

RWE

High Grove Solar

Preliminary Environmental Information Report

Chapters 1 to 4 Introductory Chapters

April 2025

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1 Introduction

1.1 Purpose

- 1.1.1.1 This Preliminary Environmental Information Report (PEIR) has been prepared to enable the local community, any other interested person and stakeholders to understand the potential environmental effects of High Grove Solar (the Proposed Development) and enable an informed response to statutory consultation. The document sets out how each environmental aspect is being assessed, the potential environmental effects of the Proposed Development based on the information available at the time, and measures proposed to avoid or reduce potentially significant effects. This is to support consultees in developing an informed view of the likely significant environmental effects of the Proposed Development.
- 1.1.1.2 It should be noted that the development of the design of the Proposed Development is currently ongoing, environmental information is still being assembled and potential effects assessed. The information contained within this PEIR should be regarded as a preliminary account of the principal environmental issues identified to date. The PEIR details a number of uncertainties and assumptions and may be subject to change as the environmental assessment work progresses and is finalised.
- 1.1.1.3 The design may also be subject to change as a result of consultation responses which will in turn inform the ongoing environmental assessment process. The results of the environmental assessment process will be reported within the Environmental Statement (ES) which will be submitted to the Planning Inspectorate as part of the Development Consent Order (DCO) application.
- 1.1.1.4 This PEIR presents the findings of the environmental assessments to date for the Proposed Development to inform the statutory consultation process for the proposed DCO application, in accordance with the Planning Act 2008 (the Act).
- 1.1.1.5 The location of the Proposed Development is shown in Figure 1.1 Site Location Plan, provided in a separate document for Figures as part of this PEIR. A full description of the Proposed Development is provided in Chapter 2 of this PEIR.

1.2 The Applicant

- 1.2.1.1 The Applicant is RWE Renewables UK Solar and Storage Limited, a leading solar and battery energy storage developer with one of the largest development pipelines in the UK. RWE Renewables UK Solar and Storage Limited is a subsidiary of RWE AG, which has more than 125 years of energy expertise, through design, construction, and operation. It is RWE AG's ambition to have a carbon neutral energy portfolio by 2040, providing clean, secure, and affordable energy to millions of households.

1.3 Overview of the Proposed Development

- 1.3.1.1 The Proposed Development is a renewable energy scheme, comprising five distinct Panel Areas covering an area of approximately 1,700 hectares (ha), including solar photovoltaic (PV) panels, on-site Battery Energy Storage Systems (BESS), underground cabling and associated infrastructure including substations and environmental mitigation and enhancement areas. The Proposed Development will also include underground Cable Corridors, which are still being refined, connecting the Panel Areas to one another and to the point of connection. The Proposed Development will have the capacity to generate over 50 Megawatts (MW) of alternating current (AC) electricity. The Proposed Development is located between Narborough and Dereham in the county of Norfolk in the East of England.
- 1.3.1.2 A full description of the Proposed Development and a detailed description of the design and environmental mitigation is provided in PEIR Chapter 2 The Proposed Development.

1.4 Need for the Proposed Development

- 1.4.1.1 The Proposed Development would provide new energy generating infrastructure, in line with national policy targets for decarbonisation, including meeting Net Zero targets, safeguarding energy supply and ensuring affordability.
- 1.4.1.2 The Overarching National Policy Statement (NPS) for Energy (EN-1) [1], NPS for Renewable Energy Infrastructure (EN-3) [2] and the Electricity Networks NPS (EN-5) [3], were established against legal obligations made as part of the Climate Change Act 2008 [4], as amended by the 2050 Target Amendment Order 2019, for the UK to meet Net Zero greenhouse gas (GHG) emissions by 2050 [5]. The NPS set out a case for the need and urgency of new energy infrastructure, to support government policy on sustainable development. Chapter 3 Section 3.3 covers the need for the Proposed Development in greater detail.
- 1.4.1.3 The Energy Security Strategy [6] produced by the UK Government in April 2022 announced the intent to increase solar capacity in the UK from 14GW to 70GW by 2035. In addition, the Energy White Paper: Powering our Net Zero Future [7] [8] outlined the need to 'build back greener' following the impact of the global Coronavirus pandemic, addressing the inter-generational challenge of climate change. The White Paper identifies the UK Government's aim for a fully decarbonised, reliable and low-cost power system by 2050. The 'Powering Up Britain' policy paper [9] further reiterated the Government commitment to solar energy, setting out a goal for a fivefold increase in solar power by 2035.
- 1.4.1.4 To reiterate the UK Government's commitment to clean energy, the National Energy System Operator (NESO) was commissioned to provide a clear roadmap on how to reach these targets. Published in December 2024, the 'Clean Power 2030 Action Plan' [10] announced the intent to increase solar capacity in the UK to 45-47 GW by 2030.

1.5 Legislation and Planning Policy Context

1.5.1 Overview

1.5.1.1 To support the preparation of the PEIR, it is necessary to review the national and local planning policy and legislation that informs the overall approach to the Environment Impact Assessment (EIA) process. An overview of policies relevant and important to the Proposed Development are presented in this section. Further information on relevant aspect specific legislation and policies is considered within each of the aspect chapters (set out within Chapter 5 to Chapter 15 of this PEIR).

1.5.2 Planning Act 2008

1.5.2.1 The Proposed Development is considered to be a Nationally Significant Infrastructure Project (NSIP) under Section 14(1)(a) and Section 15(2) of the Act as an onshore generating station in England with a capacity of more than 50MW.

1.5.2.2 As an NSIP, the Applicant is required to make an application for a DCO before it can lawfully construct or operate the Proposed Development. The Act provides that the Secretary of State (SoS) is responsible for determining the application for development consent. The Planning Inspectorate, on behalf of the SoS, has responsibility for administering the examination of DCO applications and supporting the examining authority that will be appointed to make a recommendation to the SoS as to whether to grant development consent. If granted by the SoS, the DCO will provide the necessary authorisation to allow the Proposed Development to be constructed and operated.

1.5.2.3 The relevant SoS for the Proposed Development is the SoS for Energy Security and Net Zero (formally Business, Energy and Industrial Strategy)¹.

1.5.3 National Policy Statements

1.5.3.1 In accordance with Section 104(2) of the Act, the NPSs are the primary policy basis for NSIP development and the SoS is directed in the Act to determine a DCO application in accordance with the relevant NPSs.

1.5.3.2 The following NPSs are relevant to the Proposed Development:

- Overarching NPS for Energy EN-1 [1];
- NPS EN-3 Renewable Energy Infrastructure [2]; and
- NPS EN-5 Electricity Networks Infrastructure [3].

¹ The UK Government confirmed on 7 February 2023 a new Department for Energy Security and Net Zero, which replaces the Department for Business, Energy and Industrial Strategy <https://www.gov.uk/government/news/making-government-deliver-for-the-british-people>

NPS EN-1

- 1.5.3.3 The Overarching NPS for Energy (EN-1) sets out the overall national energy policy for nationally significant energy infrastructure. It is intended to be combined with relevant technology-specific NPSs to form the primary basis for decisions by the SoS. Chapter 2 of NPS EN-1 reflects the current national policy and legislative position on energy infrastructure development, including the legally binding commitment made through the Climate Change Act 2008 to be net zero by 2050. Emphasis is made on decarbonising the power sector and ensuring security of energy supply, with reference to the Net Zero Strategy.
- 1.5.3.4 In addition, NPS EN-1 introduces that there is a CNP for the provision of nationally significant low carbon infrastructure, which will in general outweigh any other residual impacts not capable of being addressed by application of the mitigation hierarchy, which supports the delivery of the Proposed Development. The exceptions to this presumption of consent are residual impacts which present an unacceptable risk to, or unacceptable interference with, human health and public safety, defence, irreplaceable habitats or unacceptable risk to the achievement of net zero, flood and coastal erosion risk. For more information on the need for the Proposed Development, see Section 3.3.
- 1.5.3.5 NPS EN-1 also sets out aspect-specific ‘assessment principles’ and ‘generic impacts’ which set out how energy NSIP applications should be prepared by applicants and considered by the SoS.

NPS EN-3

- 1.5.3.6 NPS EN-3 is a technology-specific NPS, focusing on renewable energy generation projects. It is therefore to be considered alongside NPS EN-1 as the primary policy basis for decisions on renewable energy infrastructure DCO applications. Section 2.10 sets out policy specific to solar NSIP development, directing the approach to assessment and consideration of impacts which are additional to those detailed in NPS EN-1.

NPS EN-5

- 1.5.3.7 NPS EN-5 is a technology-specific NPS, focusing on infrastructure for electricity networks, to include transmissions systems (above or underground) and associated infrastructure such as substations and converter stations. It is therefore to be considered alongside NPS EN-1 as the primary policy basis for decisions on electricity network infrastructure DCO applications. It is relevant to the Proposed Development due to the inclusion of electricity network infrastructure (underground cables and on-site substations) within the project.
- 1.5.3.8 NPS EN-5 sets out assessment principles specific to electricity network infrastructure, with a predominant focus on overhead lines, in addition to those detailed in NPS EN-1.
- 1.5.3.9 Chapters 5 to 15 of the PEIR include the NPS paragraphs relevant to assessment and where the requirements of those paragraphs are addressed within the PEIR.

