) West Lindsey District Council (WLDC)	<p>WLDC states that the specific contents for site selection and justification are generic and requests further information as to whether the Site was considered alongside other areas and asks that this is demonstrated within the ES.</p> <p>WLDC specifically raises a series of queries regarding site selection including:</p> <ul style="list-style-type: none"> • Did the applicant consider other points of connection? • Why was the specific area of search limited to 2,700ha of land to the south-east of Gainsborough? • Were there any other geographic areas considered besides the east of England? 	<p>The site selection process was informed by national and local planning policy at the time it was undertaken. This accords with the approach now formally set out in designated NPS EN-3 (Ref 4-6), which sets out the key considerations involved in the siting of solar nationally significant infrastructure projects including irradiance and site topography, network connection, proximity to dwellings, agriculture land classification and land type, accessibility, and public rights of way. These factors are set out in Sections 4.5 and 4.6 and the Design and Access Statement submitted as part of this DCO application [EN010142/APP/7.3].</p> <p>In respect of the three specific questions raised, paragraph 4.11.1 of NPS EN-1 recognises that the connection of an electricity generating plant such as the Tillbridge Solar Project is “<i>an important consideration</i>” for applicants and paragraphs 2.10.21 to 2.10.26 of NPS EN-3 confirms that network connection is a key consideration in the siting of a solar scheme. There is not a planning policy requirement to consider alternative points of connection.</p>

Consultee(s) Main matter(s) raised

How have the matter(s) been addressed

- The Scheme sought a maximum site area of 1700ha reflecting the potential size of site to fully utilise the import and export agreement with NGETs. After identifying the preferred zone within the 15km search radius for the Site, the process sought to ensure that constraints and environmental considerations were further refined and considered to ensure that the Site was suitable for the Scheme with the least amount of impact. The rationale adopted was to identify a contiguous Site, that was available and with good access to the local highway. Identifying a larger site than required allowed further iteration prior to defining the area of the Principal Site to form the basis of the Scoping Report.
- The site selection process only considered a location to the east of England that was then subsequently informed by the point of connection, irradiance levels and topography. This approach is in accordance with the key factors influencing site selection and design set out at paragraphs 2.10.18 to 2.10.26 of NPS EN-3 (Ref 4-6).

Section 42(1)(a) Ingham Parish Council states that it is against the proposed large-scale solar developments, because of their limited contribution to decarbonisation and the adverse consequences arising from using farmland in this way.
 Ingham Parish Council They state that they are in favour of good solar development confirming that solar should be deployed where there is little else that can be done with the space

The Statement of Need submitted alongside the DCO application [EN010142/APP/7.1] sets out the need for the Scheme explaining that large-scale solar alongside other technologies is required to diversify the UK’s low-carbon portfolio to meet its legal obligations to achieve net zero by 2050. Rooftop solar alone will not meet the urgent need for solar in the UK, for example not all households have roof space which is suitable for solar installation. Whilst rooftop solar is likely to contribute to decarbonisation, large-scale

Consultee(s)	Main matter(s) raised	How have the matter(s) been addressed
	such as rooftops (in the UK only around 3% of households have solar panels)	solar is an essential part of the future electricity system, that must be deployed where there is the natural resource, where land is available and suitable, and in proximity to available grid connection locations, such as the area local to the Scheme.
Section 42(1)(a) Glentworth Parish Council	Glentworth Parish Council confirms that it is in favour of good solar development and that it should be deployed where there is little else that can be done with the space such as rooftops (in the UK only around 3% of households have solar panels)	The Statement of Need submitted alongside the DCO application [EN010142/APP/7.1] sets out the need for the Scheme explaining that large-scale solar alongside other technologies is required to diversify the UK's low-carbon portfolio to meet its legal obligations to achieve net zero by 2050. Rooftop solar alone will not meet the urgent need for solar in the UK, for example not all households have roof space which is suitable for solar installation. Whilst rooftop solar is likely to contribute to decarbonisation, large-scale solar is an essential part of the future electricity system, that must be deployed where there is the natural resource, where land is available and suitable, and in proximity to available grid connection locations, such as the area local to the Scheme.
Section 42(1)(a) Canal and River Trust (CRT)	CRT state that Tillbridge could involve the importation of indivisible heavy loads and states that as the River Trent is a commercial waterway, that it may be possible to transport equipment along the river to help minimise the need to utilise the Highway Network.	Potential use of the river for transportation during construction has been explored as part of the transport strategy Paragraph 16.3.17 of Chapter 16: Transport and Access of the ES [EN010142/APP/6.1] sets out that the potential to utilise the River Trent for freight was considered and explains why this was ruled out.
Section 42(1)(a)	NWT states that there is a need to consider the impact of the Scheme upon LWS with a preference for the Scheme to avoid these. It confirms that where there is a need to	Sections 4.6 and 4.7 explains how through the iteration of the Order limits associated with the Cable Route Corridor and its

Consultee(s)	Main matter(s) raised	How have the matter(s) been addressed
Nottinghamshire Wildlife Trust (NWT)	cross a LWS, that this should be via bailey bridge, rather than culvert to minimise negative impacts.	associated access points has been developed so as to minimise impacts upon the LWS's near to the Scheme.
Section 42(1)(a) Fillingham Parish Council	The parish council states that the exploration of alternatives is limited based on 'pre-determined geographic and scale decisions.' It states that the site search is based on a concept from a single point of connection with no other options having been explored. They go on to state that other coal closure sites across the UK are not mentioned and that other schemes have been developed that connect directly to transmission towers, and there is no such need for a substation connection. The parish council states that Tillbridge has limited its consideration of alternative proposals.	As set out in NPS EN-1 (Ref 4-2) there is not a general requirement for applications to consider alternatives and that where alternatives are considered, such assessments should be proportionate and reflect the CNP for the delivery of renewable energy schemes necessary to meet the UK's net zero obligations. Paragraphs 2.10.21 to 2.10.26 of NPS EN-3 recognises that the point of connection is a critical locational criterion for the site selection of solar projects. There is no national policy requirement to consider alternative point of connections across the UK. NPS EN-1 and EN-3 support the urgent need to deliver large scale renewable energy projects as CNP infrastructure and recognises that network connection whether this be in the form of a connection into the local distribution network or connection into the transmission network is a key locational criteria to deliver solar projects. The point of connection is a determining factor for the location of a project and where there is available capacity this an opportunity that should be exploited given the CNP for the infrastructure proposed as part of this Scheme. The Tillbridge Solar Project has considered alternatives where there is a policy requirement to do so, for example, with respect to flood risk, and developed a rational site selection process based upon operational requirements and then led by environmental and planning considerations to identify a suitable site for the Scheme. Alternatives have been limited since the site selection process removed those

Consultee(s)	Main matter(s) raised	How have the matter(s) been addressed
Section 47 Consultee	The consultee stated that the proposed cable route is significant in length and as such is a very long distance from the links to the National Grid. On this basis, it is stated that the land affected by this route is extensive and excessive.	<p>areas that would trigger a policy requirement to do so. For example, with respect to national landscapes and ecological and geological considerations. The site selection process completed sets out the Applicant’s approach to site selection that has had regard to environmental, technical and commercial feasibility of the Scheme. The approach adopted is proportionate and in accordance with paragraphs 4.3.14 to 4.3.17 of NPS EN-1 (Ref 4-2).</p> <p>Section 4.5 sets out the site selection process to identify the Principal Site (including consideration of its distance from the grid connection) and Section 4.8 explains the design evolution of the extent of the Order limits for the Cable Route Corridor so as to minimise environmental impacts, including for this to form a shared corridor with other developers in the area to minimise impacts. The design evolution of the Cable Route Corridor is also set out within the Design and Access Statement submitted alongside the DCO application [EN010142/APP/7.3].</p>
Section 47 Consultee	These consultee comments suggested installing solar panels on new factories, warehouses, and brownfield sites which would have appropriate angles for solar panels and would not impact existing farmland, woodland and food supply.	<p>The Applicant has considered many factors in determining the site selection for the Scheme including environmental and planning considerations and designations. The site selection was initially driven from an established point of connection and consideration has been given to minimise the use of Grade 1 and 2 BMV agricultural land. This has been minimised where possible within the Scheme.</p> <p>The Scheme seeks to protect existing woodland from development. Table 9-15 of Chapter 9: Ecology and Nature</p>

Consultee(s) **Main matter(s) raised**

How have the matter(s) been addressed

Conservation of the ES [EN010142/APP/6.1] sets out how the Scheme will retain and avoid areas of woodland within the Site boundary.

Consideration was also given to the availability of brownfield land within range of the point of connection. The brownfield land that was identified was less than 5ha in size or already allocated for other uses within the adopted or emerging local plan at the time of the search. Therefore, it was concluded that there was no available or suitable brownfield land for the Scheme.

The Statement of Need submitted alongside the DCO application [EN010142/APP/7.1] sets out the need for the Scheme, and explains how both rooftop solar and large-scale solar alongside other technologies is required to diversify the UK's low-carbon portfolio to meet its legal obligations to achieve net zero by 2050. The UK Government has made a legal commitment to achieve Net Zero by 2050. There is an urgent need to decarbonise the UK electricity system and the Government is aiming to achieve this by 2035. The Government's 2020 Energy White Paper states that a low-cost, net zero consistent system is likely to be composed of predominantly wind and solar. The Government has targeted 70GW of UK solar by 2035, up from a baseline of c.15GW today supported by NPS EN-1 (Ref 4-2) given the CNP for the provision of low carbon infrastructure, which includes electricity generation from renewable sources such as solar. Rooftop solar alone will not meet the urgent need for solar in

Consultee(s)	Main matter(s) raised	How have the matter(s) been addressed
Section 47 Consultee	Consultee comments suggested that solar is wasteful and harmful to land if placed on productive farmland rather than brownfield sites or roof tops and asked to what extent has Tillbridge Solar explored these alternatives rather than proposing to industrialise a rural area?	<p>the UK. For example, not all households have roof space which is suitable for solar installation. Whilst rooftop solar is likely to contribute to decarbonisation, large-scale solar is still an essential part of the future electricity system, that must be deployed where there is the natural resource, where land is available and suitable, and in proximity to available grid connection locations, such as the area local to the Scheme.</p> <p>The Applicant has considered many factors in determining the site selection for the Scheme including environmental and planning considerations and designations. The site selection was initially driven from an established point of connection and consideration has been given through site selection and through the proposed design of the Scheme to minimise impacts on the BMV land (grade 1, 2 or 3a) and to use land in areas of poorer quality in accordance with national planning policy.</p> <p>Consideration was also given to the availability of brownfield land at the site selection stage through reference to the local planning authorities brownfield land registers. The brownfield land that was identified was less than 5ha in size or already allocated within the emerging local plan at the time of the search. Therefore, it was concluded that there was no available or suitable brownfield land for the Scheme.</p> <p>The Statement of Need submitted alongside the DCO application [EN010142/APP/7.1] sets out the need for the Scheme explaining that both rooftop <i>and</i> large-scale solar alongside other technologies is required to diversify the UK's</p>

Consultee(s)	Main matter(s) raised	How have the matter(s) been addressed
Section 47 Consultee	The consultee suggested that there are better ways to produce energy in more appropriate places, such as offshore wind, tidal (hydro-electric) and nuclear energy and stated that at present there is not the capacity to store energy.	<p>low-carbon portfolio to meet its legal obligations to achieve net zero by 2050. The UK Government has made a legal commitment to achieve Net Zero by 2050. There is an urgent need to decarbonise the UK electricity system and the Government is aiming to achieve this by 2035. The Government's 2020 Energy White Paper states that a low-cost, net zero consistent system is likely to be composed of predominantly wind and solar. The Government has targeted 70GW of UK solar by 2035, up from a baseline of c.15GW today supported by NPS EN-1 (Ref 4-2) given the CNP for the provision of low carbon infrastructure, which includes electricity generation from renewable sources such as solar. Rooftop solar alone will not meet the urgent need for solar in the UK, for example not all households have roof space which is suitable for solar installation. Whilst rooftop solar is likely to contribute to decarbonisation, large-scale solar is an essential part of the future electricity system, that must be deployed where there is the natural resource, where land is available and suitable, and in proximity to available grid connection locations, such as the area local to the Scheme.</p> <p>The Statement of Need submitted alongside the DCO application [EN010142/APP/7.1] NPS EN-1 (Ref 4-2) and EN-3 (Ref 4-6) confirms that there is an urgent need to deliver low carbon energy infrastructure with this urgent need to be given substantial weight when considering applications for development consent such as this Scheme. Paragraph 4.2.4 of NPS EN-1 states that "<i>government has therefore concluded that there is a critical national priority (CNP) for the provision of nationally significant low carbon infrastructure.</i>"</p>

Consultee(s) **Main matter(s) raised**

How have the matter(s) been addressed

To meet this CNP and urgent need it will require the deployment of different types of technologies to deliver a secure, reliable and affordable energy system. This includes the need for solar, wind, electricity storage and nuclear power. The need for new electricity infrastructure to store energy is recognised and forms part of government's energy plans. The Scheme includes BESS. This would enable the Scheme to store energy created by the solar PV. This would maximise the output from the solar PV and support balancing services. This would subsequently help reduce constraints on the network through exporting the energy created at times of peak demand.

