



# SUNNICA ENERGY FARM

EN010106

Volume 6

Environmental Statement

6.1 Chapter 4: Alternatives and Design Evolution

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and  
Procedure) Regulations 2009



Planning Act 2008

**The Infrastructure Planning  
(Applications: Prescribed Forms and  
Procedure) Regulations 2009**

**Sunnica Energy Farm**

**Environmental Statement**

**Chapter 4: Alternatives and Design Evolution**

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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 design evolution in relation to the Scheme.

### 4.2 Legislation, Policy and Advice Notes

4.2.1 Schedule 4 (2) of the Environmental Impact Assessment (EIA) Regulations (Ref 4-1) requires *“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”* to be presented in the ES.

4.2.2 National Policy Statement (NPS) EN-1 (Ref 4-2) paragraph 4.4.1 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 a proposed development is in the first instance a matter of law, detailed guidance on which falls outside the scope of this NPS’*. The NPS confirms that from a policy perspective there is no general requirement to consider alternatives or to establish whether a development represents the best option. However in paragraph 4.4.2 of NPS EN-1 it is noted:

- a. *applicants are obliged to include in their ES, as a matter of fact, information about the main alternatives they have studied. This should include an indication of the main reasons for the applicant’s choice, taking into account the environmental, social and economic effects and including, where relevant, technical and commercial feasibility;*
- b. *in some circumstances there are specific legislative requirements, notably under the Habitats Directive, for the IPC<sup>1</sup> to consider alternatives. These should also be identified in the ES by the applicant; and*
- c. *in some circumstances, the relevant energy NPSs may impose a policy requirement to consider alternatives (as this NPS does in Sections 5.3, 5.7 and 5.9)*

4.2.3 NPS EN-3 and NPS EN-5 are not considered to include any relevant policy on alternatives.

4.2.4 The Planning Inspectorate’s (PINS) Advice Note 7 sets out that PINS considers that a good ES is one that, amongst other things: *“explains the reasonable alternatives considered and the reasons for the chosen option*

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<sup>1</sup> The former Infrastructure Planning Commission (IPC), which was abolished in 2011. The Planning Inspectorate (PINS) are now the agency responsible for operating planning process for NSIPs, with the Secretary of State as the decision maker.

*taking into account the effects of the Proposed Development on the environment”.*

- 4.2.5 In light of the above, consideration of alternatives is necessary. The Scheme would be development that falls under the EIA Regulations and therefore consideration of alternatives is needed. There are also other specific legislative requirements and policy circumstances which require the consideration of alternatives. These include a requirement under the Habitats Directive, as transposed into UK law by the Conservation of Habitats and Species Regulations 2017, and also in relation to avoiding significant harm to biodiversity and geological conservation interests; flood risk; and development within nationally designated landscapes set out in sections 5.3, 5.7 and 5.9 of the NPS. Paragraph 4.4.3 states *‘where there is a policy or legal requirement to consider alternatives the applicant should describe the alternatives considered in compliance with these requirements’*. Paragraph 4.4.3 goes on to set out the principles that should guide the decision maker when considering the weight that should be given to alternatives.
- 4.2.6 Taking into consideration the policy and legal requirements as well as the iterative approach to the design to date, the following alternatives have been considered for the Scheme and are discussed in this chapter:
- a. alternative sites;
  - b. alternative technologies;
  - c. alternative design/layouts;
  - d. alternative cable route corridors; and
  - e. alternative locations for the extension to the Burwell National Grid Substation.
- 4.2.7 A ‘no development’ scenario as an alternative to the Scheme has not been considered further. This is because ‘no development’ is not considered to be a reasonable alternative to the Scheme as it would not deliver the additional electricity generation and electricity storage proposed. NPS EN-1 at paragraph 4.4.3 states *‘alternative proposals which mean the necessary development could not proceed can be excluded on the grounds that they are not important and relevant to the IPC’s (now Secretary of State) decision.’*
- 4.2.8 A ‘smaller development’ as an alternative to the Scheme has also not been considered further, as NPS EN-1 at paragraph 4.4.3 states that the decision maker: *“...should be guided in considering alternative proposals by whether there is a realistic prospect of the alternative delivering the same infrastructure capacity (including energy security and climate change benefits) in the same timescale as the proposed development”*. A smaller scheme would not deliver the same generation capacity or energy security and climate change benefit as the Scheme, and as such would not represent a reasonable alternative. A Need Statement has been submitted

with the DCO Application [EN010106/APP/7.1] which addresses the need for the Scheme at the size it is.

### 4.3 Stakeholder engagement

- 4.3.1 The Applicant has carried out statutory consultation in accordance with the PA 2008 which is described in detail in the Consultation Report submitted as part of the DCO application [EN010106/APP/5.1-5.2].
- 4.3.2 **Table 4-1** summarises the matters raised in relation to alternatives at the statutory consultation stage.

**Table 4-1: Matters raised in relation to alternatives at the statutory consultation stage**

Consultee	Main matter raised	How has the matter been addressed
<p>West Suffolk Council, East Cambridgeshire District Council, Suffolk County Council and Cambridgeshire County Council s.42 consultation response</p>	<p>The Councils expect to see a comparison to other energy generation technologies. It is appropriate to consider how alternative schemes using the same technology may have different acceptability depending on the scale of development.</p> <p>This includes considering the impact of multiple smaller sites generating the same total output as the proposed Scheme.</p>	<p>The consideration of alternative generation technologies is discussed in section 6.3 of the <b>Statement of Need [EN010106/APP/7.1]</b> This identifies that there is a need for solar to complement other energy technologies particularly in relation to diversifying renewable generation sources to maintain adequacy of supply and minimise disruption. Other energy technologies would not therefore be alternatives as solar is necessary to meet the renewable energy mix.</p> <p>The Applicant does not consider that multiple smaller sites are a reasonable alternative to the Scheme. The <b>Statement of Need [EN010106/APP/7.1]</b> explains that large single solar assets bring carbon savings and economic benefits in line with government policy, versus developing combinations of smaller independent schemes. Larger singular schemes attract some cost efficiencies as a result of their increased scale, for example unit procurement costs, or annual maintenance costs. Such efficiencies of scale are less apparent in smaller schemes. Small scale solar typically connects to the lower voltage distribution networks rather than the centralised network (connecting to the national grid - the high voltage transmission system). This means that the Scheme would maximise the supply of low-carbon power across the widest possible geography, which would not be the case with smaller schemes.</p>

Consultee	Main matter raised	How has the matter been addressed
<p>West Suffolk Council, East Cambridgeshire District Council, Suffolk County Council and Cambridgeshire County Council s.42 consultation response</p>	<p>While the Preliminary Environmental Information (PEI) Report sets out that a key consideration in relation to site selection was the chosen connection point at Burwell, it is unclear how a search radius of 15km from this point was arrived at.</p> <p>The Applicant should explain why land closer to Burwell Substation does not form part of the scheme, to negate the need for the installation of extensive connecting cables, and that the use of four separate sites is an efficient strategy given the additional connection work that will need to be undertaken.</p>	<p>The Applicant has followed a step by step process which confirms the location of the Scheme is suitable for a large scale solar farm.</p> <p>Details of the process are set out in <b>Appendix 4A Alternative Sites Assessment [EN010106/APP/6.2]</b> and includes the reasons for selecting the area of search from Burwell National Grid Substation and how suitable land within the area of search has been identified. The latter includes the process of excluding various planning and environmental constraints.</p> <p>The area of search is centred on the point of connection at Burwell Substation. All land within 15 km of the substation has been considered by the assessment presented in <b>Appendix 4A Alternative Sites Assessment [EN010106/APP/6.2]</b>.</p>
<p>West Suffolk Council, East Cambridgeshire District Council, Suffolk County Council and Cambridgeshire County Council's.42 consultation response</p>	<p>The PEIR fails to include two critical requirements for site selection in connection with the avoidance of areas that have an impact on residential areas and in respect of Sunnica East, the avoidance of an impact on The Brecks.</p>	<p>The Applicant has followed a step by step process which confirms the location of the Scheme is suitable for a large scale solar farm. This has included the avoidance of residential areas and The Brecks Special Protection Area in confirming site suitability and consideration of alternative sites.</p> <p>Details of the process are set out in <b>Appendix 4A Alternative Sites Assessment [EN010106/APP/6.2]</b>.</p> <p>The assessment in Chapter 6 to 16 of this Environmental Statement <b>[EN010106/APP/6.1]</b> do not identify any significant residual effects on residential receptors during operation, apart from visual effects; however, these are not considered significant after year 15.</p>
<p>S.42 statutory consultee - Isleham Parish Council</p>	<p>RAF Mildenhall should be considered as an alternative location for the Scheme</p>	<p>The RAF Mildenhall site has been considered as part of the Alternative Sites Assessment (see Appendix 4A, Table 3-1 <b>[EN010106/APP/6.2]</b>)</p>