The Proposed Development's compliance with the NPSs and other policy is not part of the EIA and will be set out in a compliance table to be submitted as part of the DCO application.

1.5.4 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017

- 1.5.4.1 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 [11] (the EIA Regulations) set out the legislative requirements for undertaking a statutory EIA. EIA is defined by Regulation 5 of the EIA Regulations as a process consisting of:
- a) *"the preparation of an environmental statement or updated environmental statement, as appropriate, by the applicant;*
 - b) *the carrying out of any consultation, publication and notification as required under these Regulations or, as necessary, any other enactment in respect of EIA development; and*
 - c) *the steps that are required to be undertaken by the Secretary of State under regulation 21 or by the relevant authority under regulation 25, as appropriate."*
- 1.5.4.2 The EIA Regulations identify which developments are potentially required to undergo EIA, and these are listed under either 'Schedule 1' or 'Schedule 2' of the EIA Regulations. Those developments listed under 'Schedule 1' must always be subject to EIA and 'Schedule 2' developments are only subject to EIA should it be judged, in accordance with Regulation 3(1), that the development is *'likely to have significant effects on the environment by virtue of factors such as its nature, size or location'*. Schedule 3 of the EIA Regulations provides the selection criteria for reaching a conclusion on that judgement, a process known as "screening".
- 1.5.4.3 The Proposed Development is categorised as 'Schedule 2' EIA development under Paragraph 3(a) of Schedule 2 of the EIA Regulations, as it comprises of *'industrial installations for the production of electricity, steam and hot water'*. Due to the Proposed Development's nature, size or location, it has the potential to have significant effects on the environment and as such the Applicant has notified the SoS that an ES will be submitted with the DCO.
- 1.5.4.4 Regulation 12 of the EIA Regulations requires a Statement of Community Consultation (SoCC), which the Applicant is required to prepare under Section 47 of the Act, to set out how it intends to publicise and consult on preliminary environmental information relating to 'EIA development'. For the purposes of Regulation 12(2), the preliminary environmental information in the PEIR means the information reasonably required to enable stakeholders to develop an informed view of the likely significant effects of the development (and of any associated development). Planning Inspectorate Advice Note Seven [12] explains that the PEIR does not need to constitute a complete assessment and is a compilation of the preliminary environmental information available at the point in time the PEIR has been produced.
- 1.5.4.5 Further details on the approach to EIA for the Proposed Development is provided in Chapter 4 of this PEIR.

1.5.5 National Planning Policy Framework

- 1.5.5.1 The National Planning Policy Framework (NPPF) (2024) [13] sets out the Government's planning policies for England and how these are expected to be applied.
- 1.5.5.2 Chapter 2 of the NPPF states the purpose of the planning system is to contribute to the achievement of sustainable development. It also details how the planning system should provide ways for the UK to meet the challenge of climate change and transition to a low carbon future.
- 1.5.5.3 The NPPF does not contain specific policies relating to NSIPs. These are determined in accordance with the decision-making framework in the Act and relevant NPS for major infrastructure, as well as any other matters that are important and relevant (which may include the NPPF).

1.5.6 Local Policy

- 1.5.6.1 The Proposed Development would be located within an area of three tiers of local government: Breckland Council, Norfolk County Council and a number of civil parishes. Breckland Council is responsible for the majority of planning matters, other than transport, and minerals and waste planning which are the responsibility of Norfolk County Council. Under Section 43 of the Act, both local authorities are defined as 'host' authorities, and therefore must be consulted as part of the planning process.

Breckland Council

- 1.5.6.1 Following the completion of the single policy update of the Breckland Council Local Plan (2019), Breckland Council adopted the Breckland Local Plan on 21 September 2023 [14], which sets out the framework for the District until 2036. Breckland Council is now in the process of undertaking a Full Update of the Plan [15] following consultation on the draft in summer 2024. The full update will cover the period 2021-2046 and will include the allocation of new developments and review of policies.

Norfolk County Council

- 1.5.6.2 Norfolk County Council are currently preparing a Norfolk Minerals and Waste Local Plan Review, to consolidate the three adopted Development Plan Documents (DPD) into one Local Plan, ensuring that the policies within them remain up-to-date and to extend the plan period to end of 2036. The Plan was submitted to the Planning Inspectorate for independent examination in December 2023, and Examination Hearings were held July 2024. The three adopted DPDs are listed below:
- Core Strategy and Minerals and Waste Development Management Policies DPD 2010-2026 (adopted September 2011) [16];

- Minerals Site Specific Allocations Development Plan Documents (DPD) (adopted October 2013, amendment adopted December 2017) [17]; and
- Waste Site Specific Allocations Development Plan Document (DPD) (adopted October 2013) [18].

1.6 Competent Expert

- 1.6.1.1 In accordance with the EIA Regulations, Regulation 14 paragraph 4, a Statement of Competence will be included within the ES, outlining the relevant expertise or qualifications of the experts who undertook the EIA.
- 1.6.1.2 Competent experts have prepared this PEIR and will prepare the ES. The Applicant has engaged Ove Arup and Partners Limited (Arup) to lead the EIA, along with expert aspect inputs from Wardell Armstrong (part of SLR), Headland Archaeology, Reading Agricultural Consultants, Avian Ecology and Treeworks. Arup and Wardell Armstrong hold the Institute of Environmental Management and Assessment's (IEMA) EIA Quality Mark.
- 1.6.1.3 The aspect-specific chapters of this PEIR (Chapters 5-14) and their corresponding appendices have been prepared by expert aspect authors, as summarised in Table 1-1. The credentials of each aspect expert and lead authors are detailed in PEIR Appendix 1.1.

Table 1-1 Competent Authors

Chapter	Author
Chapter 1 Introduction	Arup
Chapter 2 The Proposed Development	Arup
Chapter 3 Alternatives and Design Iteration	Arup
Chapter 4 Approach to the PEIR	Arup
Chapter 5 Agricultural Land and Soils	Reading Agricultural Consultants
Chapter 6 Biodiversity	Wardell Armstrong (part of SLR) with inputs from Avian Ecology
Chapter 7 Climate Change	Wardell Armstrong (part of SLR)
Chapter 8 Cultural Heritage and Archaeology	Headland Archaeology
Chapter 9 Glint and Glare	Wardell Armstrong (part of SLR)
Chapter 10 Landscape and Visual	Arup with inputs from Treeworks
Chapter 11 Noise and Vibration	Wardell Armstrong (part of SLR)
Chapter 12 Socio-economics	Arup
Chapter 13 Traffic and Transport	Arup
Chapter 14 Water Resources and Flood Risk	Arup

Chapter	Author
Chapter 15 Cumulative Effects Assessment	Arup

1.7 Statutory Consultation Stakeholder Engagement

- 1.7.1.1 The Applicant is undertaking a consultation on the proposals for the Proposed Development between 24 April - 12 June 2025.
- 1.7.1.2 During this time, a copy of the PEIR (this report), together with a Non-Technical Summary, the Statement of Community Consultation (SoCC) and other consultation documentation explaining the consultation process and details of the Proposed Development may be inspected free of charge from the document library at rwe.com/Highgrove.
- 1.7.1.3 All consultation materials and further details can also be found on the project website. The website provides information to the wider community and the opportunity to contact the Applicant with any queries or for further information. Consultation materials will be free to read, download and print and responses to the consultation can be submitted via the website.
- 1.7.1.4 Information on how additional hard copies of the consultation documentation, or copies of the documentation in alternative formats, can be requested is included in the SoCC, which is available on the project website.

1.8 Structure of the PEIR

- 1.8.1.1 The PEIR is comprised of several separate documents, including chapters, appendices and figures, which reflect the likely structure of the ES to be compiled for the DCO application. These are outlined further below.
- 1.8.1.2 The Non-Technical Summary (NTS) is a standalone report which summaries the findings of the EIA, written in non-technical language.
- 1.8.1.3 The main text of this PEIR contains the following chapters:
- Chapters 1 to 4 contain an introduction, a description of the Proposed Development, the alternatives considered, and the approach that will be taken to the PEIR;
 - Chapters 5 to 14 present the preliminary assessment of the likely significant effects of the Proposed Development in relation to specialist aspects covering particular aspects of the environment:
 - Chapter 5: Agricultural Land and Soils;
 - Chapter 6: Biodiversity;
 - Chapter 7: Climate Change;

- Chapter 8: Cultural Heritage and Archaeology;
- Chapter 9: Glint and Glare;
- Chapter 10: Landscape and Visual;
- Chapter 11: Noise and Vibration;
- Chapter 12: Socio-Economics;
- Chapter 13: Traffic and Transport; and
- Chapter 14: Water Resources and Flood Risk.
- Chapter 15 considers the potential inter-relationships between the aspects covered in Chapters 5 to 14, and between the Proposed Development and other developments in the surrounding area; and
- Chapter 16 presents a preliminary summary of the likely significant environmental effects.