Nuclear power does form part of the energy strategy for the country, but it will take a long time to deploy. The strategy to deliver nuclear power is in its infancy, which will be informed by a Nuclear National Planning Statement is understood will be designated after 2025.

Hydropower is a potential source of new energy, but its capacity is limited by the topography of the UK. Similarly, tidal power capacity is also limited due to its establishment costs currently preventing this technology being commercially viable and due to its total capacity being limited (paragraph 3.3.54 of NPS EN-1 (Ref 4-2)).

While offshore wind developments are a viable and important part of the UK's renewable energy generation future, they are also not intended to be the only form of energy generation

Consultee(s)	Main matter(s) raised	How have the matter(s) been addressed
Section 47 Consultee	This consultee stated that access should be via A631 and not B1398 or through the village of Glentworth due to concerns regarding impact on the Cliff as it is an Area of Great Landscape Value.	<p>utilised. Paragraph 3.3.20 of NPS EN-1 states that “a <i>secure, reliable, affordable, net zero consistent system in 2050 is likely to be composed predominantly of wind and solar.</i>”</p> <p>There is therefore a need for a combination of sources of renewable energy with solar forming an important part of the government’s energy strategy. It can be deployed quickly, is relatively low cost and provides a secure source of electricity supply that is not reliant on fuel for generation.</p> <hr/> <p>Alternative routing options have been considered in developing the access strategy as detailed in the Appendix 16-2: Transport Assessment of the ES [EN010142/APP/6.2].</p> <p>The Transport Assessment sets out the access strategy for the construction and operation of the Scheme with the aim to focus access off the A631 but with a fourth access to enable access to the eastern extent of the Scheme via the improvement of an existing access. The strategy has sought to deal with construction traffic utilising major roads (A) and B roads. B roads feed traffic between A roads and smaller roads onto the network. A and B roads are higher classes of road that are suitable for larger volumes of traffic. The access strategy does not seek to use the smaller and minor roads within proximity to the Scheme as main access points in the interests of highway safety and capacity. Given this, both the A631 and the B1398 are suitable and appropriate points of access for the Principal Site.</p>

Consultee(s) **Main matter(s) raised**

How have the matter(s) been addressed

In respect of the A631 and B1398, Heavy Goods Vehicles (HGVs) during construction will only utilise the B1398 Middle Street to the north of Principal Site Access four, with no HGVs routed to the south through the village of Glentworth. The landscape and visual effects of the Scheme upon the Cliff are considered within **Chapter 12: Landscape and Visual Amenity** of the ES [EN010142/APP/6.1]. The Area of Great Landscape Value reflects is a local landscape designation and whilst the Scheme will result in limited and localised adverse landscape and visual effects, these impacts will reduce over its 60 year operation and will be reversible. Paragraph 5.10.12 of NPS EN-1 (Ref 4-2) states that *“locally valued landscapes should not be used in themselves to refuse consent, as this may unduly restrict acceptable development.”* The site selection process as set out in this chapter and the **Design and Access Statement** submitted alongside the DCO application [EN010142/APP/7.3] submitted as part of this DCO application illustrates how the design of the Scheme has been iterated to minimise landscape and visual effects.

4.4 Need for the Scheme

- 4.4.1 NPS EN-1 (Ref 4-2) confirms at paragraph 4.2.5 that “there is a critical national priority (CNP) for the provision of nationally significant low carbon infrastructure.” This sets out a policy presumption in favour of CNP infrastructure, such as solar, to achieve energy objectives to decarbonise the energy sector by 2035 and to achieve net zero by 2050.
- 4.4.2 The DCO Application is also accompanied by a **Statement of Need [EN010142/APP/7.1]**. This sets out a detailed and compelling case as to why the Scheme is urgently required at the scale and location proposed. This section provides a summary of the need for the Scheme.
- 4.4.3 The Scheme’s principal objective is to efficiently generate a substantial capacity of renewable energy to the National Electricity Transmission System, thereby supporting the delivery of the Government’s objectives and commitments for the development of a secure, affordable and low carbon energy.

Global commitments to decarbonisation

- 4.4.4 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 4-9). 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.
- 4.4.5 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 4-10).
- 4.4.6 The most recent Conference of the Parties (COP) 28 held in Dubai between the 30 November and 12 December 2023 signalled a further increase in the urgency of global action required to fight climate change. COP28 marked the beginning of the end of fossil fuels, therefore also marking the absolute requirement to generate energy from low-carbon sources. The COP28 agreement also stated that all countries must take action now to curb emissions – not in a distant future. This is a key point, since all countries including the UK committed to update their national climate plans for COP29 and therefore must now increase their carbon reduction ambitions (Ref 4-11).

UK commitments to decarbonisation

- 4.4.7 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.
- 4.4.8 Decarbonisation is a legal requirement on the UK Government. In June 2019, Government passed law to end the UK’s contribution to global

warming by 2050: Net Zero (Ref 4-12). Alongside the Net Zero commitments, the UK Government has also committed to achieving decarbonisation of the energy sector by 2035 (Ref 4-13).

- 4.4.9 Decarbonisation requires the electrification of energy which is currently sourced from fossil fuels (including gas, petrol and diesel); the utilisation of renewable energy to meet the expected increase in demand for UK electricity (being for demand to double from current levels by 2050) and wider transitions outside of the power sector, including decarbonising transport, industry, agriculture and homes (many of which will contribute to the expected greater demands for electricity e.g. through the use of electric cars or electric powered heating systems).
- 4.4.10 This is a critical point because it will be through the extensive electrification of energy demand which is currently outside of the power sector, that the required emissions reductions will be achieved. Reducing emissions therefore requires the major expansion of renewable and other low-carbon power generation to ensure that the UK is capable of securely meeting future energy 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 4-4).

Practical obstacles to meeting decarbonisation commitments

- 4.4.11 While the policy outlined above sets a clear commitment to decarbonisation and net zero, the Committee on Climate Change (CCC) has outlined concerns in its most recent Progress Report to the UK Government that current efforts will not meet the goals committed to: *“Our confidence in the achievement of the UK's 2030 target and the Fifth and Sixth Carbon Budgets has markedly declined from last year”* (Ref 4-14) The CCC also stated in its June 2023 Progress Report (Ref 4-14) 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 – let alone the complete decarbonisation of the energy sector by 2035.
- 4.4.12 The decommissioning of existing generation assets necessary as part of decarbonisation also increases the requirement to develop new low-carbon generation with urgency in order to “keep the lights on” at even existing demand levels. This decommissioning includes:
- a. Only one UK coal station is currently still in operation. It is currently scheduled to close in September 2024.
 - b. Most existing UK nuclear power will close by 2028 leaving just one existing plant operational in 2030, to be joined by Hinkley Point C (funded and currently under construction). No other new developments have yet secured full funding, and none have commenced nuclear construction. Therefore, none are likely to commission before the mid-2030s at the earliest, given the long lead times required for nuclear developments.
- 4.4.13 In 2022 the UK's gas fired generation capacity contributed over 30% of the UK's total annual electricity generation output. Currently all gas-fired capacity

is fully unabated, meaning that the CO₂ emitted as a by-product of the electricity generation process is released to the atmosphere and contributes to global warming. Progressing towards a zero-carbon electricity system by 2035 requires the decarbonisation of these assets, or the replacement of that generation capacity with alternative low-carbon sources.

- 4.4.14 Alongside the decommissioning of existing emitting assets, the development of CCUS is currently being pursued as a key measure to help the UK move towards Net Zero. CCUS will, if delivered, facilitate the decarbonisation of the UK's thermal (carbon emitting) fleet, (currently circa 42 GW), capture carbon emissions from industry, capture carbon which may arise from the production of hydrogen, and deliver greenhouse gas removal technologies. Recent progress has been made towards bringing CCUS clusters forward by the end of the decade however the UK Government recognises that the technology has not been delivered at the scale necessary to curb emissions and significant risks to the delivery of the technology at the pace and scale remain.
- 4.4.15 Hydrogen is also being pursued as another new measure to help the UK move towards Net Zero. 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 – that is, its production must be coupled with an energy generating activity. Hydrogen has the potential to be used as a low-carbon substitute for natural gas in electricity generation, homes and industry. It also has potential to be used as a substitute transport fuel, and as a means of storing energy. The production of green hydrogen will cause an increase in the demand placed on UK electricity generation. Progress continues to be made in the development of electrolysis schemes to generate green hydrogen and also on developments to facilitate the substitution of carbon-intensive fuels by hydrogen in end use situations.

Policy promotion of renewable energy development

- 4.4.16 Alongside the above decarbonisation technologies, is the production of renewable energy. 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 the UK's range of policy documents and guidance make it clear that wind on its own is not sufficient and that solar energy developments play a crucial role in the decarbonisation of the UK's electricity network. As set out in the NPS EN-1 (Ref 4-2) at paragraph 3.3.20, "*a secure, reliable, affordable, net zero consistent system in 2050 is likely to be composed predominantly of wind and solar.*"
- 4.4.17 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) 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 4-4) set an ambition of 70 GW of solar by 2035 (an increase of circa 55 GW from the current installed capacity).

- 4.4.18 Mission Zero (Ref 4-15), 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 through 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*".
- 4.4.19 Government's Powering Up Britain strategy, published in March 2023 (Ref 4-16) concludes that "We need investment at scale across a range of sectors to rapidly rollout existing technologies and bring through transformative new ones. Established technologies ... need to be deployed 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". This is an important point because not all prototype projects successfully achieve deployment at scale and as such technologies which are currently in their prototype phase, cannot yet be relied upon to deliver the benefits ascribed to them. Therefore, a prudent approach is needed to meet the urgent need to reach net zero by 2050, including carbon-neutral operation of the electricity system by 2035. The deployment of proven technologies including large-scale solar to cover the case that prototype technologies do not proceed to full-scale technical deployment is such a prudent approach. 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], Powering Up Britain's Energy Security Plan (Ref 4-16) explicitly states that the Government is "aiming for 70 gigawatts of ground and rooftop [solar] capacity together by 2035" because "Ground-mounted solar is one of the cheapest forms of electricity generation and is readily deployable at scale. The government seeks large scale ground-mount solar deployment across the UK, looking for development mainly on brownfield, industrial and low and medium grade agricultural land" (pp37-38).

Grid connection requirements for solar / renewable energy developments

- 4.4.20 The availability of grid connections is limited and this is a significant risk to the UK's approach to achieving net zero. The utilisation of existing grid infrastructure is therefore fundamental to ensuring new renewable energy projects can be brought online quickly. Grid connections with dates for new generators in the 2020s have the potential to contribute to the UK's immediate decarbonisation and security of supply efforts. Having identified available grid connection capacity at National Grid Cottam Substation, the Applicant assessed all available sites close to the point of connection, including brownfield land, at the site selection stage through reference to the local planning authorities brownfield land registers. The brownfield land that was identified was less than 5ha in size or already allocated within the emerging local plan at the time of the search. Therefore, it was concluded that there was no available or suitable brownfield land for the Scheme. The Applicant is proposing a scheme which has been designed to make the greatest use of that available grid connection capacity at National Grid

Cottam Substation through the use of available and suitable land close to the point of connection.

- 4.4.21 By not developing schemes which make use of such connections, the criticality and scale of projects required to deliver in later timeframes to make up for the carbon emissions (and their associated global warming effect) will increase. This would have an effect on the cost and timings associated with connecting the required capacities of low-carbon generation to meet Net-Zero. Further, unless a different low-carbon generation scheme came forward and was consented to connect at such a connection point in a similar timescale, more connection capacity would need to be created elsewhere to connect schemes to meet government's targets. This would likely take more time (increasing carbon emissions in the ensuing period) and increase consumer costs (when compared to utilising an existing and available point of connection).
- 4.4.22 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.