Consultee	Main matter raised	How has the matter been addressed
S.47 statutory consultee		<p>This is currently an active military base, although the United States Visiting Forces in Europe have indicated their intention to withdraw from the site by 2024. The Ministry of Defence has also indicated that part of the site should be released for housing (Ref 4-3).</p> <p>The eastern section of this site falls outside the 15km area of search and is therefore not considered a viable distance from the grid connection, and the unconstrained area of the western section of the site is located too far away from other potential solar development areas.</p>
S.47 statutory consultee	Land north and south of the A11 should be considered as an alternative location for the Scheme	<p>This land has been considered as part of the <b>Alternative Sites Assessment</b> (see <b>Appendix 4A, Table 3-1 [EN010106/APP/6.2]</b>)</p> <p>Alternative locations north and south of the A11 have been considered as part of the Alternative Sites Assessment. These sites have been found to be subject to various constraints and are not obviously more suitable locations than the Sunnica Sites for a solar farm of the scale proposed.</p>
S.47 statutory consultee	E24/25/ E26/27/28/29 could be sited further from Worlington Village towards the A11, in the immediate field south and east of those numbered	<p>This land has been considered as part of the Alternative Sites Assessment (see <b>Appendix 4A, Table 3-1 [EN010106/APP/6.2]</b>). This identifies that the Scheme extends east of E24/E25/E26/E27/E28 and E29 as shown by proposed development areas E30, E31 and E32. Further east of the A11 at this location is Grade 3 Agricultural land which would not therefore be identified as unconstrained land following the Stage 2 mapping sift set out in the alternative sites assessment. An explanation of the methodology and stages of the alternative sites assessment is set out by <b>Appendix 4A Alternative Sites Assessment [EN010106/APP/6.2]</b>.</p> <p>The assessment in Chapter 6 to 16 of this Environmental Statement <b>[EN010106/APP/6.1]</b> do not identify any significant residual effects on Worlington Village during operation.</p>
S.47 statutory consultee	Land above Fordham Moor should be	This land has been considered as part of the Alternative Sites Assessment (see



Consultee	Main matter raised	How has the matter been addressed
	considered as an alternative	<b>Appendix 4A, Table 3-1 [EN010106/APP/6.2].</b> This identifies that this land is the land north of Fordham, the majority of which is Grade 2 Agricultural land with some areas of Grade 1 and Grade 3 land. This land would not therefore be identified as unconstrained land following the Stage 2 mapping sift set out in the alternative sites assessment. An explanation of the methodology and stages of the alternative sites assessment is set out by <b>Appendix 4A Alternative Sites Assessment [EN010106/APP/6.2].</b>
S.47 statutory consultee	Non-food producing land such as heathland e.g. The Elvin Estate should be considered as an alternative location for the Scheme	It is not clear where the Elvin Estate is located following searches for this location. Heathland is typically ecologically and hydrologically sensitive land that would normally be avoided by solar developers due to the likelihood of resulting in significant effects on the environment. Any non-food producing land within the area of search has been considered as part of the Alternative Sites Assessment (see <b>Appendix 4A, Table 3-1 [EN010106/APP/6.2].</b> The assessment seeks to avoid best and most versatile agricultural land when considering alternatives to the Scheme location.
S.47 statutory consultee	The Fens should be considered as an alternative location for the Scheme	The Fens is designated as a Ramsar site, Special Area of Conservation, Special Protection Area, European Marine Site, Site of Special Scientific Interest, National Nature Reserve and Local Nature Reserve and therefore has been excluded as land suitable for the Scheme.
S.47 statutory consultee	Smaller scale development along the A11 and A14 should be considered as an alternative location for the Scheme	This land has been considered as part of the Alternative Sites Assessment (see <b>Appendix 4A, Table 3-1 [EN010106/APP/6.2].</b> This identifies that Parts of the land along the A11 and A14 have been identified as Grade 3 Agricultural land which would not therefore be identified as unconstrained land following the Stage 2 mapping sift set out in the alternative sites assessment. An explanation of the methodology and stages of the alternative sites assessment is set out by <b>Appendix 4A Alternative Sites Assessment [EN010106/APP/6.2].</b>

Consultee	Main matter raised	How has the matter been addressed
S.47 statutory consultee	Land between Fordham and Burwell/ closer to Burwell should be considered as an alternative location for the Scheme	This land has been considered as part of the Alternative Sites Assessment (see <b>Appendix 4A</b> , Table 3-1 <b>[EN010106/APP/6.2]</b> ). The majority of land between Fordham and Burwell has been identified as Grade 2 Agricultural land with some areas of Grade 3 land and therefore would not be identified as unconstrained land following the Stage 2 mapping sift set out by <b>Appendix 4A Alternative Sites Assessment [EN010106/APP/6.2]</b> .
S.42 statutory consultee - Isleham Parish Council  S.47 statutory consultee	Car parks and roof tops/brownfield land/commercial properties should be considered as an alternative location for the Scheme	The <b>Statement of Need [EN010106/APP/7.1]</b> explains the reasons for the Scheme being large scale solar generation within section 9.3. It is not considered that small scale generation is an alternative to this rather it complements it.  A search for brownfield land has been undertaken as part of the <b>Alternative Sites Assessment</b> (see <b>Appendix 4A, [EN010106/APP/6.2]</b> )

## 4.4 Need for the Scheme

- 4.4.1 The case for the need for the Scheme is centred on its significant contribution to the three important national energy policy aims, which are:
- a. **Decarbonisation - achieving Net Zero by 2050 and the importance of urgently deploying zero-carbon generation assets at scale** - the Scheme will provide a large scale low carbon energy generating asset which is expected to be operational by 2025.
  - b. **Security of supply - geographically and technologically diverse supplies** - the Scheme will provide security of supply due to its large scale; direct connection to the National Electricity Transmission System, meaning the power it generates has national benefit; ability to complement other renewables, and the unique and efficient opportunity to integrate BESS.
  - c. **Affordability** - the Scheme will provide large scale generation at low cost which will provide value for money for end-use consumers.
- 4.4.2 The Scheme will therefore be a critical part of the development of the UK's portfolio of large scale solar generation required to decarbonise its energy supply quickly, and provide secure and affordable energy supplies.