1.8.1.4 Further technical information and other supporting assessments that accompany the PEIR chapters are provided as appendices to the PEIR and include:

- Appendix 1.1 Competent Expert Evidence
- Appendix 1.2 Glossary and Abbreviations
- Appendix 4.1 EIA Scoping Report
- Appendix 4.1 EIA Scoping Opinion
- Appendix 5.1 Draft Agricultural Land Classification Assessment
- Appendix 6.1 Preliminary Ecological Appraisal
- Appendix 6.2 Riparian Mammal Survey
- Appendix 6.3 Habitat Regulations Assessment - Screening
- Appendix 6.4 Breeding Bird Survey Report
- Appendix 6.5 Non-Breeding Bird Survey Report
- Appendix 8.1 Desk-Based Baseline Assessment and Setting Assessment
- Appendix 10.1 Legislation and Planning Policy
- Appendix 10.2 Landscape Baseline And Effects
- Appendix 10.3 Visual Baseline And Effects
- Appendix 10.4 Draft Arboricultural Impact Assessment
- Appendix 11.1 Noise Data
- Appendix 11.2 Noise Assessment Results
- Appendix 14.1 Preliminary Flood Risk Assessment
- Appendix 14.2 Preliminary Drainage Strategy
- Appendix 14.1 Preliminary Water Environment Regulations (WER) Compliance Assessment
- Appendix 15.1 Long list of Committed Developments
- Appendix 15.1 Short List of Committed Developments

1.8.1.5 Figures that are referenced in the PEIR are provided separately in documents with the figures listed in the files name, to meet file size requirements, including:

- Figure 1.1 Site Location Plan
- Figure 2.1 Draft Order Limits
- Figure 2.2 Preliminary Design - Western Panel Area
- Figure 2.3 Preliminary Design- Central Panel Area
- Figure 2.4 Preliminary Design- Northern Panel Area
- Figure 2.5 Preliminary Design- Eastern Panel Area
- Figure 2.6 Preliminary Design- Southern Panel Area
- Figure 2.7 Environmental Designations
- Figure 2.8 Typical Solar PV Module Designs
- Figure 2.9 Hybrid Packs
- Figure 2.10 Typical Customer Switchgear
- Figure 2.11 Typical Substation
- Figure 2.12 Typical Fencing
- Figure 2.13 Typical CCTV Pole
- Figure 5.1 Location of Observations
- Figure 5.2 Agricultural Land Classification
- Figure 6.1 Waterbody Location Plan
- Figure 6.2 Designated Wildlife Sites within 10km
- Figure 6.3 Local Wildlife Sites within 2km
- Figure 6.4 Ancient Woodland within 2km
- Figure 6.5 Priority Habitats within 2km
- Figure 6.6 UKHab Habitat Plan
- Figure 6.7 Otter and Water Vole Survey Results Plan
- Figure 8.1 Heritage Assets within the draft Order Limits
- Figure 8.2 Heritage Assets within 3km of the draft Order Limits
- Figure 8.3 Geophysical Survey Results within draft Order Limits
- Figure 10.1 Site Location and study area
- Figure 10.2 Topography and hydrology
- Figure 10.3 Geology
- Figure 10.4 Soils
- Figure 10.5 Landcover and vegetation patterns
- Figure 10.6 Land use and settlement
- Figure 10.7 Tranquillity baseline
- Figure 10.8 Night time baseline
- Figure 10.90 Other Relevant Designations
- Figure 10.10 National Landscape Character Areas

- Figure 10.11 Historic Landscape Characterisation
- Figure 10.12 District landscape character areas
- Figure 10.13 Local landscape character areas
- Figure 10.14 Zone of theoretical visibility (ZTV) – bare earth
- Figure 10.15 Zone of theoretical visibility (ZTV) – with screening
- Figure 10.16 Representative Viewpoints
- Figure 11.1 Existing Sensitive Receptor Plan
- Figure 11.2 Operational Noise Contour Plot
- Figure 11.3 Construction Noise Buffer
- Figure 12.1 Site Location and Study Area
- Figure 13.1 HGV Routes to Construction Compounds
- Figure 14.1 Surface Water Features
- Figure 14.2 Bedrock Geology
- Figure 14.3 Superficial Geology
- Figure 14.4 WER/WFD surface water bodies
- Figure 14.5 WER/WFD groundwater bodies
- Figure 14.6 Wendling Beck WER/WFD Water Body – Watercourse Naming
- Figure 14.7 Watton Brook WER/WFD Water Body – Watercourse Naming
- Figure 14.8 Wissey – Upper WER/WFD Water Body – Watercourse Naming
- Figure 14.9 Groundwater Designations
- Figure 14.10 Licenced Abstractions And Discharges
- Figure 14.11 Risk of Flooding from Surface Water
- Figure 14.12 Risk of Flooding from Rivers And Seas
- Figure 14.13 Risk of Flooding from Reservoirs
- Figure 14.14 Susceptibility to Groundwater Flooding
- Figure 15.1 Long list of Committed Developments
- Figure 15.2 Short list of Committed Developments

2 The Proposed Development

2.1 Introduction

- 2.1.1.1 This chapter provides a description of the location of the Proposed Development and the surrounding area, as well as an overview of the Proposed Development including a description of its main components and environmental mitigation measures. Detail regarding construction, operational and decommissioning requirements are also set out. This information is used to inform the technical assessments within Chapters 5 to 14 of this PEIR.
- 2.1.1.2 Planning Inspectorate Advice Note Seven [12] requires Preliminary Environmental Information (PEI) to be produced to support consultation bodies to develop an informed view of the likely significant environmental effects of the development. It is noted that PEI is 'preliminary', and that through its production the Applicant is actively seeking consultees' comments and that there will be the opportunity for both the design of the Proposed Development and the EIA to take into consideration any comments received through this consultation.
- 2.1.1.3 For the purposes of this report, the PEIR (presenting the PEI), a version of the design has been assessed to inform consultees of the likely significant environmental effects of the Proposed Development, this design is detailed further below. The final design for the Proposed Development, for which consent will ultimately be sought, will be detailed further within the ES which will support the DCO application. That iteration of the design will account for consultee comments received in response to the PEIR and statutory consultation where appropriate.
- 2.1.1.4 The following figures have been produced to illustrate the design of the Proposed Development, and support the descriptions presented in this chapter:
- Figure 2.1 Draft Order Limits
 - Figure 2.2 Preliminary Design - Western Panel Area
 - Figure 2.3 Preliminary Design- Central Panel Area
 - Figure 2.4 Preliminary Design- Northern Panel Area
 - Figure 2.5 Preliminary Design- Eastern Panel Area
 - Figure 2.6 Preliminary Design- Southern Panel Area
 - Figure 2.7 Environmental Designations
 - Figure 2.8 Typical Solar PV Module Designs
 - Figure 2.9 Hybrid Packs
 - Figure 2.10 Typical Customer Switchgear
 - Figure 2.11 Typical Substation
 - Figure 2.12 Typical Fencing
 - Figure 2.13 Typical CCTV Pole

2.2 The draft Order Limits

- 2.2.1.1 The draft Order Limits for the Proposed Development include the maximum area of land potentially required for the construction, operation and decommissioning of the Proposed Development, as shown in Figure 2.1.
- 2.2.1.2 The draft Order Limits are based on the land anticipated to be required temporarily, with permanent rights of access, or permanently for the construction and operation of the Proposed Development, in addition to all land necessary for any works where the Proposed Development interfaces with existing utilities.
- 2.2.1.3 The Proposed Development is subject to ongoing design development and the draft Order Limits will continue to be refined in response to environmental and technical factors as identified as part of the EIA process, as well as discussions with landowners and consultation responses, including to this PEIR. This process ensures that the draft Order Limits only include land which is required to deliver the Proposed Development.
- 2.2.1.4 The preferred cable corridor options for both the 33 kilovolt (kV) and the 132kV cables (explained further in paragraphs 2.4.4 and 2.4.5 respectively) are still being assessed and surveyed, and are presented in Figure 2.1. The preferred cable corridors will be confirmed as the design and assessment develop, considered in the EIA and described the ES.
- 2.2.1.5 Potential mitigation works and/or traffic management measures on access roads approaching the Proposed Development are being developed through further assessment, design, and stakeholder engagement. Where these potential locations have been identified they have been included in the draft Order Limits shown in Figure 2.1 as land for potential highway mitigation. These linear areas show where potential works or management measures may be required, however, as works are not confirmed in these areas they have not been considered in generating the study areas and baseline information in this PEIR, which have been defined from boundary of the Panel Areas and Cable Corridors. This preliminary assessment remains robust and, if confirmed as required, these potential works will be described and assessed in the ES.