Summary

- 4.4.23 Solar generation is already a leading low-cost generation technology in the UK as set out in the government's 2023 Cost of Energy Report (Ref 4-17) 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.
- 4.4.24 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.
- 4.4.25 Large scale solar like that provided by the Scheme is best placed to make the most of available grid connections which are vital to providing renewable energy in the urgent timeframes set by the UK Government and CCC.
- 4.4.26 In summary, the Scheme has a vital role to play on the national and world stage in the urgent response to tackle climate change.

4.5 Principal Site – Site Selection

- 4.5.1 There is no standard methodology for the site selection of energy projects. Paragraph 2.3.5 of NPS EN-3 (Ref 4-6) states that "*the government does not seek to direct applicants to particular sites for renewable energy infrastructure.*" Instead, the NPS focuses on the general presumption in favour of granting consent for applications for renewable energy where there is an urgent need for this CNP infrastructure. National planning policy confirms that the presumption for development will in general outweigh any other residual impacts not capable of being addressed by the application through mitigation.

- 4.5.2 NPS EN-3 (Ref 4-6) does however set out general considerations relating to site selection for renewable energy projects. It refers to the need to consider national designation tests related to potential impacts upon biodiversity, landscape and visual considerations and the need to demonstrate that any significant effects on qualities for which the area has been designated are clearly outweighed by the urgent need for the Scheme. The Secretary of State should also have regard to the aims, goals and targets of the Government's Environmental Improvement Plan (Ref 4-18) and other existing and future measures and targets in England, as well as compliance with the Environment Act 2021. Specific reference is also made to the historic environment given the statutory duty for the Secretary of State to give considerable importance and weight to the desirability of preserving all heritage assets.
- 4.5.3 Paragraph 2.3.9 of NPS EN-3 recognises that *"most renewable energy resources can only be developed where the resource exists and where economically feasible, and because there are no limits on the need established in Part 3 of EN-1, the Secretary of State should not use a consecutive approach in the consideration of renewable energy projects (for example, by giving priority to the re-use of previously developed land for renewable technology developments)."*

Stage 1: Determining and Initial Area of Search

Irradiance and Topography

- 4.5.4 The first stage of selecting the Principal Site was to define an initial area of search. This was based upon considerations of irradiation (sunlight) and topography. A site was required in a location where land was flat to limit shading between arrays, enabling panels to be optimally configured for best production levels and in an area with good levels of sunlight to generate more energy.
- 4.5.5 The east of England was chosen as a region within which to search for a site to locate the Scheme since it has a combination of high levels of irradiation and large flat open areas of land. As shown in **Figure 12-5: Topography and Watercourses** of the ES [EN010142/APP/6.3], the Site is located within low-lying land with a relatively flat landscape thereby being suitable for large-scale solar development.

Point of Connection

- 4.5.6 From this baseline, a Point of Connection (POC) search was undertaken by the Applicant within the east of England region in addition to considering the maximum distance in which a site could be located from the POC. Distance from the POC was a factor to consider since the transmission of electricity to the grid becomes less efficient and the connection becomes more costly. NPS EN-1 (Ref 4-1) paragraph 4.11.1 confirms that the *"connection of a proposed electricity generation plant to the electricity network is an important consideration for applicants wanting to construct or extend a generation plant."* Available network capacity and the availability of infrastructure is a key locational criterion for solar. This is also recognised at paragraph 2.10.24 of NPS EN-3 (Ref 4-6) stating that:

“...the connection voltage, availability of network capacity, and the distance from the solar farm to the existing network can have a significant effect on the commercial feasibility of a development proposal.”

- 4.5.7 Cottam Power Station ceased generation as a coal fired power station on the 30 September 2019. The National Grid Cottam Substation is located within the site. The existing sub-station has spare capacity for a POC that can connect into the 400kV network with no requirement for reinforcement of the grid.
- 4.5.8 Paragraph 4.11.1 of NPS EN-1 recognises that the connection of an electricity generating plant such as the Tillbridge Solar Project is “*an important consideration*” for applicants and paragraphs 2.10.21 to 2.10.26 of NPS EN-3 confirms that network connection is a key consideration in the siting of a solar scheme. There is not a planning policy requirement to consider alternative points of connection. Other factors influencing site selection and design include proximity to dwellings, agriculture land classification and land type, accessibility, public rights of way and technical considerations. These elements were all considered as part of the site selection process in accordance NPS EN-3.
- 4.5.9 The Applicant has secured a POC at the National Grid Cottam Substation with it having sufficient capacity to accommodate the required connection and with space available within the existing substation that can be accommodated alongside existing public assets. The availability of the POC means that the Scheme can be deployed quickly. The availability of the POC and its ability to be utilised without requiring the reinforcement of the existing grid illustrates its suitability for the delivery of CNP infrastructure. The site selection process that followed as set out in the remaining sections of this chapter further demonstrates the suitability of the Principal Site for the Scheme. Due to the site selection process that followed, this excluded from further consideration areas of greatest environmental sensitivity and constraints or where specific sequential policy tests needed to be met ensuring that the Principal Site is suitable for the Scheme.
- 4.5.10 Due to the criteria set out above, an initial area of search from the proposed point of connection at the National Grid Cottam Substation was established. The initial area of search that was derived was up to a maximum of a 15km radius from the point of connection. This was the furthest distance that the Applicant sought to locate the Scheme from the POC, due to the impact of an increased distance from the POC on commercial feasibility but balancing this against the need to find a site with reduced environmental effects supported by the site selection exercise described below. The Cable Route Corridor is a shared route with other NSIP projects, all located at varying intervals along Cable Route Corridor between 5km and 20km from the POC. The Scheme is located within the range of distances from the POC already established by others and benefits from the delivery of a shared Cable Route Corridor to minimise environmental effects, as discussed in Section 4.6. This initial area of search incorporated land falling within both Lincolnshire and Nottinghamshire including the Districts of West Lindsey and Bassetlaw. This area is shown in **Figure 4-1** of the ES [EN010142/APP/6.3].

Stage 2: Refining the Area of Search

4.5.11 To refine the site selection process from this initial area of search, consideration was then given to the presence of environmental and planning constraints with national designations avoided. On this basis, the following sites within the Area of Search were excluded from further consideration:

- a. Internationally and nationally designated ecological and geological sites – Sites of Special Scientific Importance (SSSI) and Ancient Woodland;
- b. Designated heritage assets –such as Scheduled Monuments, Registered Parks and Gardens, Grade I, II and II* Listed Buildings (point data with a 50m buffer); and
- c. Flood risk – specifically large areas of the sites identified by the Environment Agency as Flood Zones 2 and 3 and at higher risk of flooding.

4.5.12 The initial area of search did not contain:

- a. Internationally and nationally designated ecological and geological sites - No Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar, National Nature Reserves, or proposed SPAs, SACs and listed Ramsar;
- b. Nationally designated landscapes – no AONBs or National Parks;
- c. Designated heritage assets - No World Heritage Sites or registered battlefields; and
- d. Greenbelt – no greenbelt.

4.5.13 Further refinement was then undertaken to exclude the following land from the site selection process:

- a. Agricultural land – planning policy seeks to minimise impacts on the BMV agricultural land (defined as land in grades 1, 2 and 3a of the Agricultural Land Classification) and to instead preferably use land in areas of poorer quality (grades 3b, 4 and 5). Land classified as grades 1 and 2 were identified using the Provisional Agricultural Land Classification (ALC) (England) mapping produced by Defra (Ref: 4-16) and excluded from the area of search. The majority of the area of search is within grade 3 land classification which does not distinguish between grades 3a and 3b. Therefore, to consider this land further at the site selection stage, reference was made to supplementary maps (Ref 4-19) produced by Natural England which identify the likelihood of this Grade 3 land being BMV agricultural land. Land identified as the highest likelihood of BMV land was identified and excluded from further consideration;
- b. Topography – this was mapped across the 15km radius from the POC and all land above a 2% gradient was excluded due to the operational requirement for solar schemes to be located on relatively flat land for those reasons set out in paragraph 4.5.4;
- c. Local landscape designations – Areas of Great Landscape Value including the Lincolnshire Edge/Lincoln Cliff;

- d. Urban areas – building clusters defined as comprising ten or more buildings with a 100 m buffer placed around them were excluded from further consideration; and
 - e. Previously developed land – the brownfield register for all relevant local planning authority areas was reviewed and all sites within the search area were considered. No sites of a suitable size required for the Scheme were identified with them all being less than 5 hectares (ha). Due to site size, none would not be suitable to deliver the Scheme. As an example, as of December 2023, West Lindsey District Council's brownfield land register (Ref 4-20) shows a total of 36.84 ha of brownfield land. Removing sites with planning permission for alternative uses to solar from this total, further reduced the amount of available brownfield land to 15.26 ha aggregated across 19 sites. Bassetlaw District Council's brownfield land register (September 2023) (Ref 4-21) identified a total of 112.12 ha of brownfield land. Removing sites with planning permission for alternative uses to solar from this total, further reduced the amount of available brownfield land to 6.36 ha split across 8 sites. This was apart from Cottam Power Station, which measures 348 ha. The unsuitability of Cottam Power Station is discussed further in paragraph 4.5.15 below. There is no 'brownfield first' approach to site selection for large-scale solar projects encapsulated in NPS EN-1 (Ref 4-2) or NPS EN-3 (Ref 4-6). As set out above at paragraph 4.5.3, the NPS EN-3 confirms this is intentional given the policy presumption for development due to the urgent need to decarbonise the energy sector.
- 4.5.14 The National Planning Policy Framework (NPPF) (Ref 4-7) at paragraph 123 does seek to ensure that planning decisions promote “*an effective use of land*” and in meeting future development needs that this “*makes as much use as possible of previously-developed or 'brownfield' land.*”. However, this policy direction does not preclude the use of greenfield sites for future development, and in any case is not technically applicable to the consideration of this Application, given NPS-EN-1 and NPS EN-3 are in effect.
- 4.5.15 This was with the exception of the former Cottam Power Station site which measures 348 ha. This was also discounted due to its allocation within the emerging plan for redevelopment as a residential led regeneration project. The Bassetlaw Local Plan is now at an advanced stage with consultation on main modifications having closed and the plan expected to be adopted during the summer of 2024. Policy ST6 (Cottam Regeneration Priority Area) of the emerging Bassetlaw Local Plan (Ref 4-22) safeguards the land at the former Cottam Power Station for mixed use development to come forward beyond the plan period. The site is being promoted by the landowner EDF for future redevelopment through the local plan process who has succeeded in its allocation as safeguarded land to meet part of the future housing and employment needs of the district. Given this, the site would not be available for solar development and its status as safeguarded land for future development would be in conflict with the emerging plan.
- 4.5.1 In summary, the above confirms that the available brownfield sites within the initial area of search were not of sufficient size for the Scheme and would compete or be in conflict with local planning policy seeking to deliver housing

and traditional employment use on these sites to meet local need. No brownfield sites were therefore taken forward for further consideration. The outcome of the planning and environmental constraints exercise within the 15km site search area is shown in **Figure 4-2** of the ES [EN010142/APP/6.3].

Stage 3 - Identifying potential solar development zones

- 4.5.16** Stage 3 of the site selection process sought to identify zones potentially suitable for solar development. These are shown in **Figure 4-3** of the ES [EN010142/APP/6.3]. The overall site search process included an assumption in favour of a contiguous site to allow the development of a cohesive design; to assist with operation; to derive a size of site that was sufficient to reflect the power output reflective of the Bilateral Connection Agreement with National Grid and to ensure commercial viability. Details of this can be found in the **Grid Connection Statement** submitted alongside the DCO application [EN010142/APP/7.5].
- 4.5.17** These inputs required the identification of a gross site area between 930ha and 1,700ha within any zone to ensure that the Scheme would be commercially feasible. This was based on the Applicant requiring between 1.43ha and 1.7ha of land as a gross site area figure per MW of power output. This site area assume that 70% of the land would be developable (land used for solar PV and BESS) and 30% would be non-developable (land used for offsets and mitigation). For the purpose of this exercise, the Applicant assumed a solar PV overplanting ratio of between 1.3 and 2.
- 4.5.18** Paragraph 2.10.17 of NPS EN-3 (Ref 4-6) states that “*a solar farm requires between 2 to 4 acres for each MW of output.*” This would equate to a net site area for solar PV only f between 1,000 ha and 2,000 ha based on the Bilateral Connection Agreement with National Grid. The range of site size considered as part of the site selection process was therefore firmly within the range of expected site size for each MW of output set out within paragraph 2.10.17 of NPS EN-3 (Ref 4-6). However, it should be noted that this goes on to state that site size:
- “...will vary significantly depending on the site, with some being larger and some being smaller.”*
- 4.5.19** Areas of land capable of delivering a contiguous site of at least 930ha were taken forward to the next stage of the process.