- 4.4.3 The **Statement of Need [EN010106/APP/7.1]** accompanying the DCO application sets out a detailed compelling case for why the Scheme is urgently required at the location and scale proposed.
- 4.4.4 The Government, through the Climate Change Act 2008 (Ref 4-4), made the UK the first country in the world to set legally binding carbon budgets, aiming to cut emissions (versus 1990 baselines) by 34% by 2020 and at least 80% by 2050. This is to be achieved *‘through investment in energy efficiency and clean energy technologies such as renewables, nuclear and carbon capture and storage’* (Ref 4-5). In October 2018, following the adoption by the UN Framework Convention on Climate Change of the Paris Agreement, the Intergovernmental Panel on Climate Change (‘IPCC’) published a ‘Special Report on the impacts of global warming of 1.5°C above pre-industrial levels’ (Ref 4-6). This report concludes that human-induced warming had already reached approximately 1°C above preindustrial levels, and that without a significant and rapid decline in emissions across all sectors, global warming would not be likely to be contained, and therefore more urgent international action is required.
- 4.4.5 In response, in May 2019, the Government’s independent expert Climate Change Committee (CCC) published ‘Net-Zero: The UK’s contribution to stopping global warming’ (Ref 4-7). This report recommended that the UK Government extend the ambition of The Climate Change Act (2008) and that *“The UK should set and vigorously pursue an ambitious target to reduce greenhouse gas emissions (GHGs) to ‘Net-Zero’ by 2050, ending the UK’s contribution to global warming within 30 years.”* In June 2019, the Government announced the laying of a statutory instrument in Parliament, which amends the Climate Change Act 2008, in order to implement the Climate Change Committee’s recommendation into law, and the UK became the first major economy to pass laws to end its contribution to global warming by 2050.
- 4.4.6 Because electricity can be generated from low-carbon sources, the decarbonisation of non-electric sectors (transport, heat, industrial process, etc) will cause a significant increase in electricity demand. This means that the capacity of electricity generation in the UK must grow to meet that demand. Emerging energy vectors, such as hydrogen electrolysis and large scale electricity storage, are earmarked to enable the decarbonisation of traditionally hard-to-reach sectors, such as chemical processing and freight transport. The need for a significant growth in new low carbon generation assets, including well-proven renewable technologies such as wind and solar, is therefore clear.
- 4.4.7 Not only will new assets be required to meet additional anticipated demand, but they will also be needed to replace existing generation capacity, which is due to close over the next decade, either because of environmental regulation or technological lifetime limits.

- 4.4.8 A diverse renewable generation infrastructure (i.e. consisting of many different technologies) in the UK will play an important role in the resilience of the UK's electricity system from an adequacy and system operation perspective; diversity improves the resilience of low-carbon supplies against the uncertainty of when they will be generated. Solar is part of this diverse renewable mix.
- 4.4.9 In June 2020, the Climate Change Committee made recommendations for the Department of Business, Energy and Industrial Strategy to *“deliver plans to decarbonise the power system to reach an emissions intensity of 50 gCO<sub>2</sub>/kWh by 2030, with at least 40 GW of offshore wind and a role for onshore wind and large-scale solar power”*. The Department of Business, Energy and Industrial Strategy have accepted those recommendations and have announced the requirement for sustained growth in the capacity of solar in the next decade (Ref 4-8).
- 4.4.10 Large-scale renewable generation is already very competitive against other forms of conventional and low-carbon generation, both in the UK and more widely; and the UK already has successfully incorporated 36GW of wind and solar generation into its electricity mix (Ref 4-9).
- 4.4.11 The inclusion of electricity storage assets in this Scheme also provides a means of further enhancing the utility of the power generated by the Scheme by providing energy balancing capability and other services to support the operation of the National Electricity Transmission System.
- 4.4.12 The case is therefore clear for the need for solar generation capacity to be increased urgently.

## 4.5 Alternative Sites

- 4.5.1 The selection of the Scheme's location has followed a systematic step-by-step process. This process and confirmation of its suitability when considered against potential alternative sites is summarised in the following sections and set out in more detail in **Appendix 4A: Alternative Sites Assessment** of this Environmental Statement [EN010106/APP/6.2].

### **Stage 1 – Defining the area of search for potential large scale solar development**

- 4.5.2 Irradiation (sunlight) levels and topography are key factors when determining the location of solar development. Solar developments are currently found across the UK, however their efficiency is determined by the levels of irradiation at their location. In addition, topography is an important factor for locating solar development, with flat land being optimal for construction and less visually intrusive. It also limits the shading between arrays; provides opportunities for better screening of the development compared to sloping land; and enables the panels to be optimally configured for best production levels.

- 4.5.3 Given these key characteristics Sunnica Limited considers East Anglia to be an optimal region within UK to locate a large scale solar farm given its high levels of irradiation and its topography, which is predominantly made up of and characterised by large flat open land. In addition, East Anglia is well located to high demand centres for electricity (i.e. Cambridge and London) and therefore large scale solar development in this region will place the generation close to areas of high demand.
- 4.5.4 Following the identification of East Anglia, a search for a Point of Connection (POC) within this region was undertaken. This involved discussions with network operators to identify available capacity in the region. NPS EN-1 paragraph 4.4.3 states that when considering alternative proposals they should be commercially viable and physically suitable. In identifying a POC, the Applicant also took account of the proximity of existing National Grid substations to areas of lower grade agricultural land as planning policy seeks to direct development away from best and most versatile agricultural land. It also considered whether land was available to construct a large scale solar farm development. The availability of land was important as the UKPN requires the Applicant to demonstrate that there was agreement in principle for land to be used for a large scale solar farm in order to obtain a grid connection agreement.
- 4.5.5 This POC search identified Burwell as a location which has available capacity with reinforcement that could be completed within a reasonable timeframe and cost and is therefore deemed to be a suitable location to be the POC. The identification of Burwell as the POC narrows the area of search within East Anglia to within the vicinity of Burwell within which to locate a large scale solar development.
- 4.5.6 From the POC at Burwell a 15km radius is considered by Sunnica Limited to be the maximum viable distance for the area of search. This threshold was set based on an estimation of the maximum cost that would be viable for the Scheme to meet the target financial metrics. The cost estimate applied a distance factor to the 15km radius of 1.5\* assuming the cable would not run in a straight line and a set of industry assumptions for the cost of the infrastructure by units and distance. . It is also broadly consistent with industry standard practice.. **Figure 1 of Appendix 4A: Alternative Sites Assessment [EN010106/APP/6.2]** illustrates the area of search defined.

## **Stage 2 – Planning and environmental constraints mapping**

- 4.5.7 In order to identify potentially suitable areas for large scale solar development within the area of search, spatial constraints were identified following a review of planning and environmental policy objectives contained in the National Policy Statement EN-1: Overarching National Policy Statement for Energy (Ref 4-2), National Policy Statement for Renewable Energy Infrastructure EN-3 (Ref 4-10) National Policy Statement for Electricity Networks Infrastructure EN-5 (Ref 4-11), the National Planning Policy Framework (Ref 4-12), and where relevant, local planning

policy. This identified a number of spatial planning and environmental constraints which have been applied using GIS mapping across the area of search in order to narrow down the area of search and identify potential solar development search areas which are outside these constraints.

4.5.8 The following spatial constraints were mapped and excluded from further consideration:

- a. **Designated international and national ecological and geological sites** – Sites of Special Scientific Importance (SSSI), Special Areas of Conservation (SAC), Special Protection Areas (SPA), SPA protection buffer areas, Ramsar sites, and National Nature Reserves (NNR) have been identified in the search area and excluded.
- b. **Agricultural land classifications** – Planning policy seeks to minimise impacts on the best and most versatile agricultural land (defined as land in grades 1, 2 and 3a of the Agricultural Land Classification) and preferably use land that is not classified as best and most versatile (grades 3b, 4 and 5). The Scheme's proposed location has been determined through the exclusion of land that the best available data identifies as being within an agricultural land classification category that is, or includes, best and most versatile land. Through discussions with landowners, the Applicant understood that agricultural land across the Sites was unlikely to be of a high quality. Soil surveys were undertaken to validate this understanding. **Soils and Agricultural Baseline Report at Appendix 12B:** of the Environmental Statement [EN010106/APP6.2] has confirmed that 96.2% of the land within the Sites is not classified as best and most versatile land (50.3% grade 3b; 40.1% grade 4 and 5.8% non-agricultural use across the Sites). Only 3.8% of the land within the sites is classified as grade 3a and none is grade 2 or grade 1. Outside of the Sites, only national level data on agricultural land classification is available. Due to the way that this national level data is presented, grade 3 agricultural land cannot be distinguished as grade 3a and 3b on the mapping sift. Therefore land outside of the Site that is classified as grades 1,2 and 3 has been identified and excluded from the area of search since it is within a category that is, or could be, best and most versatile.
- c. **Urban areas** – Built up areas with a population of 10,000 or more residents have been identified and excluded from the area of search.
- d. **Greenbelt** – Greenbelt land has been identified and excluded from the area of search.