2.2.2 The Rochdale Envelope and use of design parameters

- 2.2.2.1 The design of the Proposed Development will continue to evolve throughout the EIA process through the ongoing use of an iterative design process. The iterative design process has already taken into account comments made during the non-statutory consultation in Autumn 2024, in response to the EIA Scoping Report, and outputs from field surveys and preliminary results presented in this PEIR. A summary of these changes are outlined in Chapter 3. The ES will provide a further update on how the design of the Proposed Development has been influenced by the iterative design process.
- 2.2.2.2 It is the intention of the Applicant to implement the advice within Planning Inspectorate Advice Note Nine: Using the 'Rochdale Envelope' [19] regarding the

degree of flexibility that may be considered appropriate with an application for development consent under the Planning Act 2008 (the Act).

2.2.2.3 In particular, the Advice Note outlines that:

- The DCO application documents should explain the need for, and the timescales associated with, the flexibility sought, and this should be established within clearly defined parameters;
- The clearly defined parameters established for the Proposed Development must be sufficiently detailed to enable a proper assessment of the likely significant environmental effects and to allow for the identification of necessary mitigation, if necessary, within a range of possibilities;
- The assessments in the ES should be consistent with the clearly defined parameters and ensure a robust assessment of the likely significant effects;
- The DCO must not permit the Proposed Development to extend beyond the clearly defined parameters which have been requested and assessed. The SoS may choose to impose requirements to ensure that the Proposed Development is constrained in this way; and
- The more detailed the DCO application is, the easier it will be to ensure compliance with the EIA Regulations.

2.2.2.4 The Advice Note also acknowledges that there may be aspects of the design that are not yet fixed, resulting in the need for the EIA to assess likely worst case variations to ensure that all foreseeable significant environmental effects of the Proposed Development are assessed.

2.2.2.5 NPS EN-1 [1] additionally sets out in paragraph 4.3.12 that the Rochdale Envelope approach should be utilised where details are still to be finalised and seek to utilise worst case parameters for assessment. This is of particular importance due to the ever-evolving technology and speed of development within solar PV module and energy storage markets. The Rochdale Envelope approach been followed throughout this PEIR, and will be used in the ES.

2.2.2.6 For the purposes of the Proposed Development design parameters have been set to define a worst-case scenario for any element of the design which is not fixed at the time of assessment. This helps to set the Rochdale Envelope for assessment purposes within the PEIR. Further information on design parameters are available later in this chapter set out against each element of the Proposed Development where relevant.

2.2.2.7 Within the PEIR, each environmental aspect has assessed the design considered to be the likely worst-case scenario for that discipline to determine the potential for significant effects and identify suitable mitigation measures, and the ES will follow the same approach.

2.3 Site Description

2.3.1.1 The total area within the draft Order Limits is shown in Figure 2.1. The draft Order Limits comprise five Panel Areas (groups of solar PV panels), of which the areas currently proposed within the Panel Areas (including solar development and environmental mitigation and enhancement), excluding Cable Corridors are defined in Table 2-1, and shown on Figures 2.2 to 2.6.

Table 2-1 Overview of proposed Panel Areas

Panel Area	Size (ha)
Western Panel Area	161
Central Panel Area	534
Northern Panel Area	240
Eastern Panel Area	304
Southern Panel Area	438
Total	1,677

2.3.1.2 The draft Order Limits also comprise Cable Corridors within which the underground cable between the Panel Areas would be located. These corridors will be narrowed further in some locations prior to submission of the DCO application.

2.3.1.3 The entirety of the Proposed Development is within the administrative boundary of Breckland Council.

2.3.1.4 The draft Order Limits include the maximum extent of land that is currently expected to be included within the DCO application for the Proposed Development, and considers land required for the solar PV modules, Battery Energy Storage Systems (BESS), underground cables, substations and other supporting infrastructure, as well as mitigation and enhancement measures such as landscape design.

2.3.1.5 The draft Order Limits are described in the following sections of this chapter, and are shown in Figures 2.2 to 2.6. Key environmental designations present across each Panel Area are described accordingly in Section 2.3.2, the designations across the draft Order Limits are shown in Figure 2.7.

2.3.1.6 The land within the draft Order Limits is generally rural and comprises undulating agricultural landscape ranging from 15m AOD (Above Ordnance Datum) to 95m AOD. The valley of the River Nar creates steeper sloping topography towards the north of the draft Order Limits. The draft Order Limits consist of a mix of agricultural land quality grades, including Grade 2 or Subgrade Grade 3a quality which are identified as Best and Most Versatile (BMV) agricultural land.

- 2.3.1.7 Land uses on and in the areas surrounding the Proposed Development are predominantly agricultural activities with dispersed settlements which support local services, including the towns of Swaffham and Dereham, but also smaller villages, hamlets and individual residential properties around Necton, Little Fransham, Bradenham, Ashill, Saham Toney, Saham Hills, Wendling, Scarning and High Green. Royal Air Force (RAF) Marham is located 340m to the west of the Western Panel Area.
- 2.3.1.8 Panel Areas are located either side of a number of major roads and routes, including the busy A47 trunk road, which crosses the draft Order Limits from west to east, and the A1065 which runs north to south through the centre of Swaffham. Numerous minor roads cross the rural landscape, connecting small villages, hamlets and individual properties.
- 2.3.1.9 Pylons carrying 400kV power lines cross the draft Order Limits from South Acre in the west to Westfield in the east via Necton Substation which sits just outside the draft Order Limits.
- 2.3.1.10 Hedgerows and scattered trees form field boundaries between generally large-scale fields and smaller scale fields are generally located at the fringes of settlements. There are some small areas of broadleaved and mixed woodlands and plantations, along with hedgerows and lines of trees, generally these form the field margins. Small amounts of grassland are present, mainly as strips alongside hedgerows.
- 2.3.1.11 The Proposed Development is predominantly set within agricultural land, which due to its existing use, is not in itself a key recreational attraction or destination. The land does, however, play a role in providing a landscape context to recreational use of waterways and walking and cycling routes.
- 2.3.1.12 Members of the public can access countryside and nature through numerous Public Rights of Way (PRoW) through and immediately adjoining the draft Order Limits, predominately around the Central and Western Panel Areas around Swaffham, Drymere and South Acre. Peddars Way and Norfolk Coast Path National Trail runs adjacent to the Central Panel Area.

2.3.2 Environmental Designations

- 2.3.2.1 Statutory environmental designations, and other key features, are shown on Figure 2.7 of this PEIR.
- 2.3.2.2 The Western Panel Area is located immediately adjacent to the Breckland Special Protection Area (SPA) and Breckland Forest Site of Special Scientific Interest (SSSI). Ancient woodland is present along the boundary of the draft Order Limits.
- 2.3.2.3 The draft Order Limits are located within National Character Area (NCA) Profile: 84 Mid Norfolk (NE523).
- 2.3.2.4 There are three Scheduled Monuments within the draft Order Limits:

- Hangour Hill (NHLE 1003160) – a prehistoric burial mound;
- Roman enclosure 3/4 mile (1210m) NE of Panworth Hall (NHLE 1003965) – the earthwork remains of a Roman enclosure; and
- Devil's Dyke, Beechamwell and Barton Bendish. Section 1km in length West of Smeeth Wood (NHLE 1003973) – a large linear earthwork of possible early medieval date.

2.3.2.5 Wendling Beck runs just outside the draft Order Limits, along the boundary of the Northern Panel Area. There are several unnamed tributaries to Wendling Beck, some of which are within the draft Order Limits. The River Wissey flows through the Southern Panel Area, and the River Tud is located just outside the Eastern Panel Area.

2.3.2.6 The majority of land within the draft Order Limits is located within Flood Zone 1, an area with a low probability of flooding from rivers and the sea, with some minor instances of Flood Zones 2 and 3 located in the Northern and Southern Panel Areas.

2.4 Description of the Proposed Development

2.4.1 The Proposed Development

2.4.1.1 The Proposed Development is a solar farm capable of generating over 50MW Alternating Current (AC) of electricity with co-located BESS, located between Narborough and Dereham in the county of Norfolk in the East of England.

2.4.1.2 The Proposed Development comprises five Panel Areas. Panel Areas are defined as an area within the draft Order Limits that contain a group of solar PV modules. The solar PV modules will either be fixed in position or will track the sun throughout the day; both options remain under consideration in this PEIR, to ensure the worst case is considered, and may be confirmed prior to the submission of the DCO application. A total of up to 7no. 132 kV substations, are currently assumed to be required.

2.4.1.3 The Proposed Development includes a series of 33kV and 132kV underground cables between the proposed Panel Areas and the up to 7no. on-site substations. A range of supporting infrastructure is required for the Proposed Development, comprising BESS; transformers, inverters, DC-DC converters and customer switchgear for managing the electricity produced; storage containers to hold equipment for maintenance; drainage, weather masts and security measures such as fencing, closed circuit television (CCTV) and sensor triggered lighting.

2.4.1.4 The Proposed Development will include environmental mitigation and enhancement measures to avoid or reduce adverse impacts on the surrounding environment and nearby communities. The detailed design specifications of the Proposed Development have not yet been finalised and will be reviewed following the outcome of the specialist assessments undertaken as part of the EIA, and statutory and non-statutory consultation feedback.