Stage 4 – Further evaluation of zones considered suitable for solar development

- 4.5.20** Stage 4 included a desktop assessment of the zones identified by stage 3 in terms of their suitability for a large-scale solar Scheme. This included the development of a red, amber and green (RAG) system to measure and evaluate the suitability of each zone against potential impacts associated with:
- a. Ecology and biodiversity;
 - b. Landscape and Visual:

- c. Land Use; including public rights of way;
- d. Cultural Heritage;
- e. Access for construction vehicles;
- f. Field shading;
- g. Deliverability of grid connection; and
- h. Terrain.

4.5.21 The criteria used to measure the suitability of each zone was developed having regard to relevant national and local planning policy and operational requirements for the solar scheme. The performance of each zone against the established evaluation criteria was recorded with zones then evaluated against their overall performance to determine whether they would be suitable for the Scheme.

4.5.22 The Stage 4 desktop assessment of the zones identified in stage 3 is shown below in **Table 4-3** and concludes that all zones performed well against the criteria above, and would be suitable for the Scheme albeit with some zones slightly more constrained than others. Zone B was more constrained by its undulating terrain and the fact that it surrounds a number of settlements. Zone C was more constrained by its proximity to settlements, including the large village of Skellingthorpe, mineral workings in the area being restored to water, deciduous woodland surrounding and within the zone of several designated heritage assets including the Grade I listed Doddington Hall and its associated Grade II* park and gardens. The least constrained zone (Zone A) was recommended for further consideration as the preferred location for the Scheme. This zone included land to the east and south-east of Gainsborough, which the Principal Site is located within. These results are set out in **Table 4-3** below.

Table 4-3 RAG assessment of potential development zones

Indicator	Potential Development Zone A	Potential Development Zone B	Potential Zone C
Zone Size (ha)	5,660	1,927	1,543
Zone Description	<p>Zone A is an area of land, primarily comprised of agricultural fields and farmsteads with vegetation including hedges and trees. It is located in the north eastern and eastern extents of the area of search. The zone's northern extent is to the east of the town of Gainsborough and the zone surrounds the villages of Corringham, Springthorpe, Sturgate and Heapham to the east/south east of Gainsborough. The A631 runs east of Gainsborough through the zone. The zone's central and southern extents are situated to the east of the River Till and the west of the settlements of Fillingham, Ingham, Cammeringham, Brattleby, Aisthorpe and Scampton situated along the</p>	<p>Zone B is an area of land primarily comprised of agricultural fields and farmsteads with vegetation including hedges and trees. It is located in the eastern extent of the area of search and the majority of its western boundary follows the Gainsborough to Lincoln Railway line and River Till to the east. The zone's northern boundary is the B241 which connects the village of Lea with the village of Kexby. The northern part of the zone is located west of the village of Willingham by Stow. The southern part of the zone is located to the north of the village of Saxilby and south of the A1500. The central part of the zone surrounds a number of villages including Sturton by Stow, Stow and Ingleby The Fossdyke Navigation canal runs along the zone's western</p>	<p>Zone C is an area of land primarily comprised of agricultural fields with vegetation including hedges and trees. It is located in the south eastern extent of the area of search and the eastern boundary follows the A46 on the periphery of the City of Lincoln. The zone is immediately south west of the large village of Skellingthorpe and east of the village of Harby. To the south west are the small villages of Eagle and North Scarle and Doddington is in the centre of the Zone. Doddington also includes a number of woodlands including the 93ha Old Wood (ancient Woodland) and Doddington Clay Woods (SSSI). On the opposite side of the A46 to the east of Zone C is the residential district known as Birchwood and an industrial/retail site off Doddington Road.</p>

Indicator	Potential Development Zone A	Potential Development Zone B	Potential Zone C
	<p>B1398. The majority of the zone is located to the north of Till Bridge Lane (A1500) Immediately to the north of the A1500 the zone surrounds the hamlet of Thorpe in the Fallows. An area of the zone situated to the south of the A1500 is west of North Carlton and South Carlton. The Zone also incorporates an airfield at Sturgate. RAF Scampton is approximately 1.5km (as the crow flies) to the east of the zone beyond the village of Aisthorpe. Mapping suggests that a network of drainage channels is present throughout the zone.</p>	<p>boundary. Mapping suggests that a network of drainage channels is present throughout the zone. The Stow petroleum storage depot is located adjacent to the zone's western boundary close to Stow.</p>	

Indicator	RAG Justification	RAG Justification	RAG Justification
Ecology and Biodiversity	<p>There are no internationally designated sites adjacent to or in close proximity of the zone. Lea Marsh Site of Special Scientific Interest (SSSI) is approximately 4.8km west of the northern</p>	<p>There are no internationally designated sites adjacent to or in close proximity of the zone. Lea Marsh Site of Special Scientific Interest (SSSI) is approximately 3km north west of the northern extent of the zone and the zone</p>	<p>The zone is located in close proximity to the Doddington Clay Roads SSSI located in the centre of this zone, north of the village of Doddington. This is cited as two woodlands which are managed as high forest and are in a neglected state from a commercial forestry</p>

Indicator	Potential Development Zone A	Potential Development Zone B	Potential Zone C
	<p>extent of the zone and the zone falls within the 5km impact zone for this SSSI.</p> <p>Within the zone is a linear local wildlife site Willingham to Fillingham Road Verges which is located to the north of Fillingham Lane east of Willingham on Stow. Upton Grange Road Verges. Local Wildlife Site is also within the zone to along Cow Lane approximately 2km east of Upton.</p> <p>There are small pockets of woodland throughout the zone which are deciduous woodland, a priority habitat. Mapping indicates that a network of drainage channels is present throughout the zone which fragment the area and may provide habitat for ecological species such as aquatic species and riparian mammals.</p>	<p>falls within the 5km impact zone for this SSSI.</p> <p>The southern tip of the zone at Saxilby is approximately 4.9km to the north of the Doddington Clay Woods SSSI and therefore just within the 5km impact zone for this SSSI. This is cited as two woodlands which are managed as high forest and are in a neglected state from a commercial forestry perspective. Both woodlands support mainly native trees with small-leaved lime a key component.</p> <p>There are no local wildlife sites within the zone. There are small pockets of woodland mainly in the north of the zone and close to the railway line to the west.</p> <p>A Wetland Opportunity Area runs along the River Till which is along the eastern boundary of</p>	<p>perspective. Both woodlands support mainly native trees with small-leaved lime a key component. The zone is therefore within the SSSI impact risk zone.</p> <p>To the north of the zone is the Skellingthorpe Big Wood (a Site of Nature Conservation Interest 2018-2019 GLNP) and Old Wood which is an Ancient Woodland. Both directly adjoin the zone boundaries to the north.</p> <p>In addition to the designated woodland there are a number of areas of deciduous woodland within and surrounding the zone which would likely provide habitat to ecological receptors.</p> <p>The area around Swinethorpe to the east of the zone is identified as priority habitat for coastal and floodplain grazing marsh. Whereas land surrounding Doddington is identified as Woodpasture and Parkland Biodiversity Action Plan Priority Habitat.</p>

Indicator	Potential Development Zone A	Potential Development Zone B	Potential Zone C
	<p>There are biodiversity opportunity areas identified on the Central Lincolnshire Local Plan policy map. These include multiple but small areas of Natural and Seminal Green Space (Not identified as publicly accessible) distributed across the zone. A small area of the zone immediately north and south of the A1500 falls into the priority area for wetland opportunities. A Wetland Opportunity Area associated with the River Till is adjacent to the western boundary of this zone in the south and at Willingham by Stow. A Strategic Green Access Link (linear feature) is close to the eastern boundary of this zone and is west of the villages that are located along the B1398.</p> <p>The zone is large enough to avoid direct impacts on</p>	<p>this zone and may provide habitat for aquatic species. Mapping indicates that a network of drainage channels is present throughout the zone which fragment the area and may provide habitat for ecological species such as aquatic species and riparian mammals.</p> <p>There appear to be no significant constraints to developing the zone with respect to biodiversity.</p>	<p>The zone is also covered by a designation for Mosaic Heath Wet Wood Opportunity Area within the Central Lincolnshire Local Plan Policies Map. As such there is a desire to improve this habitat type within this location.</p> <p>There are therefore several constraints associated with developing this zone with respect to biodiversity.</p>

Indicator	Potential Development Zone A	Potential Development Zone B	Potential Zone C
	<p>these features and can incorporate them into the SEF design.</p>		
Landscape and Visual	<p>There are no nationally designated protected landscapes adjacent or in close proximity of the zone.</p> <p>An Area of Great Landscape Value (AGLV) is situated adjacent to the north west of the potential development zone and to the east of Gainsborough as designated within the Central Lincolnshire Local Plan. There is also an Area of Great Landscape Value running north-south alongside the eastern boundary of this zone from Fillingham to South Carlton. Views from these areas into the zone are likely to be important / sensitive.</p> <p>The majority of the zone is located within the Trent and</p>	<p>There are no nationally designated protected landscapes adjacent or in close proximity of the zone.</p> <p>An Area of Great Landscape value is situated adjacent to the west of the potential development zone beyond the railway line as designated within the Central Lincolnshire Local Plan. Views from this designated area into the zone are likely to be important/sensitive.</p> <p>This zone is located within the Trent and Belvoir Vales National Landscape Character Area No. 48. NCA 48 is described as being “characterised by undulating, strongly rural and predominately arable farmland, centred on the River Trent. A low-lying rural landscape with relatively little woodland cover,</p>	<p>There are no nationally or locally designated protected landscapes adjacent or in close proximity of the zone.</p> <p>This zone is located within the Trent and Belvoir Vales National Landscape Character Area No. 48. NCA 48 is described as being “characterised by undulating, strongly rural and predominately arable farmland, centred on the River Trent. A low-lying rural landscape with relatively little woodland cover, the NCA offers long, open views.”</p> <p>There are a number of public rights of way (PRoW) within the zone and due to the flat topography of the surrounding area are likely to see the proposed SEF unless suitable screening is adopted.</p> <p>There are a number of villages including large settlements which are located immediately adjacent to this zone and would therefore have close views of the</p>

Indicator	Potential Development Zone A	Potential Development Zone B	Potential Zone C
	<p>Belvoir Vales National Landscape Character Area No. 48 with the eastern edge of the zone falling within the Northern Lincolnshire Edge with Coversands No.45.</p> <p>NCA 48 is described as being “characterised by undulating, strongly rural and predominately arable farmland, centred on the River Trent. A low-lying rural landscape with relatively little woodland cover, the NCA offers long, open views.”</p> <p>NCA 45 is described as being “a ridge of Jurassic limestone running from Lincoln to the Humber Estuary. The scarp slope rises prominently from adjacent lowlying land, forming the Edge or Cliff, and giving panoramic views out, in particular to the west.” This is consistent with the AGLV located east of the zone.</p>	<p>the NCA offers long, open views.”</p> <p>There are a large number of public rights of way (PRoWs) within the built up areas excluded from the zone. Those PRoWs that cross through the zone and due to the flat topography of the surrounding area are likely to see the proposed SEF unless suitable screening is adopted. PROW which cross the zone include south west of Sturton by Stow and there is a bridleway west of Stow.</p> <p>The central part of the zone surrounds a number of villages including Sturton by Stow, Stow and Ingleby. There would therefore be close views of the development if located close to these settlements. The larger village of Saxilby is located adjacent to the south of the</p>	<p>zone including Skellingthorpe, Harby and Doddington.</p>

Indicator	Potential Development Zone A	Potential Development Zone B	Potential Zone C
	<p>There are a large number of public rights of way (PRoW) within the built up areas excluded from the zone. Some of these cross through the zone and due to the flat topography of the surrounding area, it is likely the development will be visible from these paths unless suitable screening is adopted. These include routes out from Ingham to Coates and north to Fillingham and PRoW and bridleways around Cammeringham and Thorpe in the Fallows.</p> <p>There are a number of villages which are located immediately east of this zone and would therefore have close views of the zone, this includes Fillingham, Ingham, Cammeringham, Brattleby, Aisthorpe and Scampton. The northern part of the zone also surrounds Corringham, Sturgate and Springthorpe</p>	<p>zone. Buffering and screening would therefore be required.</p>	