4.5.9 In addition to the above, the following spatial constraints were considered however have not been identified in the area of search:

- a. **Proposed designated international and national ecological and geological sites** - No proposed SPAs, proposed SACs or listed Ramsar have been identified in the area of search.

b. **Nationally designated landscapes** – No Areas of Outstanding Natural Beauty or National Parks have been identified in the area of search.

4.5.10 **Figure 2 of Appendix 4A: Alternative Sites Assessment** of this Environmental Statement [EN010106/APP/6.2] illustrates the planning and environmental spatial constraints within the search area and **Figure 3 of Appendix 4a** shows the areas of unconstrained land following the exclusion of these constraints.

### **Stage 3 – Identification of potential solar development areas**

4.5.11 Stage 3 of the assessment has applied key operational criteria for large scale solar development - site size and land assembly; and site topography to further refine the unconstrained areas identified at Stage 2.

4.5.12 Large areas of land are ideal for large scale solar development as they have less vegetation to be removed for efficient installation of the solar infrastructure. This also reduces the amount of buffering required for tree root protection, avoidance of shading compared to small fields and can reduce the solar development's impact on vegetation such as hedgerows and trees. Flat land is ideal for construction and helps reduce visual intrusion. Flat land also limits the shading between arrays and enables the panels to be optimally configured for best production levels.

4.5.13 Individual site size and development area thresholds were identified by the Applicant following economic analysis of the MW output per hectare, taking into consideration infrastructure costs and the need for land to provide appropriate environmental mitigation. This resulted in a site threshold of 38 ha being applied. A smaller development area results in higher unit costs and an assessment was made as to the maximum cost and therefore minimum site area threshold that would be viable for the Scheme to hit the target financial metrics. Topographical constraints have also been identified and mapped with all land with a 3% or less gradient, which is considered to be very flat and optimal for solar generation, being considered as potential solar development areas.

4.5.14 **Figure 5 of Appendix 4A: Alternative Sites Assessment** of this Environmental Statement [EN010106/APP/6.2] illustrates the unconstrained land identified from the mapping at Stage 2 with a slope gradient of 3% or less.

4.5.15 The use of previously developed (brownfield) land and alternative locations proposed through the statutory consultation stage (as discussed above) were also considered. However no brownfield land that meets the minimum individual site size threshold or the area of approximately 1000ha required for a network of sites in close proximity for the whole Scheme has been identified within the search area. **Figure 4 of Appendix 4A: Alternative Sites Assessment [EN010106/APP/6.2]** shows the brownfield land locations considered.

#### **Stage 4 – Assessment of potential solar development areas**

- 4.5.16 Stage 3 of the assessment resulted in the identification of seven potential development areas (PDAs) which are in close proximity to the proposed location for the Scheme. These were:
- a. PDA1 - Land west of Worlington
  - b. PDA 2 - Land South of Freckenham
  - c. PDA 3 - Land east and west of Red Lodge
  - d. PDA 4 - Land at Dane Hill Farm
  - e. PDA 5 - Land at Snailwell
  - f. PDA 6 - Land south of the A14
  - g. PDA 7 - Land east of Newmarket
- 4.5.17 These are shown on **Figure 8 of Appendix 4A: Alternative Sites Assessment** of this Environmental Statement [EN010106/APP/6.2] with constraints presented on **Figures 10a – 10g**.
- 4.5.18 Individually, none of the PDAs are large enough to provide the minimum 1000ha of unconstrained land required to accommodate the whole Scheme. However, the PDAs which have been identified are in close proximity to each other, or to the Scheme. Therefore the PDAs could be connected to provide enough land for the Scheme or be alternatives at the individual site level.
- 4.5.19 Following the identification of the individual PDAs, Stage 4 involved a desktop assessment to establish each PDA's suitability to accommodate a large scale solar development. Each PDA was evaluated against planning, environmental and other operational assessment indicators which were derived from national and local planning and environmental policy objectives and the operational requirements of the Scheme (see Appendices B and C of **Appendix 4A: Alternative Sites Assessment** of the Environmental Statement [EN010106/APP/6.2]). These have included biodiversity, landscape and visual amenity, cultural heritage, flood risk, land use, access for construction, as well as operational factors related to deliverability such as grid connection feasibility, topography and shading to consider the suitability of these areas for large scale solar development.
- 4.5.20 The conclusions of this evaluation indicate that the PDAs have a number of potential operational, land use and environmental constraints which would mean it could be difficult to develop solar of the scale required at these locations. Given the assessment findings it is considered that there are no more suitable locations within the area of search than the proposed Sites for the Scheme.



## Summary

- 4.5.21 The application of the assessment process described above confirms that the location of the Scheme is suitable for large scale solar development because:
- a. the land is within East Anglia, an optimal region within the UK to locate a large scale solar farm. This is due to the region's high levels of solar irradiation compared to other parts of the UK and its topography, which is predominantly made up of and characterised by large flat open land. East Anglia is also located near high demand centres for electricity (i.e. Cambridge and London) therefore, large scale solar development in this location will be placed close to areas of high demand;
  - b. there is available capacity for the Scheme to connect to the national electricity transmission system with reinforcement at Burwell National Grid Substation that can be completed within a reasonable timeframe and cost;
  - c. the land maximises the utilisation of low grade, non best and most versatile (BMV) agricultural land with 96% of the land being classified as non BMV land;
  - d. the land is not located within internationally and nationally designated biodiversity sites and can avoid direct impact on locally designated biodiversity sites;
  - e. the land is not located within or close to Areas of Outstanding Natural Beauty or designated areas of local landscape value;
  - f. the land is not located within designated green belt;
  - g. the land can avoid direct physical impact on designated heritage assets;
  - h. the land is predominantly within Environment Agency flood zone 1 and is therefore at a low risk of flooding;
  - i. the land has good transport access for construction and operational maintenance, being adjacent to the A14 and A11 part of the strategic road network;
  - j. the land is of a size and has excellent topographical characteristics which meet the requirements of the Scheme to generate significant amounts of electricity and be able to store it; and
  - k. the land has limited land use conflicts with respect to local development plan allocations and displacement of existing businesses.

## 4.6 Alternative Technologies

### Consideration of Alternative Low-Carbon Forms of Electricity Generation

- 4.6.1 Alternative types of low-carbon forms of electricity generation for utilising the existing Burwell National Grid Substation connection capacity were not

considered by the Applicant, who is a solar PV and BESS developer. However, notwithstanding this, it is not considered that the Order limits would be suitable for other forms of renewable generation at the same scale of the Scheme.

- 4.6.2 Tidal power, offshore wind and hydroelectric storage were not possible due to the location of the Burwell National Grid Substation and the 15km search radius, which is located approximately 90km from the coast and within an area of low, flat topography.
- 4.6.3 The Order limits is not considered suitable for onshore wind due to the low wind yield relative to other parts of the UK, coupled with the proximity to residential dwellings which would be subject to risks associated with shadow flicker and wind turbine noise. It is not expected that the Order limits would have been able to host an economically viable and successful onshore wind farm without causing greater environmental consequences than the Scheme.
- 4.6.4 Nuclear power was not considered as an alternative because of the high cost of electricity. Additionally, it is likely that the available grid connection at Burwell Substation could not accept the power capacity that would be generated by a conventional nuclear reactor.
- 4.6.5 It is therefore considered that solar PV is the best renewable generating solution for the Order limits.