- 2.4.1.5 In addition, the Proposed Development may also include mitigation works on access roads approaching the Panel Areas. The need for and detail of these works is being developed through further assessment, design, and stakeholder engagement. It is anticipated that works could include the creation of passing places and potentially, localised junction widening in some areas.
- 2.4.1.6 Due to rapidly changing and evolving solar and energy storage technology, the Proposed Development parameters are designed to maintain flexibility to allow the latest technology to be installed at the time of construction. However, as outlined in Chapter 4, this PEIR, and the ES, will assess the reasonable worst-case scenario for key design parameters.

2.4.2 Solar Panels

- 2.4.2.1 Solar panels generate electrical power by using a solar PV module to convert sun light into direct current (DC) electricity. Individual solar PV modules, more commonly known as solar panels, contain several PV cells wired and encapsulated by tempered glass. Solar PV modules are sealed for weatherproofing and held together by a metal frame in a mountable unit.
- 2.4.2.2 Individual solar PV modules are typically 2m by 1m in width and depth and can vary in height. However, as solar PV modules are rapidly developing due to innovation in technology and processing techniques for the PV cells, the dimensions of the solar PV modules available at the time of construction may vary. Assessments therefore consider a height parameter which represents the worst-case scenario in terms of identifying potential environmental effects.
- 2.4.2.3 It is possible to install the solar PV modules as fixed or as tracking, which adjust the position of the solar PV modules to track the sun throughout the day. The exact number and arrangement of modules depends on a range of factors including the size of the system, the type of technology (fixed or tracking), its location and the direction in which the panels are installed. As technology and equipment is evolving, some flexibility in design is required to accommodate technology advances.
- 2.4.2.4 Table 2-2 presents a summary of the design parameters considered in this PEIR, and the key differences between fixed and tracking solar PV modules. Typical solar PV module design is shown on Figure 2.8.

Table 2-2 Solar PV module parameters

Parameter	Fixed	Tracking
Panel alignment	Rows of solar PV modules aligned in East-West rows with panels facing South	Rows of Solar PV modules mounted on a metal tracking system aligned in North-South rows with panels rotation East-West
Angle	+/- 10° to 30°	+/- 60°
Orientation	South	East-west

Parameter	Fixed	Tracking
Separation distance	Minimum 4m and maximum 12m between rows	Approximately 4 – 6m between rows when the solar PV modules are at full vertical tilt
Height	Maximum height of up to 3m. Minimum height of the lowest part of the panel would typically be 0.8m.	Maximum height of 3m, which would vary throughout the day. Minimum height of the lowest part of the panel would typically be between 0.4m-1m.
Panel colour	Typically dark blue or black	Typically dark blue or black
Mounting structure	The mounting structure for the solar PV modules is a metal frame (usually anodised aluminium alloy) securely fixed to the ground by galvanized steel poles which are typically driven into the ground to a depth of approximately 1m. Where archaeological protection has been identified as required through the assessment process, an alternative mounting structure would be proposed, in the form of ballast slabs which sit on the surface rather than penetrating the ground.	

2.4.3 On-site Supporting Equipment

2.4.3.1 A range of equipment is required to support the solar PV modules to convert the electrical power generated, manage this power, and export power onto the national grid. The electrical output from the solar PV modules would be exported by low voltage cabling to shipping container style storage units which would contain an inverter, transformer and BESS. The function of each of these elements are as follows:

- Inverter units convert the DC electricity generated by the solar PV modules into AC electricity that can be exported to the electricity distribution network. Transformers monitor, increase and control the voltage of the electricity produced before it reaches the on-site 132kV substations. The transformers would be located adjacent to the inverters.
- BESS units are likely to consist of lithium-ion batteries and would allow energy to be stored within the Proposed Development, providing a balance in electricity generation where surplus electricity is produced. BESS would allow the energy from the solar PVs to be stored then released when required and would comprise containerised battery storage systems, DC-DC converter boxes and ancillary equipment.
- The Proposed Development would utilise switchgears to control, protect and isolate electrical currents and equipment. Switchgears allow parts of the solar PV system to be de-energised safely, allowing for routine maintenance or faults to be identified and work undertaken. A typical customer switchgear of the style likely to be used on the Proposed Development is shown in Figure 2.10.

- 2.4.3.2 The inverters, transformers, and BESS and DC-DC converters would generally be arranged together as 'Hybrid Packs' in locations across the Proposed Development as indicated in the Outline Environmental Masterplan. Typical parameters for the on-site supporting infrastructure is set out in Table 2-3

Table 2-3 *Inverters/BESS/DC-DC converter/hybrid pack/customer switchgear parameters*

Component	Parameters
Inverter unit (including transformer and auxiliary equipment)	Height: 3.5 m Length: 12.5 m Width: 2.5 m Foundations: 300mm concrete slab with gravel on-top (as a worst case) Colour: Light grey, white, dark green or similar
BESS unit	Height: 3.5 m Length: 6.5 m Width: 2.5 m Foundations: 300mm concrete slab with gravel on-top (as a worst case) Colour: Light grey, white, dark green or similar Type: Lithium Ion
DC-DC converter	Height: 2.3m Length: 1.8m Width: 0.9m Foundations: 300mm concrete slab with gravel on-top (as a worst case) Colour: Light grey, white, dark green or similar
Hybrid pack (including inverters, units, DC-DC converters and BESS)	There could be some stand-alone inverter units and BESS units spread across the draft Order Limits. However, the majority of the BESS, inverter units and converters would be arranged together throughout the site as a hybrid pack. Each hybrid pack would comprise of four BESS units, one inverter unit and four direct current (DC)-DC converters with a footprint of 13m by 22m and a maximum height of 3.5m. Foundations: 300mm concrete slab with gravel on-top (as a worst case) Colour: Light grey, white, dark green or similar
Customer Switchgear	Height: 3 m Length: 12.5 m Width: 2.5 m Foundations: 300mm concrete slab with gravel on-top (as a worst case) Colour: Grey
Storage containers	Containers to contain extra equipment to support maintenance activities. The parameters are same as for customer switchgear.

- 2.4.3.3 The typical layout of this supporting infrastructure, and access required to it, is provided in Figure 2.9.

- 2.4.3.4 Low voltage cabling within the Panel Areas would be required to connect solar PV modules and the BESS to inverter units/hybrid packs (which include transformers) where the voltage is transformed from the lower voltage to 33kV.

- 2.4.3.5 Cabling from the solar PV modules to the inverter units/hybrid packs would typically be installed above ground, fixed to the mounting structure of the modules, with a small section placed underground where it leaves the solar PV modules and connects to the inverter units/hybrid packs.

2.4.4 Underground Cable Corridors

- 2.4.4.1 The electrical connection to the Proposed Development would comprise both 33kV and 132kV underground cables located between the Panel Areas, and are described further below.

33kV Underground Cables

- 2.4.4.2 33kV underground cables would connect the solar PV modules and Panel Areas to the proposed on-site 132kV substations which would be located in a number of locations across the land within the draft Order Limits.

- 2.4.4.3 These cables could be located within the draft Order Limits (e.g. within the Panel Areas and within the cable corridors between Panel Areas, as presented on Figure 2.1). Cable Corridors are currently around 100m to 400m wide to allow flexibility in design as ground conditions and other constraints are further understood, and may be refined prior to submission of the DCO application. Other factors, such as ongoing survey work, landowner engagement and any feedback received during the consultation and engagement process may also influence this, and will be considered in the EIA and reported in the ES.

132kV Underground Cables

- 2.4.4.4 The 132kV cables would connect the on-site 132kV substations to the 400kV substation, should this be located within the draft Order Limits (see Section 2.4.7). These may be installed by conventional trenching or a cable plough could be used to lay the cable. The routes for the 132kV cable could be located within the draft Order Limits, within the Panel Areas or within cable corridors presented on Figure 2.1 and may be further refined before being finalised for the DCO application.

Cable Parameters

- 2.4.4.5 The Cable Corridors presented therefore capture the worst-case scenario. Cable parameters are set out in Table 2-4.

Table 2-4 *Cable parameters*

Component	Parameters
33kV cables	Installation technique: either cable plough or open cut trench, assumed trench as a worst-case scenario Trench dimensions: 1.2m wide, 1.5m deep Construction working width: 10m
132kV cables	Installation technique: either cable plough or open cut trench, assumed trench as a worst-case scenario

Component	Parameters
	Trench dimensions: 2m wide, 1.6m deep Construction working width: 30m

- 2.4.4.6 The Cable Corridors are currently being surveyed as shown in Figure 2.2. The preferred cable routes will be confirmed as part of the DCO application but are expected to be within the draft Order Limits.