Indicator	Potential Development Zone A	Potential Development Zone B	Potential Zone C
	<p>and is east of Upton with the potential for views from these locations too. The zone's size does however allow the location of the SEF to be buffered from these settlements.</p>		
Land Uses	<p>The zone is mainly rural and in agricultural use with a number of farmsteads dispersed across the area as shown by aerial mapping.</p> <p>It is wholly within land classified as agricultural land Grade 3, the majority of which has a moderate likelihood of Best and Most Versatile agricultural land although there are pockets of low likelihood in the southern and central extents of the zone. Other small businesses exist and are dispersed throughout including equestrian uses.</p> <p>Sturgate Airfield is located within the zone and RAF</p>	<p>The zone is mainly rural and in agricultural use with a number of farmsteads dispersed across the area as shown by aerial mapping.</p> <p>It is wholly within land classified as agricultural land Grade 3 with a moderate likelihood of Best and Most Versatile agricultural land. Other small businesses exist and are dispersed throughout including equestrian uses.</p> <p>The Central Lincolnshire local plan policies map does not indicate any significant allocations for development which are within the zone. There are no minerals and waste</p>	<p>The zone is mainly rural and in agricultural use with a number of residential villages and woodland dispersed across the area as shown by aerial mapping.</p> <p>It is wholly within land classified as agricultural land Grade 3. The majority has a moderate likelihood of Best and Most Versatile agricultural land. There are pockets of land dispersed throughout the zone which are considered low likelihood of Best and Most Versatile agricultural land.</p> <p>The Central Lincolnshire local plan policies map includes designations of natural and semi natural greenspace which are within the site boundary. There are also a number of Housing and Employment Land designations within</p>

Indicator	Potential Development Zone A	Potential Development Zone B	Potential Zone C
	<p>Scampton is situated approximately 1.5km east, beyond the B1398. Therefore, potential glint and glare upon operations at these airfields from the solar panels will need to be considered.</p> <p>The Central Lincolnshire local plan policies map does not indicate any significant allocations for development which are within the zone. There are no minerals and waste allocations within the zone.</p> <p>The zone is wholly within an area classified as a Petroleum Exploration Development Licence Block identified on the Central Lincolnshire Local Plan Policies maps which means oil and gas companies awarded the licence within the zone can carry out exploration activities subject to gaining planning permission. There is a coal bed methane well and</p>	<p>allocations within the zone. There is an allocation for residential development adjacent to the northern boundary of Saxilby which would be adjacent to the zone.</p> <p>The zone is wholly within an area classified as a Petroleum Exploration Development Licence Block identified on the Central Lincolnshire Local Plan Policies maps which means oil and gas companies awarded the licence within the zone can carry out exploration activities subject to gaining planning permission. Stow Park Petroleum depot appears to be immediately west of the zone, south of the A1500.</p> <p>There is a Sand and Gravel Mineral Safeguarding Area east of the Sturton by Stow which is within the eastern section of the zone.</p> <p>There are a number of public rights of way clustered around</p>	<p>Doddington (514, 512, 511) adjacent to the site as well as around Skellingthorpe (195, 196, 194).</p> <p>The zone is wholly within an area classified as a Petroleum Exploration Development Licence Block identified on the Central Lincolnshire Local Plan Policies maps which means oil and gas companies awarded the licence within the zone can carry out exploration activities subject to gaining planning permission.</p> <p>The majority of the zone is also within a Sand and Gravel Mineral Safeguarding Area. Aerial mapping appears to show existing mineral workings within the zone to the south of the village of Eagle. Other mineral workings close to the zone appear to have been restored to water bodies and therefore it could mean areas of the zone may not be developable due to post mineral working water bodies.</p> <p>There are several public rights of way including bridleways crossing the zone east to west connecting the villages of</p>

Indicator	Potential Development Zone A	Potential Development Zone B	Potential Zone C
	<p>oil and gas well located west of Scampton as shown by oil and gas agency mapping.</p> <p>Small areas east of Willingham by Stow and Sturton by Stow; south of Upton and around Corringham in the north are Sand and Gravel Safeguarding Areas. There is also a safeguarded area to the south of the zone and an area of search for sand and gravel west of South Carlton.</p> <p>There are a large number of PRow which are clustered around the settlements of Fillingham, Ingham. PRow Stow/83/1 crosses the zone from Ingham to Coates where there is a scheduled monument; TLF/31/2 is within the zone north of Thorpe in the Fallows. In addition, PRow number Gltw/85/1 runs through the zone (2km west of Fillingham)</p>	<p>the villages of Sturton by Stow and Stow in the central area of the zone There are two public rights of way that appear to cross the zone south west of Sturton by Stow – south of the A1500. These are Stur 75/1 and Stur 75/2. There are also cemeteries on the western edges of Willingham by Stow, Stow and Sturton by Stow.</p> <p>Within the south western section of the zone there is extant planning permission for Application No. 1285593: proposed siting of 1no. 36.4m high wind turbine. Granted with time limit and conditions on the 26/07/2012. Whilst this small-scale wind turbine scheme was granted permission in 2012 it is not evident from aerial mapping whether the turbine is constructed and operational. If there is an operational turbine within this zone a buffer distance around the infrastructure and</p>	<p>Harby, Doddington, Eagle, Whisby and Skellingthorpe. These include Broa/1/1, Dodd/4/1, Dodd/5/2, Skel/5/1, Skel/6/1, Dodd/7/2, Dodd/6/1.</p> <p>There are no extant planning permissions which would appear to conflict with the SEF which are known to be within the zone.</p>

Indicator	Potential Development Zone A	Potential Development Zone B	Potential Zone C
	<p>travelling south of Glentworth Grange towards Glebe Farm. This PRoW links with Fill/85/1 and Fill/767/1. PRoW are also clustered around Brattleby, Aisthorpe and Scampton. Several public footpaths and bridleways surround the settlements of North Carlton and South Carlton and run through the zone. Users of the PRoW crossing the zone would likely have uninterrupted views of the proposed development within this zone and suitable buffers along with landscape planting would likely be required.</p> <p>There are no extant planning permissions which would appear to conflict with the SEF with exception of the potentially the following: Application No. 13746462: Request for a screening opinion for proposed solar farm and associated development. Confirmation</p>	<p>access provisions to it would need to be maintained.</p> <p>There are no other extant planning permissions which would appear to conflict with the SEF which are known to be within the zone. Application No. 13432324: Planning application for the installation of pressurised oil pipeline. Granted with time limit and condition on the 01/07/2016. This development is located on land west of Stow Park Petroleum depot which is immediately west of the zone south of the A1500.</p> <p>On some OS mapping there appears to be solar development indicated in the southern part of the zone north of Stow Park Road however searches of the planning portal and aerial mapping do not show this.</p> <p>The zone surrounds a number of settlements including Sturton by Stow, Stow and Ingleby and is</p>	

Indicator	Potential Development Zone A	Potential Development Zone B	Potential Zone C
	<p>that EIA not required on the 16/03/2018. This is on land between School Lane and A631 north east of Springthorpe and is within the zone. There is no evidence of a subsequent planning application having been made.</p> <p>The zone has few settlements it surrounds with the exception of Springthorpe, Sturgate and Corringham in the north west. There are settlements along the B1398 which are adjacent to the zone's eastern boundary.</p>	<p>located immediately north of Saxilby.</p>	
Cultural Heritage	<p>A1500 and A15 are Roman Roads and any improvements or new accesses off these roads may require consideration of their historical significance. The A15 runs alongside the eastern boundary of this zone whereas the A1500 runs</p>	<p>The A1500 is a Roman Road and passes through the centre of this zone any improvements or new accesses off these roads may require consideration of their historical significance.</p> <p>Designated heritage assets which are excluded areas but</p>	<p>Designated heritage assets adjacent to the zone include the following:</p> <ul style="list-style-type: none"> • Remains of preceptory, fish ponds and post medieval gardens at Eagle Hall scheduled monument to the south west of the zone • Moated site west of Church Road scheduled monument within Harby to the west of the zone

Indicator	Potential Development Zone A	Potential Development Zone B	Potential Zone C
	<p>through the southern part of this zone.</p> <p>Designated heritage assets which are excluded areas but within (surrounded by) the zone include:</p> <ul style="list-style-type: none"> • Coates medieval settlement and moated site scheduled monument • within settlement of Coates in the central area of the zone • Grade I Church of St Edith – within medieval settlement of Coates • Thorpe medieval settlement scheduled monument - Moated manorial complex immediately north west of Elm Tree Farm, Sturgate scheduled monument <p>Adjacent to the development zone are:</p>	<p>within (surrounded by) the zone include the following:</p> <ul style="list-style-type: none"> • Site of a college and Benedictine Abbey, St Mary's church scheduled monument within Stow in the central section of the zone. • Deserted village of north Ingleby scheduled monument in the southern section of the zone • the medieval bishop's palace and deer park scheduled monument at Stow Park – south of the A1500 – linear features are surrounded by the zone but moated site is adjacent to the west. The medieval deer park associated with the palace formerly occupied an area of about 275ha extending southwards from the moated site. The surviving remains of the park pale are protected in two areas, 1.5km and 1km to the south west and south east of the moated site respectively. However, those 	<ul style="list-style-type: none"> • Listed buildings are clustered around excluded settlement areas which includes several Grade I assets (outside the zone but located adjacent and therefore require setting considerations): <p>These include:</p> <ul style="list-style-type: none"> • Grade I listed Church of St Peter location within Doddington in the centre of the zone. • Doddington Hall Grade I listed building and Registered Park and Gardens Grade II* including walls and gates. • Gatehouse • The Jungle Grade II* located on Green Lane to the west of the zone. • Grade II listed buildings within Harby to the west of the zone. • Grade II listed buildings within Eagle to the south west of the zone - Grade II listed buildings within Scarle <p>Doddington Conservation is also surrounded by the central area of the zone.</p>

Indicator	Potential Development Zone A	Potential Development Zone B	Potential Zone C
	<ul style="list-style-type: none"> • Shrunken Village in South Carlton south east of this zone • Roman Villa West of Scampton Cliff Farm – to the east of this zone • Hermit Dam moated site (near Somerby) – to the north west of the zone • Gilby medieval settlement and cultivation remains, Corringham to the north west of this zone • Broxholme medieval settlement and cultivation remains to the south west of the zone and between 1.5-2km from the zone boundary <p>Listed buildings are clustered around excluded settlement areas which includes several Grade I assets (outside the zone but located adjacent and therefore require setting considerations):</p>	<p>areas not protected also form part of the setting and context of the monument and as such would require sufficient buffer and mitigation to address the setting of this monument.</p> <ul style="list-style-type: none"> • grade II listed buildings within Sturton by Stow, Stow <p>Adjacent to the north west corner of the zone is the site of Heynings Priory, Knaith a scheduled monument and grade II listed building.</p> <p>Notwithstanding other environmental constraints for this zone, whilst there are a number of listed buildings and scheduled monuments given the size of the zone it is likely that a sufficient buffer and mitigation could be incorporated to provide offsets to reduce impacts on their setting.</p>	<p>Notwithstanding other environmental constraints for this zone, whilst there are a number of listed buildings and scheduled monuments given the size of the zone it is likely that a sufficient buffer and mitigation could be incorporated to provide offsets to reduce impacts on their setting.</p>

Indicator	Potential Development Zone A	Potential Development Zone B	Potential Zone C
	<ul style="list-style-type: none"> • Grade I Church of St John the Baptist and Monson Mausoleum (South Carlton) – to the south east of this zone • Grade I Gateway at Scampton House farm in field to west of house Grade I Scampton – east of this zone - Church of St Lawrence Grade I Corringham – north west of this zone - North Carlton Hall Grade I – south east of this zone • Church of All Saints Grade I (Heapham) – north west of this zone <p>There are also a number of grade II and grade II* buildings including churches within nearby settlements.</p> <p>Conservation areas are also located to the east of the zone – Springthorpe Conservation area Fillingham Conservation</p>		

Indicator	Potential Development Zone A	Potential Development Zone B	Potential Zone C
	<p>area – Fillingham Castle Park and Gardens, Brattleby Conservation Area, South Carlton and Burton Conservation Areas.</p> <p>Whilst there are a number of listed buildings and scheduled monuments given the size of the zone it is likely that a sufficient buffer and mitigation could be incorporated to provide offsets to reduce impacts on their setting.</p>		
Access for construction traffic	<p>The zone is well served by the primary road network. The A631 runs west-east through the northern section of the zone and the A1500 which runs west to east through the southern extent of the zone. The A15 is approximately 2.9km east of the southern part of the zone.</p> <p>The B1398 lies to the east of the zone is fairly wide and straight although has a</p>	<p>The southern section of the zone is well served by the primary road network. The A1500 runs through central section of the zone and there is access to the A156 approximately 3km to the west. This does however need to cross the railway line but this is via a level crossing. Some parts of the A1500 are also lined with residential dwellings.</p> <p>The B1241 runs through the centre of the zone north to south</p>	<p>The zone is well served by the primary road network with the A46 directly adjacent to the east of the zone.</p> <p>The B1190 also runs through the centre of this zone however features a number of settlements along it which would result in construction traffic travelling past residential receptors.</p>