### Solar Technology

- 4.6.6 As described in **Chapter 3** of this Environmental Statement **[EN010106/APP/6.1]**, the design parameters for the Scheme have been designed to allow flexibility when undertaking the detailed design of the Scheme and 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, taking into consideration environmental effects and the Scheme’s environmental policy objectives and need for optimal functionality. **Table 4-2** summarises these design alternatives.

**Table 4-2 Design technology alternatives**

Design technology element	Considerations
Type of battery storage technology DC coupling or AC coupling	Although similar in terms of costs, DC-coupling (where the BESS is decentralised and battery containers are distributed across the Sites) has far greater potential impact than AC coupling (where the battery storage is centralised in each Site) in terms of landscape and visual impacts. It is considered easier to screen the BESS better if it is centralised and it allows for a more consistent massing appearance across the Sites.

Design technology element	Considerations
	<p>Therefore, having regard to the potential landscape and visual impacts and non-statutory consultation responses received regarding visual impact AC-coupled has been selected.</p>
<p>Heights for battery storage</p>	<p>The height of the battery storage was originally proposed to be 10m to allow for the containers which house the batteries to be mounted on top of each other. This approach has now been discounted to reduce landscape and visual impacts and it has been reduced to 6m to reduce the visual impact of the containers. Six metres still allows for the height of a standardised battery storage container, which most technologies use, with some headroom to accommodate several potential technology providers. This height also retains flexibility to enable the containers to be mounted on some form of raised structure or foundations to avoid flood risk and / or enable cables to enter from the underside. Heating and cooling infrastructure can also still be installed on the top of the containers within this height limit.</p>
<p>Solar PV configuration</p>	<p>Two configurations were considered for the Solar PV layout: south-facing vs east-west.</p> <p>The east-west configuration was discounted for the following reasons:</p> <ul style="list-style-type: none"> <li>- There is a 14.8% less yield in terms of electricity generation using east-west compared to south-facing.</li> <li>- There are less biodiversity benefits derived. This is because there is more land take with east-west whereas south-facing would allow greater amounts of land between the solar PV arrays such that grass will be able to grow and provide ecological benefits for the lifetime of the project</li> </ul> <p>There would also potentially be more Heavy Goods Vehicle movements than a south facing design due to more panels per m<sup>2</sup>.</p>
<p>PV array height</p>	<p>The proposed solar module racking height was originally 3.5m to accommodate three panels in portrait; however, this was reduced to two panels in portrait meaning the racking height could reduce to up to 2.5m in height to minimise the potential visual impact of the Scheme.</p>

## 4.7 Alternative Layouts

4.7.1 The layout of the Scheme has evolved iteratively taking into consideration environmental effects, the planning and environmental policy objectives and Scheme functionality, and feedback from stakeholders and public consultation.

- 4.7.2 The purpose of this section is to describe the alternative layouts considered for the Scheme at various stages of its design process. The Design and Access Statement **[EN010106/APP/7.3]**, submitted with the DCO application, explains further the design evolution of the Scheme. **Table 4-3** summarises the main design layout iterations considered. The following figures illustrate the changes in terms of land area:
- a. Figure 4-1 EIA Scoping boundary;
  - b. Figure 4-2 Non-statutory consultation boundary;
  - c. Figure 4-3 Cable routes pre scoping;
  - d. Figure 4-4 Sunnica East Site A and B Parameter Plan for statutory consultation;
  - e. Figure 4-5 Sunnica West Site A and B Parameter Plan for statutory consultation;
  - f. Figure 4-6 Grid Connection Route B between Sunnica West Site B and Burwell National Grid Substation presented in the PEIR; and
  - g. Figure 4-7 Burwell National Grid Substation Extension - land options presented in the PEIR.

**Table 4-3 Main design Iterations for the Sites**

Stage	Proposed Layout	Consultation which influenced the proposed layout at this stage	Design evolution
EIA Scoping Layout (March 2019)	Two principal sites covering approximately 1,172ha a. Sunnica East Site (approximately 780ha) b. Sunnica West Site (approximately 392ha) split into Sunnica West Site (north); and Sunnica West Site (south).	This was prior to extensive non-statutory consultation with relevant stakeholders and therefore was not influenced by this.	The EIA Scoping Layout was produced with limited data from desk based and preliminary environmental surveys. The Scoping stage layout was indicative to show the largest potential land take and not to show areas where infrastructure would be sited.
Non-Statutory Consultation Layout (June/July 2019)	Three sites covering approximately 1,373ha: a. Sunnica East Site (approximately 809ha) b. Sunnica West Site A (formerly Sunnica West Site (south)) (approximately 503ha) c. Sunnica West Site B (formerly Sunnica West Site (north)) (approximately 61ha) – no change from EIA Scoping.	Landowner discussions and initial discussions with West Suffolk Council identified a land use conflict reducing the eastern side of Sunnica East.  Discussions with the operators of Worlington Quarry	The Non-Statutory Consultation Layout was developed with the feedback from the EIA scoping process and ongoing landowner discussions.  The eastern area of Sunnica East was reduced due to the removal of the existing operational area of Worlington Quarry and other areas close to the A11 with conflicting land uses.  As a result of the outcome of ecological surveys and the need for additional solar PV, land to the north-west of Sunnica East (now Sunnica East A) was added for habitat mitigation, if required, and to compensate for the loss of the eastern area of Sunnica East.  Land to the east of Sunnica West A around La Hogue Farm shop and to the south of the A11 was added to provide generation capacity and environmental mitigation.

Stage	Proposed Layout	Consultation which influenced the proposed layout at this stage	Design evolution
PEIR Layout (August 2020)	<p>Four sites covering approximately 1,389ha:</p> <ul style="list-style-type: none"> <li>a. Sunnica East Site A (approximately 222.4ha)</li> <li>b. Sunnica East Site B (approximately 322.7ha)</li> <li>c. Sunnica West Site A (approximately 459.8ha)</li> <li>d. Sunnica West Site B (approximately 68.8ha)</li> </ul>	<p>Landowner discussions</p> <p>Non-statutory consultation feedback</p>	<p>Further reduction in land occurred in the eastern area of Sunnica East to remove sites proposed for extensions to Worlington Quarry following discussions with the mineral operator regarding the programme for mineral extraction and thus impact on its mineral operations.</p> <p>Land for Solar PV in the western area of Sunnica East was removed as a result of landowner discussions. Land was retained to accommodate a cable route crossing linking Sunnica East Site A and Sunnica East Site B. Additional land was included to the north west of Sunnica East (now Sunnica East A) within the land holding already within the proposed DCO Site. These changes were to accommodate environmental mitigation areas particularly for stone curlew and deliver electricity generation capacity.</p> <p>The Scheduled Monument (Bowl barrow on Chalk Hill) within Sunnica East was removed from the proposed DCO Site boundary. This had originally been retained as land for ecological mitigation, but it was decided that this would be removed in response to feedback from the EIA scoping and non-statutory consultation.</p> <p>Permissive paths were added to the design for Sunnica East Site A, Sunnica East Site B and Sunnica West Site A in order to provide benefits to recreational users during operation. These would be operational during operation only. Further information on their locations at PEIR stage are provided below.</p> <p>A strategic environmental design (see Figures 4-4 and 4-5) was developed for the PEI Report layout to respond to the environmental opportunities and constraints of the proposed Order limits and non-statutory consultation feedback, particularly in relation to scale, proximity to existing residential areas, visual impact and ecological concerns. This has identified developable areas for solar PV, battery storage and suitable locations for associated infrastructure as well as environmental mitigation and enhancement.</p>