2.4.5 On-site 132kV Substations

- 2.4.5.1 It is currently assumed that seven no. 132kV substations would be required for the Proposed Development to connect the Panel Areas to the electricity distribution network. The substations would also house other electrical equipment such as transformers, customer switchgear, and metering equipment.
- 2.4.5.2 The purpose of these on-site substations is to 'step up' low voltages from electricity generation to high voltages, using power transformers. The exact locations of these substations across the Panel Areas are yet to be defined and will be presented as part of the DCO application, indicative locations are shown in Figures 2.2 – 2.6. Typical 132kV substation parameters are set out in Table 2-5.

Table 2-5 132kV substation parameters

Component	Parameters
Substation compound	Maximum height: 15m (which would only relate to a communications tower, with the highest electrical equipment being 8m) Width: 50m Length: 80m Foundations: Regular piled foundations up to 2m BGL Area of hardstanding: 4000m ² per substation, to be a mixture of concrete and crushed rock with drainage provided Fencing: palisade fence, 2.4m in height Note – the dimensions above include the operational parking/turning area.

- 2.4.5.3 A typical 132kV substation is shown in Figure 2.11.

2.4.6 Supporting Infrastructure

- 2.4.6.1 Additional infrastructure would be required to support the operation of the Proposed Development. The following equipment would be installed across the draft Order Limits as follows:
- **Fencing and gates** – a perimeter security fence would be installed to enclose the operational areas of the Proposed Development. The fence is likely to be a deer fence with a height of approximately 2m. The fence would be designed in such a way to allow small animals to pass through and would also be gated to allow access to and from the Proposed Development. The substations would

require palisade fencing for security reasons as set out in Table 2-5 and typical fencing is shown in Figure 2.12.

- **CCTV** – pole-mounted, infra-red security detection cameras would be mounted on poles of up to approximately 3m in height located within the perimeter fence. These cameras would have motion detection technology for recording and would be pointed directly into the Proposed Development and away from any land outside of the draft Order Limits. A typical CCTV pole is shown in Figure 2.13.
- **Lighting** – in general, the Proposed Development would not be lit. The exception would be at the substations, where sensor-triggered lighting will be needed for security/safety reasons. The substations would generally not be occupied by personnel overnight so the lighting would not be on continuously. The lighting infrastructure is expected to be approximately 10m in height.
- **Access tracks** – access to the Proposed Development during operation would be required for maintenance. Access tracks would be permeable to allow water to filtrate through and maintain greenfield runoff rates. Each access point would be approximately 8m wide at the point of entry/exit and the internal tracks would be up to approximately 4.5m wide.
- **Drainage** – the detailed operational drainage design for the Proposed Development will be developed after development consent is granted but prior to construction, likely to be secured as a Requirement of the DCO. The overarching principle of the drainage strategy is to provide sustainable drainage solutions (SuDS) at source, ensuring that surface water run-off is managed appropriately. A Preliminary Drainage Strategy describing the overarching principles is provided as Appendix 14.2 to this PEIR.
- **Weather masts** – these are only required if tracker panels are used; up to 0.5 masts per inverter unit/hybrid pack (1 mast per 2 inverters) would be required. These would be dispersed across the site and would be approximately 5m in height.

2.4.7 National Grid Connection

- 2.4.7.1 The Applicant has received a Bilateral Connection Agreement from National Grid Electricity Transmission (NGET) for the connection of High Grove Solar to the transmission network.
- 2.4.7.2 The agreement identifies that a new 400kV substation would be required, connected to an existing circuit between Necton and Norwich Main substations. This new substation is required to increase capacity on the network to facilitate delivery of a number of projects, so is not only required for High Grove Solar.
- 2.4.7.3 NGET has commenced their substation siting process, and the exact location of the substation will not be confirmed until this process is concluded.
- 2.4.7.4 The final location of the substation will be dependent on many factors such as technical, design and environmental factors, as well as other factors outside the

control of the Applicant. This includes the requirements of National Grid, the owners of the national distribution network infrastructure, and their further appraisal and connection considerations.

- 2.4.7.5 Following the conclusion of the siting work, NGET would then progress a separate consenting process for the new substation and would own and operate the substation following construction.
- 2.4.7.6 For the purposes of this PEIR, no assessment is therefore made of the 400kV substation beyond the assessment of 132kV connection cables being laid within the draft Order Limits. The potential substation will be included within the cumulative schemes considered as part of Chapter 15 of the ES should sufficient information be available at the time of writing.
- 2.4.7.7 It is assumed that a connection would be possible on the following basis:
- a) Utilising 132kV cable connections within the draft Order Limits as described in Section 2.4.4 (where the substation is sited within the draft Order Limits).
 - b) A change to the Order Limits for the Proposed Development prior to submission of the DCO application, alongside associated further, targeted consultation and assessment work (where the substation is sited outside the draft Order Limits).
 - c) Utilising on-road cable routes, or via a subsequent, separate planning application for the cable route between the draft Order Limits and the new 400kV substation (where the substation is sited outside of the draft Order Limits).
- 2.4.7.8 Progressing a project under these scenarios is not uncommon where NGET siting assessment is continuing alongside the preparation of an application. The Applicant continues to engage with NGET on this process and approach.

2.4.8 Environment-led Design

- 2.4.8.1 The design of the Proposed Development aims to avoid adverse environmental impacts where possible and to integrate the Proposed Development into the wider landscape from the outset. This has been informed by understanding the environmental constraints within and around the draft Order Limits and steering development away from sensitive areas, whilst protecting space for appropriate mitigation.
- 2.4.8.2 An Outline Environmental Masterplan has been developed at this early design stage to illustrate the potential use of the land within the draft Order Limits. This has been developed in collaboration with ecologists and landscape architects to ensure a coherent design approach, integration into existing environmental and green infrastructure, and avoid or minimise loss or damage to biodiversity, nature and communities as well as to ensure a biodiversity net gain. The Outline Environmental Masterplan includes elements of the landscape design that are integral to, and embedded in, the design of the Proposed Development and additional mitigation that has been, and may continue to be, identified and developed as part of the ongoing EIA process.

- 2.4.8.3 Additionally, a draft Design Approach Document (DAD) has been produced and is available at this statutory consultation stage to set out the project design principles used in developing the design, and the parameters to be secured and implemented through the DCO. This document will be updated following the close of the statutory consultation and submitted with the DCO application.

Design Vision

- 2.4.8.4 In line with the Planning Inspectorate's advice on good design [20], a vision statement was developed following preliminary environmental assessment work and consultation with stakeholders and local residents. The vision statement is aspirational, recognising the opportunities for enhancement and creating a legacy for local people and places. The design vision for the Proposed Development is:

"High Grove Solar Farm will deliver up to 720mw of clean, renewable energy to the national grid, helping the UK move towards net zero carbon emissions by 2050. The Proposed Development will integrate with and enhance the existing landscape framework, responding positively to the local character and connecting habitats and people with nature to deliver wider environmental net gain and to create a legacy for local communities".

- 2.4.8.5 For more information, see the draft DAD provided at this statutory consultation.

Design Principles

- 2.4.8.6 As part of the environment-led approach to the design, a set of project level design principles has guided, and will continue to inform, the design of the Proposed Development in line with the NIC Design Principles for National Infrastructure [21], these are set out in the draft DAD published as part of the consultation documentation.

Embedded and Good Practice Mitigation

- 2.4.8.7 In addition, the following mitigation is already considered embedded within the design of the Proposed Development. These include, but are not limited to:

- 15m buffer from panels to woodland and ancient woodland.
- The construction compounds will be located on low diversity (NERC s.41 Priority) habitat
- An appropriate buffer of at least 10m will be maintained between properties and construction works which have the potential to generate vibration and lighting.
- 132kV substations, BESS and inverters will be located at least 200m from residential properties.
- Minimum 5m buffer for trees suitable for bats, and a minimum 5m buffer between solar PV modules and hedgerows. Additional buffers or appropriate working methods will be employed in respect of Root Protection Areas.

- Careful consideration of cable routing will be given to avoid or minimise impacts on valued landscape features and habitats.
- Minimum 9m offset from all infrastructure (including fencing) from bank top of all riparian boundaries and watercourses (except where crossing).
- Fencing to be designed to let small mammals pass through (excluding that around proposed substations).
- SuDS will be provided at source, where practicable, ensuring that surface water run-off is managed consistently with existing site conditions.
- Access tracks will be permeable using compacted gravel to allow water to filtrate through and maintain greenfield runoff rates.
- Any access tracks, cable routing and fencing will be located to pass through existing gates and gaps in hedgerows where feasible.
- The placement of BESS and other infrastructure will avoid historic pits and compressible ground.
- Existing hedgerows in poor condition or gappy will be reinforced with planting/management where feasible.
- In general, the Proposed Development would not be lit. The exception would be at the substations, where sensor-triggered lighting will be needed for security/safety reasons. The substations would generally not be occupied by personnel overnight so the lighting would not be on continuously.
- Careful siting the Proposed Development in the landscape to avoid or reduce the loss of existing vegetation and siting solar PV modules and other above ground infrastructure to relate to existing landform and vegetation patterns to maximise landscape integration.
- Large areas of panels will be avoided where feasible, broken up by hedgerow planting along historic field boundaries to maximise landscape integration
- Where temporary habitat loss will occur, such as the removal of sections of hedgerow to accommodate cable routes, these features will be reinstated following construction as far as practicable.
- Where possible, underground cables would be installed using a cable plough or trenching. These are considered the most efficient methods of cable installation.
- Minimising fragmentation of residual agricultural land.
- Avoiding locating infrastructure other than panels on BMV agricultural land as far as reasonably possible.
- Installation of equipment that is compliant with the relevant exposure limits, in accordance with the provisions of the Government's Code of Practice on Compliance, which is compliant with the International Commission on Non-Ionizing Radiation Protection (ICNIRP) guidance.
- All solar farm infrastructure (solar PV modules, substations, BESS and inverters) will not be publicly accessible, and security measures such as fencing, CCTV and lighting will be installed.