Indicator	Potential Development Zone A	Potential Development Zone B	Potential Zone C
	<p>number of settlements along it and so construction traffic would have to travel past residential receptors. Some parts of the A1500 are also lined with residential dwellings.</p>	<p>however has a number of settlements along it which would result in construction traffic travelling past residential receptors. Access to the northern section would be via the B1241 which has a bridge to cross the railway.</p>	
Field Shading	<p>There are dispersed trees and hedgerows within the zone however these are not considered to create significant shading across a large proportion of the zone.</p>	<p>There are dispersed trees and hedgerows within the zone however these are not considered to create significant shading across a large proportion of the zone.</p>	<p>There are areas of dense woodland including Old Wood and Doddington Clay Woods adjacent to the Zone and within the zone. Whilst these could provide screening opportunities they may also have the potential to cause shading on a proportion of the zone.</p>
Grid Connection	<p>A grid connection from the point of connection identified at Cottam would require the crossing of the River Trent, River Till, the railway line as well as several roads including the A156 east of Cottam.</p> <p>The closest point of the zone to Cottam Power Station as the crow flies is approximately</p>	<p>A grid connection from the point of connection identified at Cottam would require the crossing of the River Trent, railway line as well as several roads including the A156 east of Cottam.</p> <p>The closest point of the zone to Cottam Power Station as the crow flies is approximately 5km</p>	<p>A grid connection from the point of connection identified at Cottam would require the crossing of the River Trent as well as the A1133 and A57.</p> <p>The closest point of the zone to Cottam Power Station as the crow flies is approximately 8km and the connection would be in the north western extent of the zone.</p>

Indicator	Potential Development Zone A	Potential Development Zone B	Potential Zone C
	<p>9km and the connection would be via the southern extent of the zone.</p> <p>There is an option to connect into the southern part of the zone by using the disused railway out of Cottam which would provide a crossing of the River Trent and potentially the existing railway line however this would connect into the southern most section of the zone by crossing the River Till.</p> <p>Pylons and utilities apparatus present within and surrounding the zone indicate that electrical installations are possible with adequate mitigation.</p>	<p>and the connection would be in the southern extent of the zone.</p> <p>Pylons and utilities apparatus present within and surrounding the zone indicate that electrical installations are possible with adequate mitigation.</p> <p>The disused railway line which runs from Cottam enters the zone in the south west could be a potential linear connection route crossing the River Trent and the existing railway line although would still require crossing the A156 at this location.</p>	<p>Pylons and utilities apparatus present within and surrounding the zone indicate that electrical installations are possible with adequate mitigation.</p>

Indicator

**Potential Development
Zone A**

Potential Development Zone B

Potential Zone C

Terrains



There are areas of land within this zone which benefit from being of the same gradient and therefore a flat terrain which is ideal for the construction of solar arrays. In particular, the areas identified as pale green on land to the west and southern portion of



The land within this zone undulates (varying between 0-2% gradient). There are potential pockets of land of a similar terrain gradient and therefore not so undulating, towards the north and west of the zone.



The land within this zone varies between 0% and 2% gradient however the central zone is predominantly between 0-0.5% gradient and suitably flat land. Given the size of the zone this is unlikely to be a sufficient area to deliver the minimum area threshold for the solar energy farm.

Indicator	Potential Development Zone A	Potential Development Zone B	Potential Zone C
	 this zone have a gradient of 0-0.5%.		

Stage 5 – Identification of Principal Site within Zone A to form the basis of the DCO application

- 4.5.23 Stage 4 did not consider the availability of land with respect to landownership, which was also critical in bringing forward a large-scale solar Scheme. This exercise was subsequently undertaken and informed the location of the Principal Site now subject to this DCO application. The **Schedule of Negotiations and Powers Sought [EN010142/APP/4.4]** sets out the latest position at the time of submission with respect to land interests.
- 4.5.24 Following discussions with landowners within zone A and the need to identify a contiguous site to support good design, an initial area of land measuring approximately 2,600ha was identified to the south-east of Gainsborough for further consideration.
- 4.5.25 Preliminary constraints mapping was undertaken of this area informed by further desk-top exercises. The outcome of the constraints mapping is shown in **Figure 4-4** of the ES **[EN010142/APP/6.3]**. This included an initial consideration of landscape and visual effects based upon a walk-over and desk-top survey to define high to low-risk areas having regard to landscape and visual considerations. Areas of high risk were excluded from proceeding to the next stage due to concerns arising from potential environmental effects. This exercise also produced other buffers/exclusion zones in which solar development was not considered suitable within the 2,600ha area. This included consideration of dwellings and sensitive receptors, the setting of designated heritage assets, proximity to conservation area boundaries, existing woodland, rivers and streams and access. The buffers used were based on professional judgement and have been used for other similar large scale solar developments to inform site selection exercises. These buffer zones ensure that environmental effects are minimised and that features can be avoided/preserved/protected. The buffer/exclusion zones shown in **Table 4-3** were applied:

Table 4-4: Minimum buffer zones applied for Principal Site refinement

Layer/Feature/Constraints	Minimum buffer zone where possible
Trees	15m
Hedges	5m
Ponds	20m
Ancient Woodland	15m
National Forest	20m
Rivers, drains and streams	10m
Public Rights of Way	5m
Residential dwellings and commercial buildings	50m (Solar PV)
Residential dwellings and commercial buildings	250m (BESS, Solar Stations and substations)
Flood zone 3	The whole of Flood Zone 3 to be excluded with a 0m buffer applied

Layer/Feature/Constraints	Minimum buffer zone where possible
Designated Heritage assets	All to be excluded
Local Wildlife Sites	All to be excluded

4.5.26 The second stage of Stage 5 further iterated the early landscape and visual input to produce a RAG rating of field parcels. From this RAG assessment, a reduced Principal Site area of approximately 1,500ha was derived where areas of land suitable for development were identified. The RAG assessment considered:

- a. The visibility from key receptors;
- b. Identify roads and level of visibility/sensitivity of views;
- c. Review all Public Rights of Way (PRoW) within the Principal Site and those outside where there may be an appreciable view;
- d. Consideration of settlements and residential receptors;
- e. Consideration of Neighbourhood Plans (adopted and emerging);
- f. Consideration of heritage impacts;
- g. Cumulative effects with respect to other large-scale solar schemes nearby;
- h. Topography with particular consideration of the Lincoln Edge/The Cliff as an Area of Great Landscape Value;
- i. Identification of key landscape elements to inform landscape character assessment;
- j. Development of an access strategy; and
- k. Further development of offsets for ecology, water and landscape features.

4.5.27 The RAG assessment as shown in **Table 4-5** of the ES [EN010142/APP/6.3] resulted in the identification of lower risk areas within the approximate 1,500ha site search area to form the basis of the identification of the Order limits for the Principal Site. The site selection process and initial assessments of the Principal Site informed presentation material as part of the informal consultation held in July 2022. The format of the informal consultation and how this informed the design of the Scheme is set out in **Chapter 5** and **Appendix A** of the **Consultation Report** submitted alongside the DCO application [EN010142/APP/5.1]. The **Design and Access Statement** submitted alongside the DCO application [EN010142/APP/7.3] also sets out design evolution of the Scheme, which was informed by the planning and environmental constraints listed above.

Summary

4.5.28 The Applicant has identified land for the Principal Site which includes large flat fields in agricultural use owned by a small number of landowners.

4.5.29 In summary, the main reasons for selecting the Principal Site for the Scheme are:

- a. The Principal Site is within a suitable distance from the identified point of connection;
- b. Is not located within or close to internationally and nationally designated biodiversity sites and is not located within or close to areas of national designated landscape value;
- c. Is not located within designated Green Belt;
- d. Utilises significant amounts of non BMV agricultural land;
- e. Avoids direct physical impact on designated heritage assets;
- f. Is predominantly within Flood Zone 1 and at low risk of flooding;
- g. Has good transport access for construction being in close proximity to the A631 and B1398;
- h. Has topography which meets the requirements of the Scheme to efficiently generate significant amounts of electricity;
- i. Has limited land use conflicts in terms of displacement of existing non-agricultural businesses; and
- j. Is available to the Applicant during the period of construction and operation of the Scheme.

4.6 Site Selection for the Cable Route Corridor

- 4.6.1 As described in **Chapter 2: Scheme Location** of the ES [EN010142/APP/6.1], the Cable Route Corridor links the Solar PV Site sub-station B to the National Grid Cottam Substation.
- 4.6.2 A project inception meeting was held with the Planning Inspectorate on 11 July 2022. At this meeting, the Planning Inspectorate requested a discussion on collaboration with other developers who were also bringing forward other NSIPs in the locality. The Applicant confirmed that it was considering the potential for the sharing of the cable route corridor.
- 4.6.3 The Planning Inspectorate then hosted a multi-party meeting between the host local authorities and the Applicants of the other solar NSIP projects including the **Gate Burton Energy Park** [EN010131], the **Cottam Solar Project** [EN010133], the **West Burton Solar Project** [EN01032] and the **Tillbridge Solar Project** [EN010142] on the 30 September 2022. This meeting was held to discuss potential procedural arrangements in the running of each respective examination but to also consider environmental effects. At this point, Gate Burton, Cottam and West Burton confirmed that preferred cable routes had been agreed between the three projects to deliver a joint corridor for the three transmission cables. At this point, the Tillbridge Solar Project confirmed that it currently had a wider Cable Route Corridor than the other projects and some alternative routes for crossing the River Trent than the other developers were exploring. It was agreed that given that the Scheme was behind the programme of the other projects and that the other projects had already derived a preferred and shared cable route corridor that the Tillbridge Solar Project would need to iterate its Cable Route Corridor to align with the other projects to minimise impacts. At this point, the Applicant agreed to collaborate with the other developers to consider how

the Tillbridge Solar Project could interact with the projects within the already agreed shared corridor. The **Design and Access Statement** submitted alongside the DCO application [EN010142/APP/7.3] submitted in support of the DCO application sets out the full design evolution of the Order limits associated with the Cable Route Corridor from scoping to submission, including an explanation of any alternative routes considered and the reasons why these were discounted to derive the refined Cable Route Corridor forming the basis of this application.

4.6.4 **Table 4-5** below summarises the key criteria associated with determining the alignment of the Cable Route Corridor. The full design evolution of this, including where optionality was considered and assessed is set out in the **Design and Access Statement** submitted alongside the DCO application [EN010142/APP/7.3].

4.6.5 The main design consideration that has evolved as the Scheme has developed from inception to the DCO application stage, has been the refinement of the Cable Route Corridor so that it is a shared corridor with the other solar NSIP projects referred to in paragraph 4.6.3 above that are connecting to the National Grid Cottam Substation or sharing the Cable Route Corridor as cables connect proposed areas of solar PV such is the case with respect to the West Burton Solar Project. **Figure 4-6: Order Limits Changes following Statutory Consultation** of the ES [EN010142/APP/6.3] shows the Order limits of the Tillbridge Solar Project and how this overlaps with the cable route corridors of the other NSIP projects. Whilst each project will be considered on its own merits, collaborative working between each of the developers has been undertaken with the overriding objective to deliver a shared Cable Route Corridor that minimises environmental impacts should all of the DCOs be made.

4.6.6 This has included the refinement of access points so that these are shared where possible; co-ordination at strategic crossing points including the disused railway line at Cottam power station, the River Trent, the live railway crossing to the east of Marton; and the inter-relationship of the Cable Route Corridor in relation to the Solar PV sites associated with the other projects, in particular, the Cottam Solar Project.

4.6.7 In addition to achieving the objective of a shared cable route corridor, **Table 4-5** below sets out all other design considerations that informed the iteration of the Order limits associated with the Cable Route Corridor.