Stage	Proposed Layout	Consultation which influenced the proposed layout at this stage	Design evolution
			<p>As a result of the strategic environmental design process Sunnica East Site A and Sunnica East Site B incorporate the following design principles:</p> <ul style="list-style-type: none"> <li>a. Provision of offsets/buffer zones from existing development e.g. Worlington village and along road corridors to reduce visual impact. Land has been retained within the boundary of the Sunnica East Site A and Sunnica East Site B so that the Applicant can retain control of this land such that the environmental strategy can be realised.</li> <li>b. Strategic planting to screen views including woodland and hedgerows, both of which will be cognisant of existing landscape character.</li> <li>c. Ecological offset areas principally to allow for stone curlew habitat.</li> <li>d. No solar PV and energy storage infrastructure within County Wildlife Sites.</li> <li>e. No solar PV and energy storage infrastructure within Flood Zone 3b and only solar PV within Zones 2 and 3a. Panel heights designed to be above flood level in Zone 3a.</li> <li>f. No solar PV and energy infrastructure within archaeological mitigation areas identified through geophysical surveys.</li> <li>g. Provision of a new permissive route on Beck Road during operation. Provision of a new permissive route to the north-east of the Sites south of Freckenham Road during operation.</li> </ul> <p>As a result of the strategic environmental design process Sunnica West Site A has incorporated the following design principles:</p> <ul style="list-style-type: none"> <li>a. Offsets from Chippenham Park Registered Park and Garden and planting to screen the Scheme.</li> <li>b. No Solar PV and energy storage infrastructure directly affecting the Scheduled Monuments and offset from these assets.</li> </ul>

Stage	Proposed Layout	Consultation which influenced the proposed layout at this stage	Design evolution
			<ul style="list-style-type: none"> <li>c. Strategic planting to screen / filter views including woodland and hedgerows, both of which will be cognisant of existing landscape character.</li> <li>d. No solar PV and energy infrastructure within archaeological mitigation areas identified through geophysical surveys.</li> <li>e. No solar PV and energy storage infrastructure within Flood Zone 3b and only solar PV within Zones 2 and 3a. Panel heights designed to be above flood level in one 3a.</li> <li>f. Provision of a new permissive route to connect with the existing public right of way (PRoW) 204/5.</li> </ul> <p>As a result of the strategic environmental design process Sunnica West Site B has incorporated the following design principles:</p> <ul style="list-style-type: none"> <li>a. Ecology corridor to provide continuity of habitat along the River Snail between Chippenham Fen and Snailwell Meadows.</li> <li>b. No solar PV and energy storage infrastructure within Flood Zone 3b and pm;y solar PV within Zones 2 and 3a. Panel heights designed to be above flood level in Zone 3a.</li> <li>c. No solar PV and energy infrastructure within archaeological mitigation areas identified through geophysical surveys.</li> </ul>
DCO submission (September 2021)	Four sites covering approximately 983ha: <ul style="list-style-type: none"> <li>a. Sunnica East Site A (approximately 224ha)</li> <li>b. Sunnica East Site B (approximately 319ha)</li> </ul>	Statutory consultation - feedback from s.42 and 47 consultees.	Following feedback received in relation to scale, proximity of the Scheme to residential properties, impacts on ecology and landscape and visual effects further iteration of the strategic environmental design has been undertaken at each of the Sites (see Figure 3-1 and 3-2 of the ES <b>[EN010106/APP/6.3]</b> for an illustration of the proposed strategic environmental design at submission stage). Changes have included: <u>Sunnica East Site A</u>



Stage	Proposed Layout	Consultation which influenced the proposed layout at this stage	Design evolution
	<p>c. Sunnica West Site A (approximately 373ha)</p> <p>d. Sunnica West Site B (approximately 67ha)</p>	<p>Meetings with local authority officers and other technical consultees including landscape officers, ecology officers, highways officers, archaeologists and conservation officers, lead flood authorities, fire and rescue services, Natural England, RSPB, Wildlife Trusts, Environment Agency</p>	<p>To retain the open character of the landscape between Freckenham and Isleham to the west of Beck Road solar PV has been removed from E07 (shown in Figure 3-1), so that the land to the west of Beck Road (ECO 1 and ECO 2, shown in Figure 3-1) will be used for ecological mitigation whilst also preserving archaeological assets in situ found at this location.</p> <p>The BESS/substation location has been realigned to be set back from Ferry Lane and provide a new archaeological offset as a result of intrusive investigation.</p> <p>The proposed permissive route on Beck Road has remained within the design. The final location will be subject to agreement with the landowner (Figure 12-6).</p> <p><u>Sunnica East Site B</u></p> <p>Work areas E11 and E23 shown in Figure 3-1 are no longer proposed for solar PV and will be used for ecological mitigation and additional offsets from the village of Worlington to address proximity and ecological issues raised at the statutory consultation. This area (ECO 3 on Figure 3-1) will also reduce the extent of panels viewed by users of the unclassified road known as U6006 (used by recreational users to head south from Worlington through Sunnica East Site B). A new permissive path has been included across Sunnica East Site B, to provide access from Red Lodge to Worlington and Golf Links Road, via U6006 (see Figure 3-1). The Scheme also incorporates additional landscape buffers in relation to the BESS at E18 and E33, shown in Figure 3-1.</p> <p>Two new permissive routes are now proposed to the north-east of the Sites and south of Freckenham Road, which will intersect the existing diagonal unclassified bridleway (U6006) to connect with Golf Links Road (Figure 12-6).</p> <p>One new permissive route is now proposed to the south of the Sunnica East Site B on Elms Road. This will intersect the existing diagonal unclassified bridleway (U60060) and connect with PRow W-257/003/0, which runs to Red Lodge (Figure 12-6).</p>

Stage	Proposed Layout	Consultation which influenced the proposed layout at this stage	Design evolution
			<p><u>Sunnica West Site A</u></p> <p>To address the issue raised in relation to scale, the extent of proposed solar PV at this Site has been reduced, with the removal of parcels W13, W14 and W16 (shown in Figure 3-2). This provides a greater offset from the formal parkland boundary of Chippenham Park Grade II Registered Park and Garden (RPG) and the massing of the site. The extent of solar PV has also been reduced in W15, with increased setbacks from the local road networks. In response to comments regarding impacts on the Avenue of Chippenham Park RPG, it is proposed to provide where possible additional infill planting to re-establish this linear feature.</p> <p>The permissive route proposed at PEIR stage in Sunnica West Site A has been removed following consultation.</p> <p><u>Sunnica West Site B</u></p> <p>Amendments have been made to the layout of the solar PV in W01 (Figure 3-2) to ensure a contiguous area is provided and further increase ecological buffering to the Chippenham Fen Special Area of Conservation, Ramsar and Site of Special Scientific Interest.</p> <p>Although not requiring a noticeable layout change, infrastructure including a bunded lagoon are to be included within the three BESS compound locations to mitigate any risk posed by battery fires in response to consultation feedback.</p>

## 4.8 Alternative Cable Route Corridors

4.8.1 An optioneering process has been undertaken to identify the cable route for the Scheme to connect to the Burwell National Grid Substation.

4.8.2 As described in **Chapter 3** of this Environmental Statement **[EN010106/APP/6.1]**, the electricity generated by the Scheme is to be imported and exported from the onsite substations at Sunnica East Site A, Sunnica East Site B, Sunnica West Site A and Sunnica West Site B to the Burwell National Grid Substation. The cable route therefore needs to connect the on-site substations to one another; and connect Sunnica West Site B (the closest of the Sites at 5.5km distance) to Burwell National Grid Substation. The cable route options considered are therefore across open countryside and require crossings of the railway, watercourses, various utilities, and roads.