- Avoid locating critical infrastructure within Flood Zones 2 and 3, ensuring that solar PV modules are raised above the predicted maximum flood depth for the 100 year plus climate change scenario.
- Avoidance of physical disturbance through design, including a 10m buffer between designated heritage assets and areas of construction activity.
- If below ground archaeology constraints arise through further site investigation the mounting structure of solar PV modules will utilise options such as ballast slabs, anchor, or block which sit on the ground surface where this is necessary and appropriate to mitigate any impacts to the archaeological remains.
- Large areas of panels will be avoided where feasible, broken up by hedgerow planting along historic field boundaries to maximise landscape integration
- Minimum 250m offset from substations and BESS from landfill sites.
- The final design of the Proposed Development will consider pit locations to minimise impacts.
- Existing access to community facilities/assets to be maintained at all times or a suitable equivalent provided.
- Suitable standoff from springs and existing abstractions (standoff will be dependent on construction activities, local conditions and receptors to prevent derogation).

2.5 Construction, Operation and Decommissioning

- 2.5.1.1 This section considers the approach to construct, operate and decommission the Proposed Development. This represents a feasible approach considering the nature and scale of the Proposed Development to allow preliminary assessment of potential effects, and adopts a reasonable worst case approach to ensure potentially significant effects are identified. The final approach to delivery would be further developed by design engineers and construction engineers, however, would remain within the environmental envelope and effects identified in the assessment.
- 2.5.1.2 An Outline Construction Environmental Management Plan (oCEMP) will be submitted with the DCO application which sets out the measures, commitments and actions identified in the ES to manage environmental effects during construction. These measures, commitments and actions would be carried forward to a CEMP which will be secured by Requirement of the DCO and would be for the approval of the relevant local planning authority prior to commencement of the Proposed Development.
- 2.5.1.3 A draft version of the oCEMP is provided as part of the consultation documents. For information on the construction stage, see Section 2.5.2 below.

2.5.2 Construction

Construction Programme

- 2.5.2.1 It is expected to take up to 2.5 years to construct the Proposed Development. A reasonable worst-case scenario for the construction programme has been used in this assessment and will be assessed and presented in the ES, in accordance with the design parameter approach. The programme that has been assessed can be described in high level terms as follows:
- Each Panel Area is expected to take 6-12 months to construct.
 - The Panel Areas would be constructed in phases, with up to two Panel Areas anticipated to be under construction at any one time.
- 2.5.2.2 Installation of the 33kV and 132kV underground cables within and between each Panel Area would take place in parallel with construction of the Panel Areas themselves. Cable installation would take place across the 2.5 year programme, with the cables associated with each Panel Area expected to take up to 8 months each to install (in parallel with the construction of the Panel Areas).
- 2.5.2.3 The final programme will be dependent on the detailed layout design and potential environmental constraints on the timing of construction activities.
- 2.5.2.4 The installation of solar PV modules does not involve any complex construction processes or practices and therefore risk of delay beyond this programme would largely be driven by adverse weather conditions. Many component parts of the Proposed Development would arrive on-site ready to be installed. It is anticipated that Abnormal Indivisible Loads (AILs) would be required to enable construction of the on-site substations and the Transport Statement would confirm the number and suggested routing of these movements via A11, A47 and A1065. A preliminary assessment is including in PEIR Chapter 13 Traffic and Transport.

Construction Activities

- 2.5.2.5 The types of construction activities can be broadly grouped into the following headline categories:
- Preparatory works, mobilisation and enabling works;
 - Foundations (for 132kV substations, inverters, BESS, DC-DC converters, customer switchgear);
 - Module delivery and installation;
 - Commissioning; and
 - Site Reinstatement and Habitat Creation.
- 2.5.2.6 It should be noted that activities would overlap with one another rather than being undertaken sequentially (e.g. preparatory works could be taking place on one part of the site, while foundations are being installed in another, and modules are also starting to be delivered). The activities expected to take place are set out in further detail below.

Preparatory Works, Mobilisation and Enabling works

- 2.5.2.7 The first stage of construction includes activities to enable and prepare the site for the construction of the Proposed Development. The types of activities that may be required during this stage are likely to include:
- Establishment of and/or works to site access point(s);
 - Installation of any temporary / permanent culverts under water courses/ditches;
 - Ground clearance activities;
 - Construction of any access tracks and laydown areas with the Panel Areas - this will be one of the first items within the construction programme to ensure that the majority of the construction traffic enters the Panel Areas from their new access points;
 - Establishment of construction compounds at each Panel Area;
 - Establishment of mobilisation areas, tracks and temporary construction compounds for cable installation;
 - Erection of security fencing around the site perimeter, as well as access gates;
 - Installation of security measures such as CCTV;
 - Delivery of plant and machinery to site; and
 - Delivery of materials to enable first stages of construction.
- 2.5.2.8 The design has been informed by utilities searches, however, there are still a number of utilities crossing the draft Order Limits. Prior to construction, the Applicant would review the utilities plans and use them to inform the plans for the proposed works to ensure all known utilities are avoided wherever practicable or otherwise diverted with the agreement of the relevant statutory undertaker. Necessary offsets to known assets have been considered, and will continue to be taken into account in the design and associated effects assessed and reported in the ES.

Construction of the Proposed Development – Foundations, and Module Delivery and Installation

2.5.2.9 Following the preparatory works, construction of the Proposed Development would commence, including foundations, and module delivery and installation.

2.5.2.10 The types of activities that may be required during these stages are likely to include:

- Solar PV module installation
- Installation of solar PV module support structures
- Mounting of solar PV modules
- Installation of hybrid packs (including inverter units, DC-DC converters and BESS), standalone inverter units, standalone BESS units, customer switchgear and storage containers.
- Construction of the on-site substations
- Construction of supporting infrastructure, such as fencing and access tracks, for example.
- Cable installation
- Site clearance activities such as stripping of topsoil, trenching (if required), storage and capping of soil
- Installation of construction drainage with pumping (if required)
- Installation of cabling across the solar PV module areas and connection to the inverters
- Installation of cables between inverter platforms, transfer stations and collecting stations and onto the point of connection and the proposed 400kV substation (if required as part of the Proposed Development)

Panel Area Installation and Supporting Infrastructure

2.5.2.11 The following activities would be required to install the solar PV modules:

- Import of components to the Order Limits
- Site preparation and civils for the on-site substations
- Piling and erection of solar PV module support structures, with foundations to a depth of circa 1m
- Mounting of solar PV modules – this would be undertaken by hand
- Trenching and installation of electric cabling
- Transformer, inverter and customer switchgear foundation excavation and construction
- Installation of transformers, inverters and customer switchgears. Cranes would be used to lift equipment into position
- Installation of the substation

- Installation of control systems, monitoring and communication

Cable Installation

2.5.2.12 The following activities would be required to install the cable routes:

- Site preparation
- Cable ploughing, trenching and installation of electric cabling
- Reinstatement works where necessary

2.5.2.13 It is anticipated that underground cables would be installed using a cable plough or trenching, wherever possible. The underground cables would be located in existing gaps in hedgerows wherever feasible, however the assessment assumes the loss of some hedgerows as a worst case. Trees to be removed as part of the Proposed Development will be included within an Arboricultural Impact Assessment (AIA) which will support the DCO application. A Draft AIA is available in Appendix 10.4.

2.5.2.14 Only in instances where the cable plough or trenching cannot be used, alternative methods, such as trenchless methods, would be used in more constrained locations such as going underneath certain watercourses and roads by Horizontal Directional Drilling (HDD) or clear span bridges. Where HDD is proposed beneath a watercourse, cables will be installed at an appropriate depth to ensure the integrity of the watercourse is not impacted.

Commissioning

2.5.2.15 Following construction, the Proposed Development would go through a stage of testing prior to being commissioned and the first electricity generated and supplied to the grid. This is likely to involve mechanical and visual inspection of the Proposed Development, as well as electrical and equipment testing.