Table 4-5: Design considerations for selecting the Cable Route Corridor

Criteria	Considerations
Operational and engineering requirements	<ul style="list-style-type: none"> Point of connection at National Grid Cottam Substation; The inter-relationship of the Cable Route Corridor with the Order limits of the other solar projects;

Criteria	Considerations
	<ul style="list-style-type: none"> • Space requirements to ensure that the Cable Route Corridor is sufficiently flexible to allow all solar DCO projects to proceed if all DCOs are made balanced against the need to only include land that is necessary for the Scheme; • 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; • Consideration of access strategy during construction along the Cable Route Corridor and for deliveries of infrastructure using abnormal indivisible loads; • Space requirements to undertake works to lay the cable including jointing bays, construction compounds and haul roads; and • Exclusion of land proposed for PV panels as part of other solar NSIP projects as far as possible.
<p>Planning and environmental constraints¹</p>	<ul style="list-style-type: none"> • Cultural heritage designations (Scheduled Monuments, listed buildings, registered parks and gardens, conservation areas, consideration of historic environment record). The Scheme has considered direct impacts as well as potential harm on these sites associated with setting; and • Ecological designations (Ramsar sites, SSSIs, SPAs, SACs, National Nature Reserves (NNRs), Local Nature Reserves (LNRs) and LWSs. Only LWSs are located within or adjoining the Cable Route Corridor. The Scheme seeks to avoid and protect these where possible with a buffer distance of 20m applied to design work to initially address this. It was ascertained early within the design process that there are some linear LWSs that the Cable Route Corridor would need to cross with the ES needing to assess effects and measures to minimise impacts (refer to Chapter 9: Ecology and Nature Conservation of the ES [EN010142/APP/6.1]). • Landscape and visual including consideration of national designations including AONBs. No

¹ Drawn from national and local policy requirements

Criteria	Considerations
	<p data-bbox="684 255 1375 322">national designations fall within the Cable Route Corridor;</p> <ul data-bbox="647 338 1375 2024" style="list-style-type: none"><li data-bbox="647 338 1375 405">• Protection of veteran trees, ancient and important hedgerows;<li data-bbox="647 421 1375 533">• Protection of areas of National Forest with a buffer of 20m applied from the woodland edge to proposed works;<li data-bbox="647 548 1375 1489">• Avoid impacts to trees,, woodland (including ancient woodland)and hedgerows where possible and if impacts cannot be avoided to include measures to replace or reinstate following the completion of temporary works. Design considerations also included building in sufficient flexibility within the Cable Route Corridor Order limits to ensure that woodland would not be severed and to minimise the route crossing through hedgerows/wooded areas. Public Rights of Way (PRoW) impacts, including temporary diversions to be managed during construction through an Framework Public Rights of Way Management Plan submitted alongside the DCO application [EN010142/APP/7.16]. Flood Risk and Water Quality – the Cable Route Corridor passes through Flood Zones 2 and 3 associated with the River Trent around the National Grid Cottam Substation and some smaller extents associated with the River Till closer and within the Principal Site. There are no reasonable alternatives given the availability and capacity for the POC at the National Grid Cottam Substation, which is located within areas of high/medium flood risk;<li data-bbox="647 1505 1375 1684">• Sensitivity of watercourse crossings for the River Trent and River Till as main rivers. There are also a number of ditches that run through the Cable Route Corridor requiring crossing points;<li data-bbox="647 1700 1375 1879">• Setting out a strategy to ensure that Minerals Safeguarding Areas for sand and gravel are not sterilised as set out in the Planning Statement submitted alongside the DCO application [EN010142/APP/7.2].<li data-bbox="647 1895 1375 2024">• Consideration of water-borne and rail transport for the movement of construction materials to site as an alternative means of transport from road use;

Criteria	Considerations
	<ul style="list-style-type: none"> • Consideration of waste arising from the construction of the Cable Route Corridor following open trench and trenchless methods of construction; • Deriving suitable buffers from sensitive residential receptors from proposed construction works to protect residential amenity and ensure that significant adverse effects do not arise where possible; • Planning history – consideration of planning permissions approved for development within the Cable Route Corridor as discussed within the Planning Statement submitted alongside the DCO application [EN010142/APP/7.2]; and • Ensuring that the Scheme will not prejudice the future redevelopment of the former Cottam Power Station safeguarded for future residential / urban development within the emerging Bassetlaw Local Plan (Ref 4-22).
Other land use and land ownership constraints	<ul style="list-style-type: none"> • Minimising the number of affected landowners; • Following field edges where possible in order to minimise possible disturbance for the landowner when farming or using land for other purposes; and • Minimising crossing points with existing infrastructure as far as possible.

4.6.8 In applying the design considerations set out above, the Order limits associated with Cable Route Corridor has been designed to avoid, where practicable, sensitive receptors such as the LWSs, woodland, heritage assets and their setting, residential and commercial properties, and to minimise the number of affected land interests.

4.6.9 The **Design and Access Statement** submitted alongside the DCO application [EN010142/APP/7.3] sets out how and where the Order limits have been refined from scoping through to the ES stage. The Cable Route Corridor design has been refined and reduced in width as far as possible having regard to the space requirements along the route for up to four large-scale solar projects (Gate Burton Energy Park, Cottam Solar Project, West Burton Solar Project and the Tillbridge Solar Project) should all DCO's be made.

4.6.10 For the majority of the Cable Route Corridor, the width has been reduced down to 100m. The 100m wide construction working area is considered the maximum width of construction working area which may be required for the installation of cables associated with all of the NSIP projects to retain flexibility to deal with likely constraints. It is expected that the corridor width

would be reduced through micro siting as detailed designs are developed for all projects. For the purposes of environmental assessment, the working width for the Cable Route Corridor is 40m. With respect to an open trench scenario this allows space for all of the NSIP projects to lay their cables, the inclusion of a temporary haul road for access during construction, temporary drainage channels and storage for a proposed topsoil mound to stockpile excavated soil to be used to backfill trenches once the cable has been laid.

- 4.6.11 Part of the Cable Route Corridor is located in Flood Zone 3a. As discussed in section 3.5 of the **Planning Statement** submitted alongside the DCO application [EN010142/APP/7.2] in relation to site selection, a key consideration with respect to the siting requirements of solar schemes is their proximity to a grid connection point with sufficient capacity for the electricity generated. In terms of the Scheme, this grid connection is available at the National Grid Cottam Substation. This is located in Flood Zone 2 and is surrounded by areas of Flood Zone 3 (see fluvial flood risk map alongside the Order limits in **Figure 10-5** of **Chapter 10: Water Environment** of the ES [EN010142/APP/6.3]). Whilst alternative Cable Route Corridors were considered, these alternatives also included areas of the corridor within Flood Zone 3. Therefore, there are no available alternative routes that avoid Flood Zones 2 and 3. In addition, from the early inception of the Scheme, a shared Cable Route Corridor with the other NSIP projects located within this area was sought to minimise environmental effects. This demonstrates that there were no alternative routes at a lower risk of flooding other than the Cable Route Corridor. In policy terms, the Sequential Test has been applied. Section 6 of the **Planning Statement** submitted alongside the DCO application [EN010142/APP/7.2] sets out in full how the sequential test is applied, and the resultant Exception Test passed.
- 4.6.12 **Appendix 10-3: Flood Risk Assessment** of the ES [EN010142/APP/6.2] submitted in support of the application expands upon this confirming that long term flood risk resulting from the Cable Route Corridor is considered to be as existing, as the infrastructure would be buried throughout the Cable Route Corridor with no permanent above ground-built development. As previously stated, there are no alternative routes at a lower risk of flooding from any source to the point of connection.
- 4.6.13 In addition, the **Statement of Need** [EN010142/APP/7.1] and **Planning Statement** [EN010142/APP/7.2] submitted alongside the DCO application also explain how the Scheme would provide wider sustainability benefits to the community that outweigh the flood risk.

4.7 Alternative routes within the Cable Route Corridor

- 4.7.1 Due to the Cable Route Corridor being shared with other solar projects, there is a need to retain some flexibility to ensure that no one project prevents another project coming forward should all DCOs be made. The shared Cable Route Corridor also requires the extent of the Corridor in certain pinch points with other projects to retain some optionality. There are three proposed areas of optionality within the Cable Route Corridor that are accommodated by the Scheme, including:

- a. Two alternative routes at land to the south of Marton due to concerns associated with space for all four Schemes and concern associated with land acquisition rights that has emerged through the Gate Burton Energy Park examination;
 - b. Two alternative routes to land to the east of Marton due to the need to cross a live railway line using a trenchless crossing, to protect an existing woodland, to protect a gas pipeline owned by Uniper and where the Cottam Solar Project also crosses the railway line at this point; and
 - c. Two alternative routes to land to the east of Willingham-by-Stow where the eastern option is required to extend through the proposed Solar PV area of the Cottam Solar Project thereby retaining an alternative option to the west given this constraint.
- 4.7.2 These locations are shown in **Figure 4-7: Areas of retained optionality within the Cable Route Corridor** of the ES [EN010142/APP/6.3].
- 4.7.3 The environmental assessment of the Scheme, accommodating these areas of flexibility, is presented within the ES. **Chapters 6-18** of the ES [EN010142/APP/6.1] demonstrate that there are no likely significant residual effects as a result of the Scheme retaining these areas of flexibility. Any impacts would be controlled through standard mitigation measures applied within the **Framework Construction Environmental Management Plan (CEMP)** submitted alongside the DCO application [EN010142/APP/7.8].
- 4.7.4 Further information can also be found within the **Joint Report on the Interrelationships between the Nationally Significant Infrastructure Projects** submitted alongside the DCO application [EN010142/APP/7.6] submitted with this DCO application. This was submitted to inform the Gate Burton Energy Park, Cottam Solar Project and West Burton Solar Project examinations and has been refined and developed to inform this Scheme. This sets out the collaborative approach to the design of the shared Cable Route Corridor, mitigation measures proposed to minimise environmental effects and collaboration on access points.

4.8 Evolution of the Order Limits and Alternative Layouts within the Principal Site

- 4.8.1 The Scheme has undergone several stages of design evolution which has resulted in changes to its layout and the Order limits.
- 4.8.2 This process of design evolution has been informed by ongoing environmental assessments, engineering and design considerations, engagement with stakeholders and collaboration with the other developers bringing forward solar DCO projects within the area that connect to the National Grid Cottam Substation and to the National Grid West Burton Substation.
- 4.8.3 The purpose of this section is to summarise the evolution of the Order limits and the alternative layouts considered for the Scheme to date. **Table 4-6** below summarises the evolution of the Order limits and main design layout changes for the Principal Site. Further details of the design evolution of the Scheme can be found in the **Design and Access Statement** submitted

alongside the DCO application [EN010142/APP/7.3]. The following Figures provided in the ES [EN010142/APP/6.3] illustrate the changes in terms of land area:

- a. **Figure 4-8:** Scoping Boundary;
- b. **Figure 4-9:** PEI Report Boundary;
- c. **Figure 4-10:** Order limit changes following Statutory Consultation; and
- d. **Figure 4-11** – Comparison of Order limit changes from Scoping Boundary to ES stage.

Table 4-6: Evolution of the Order limits and main design layout iterations for the Scheme following the initial site selection process described in Stages 1 to 4 in Section 4.5 (Principal Site) and Sections 4.7 (Cable Route Corridor)

Stage	Order limits configuration and proposed layout	Consultation which influenced proposed layout at this stage	Design evolution
Non-Statutory Consultation Layout (July 2022)	<p>The boundary of the Principal Site consisted of a maximum extent of land measuring approximately 1,700ha. This included approximately 1,500ha as a contiguous site and a further 200ha of land specially for breeding bird mitigation located to the west of Springthorpe.</p> <p>Cable Route Corridor was approximately 16km in length and approximately between 1.8km and 0.6km in width connecting with the National Grid Cottam Substation. The Cable Route Corridor comprised two options around the village of Willingham by Stow.</p>	Discussions with landowners, local residents with properties adjacent to the Order limits and National Grid.	<p>The non-statutory layout was produced with data from desk based and preliminary environmental surveys. It was an initial boundary of land assembled by the Applicant for the Solar PV Site and Cable Route Corridor considering the site selection process that had previously been followed as set out in section 4.5. 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"> • Contiguous site to improve master planning and design and to minimise environmental effects; • The existence of large field sizes and contiguous blocks of land with existing screening to generate the output required; and • A wide Cable Route Corridor to provide flexibility.