4.8.3 Three options were considered for the cable route (see Figure 4-3) and were initially evaluated prior to EIA Scoping. These are described below:

- a. Pre-scoping cable route option 1 was routed northwards from Burwell National Grid Substation, through fields to the west of Burwell before crossing Broads Road and running eastwards through farmland towards the railway line and the A142. The route runs through Sunnica West Site B and south-eastwards to Sunnica West Site A to the east of Snailwell. The route then diverts north-east along the northern boundary of Sunnica West Site A, before crossing agricultural fields, the B1085 and the River Kennett to join the proposed substation at Sunnica East Site B.
- b. Pre-scoping cable route option 2 was routed northwards from Burwell National Grid Substation, along Weirs Drove and Broads Road before joining the B1102 at Ness Farm. The route then joins the A142 and follows the A142 alignment before turning eastwards at the River Snail and running through Sunnica West Site B. The cable route pre-scoping option 2 then follows the same alignment as option 1 through Sunnica West Site B, before diverting north at Chippenham Road and running across Chippenham village to the north of Chippenham Park. The route then runs through agricultural fields, round Badlingham Manor and into the proposed substation at Sunnica East Site B.
- c. Pre-scoping cable route option 3 was routed south-east from Burwell National Grid substation through Burwell village, before turning north-east at Newmarket Road in Burwell. The route then runs north-east through agricultural fields to join with the pre-scoping cable route option 1. Option 3 then continues east to cross the railway line and A142 to the south of the crossing options proposed for options 1 and 2. The route then runs along the southern boundary of the Sunnica West Site B, before joining the cable route alignment for options 1 and 2 on the eastern side of Sunnica West Site A. The route then follows option 1 to the centre of Sunnica West Site A, before continuing south-east and turning north-east along the eastern boundary of Sunnica West Site A and the A11. The route then follows the A11 north-east, past Red

Lodge, before turning west into the proposed substation at Sunnica East Site B.

- 4.8.4 The high level evaluation of the three options presented at pre-EIA scoping stage is presented in **Table 4-4**.

**Table 4-4 High level cable route evaluation pre EIA scoping**

Criteria	Considerations	Cable route 1	Cable route 2	Cable route 3	Evaluation
Technical and engineering requirements	<p>Optimising routing to ensure the cable can be laid in a straight line or in shallow curves so that the cable can be pulled through the ducting efficiently.</p> <p>Space for jointing bays and pits.</p> <p>Working area for cable trenching.</p> <p>Areas of working (e.g. pits and construction compounds) for road, rail and river/watercourse crossings.</p>	<p>Potential to pull the cable efficiently as the route includes smooth curves for the most part. The sections which have sharp angles have the potential to be optimised with micro siting of the cable within the cable corridor.</p> <p>The route crosses agricultural land and therefore there is sufficient space for jointing bays and pits.</p> <p>There is sufficient working area for cable trenching.</p> <p>There is a sufficient working area for crossing obstacles.</p> <p>The Environment Agency's specific guidance on watercourse crossings can be adhered to.</p>	<p>Potential to pull the cable efficiently as the route includes smooth curves for the most part. The sections which have sharp angles have the potential to be optimised with micro siting of the cable within the cable corridor.</p> <p>The route crosses a mixture of agricultural land and 'hard' dig along roads or road verges where sufficient space for jointing bays and pits is uncertain and potentially impossible.</p> <p>The route travels through Burwell where the working area for cable trenching may prove challenging.</p> <p>The route crosses Network Rail (NWR) at a level crossing which is technically challenging owing to safety concerns from NWR.</p> <p>The Environment Agency's specific guidance on watercourse crossings can be adhered to.</p>	<p>Potential to pull the cable efficiently as the route includes smooth curves for the most part. The sections which have sharp angles have the potential to be optimised with micro siting of the cable within the cable corridor.</p> <p>The route crosses a mixture of agricultural land and 'hard' dig along roads or road verges where sufficient space for jointing bays and pits is uncertain and potentially impossible.</p> <p>The route travels through Burwell where the working area for cable trenching may prove challenging.</p> <p>The route proposes to use the verge of A11 which would result in the requirements to constrain the use of the road for a period of time.</p>	<p>Based on the considerations, Cable route 1 is considered preferred from a technical and engineering perspective. Cable routes 2 and 3 have potential constraints relating to the space required for jointing bays along roads and space restrictions where the cables travel through Burwell. There are also additional constraints related to the requirement to cross NWR at a level crossing for Cable route 2 and the potential impact on users of the A11 for Cable route 3.</p>

Criteria	Considerations	Cable route 1	Cable route 2	Cable route 3	Evaluation
	Boring, micro-tunnelling or moling requirements – impacts on hydrology and watercourses and needing to adhere to the Environment Agency’s specific guidance on watercourse crossings.			The route crosses Network Rail (NWR) at a bridge which is technically challenging owing to the distance requirements for a horizontal directional drill to clear the industrial area which is already full of services in the road.  The Environment Agency’s specific guidance on watercourse crossings can be adhered to.	
Planning and environmental constraints	Proximity to residential property.  Avoidance of international and national ecological designations.  Avoidance of national cultural heritage designations.  Proximity to local ecological designations and sensitive ecological receptors.	Not in close proximity to residential properties as it principally crosses agricultural land.  Avoids international and national ecological designations.  Avoids direct impacts upon scheduled monuments and listed buildings and works within Conservation Areas. It would cross under the avenue driveway which forms part of the Grade II listed Chippenham Hall RPG.	Would be in close proximity to residential properties that front the road network particularly through Burwell along Weirs Drove and also where it passes close to the village of Chippenham.  Would cross the eastern edge of Chippenham Fen Site of Special Scientific Interest and National Nature Reserve, which forms part of the Fenland Special Area of Conservation and Chippenham Fen Ramsar and therefore an international and national ecological designated site.	Would be in close proximity to residential properties that front the road network particularly the B1102 through Burwell  Avoids international and national ecological designations  Would cross a Scheduled Monument – Roman Villa South of Snailwell Fen, north west of Snailwell and would pass close to grade II listed buildings fronting the road network within Burwell Village.	Based on the considerations, Cable route 1 is considered to be the preferred alignment from a planning and environmental perspective. Cable routes 2 and 3 would be in close proximity to residential receptors and would likely have a larger impact on ecological and archaeological designated sites.

Criteria	Considerations	Cable route 1	Cable route 2	Cable route 3	Evaluation
	<p>Proximity to public rights of way.</p> <p>Flood risk and sensitivity of watercourse crossings.</p>	<p>Avoids other local ecological designations with the exception of one County Wildlife Site but could affect sensitive ecological receptors associated with watercourses and within agricultural land.</p> <p>Would potentially impact on PRow crossing the route close to Burwell, south west of Fordham and north east of Snailwell.</p> <p>Would cross flood risk zones 2 and 3 associated with the River Kennett, Lee Brook, River Snail, New River and Burwell Lode. Would also cross a number of drains close to Burwell.</p>	<p>Would pass close to Grade II listed buildings within the hamlet of Badlingham and village of Chippenham and the route corridor would go under Grade II Listed Phantom Cottage and Grade II Park Farmhouse. Would also pass the north western boundary edge of Grade II Chippenham Hall Registered Park and Garden. The route would also pass adjacent to the Burwell North Street Conservation Area.</p> <p>Avoids other local ecological designations but could affect sensitive ecological receptors associated with the crossing of watercourses and agricultural land.</p> <p>Would potentially impact on PRow crossing the route close to Burwell, south west of Fordham and north east of Snailwell.</p> <p>Would cross flood risk zones 2 and 3 associated with the River Kennett, Lee Brook, River Snail and New River.</p>	<p>Would pass through a County Wildlife Site adjacent to the A11. Could affect sensitive ecological receptors associated with watercourses and within agricultural land it crosses</p> <p>Would potentially impact on PRow crossing the route south west of Fordham and north east of Snailwell.</p> <p>Would cross flood risk zones 2 and 3 associated with the River Kennett, Lee Brook, River Snail, and New River.</p>	

Criteria	Considerations	Cable route 1	Cable route 2	Cable route 3	Evaluation
Land use and ownership constraints	<p>Affecting a minimum number of landowners.</p> <p>Following field edges in order to minimise possible disturbance for the landowner when farming or using land for other purposes.</p> <p>Where possible reducing interaction on rail network or strategic road infrastructure, utilities and other infrastructure.</p>	<p>This route would principally affect agricultural land owners with large land holdings and could therefore follow field edges where feasible.</p> <p>The route would need to cross the River Kennett, Lee Brook, River Snail, New River and cross the A142 and the railway west of Fordham and would be close to the Burwell Sewage Treatment works off Broads Road</p>	<p>This route would affect a large number of landowners due to it passing through the villages of Chippenham and Burwell with land ownership/rights associated with individual dwellings.</p> <p>The route would need to cross the River Kennett, Lee Brook, River Snail, New River and cross the A142 and the railway west of Fordham.</p>	<p>This route would run along the A11 south and would utilise the local road network wherever possible including the A142 and B1102 and Ness Road through Burwell. The route along the A11 and A142 could therefore disrupt the strategic road network during construction.</p> <p>This would affect a large number of landowners as a result of the route passing along the highway through Burwell village with land ownership/rights associated with individual dwellings.</p>	<p>Based on the considerations, Cable route 1 is considered to be the preferred alignment from a land use and ownership perspective. Cable routes 2 and 3 would affect a large number of individual dwellings. Cable route 3 would also result in disruption to the strategic road network.</p>



- 4.8.5 An evaluation was undertaken of the three cable route options using the outcomes identified in **Table 4-4** to identify the most suitable route for technical and engineering requirements, planning and environmental constraints, and land use and ownership constraints. Cable route option 1 was selected as the preferred cable route corridor.
- 4.8.6 The preferred cable route corridor was presented at the EIA Scoping stage as two parts shown on Figure 4-1 and described below:
- a. **Grid Connection Route A** – connecting the Sunnica East Site B to Sunnica West Site A; and
  - b. **Grid Connection Route B** – connecting Sunnica West Site A to Sunnica West Site B; and connecting Sunnica West Site B to Burwell National Grid Substation. The route connecting Sunnica West Site B to Burwell National Grid Substation presented two options for crossing the railway line west of Sunnica West Site B, named Railway Crossing 1 and Railway Crossing 2. These are shown in Figure 4-1.
- 4.8.7 Following EIA Scoping, refinements were made to the Grid Connection Route A. This was as a result of more land at Sunnica West Site A being incorporated into the Scheme. Grid Connection Route B was also amended in response to the EIA Scoping process to avoid the sewage treatment works to the north of Burwell. The grid connection routes incorporating these changes underwent non-statutory consultation.
- 4.8.8 Following the non-statutory consultation, meetings were held with Network Rail and other stakeholders to discuss Grid Connection Route B and particularly the two options crossing the railway. This resulted in the removal of Railway Crossing 2 which was the southern of the two options presented (see Figure 4-2) and an increase in land area for the northern crossing to allow for different crossing point options to the north. This was presented in the PEI Report and was in response to feedback regarding the proximity of the route to the existing level crossing and potential conflict with existing land uses to the south of Fordham. West of the railway crossing the Grid Connection Route B was widened to provide options for crossing agricultural land at this location which was also in response to discussions with landowners.
- 4.8.9 Following the statutory consultation, further meetings have been held with Network Rail and consideration has been given to engineering constraints at the railway crossing. It has been determined that the area of land crossing the railway would be reduced to the north so that the crossing point will avoid vegetation west of the railway line and to still be at an appropriate distance from the existing level crossing. Land has been included for the cable route crossing either side of the proposed cable route in order to ensure that the cable circuit can be the requisite distance apart as it crosses under the tracks and surfaces on each side. The land also provides access for construction. West of the railway the cable route has been narrowed and this allows for the cable route to run in a straight line which is optimal for construction. This has reduced the amount of agricultural land previously

proposed to be affected. Access for construction is still to be provided and is included within the Order limits.

## 4.9 Alternative locations for upgrading Burwell National Grid Substation.

4.9.1 As discussed in Section 4.5, available capacity has been identified at Burwell National Grid Substation. An extension will be required, to provide a transformer compound to transform the 132kV export voltage from the Sites to the National Grid 400kV connection voltage. The location for this extension needs to be in close proximity to the existing substation to reduce the disturbance of land; cost and, in terms of engineering feasibility, for ease of connection to the existing infrastructure. Following discussions with National Grid, three options for the location of this extension were presented and assessed in the PEIR. These are shown in Figure 4-7 and described below. The areas of land identified for each of the options varied in size to allow flexibility with regards to the precise location of the substation extension.

- a. **Substation extension option 1:** 0.31ha of land to the east of the existing substation compound adjacent to Weirs Drove, approximately 200m west of Burwell.
- b. **Substation extension option 2:** 1.58ha of land approximately 50m north of the existing substation, north of Newnham Drove, 650m west of Burwell.
- c. **Substation extension option 3:** 2.52ha of land adjacent to the north west of the existing substation, south of Newnham Drove, 450m west of Burwell.

4.9.2 All the options were considered in relation to their potential to lead to landscape and visual, ecological and heritage impacts, as well as needing to take account of ease of traffic access. None of the options are within any designated biodiversity sites or expected to result in any physical impact upon any designated heritage assets. Substation extension option 1 benefits from existing visual screening compared to the other two options and would be able to gain access off Weirs Drove. Substation extension option 1 is also currently within National Grid land ownership and closest to the existing substation. Following discussions with National Grid this was the preferred option presented at the statutory consultation stage taking into consideration environmental, engineering and landownership constraints and the fact that the land was available.

4.9.3 Following the identification of the options presented at the statutory consultation, it was identified that option 3 was not able to be pursued due to planning permission being granted for another solar development on the land. Therefore, only options 1 and 2 have been taken forward to DCO submission.

4.9.4 Following statutory consultation, National Grid presented its proposals for a separate new substation extension directly to the west of option 1. Following

discussions with National Grid, the location of option 1 was refined slightly to better sit alongside and integrate with National Grid's own proposals; thus moving eastward closer to the field boundary with Weirs Drove.

- 4.9.5 The current Options 1 and 2 to be taken forward as part of the DCO Application are shown on Figure 3-20. The footprint of the substation extension will be the same within both locations; however, the area identified for option 2 is larger due to the need for flexibility. Option 2 has been enlarged slightly within the Order limits since Statutory Consultation to allow for the substation to be setback from existing vegetation to avoid the loss of the tree line along Newnham Drove and minimise the environmental effects associated with this option. There are also constraints related to the overhead powerline and land owner negotiations. The larger area for option 2 allows for micro-siting post-consent, should this option be taken forward.

## 4.10 References

- Ref 4-1 HMSO (2017) The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017
- Ref 4-2 Department of Energy and Climate Change (DECC), (2011) National Policy Statement for Energy (EN-1)
- Ref 4-3 Forest Heath Area of West Suffolk (2019) Council Site Allocations Plan, page 16.
- Ref 4-4 Her Majesty's Stationary Office (HMSO) (2008) Climate Change Act
- Ref 4-5 HMSO (2009) The UK Low Carbon Transition Plan; Five Point Plan
- Ref 4-6 Intergovernmental Panel on Climate Change (October 2018) 'Special Report on the impacts of global warming of 1.5°C above pre-industrial levels'
- Ref 4-7 Committee on Climate Change (May 2019) Net-Zero: The UK's contribution to stopping global warming'
- Ref 4-8 Committee on Climate Change (June 2020) Reducing UK emissions: Progress Report to Parliament.
- Ref 4-9 National Grid, Future Energy Scenarios
- Ref 4-10 DECC (2011) National Policy Statement for Renewable Energy Infrastructure (EN-3)
- Ref 4-11 DECC (2011) National Policy Statement for Electricity Networks Infrastructure (EN-5)
- Ref 4-12 Ministry of Housing, Communities & Local Government (2021). National Planning Policy Framework