Stage	Order limits configuration and proposed layout	Consultation which influenced proposed layout at this stage	Design evolution
EIA Scoping Layout (September 2022)	<p>The boundary of the Solar PV Site represented the maximum extent of land being considered at the EIA Scoping Stage. The Principal Site consisted of a single contiguous site, covering an area approximately 1,400ha.</p> <p>The Cable Route Corridor, approximately 16km long was presented as an initial search area with widths ranging from approximately 1.8km to 0.6km in width. The alternative option for the Cable Route Corridor to the north of Willingham by Stow was retained.</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, the Environment Agency and Historic England.</p> <p>Further site visits and meetings held with the occupiers of neighbouring properties.</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 and Cable Route Corridor taking account known planning and environmental constraints and other factors as discussed in Section 4.5. 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 included:</p> <ul style="list-style-type: none"> • Contiguous site to improve design and ability to minimise impacts; • 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 wide Cable Route Corridor to provide flexibility.
Statutory Consultation Layout (May 2023)	<p>Solar PV Site – Solar PV Site comprising approximately 1,400ha.</p>	<p>Discussions with landowners and other key stakeholders including National Grid;</p>	<p>The layout of the Solar PV Areas was developed as part of a strategic master planning process with the outcome of baseline ecology, landscape and visual, heritage, flood risk and access</p>

Stage	Order limits configuration and proposed layout	Consultation which influenced proposed layout at this stage	Design evolution
	<p>Interconnecting cable circuit to connect two onsite substations.</p>	<p>Network Rail; Lincolnshire County Council, West Lindsey District Council, Nottinghamshire County Council and Bassetlaw District Council planning officers; conservation officers and landscape consultants, Historic England, Railway Paths and the Environment Agency.</p>	<p>surveys and consultation feedback influencing this.</p>
	<p>Cable Route Corridor approximately 16km in length from the south-western edge of the Principal Site to its connection with the National Grid Cottam Substation. The Cable Route Corridor width varied along the route between approximately 350m and 1,400m in width.</p>	<p>EIA Scoping Opinion</p>	<p>At this stage, the Scheme incorporated the following design principles:</p> <ul style="list-style-type: none"> • Four points of access, three located along the A631 Harpswell Lane and one located on B1398 Middle Street to remove the need for construction vehicles using minor and unclassified roads; • Utilisation of existing farm tracks where possible for internal access tracks during construction of the Principal Site; • The arrangement of BESS and Solar Stations decentralised rather than in a centralised location; • The inclusion of two on-site sub-stations; • Where practical locating structures such as BESS, Solar Stations and on-site substations on non-BMV agricultural land; • Avoiding the location of BESS, Solar Stations and sub-stations within areas of highest flood risk (Flood Zones 2 and 3); • A minimum of 250m radius separation distance provided between residential properties and indicative locations of BESS, Solar Stations and on-site substations;
	<p>The PEI Report Boundary this stage is shown on Figure 4.5: Order Limits for Statutory Consultation of the ES [EN010142/APP/6.3] and the preliminary design is illustrated in Figure 3-1 of the PEI Report.</p>	<p>Non-statutory Consultation feedback</p>	

Stage	Order limits configuration and proposed layout	Consultation which influenced proposed layout at this stage	Design evolution
			<ul style="list-style-type: none">• Incorporation of the principles of an Framework Battery Safety Management Plan for BESS including access to water tanks in the event of a fire;• East-west tracking panel proposed;• Inclusion of areas of ecological enhancement retaining existing features and providing enhancements to retain and improve connectivity;• The provision of landscape mitigation for screening. Offsets (undeveloped buffers) from watercourses and ditches of at least 10m;• Provision of offsets (undeveloped buffers) from existing vegetation to ensure their retention of at least 10m from woodland, individual trees and hedgerows with trees and at least 5m from hedgerows without trees; and• Providing buffers around residential properties from the Solar PV Areas, with woodland mitigation where appropriate, but also cognisant of residents' appreciation of open views. These buffers vary from around 30m (where existing dense screening is in place) or more generally a minimum of 50m, up to around 300m.

Stage	Order limits configuration and proposed layout	Consultation which influenced proposed layout at this stage	Design evolution
Order limits and Application Layout (March 2024)	<p>The Order limits comprise approximately 1,350ha for the Principal Site and a Cable Route Corridor maintaining a 100m wide shared corridor where possible to allow space for several solar projects and allowing for micro-siting to avoid sensitive areas and site accesses.</p>	<p>Discussions with landowners and other key stakeholders.</p> <p>Statutory consultation feedback.</p> <p>Targeted consultation feedback.</p>	<p>Following Statutory and Targeted 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 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"> • Removal of field parcels within the north-eastern part of the Principal Site from the Order limits due to their proximity to designated heritage assets (Harpwell Hall Scheduled Monument (SAM) and St Chad’s church); • Removal of 11ha of Grade 3a BMV agricultural land from the Scheme; • Change to field parcel located within the south-east of the Principal Site from PV to ecological mitigation having regard to the setting of a designated heritage asset (Glentworth Hall); • Adjustments to the Order limits to reflect land referencing and landowner discussions; • Inclusion of two permissive paths to enhance recreational routes within the area;

Stage	Order limits configuration and proposed layout	Consultation which influenced proposed layout at this stage	Design evolution
			<ul style="list-style-type: none">• Introduction of special archaeological areas to retain potential archaeology in situ and to exclude development;• Changes to ecological mitigation areas to address the potential presence of great crested newts;• The protection of existing utility assets within the Solar PV Site – this involved providing a buffer where no development would exist;• The inclusion of additional landscape and ecological enhancement areas to provide connectivity for wildlife and to soften the Scheme between the Solar PV areas and the adjoining agricultural fields. This also serves to preserve the setting of designated heritage assets to the east of the Principal Site (Harpwell Hall and St Chad’s church; and• Removal of land from the Order limits within the western extent of the Principal Site following landowner discussions. <p><u>Cable Route Corridor</u></p> <ul style="list-style-type: none">• Reduction of the Cable Route Corridor to approximately 100m in width, with an approximate 40m wide temporary working area;

Stage	Order limits configuration and proposed layout	Consultation which influenced proposed layout at this stage	Design evolution
			<ul style="list-style-type: none">• Cable Route Corridor length now approximately 18.5km;• Optionality retained at three locations due to constraints associated with crossing Network Rail assets, utilities, the inter-relationship of the Cable Route Corridor with Solar PV associated with other developments (Cottam Solar Project) and landownership constraints;• The Order limits have been increased to the south of Torksey Ferry Road to allow sufficient working room for the laying of the Cable Route Corridor to the south of National Grid Cottam Substation, having regard to existing utility assets and to address EDF's response to statutory consultation as a landowner; and• Inclusion of additional land to the north of Willingham Road to allow sufficient working width for the construction of the cable.

Site Accesses

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:

Stage	Order limits configuration and proposed layout	Consultation which influenced proposed layout at this stage	Design evolution
			<ul style="list-style-type: none"> • Amended access strategy for construction of the Cable Route Corridor at National Grid Cottam Substation with the removal of construction vehicles coming through the village of Rampton to the west revised to all vehicles accessing the Cable Route Corridor via Cottam Road at this point in the Site; • Inclusion of additional highway extents to allow for public road improvements and the creation of temporary access points for the construction of the Cable Route Corridor; • New temporary access points along the Cable Route Corridor to ensure that access points are shared with other developers of large-scale solar projects in the area; • The Order limits have increased to include the roundabout at the junction with Middle Street and A631 to accommodate street works associated with Abnormal Indivisible Load (AIL) movements; and • Large areas of the Order limits within the Cable Route Corridor were removed to ensure that only land that is needed for the Scheme is included and to deliver a shared Cable Route Corridor with other developers to minimise environmental effects. The additions and reductions to the Order limits are shown in Figure 4-11: Comparison of Order limits

Stage	Order limits configuration and proposed layout	Consultation which influenced proposed layout at this stage	Design evolution
			Changes from Scoping Boundary to ES Stage of the ES [EN010142/APP/6.3]. The proposed landscape masterplan is provided in the Framework Landscape and Ecological Management Plan submitted alongside the DCO application [EN010142/APP/7.17] and the Design and Access Statement submitted alongside the DCO application [EN010142/APP/7.3].

4.9 Alternative Solar Design Technologies

- 4.9.1 As described in **Chapter 3: Scheme Description** of the ES [EN010142/APP/6.1], the parameters for 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 technological design options have been considered and preferred options taken forward in consideration of environmental effects, the Scheme's objectives and the need for optimal functionality.
- 4.9.2 The following sections summarise the alternative technologies considered throughout the design process.

Solar PV Panel Technology

- 4.9.3 The Solar PV Site comprises elements such as the solar PV panels and the Solar Stations in which transformers, switchgear and inverters are located.
- 4.9.4 At the EIA Scoping Stage and early stage of design development two types of solar PV panels and their electricity production were considered:
- 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. The typical panel height for this arrangement is between 2.5m to 3.5m above ground; and
 - 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 3.5m.
- 4.9.5 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. This compares to the changing orientation and height of east-west tracker panels. **Table 3-3** and **Plate 3-3** of **Chapter 3: Scheme Description** of the ES [EN010142/APP/6.1] illustrates that the maximum height of the tracker panel at full tilt would be 3.5m high reducing to 2.5m high when the PV panel is horizontal through tracking east to west. The tracking nature of the panel in terms of its maximum height moving between the maximum range of 2.5m to 3.5m would not likely have a greater potential impact in terms of landscape and visual amenity in the context of the Scheme. The fixed panels would have a fixed height of 3.5m above ground level thereby having the potential for increased landscape impacts.
- 4.9.6 The fixed south facing solar panels have a steeper energy output profile throughout the day, peaking at around 12:00-13:00, while it has significantly lower energy output during the peak demand hours in the morning and afternoon.

- 4.9.7 The preferred option taken forward to Statutory Consultation was the east-west single access tracker solar panels. These provide a lower panel height during most of the day and at night therefore potentially have a lower visual and landscape impact when compared to the other options.
- 4.9.8 The east-west trackers also maximise the irradiance levels by continuously tracking the Sun's trajectory throughout the day.
- 4.9.9 In addition, the east-west trackers can allow more flexibility to work around some environmental limitations which pose a physical constraint such as non-rectangular field shapes. East west tracking panels can be aligned with hedges and face different azimuths or slightly north or south in order to fit optimally within irregular field shapes whilst being able to track the sun.

DC-coupled and AC-coupled

- 4.9.10 There are two options available for the way in which PV panels can connect/couple with the BESS:
- a. **Option 1 – AC-coupled** which results in batteries being located within a centralised part of the Principal Site located away from the PV panels, or
 - b. **Option 2 – DC-coupled** which results in batteries being dispersed across the Principal Site adjoining the proposed Solar Stations and associated fields of PV panels.
- 4.9.11 In the majority of cases for UK solar developments to date, where solar schemes include BESS as associated development these are AC-coupled. This means that the BESS is sited within a single and centralised location within the site. Solar panels generate DC electricity that has to be transformed via an inverter into AC electricity before being stored in a battery inverter. AC coupling systems result in efficiency losses through inverting electricity from AC to DC or from DC to AC.
- 4.9.12 DC-coupled systems, work by the DC solar electricity flowing from the solar panels to a DC/DC converter that directly feeds into the battery. This removes the inversion of solar electricity from DC to AC and back again before the battery stores the electricity. With a DC-coupled system, any electricity the solar panels produce will be inverted only once from DC to AC as it flows from batteries to the National Grid Cottam Substation. This means that a DC-coupled system is more efficient than AC-coupled.
- 4.9.13 DC-coupled schemes result in BESS being dispersed across the Scheme sitting alongside the Solar Stations rather than being in a centralised location like the AC-coupled system. This will result in a more efficient scheme. The landscape and visual impacts associated with the AC-coupled and DC-coupled systems will also be different. The dispersal of the BESS, in a DC-coupled system, provides a greater opportunity to assimilate this infrastructure within the Principal Site. This is since a DC-coupled Scheme will comprise BESS and solar stations that are dispersed across the site on smaller areas than an AC-coupled Scheme which would contain BESS within one large area. With the BESS being sited amongst the PV panels it will be easier to screen it alongside proposed landscape and ecological mitigation for the Scheme. The fire risk is also reduced where lithium batteries are

proposed since in the event of a fire, it would be easier to contain the fire at smaller DC sites than if it broke out within a larger AC-coupled system where the BESS is centrally located within the Scheme.

Summary

- 4.9.14 The technical design of the Scheme has evolved during the pre-application phase of the DCO application exploring different PV panel arrangements, alternative battery technologies and using a DC-coupled system. The consideration and use of alternative technologies as part of the Scheme will improve its efficiency and capacity to generate energy, reduce fire risk and allow the inclusion of embedded design to reduce landscape and visual effects.

4.10 References

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