Site Reinstatement and Habitat Creation

2.5.2.16 A programme of landscape and habitat reinstatement and creation would commence during the construction phase. Generally, the implementation of landscape and habitat mitigation and enhancement works will follow on from the main construction activities in each part of the draft Order Limits to avoid any abortive damage to proposed environmental features from construction. For example, it is anticipated that areas under the panels and in the adjacent landscape buffers around each panel area would be seeded with a locally suitable diverse meadow mix and managed mix. This is intended to substantially improve the ground flora, benefiting both biodiversity and soil structure over time.

2.5.2.17 Opportunities will be sought for any advance planting and seeding, which could take place during or even before the stages outlined above. Examples of this might include early planting of new or reinforcement hedgerow on the periphery of the site, or planting of woodland blocks or trees in areas where construction activities will not create a conflict.

- 2.5.2.18 Following after care maintenance, ongoing management of the landscape and ecological features and site reinstatement will be undertaken in accordance with a Landscape and Ecological Management Plan (LEMP), and outline version of which (oLEMP) will be submitted as part of the DCO application. These measures, commitments and actions would be carried forward to the LEMP to be developed substantially in accordance with the oLEMP and submitted to the local planning authority for approval, as secured via a Requirement of the DCO. A draft of the oLEMP is included in the consultation documentation. See the Outline Environmental Masterplan for the illustrative landscaping plans for the Proposed Development.

Construction Staff and Construction Hours

- 2.5.2.19 Construction activities would take place between:
- 07.00 – 19.00 Monday to Friday; and
 - 07.00 – 13.00 Saturday
- 2.5.2.20 The following controls will also apply to the construction works:
- No works, including site deliveries and collections, will take place outside of these hours, or on Sundays or Bank/Public Holidays unless necessary and agreed with Breckland Council; and
 - Employees would travel to and from site an hour on either side of these times (exceptions may be required for abnormal loads and emergency purposes).
- 2.5.2.21 It is anticipated there would be approximately 265 staff working on average with a peak of workers of 350 for limited peak periods.

Plant

- 2.5.2.22 It is anticipated that the principal plant required to install the Proposed Development would include:
- Excavator
 - Mobile crane
 - Crawled Dozer
 - Push press piling rig
 - Power generator
 - Telehandler
 - Trucks (including Heavy Goods Vehicles (HGV) and stone lorry)
 - Vibrating roller
 - Dumpers
 - Concrete mixers
 - Winches (for cable pulling)
 - HDD - drilling rigs, water tanks and generators

- Open cut trenches - excavators, grabbers, peckers, earth moving trucks

Construction Access and Public Rights of Way

- 2.5.2.23 Access into each of the Panel Areas would be required to facilitate construction, as well as allowing ongoing maintenance access from the local highway network. The requirements for access are accounted for within the draft Order Limits and at this stage, several options for access locations and route to and from them remain under consideration. The current access locations under consideration are shown in the Outline Environmental Masterplan provided as part of the consultation documents. As a general assumption, traffic will travel as far as possible along A road routes; A11, A47 and A1065.
- 2.5.2.24 Existing Public Rights of Way (PRoW) can generally be kept open during construction with diversions. Crossing points would be managed with banksmen. If any temporary closures are required they would be limited in duration as far as possible. Existing PRoW are shown on Figure 2.7. HDD would not generally be used where cables cross PRoW, unless a specific need to is identified through the assessment process.

Construction Compounds

- 2.5.2.25 It is anticipated that several construction compounds would be required for the construction of the Proposed Development. This is expected to include at least one central compound on each of the Panel Areas, as well as a number of satellite compounds across the site.
- 2.5.2.26 At this stage, the compounds are expected to be up to approximately 6,000m² and it is intended that a 'Durabase Mat System' or a similar non-ground penetrating mat system would be used.
- 2.5.2.27 The compounds would contain construction worker welfare facilities, space for a site office, parking spaces, wheel wash areas, plant and machinery storage, Heavy Goods Vehicle (HGV)/delivery turning areas and waste storage areas, as required. Staff parking would very largely be at the central compounds, with staff transported from the central compounds to the satellite compounds by shuttle bus or in shared cars. A limited number of parking spaces may also be provided at some of the satellite compounds.
- 2.5.2.28 For security and safety purposes, any live construction areas would be closed to the public throughout the construction phase. Hazard warning signs would be installed and the permanent CCTV would also be installed an operational as early as possible to provide additional security.

Waste Management

- 2.5.2.29 The Proposed Development is likely to generate waste comprising general construction waste, including packaging waste from materials, and construction materials from access roads and supporting infrastructure which would be managed appropriately through best practice waste management requirements placed on the appointed contractor. During operation, it is anticipated that waste

generation would be minimal. Waste from the decommissioning of the Proposed Development would be disposed of responsibly and undertaken in alignment with the future principles of recycling applicable at that time. Construction, operation and decommissioning of the Proposed Development is therefore expected to generate minimal waste arisings.

- 2.5.2.30 An oCEMP, an Outline Decommissioning Environmental Management Plan (oDEMP) and an Outline Materials and Waste Management Plan (oMWMP) will be submitted with the DCO application and will include the principles to be adhered to in relation to waste management. The final plans will be secured through DCO Requirement and approved by the local planning authority prior to relevant works commencing. Drafts of the oCEMP and oDEMP are included in the consultation documentation.

Construction Lighting

- 2.5.2.31 Temporary construction lighting of up to 10m height would be intermittently used throughout the construction phase for select operations in isolated locations only at the construction compounds. Construction lighting may be used within the Panel Areas during hours of darkness in the winter if works require this. Measures to minimise light spill, pollution and impacts during construction would be developed and included in the CEMP. A draft of the oCEMP is included in the consultation documentation and includes the following measures:

- Lighting will conform to best practice guidelines with respect to minimising light spill into adjacent habitats and prevent disturbance to bats and other species during construction
- The use of lighting will be minimised to that required for safe site operations. Infrared, movement sensor security lighting would be used at night. Lighting would be available for emergencies;
- Lighting will utilise directional fittings to minimise outward light spill and glare (e.g. via the use of light hoods/cowls which direct light below the horizontal plane, preferably at an angle greater than 20° from horizontal); and
- Lighting will be directed towards the middle of the construction area rather than towards the boundaries.

Construction Traffic

- 2.5.2.32 During construction it is anticipated that there will be a maximum of 106 HGV trips per day (212 two-way movements) during peak construction periods, distributed across the network and access points around the draft Order Limits.
- 2.5.2.33 Furthermore, the average 265 construction workers on site each day are expected to travel in the following ways:
- 145 car sharing (average two workers per vehicle = 73 vehicles (146 two-way movements))

- 120 by 4/5-seater cars /mini-bus shuttles to/from sites and nearby towns/villages = 24 vehicles (48 two-way movements)

2.5.2.34 This would increase as follows during limited peak periods where there are 350 workers on-site:

- 200 car sharing (average two workers per vehicle = 100 vehicles (200 two-way movements))
- 150 by 4/5-seater cars/mini-bus shuttles to/from sites and nearby towns/villages = 30 vehicles (60 two way movements)

2.5.2.35 It is anticipated that AILs would be required to enable construction of the on-site substations.

2.5.2.36 A Construction Traffic Management Plan (CTMP) will be produced which sets out the traffic management measures to be implemented during construction. The CTMP would be submitted to and approved by the relevant local planning authority prior to commencement. A Draft oCTMP is included in the consultation documentation.

2.5.3 Operation

2.5.3.1 The design life of the Proposed Development is 40 years. During the operational phase of the Proposed Development, on-site activities would be limited to maintenance activities, replacement of any components that fail, monitoring activities and vegetation management. Maintenance activities would include:

- Regular visual inspection of all infrastructure
- Regular scheduled inspections and testing of equipment
- Replacement of consumable items (e.g. inverter filters)
- Cleaning of solar PV modules, if required
- Repair or replacement of solar modules or other components, if damaged
- Delivery of spare parts, replacement equipment items and consumables
- Water management (e.g. clearing of drainage ditches)
- Vegetation management (e.g. cut back of grass, hedges, trees)

Operational Workforce

2.5.3.2 The number of people directly employed during the operation of the Proposed Development would be limited, given the nature of the activities taking place on site during this stage.

2.5.3.3 Permanent operational employees will be specially skilled electricians with training on solar PV maintenance. More irregular workers, such as those undertaking maintenance of landscaping measures and cleaning panels, will be trained appropriately in their relevant field.

Traffic and Access

- 2.5.3.4 Operational traffic would be minimal, limited to occasional visits taking place by a handful of operatives. The majority of these trips will be by cars or vans, rather than HGVs.
- 2.5.3.5 Access points will be those selected from the access points considered under paragraph 2.5.2.23 above for construction, the final selection of which is subject to further assessment and stakeholder engagement.

2.5.4 Decommissioning

- 2.5.4.1 The design life of the Proposed Development is 40 years. Decommissioning is expected to take 12-24 months and could be undertaken in phases.
- 2.5.4.2 The process of decommissioning would involve the removal of all solar PV modules, and the majority of on-site supporting equipment from the draft Order Limits, which would be recycled or disposed of in accordance with good practice and processes applicable at that time.
- 2.5.4.3 The 33kV and 132kV underground cables would remain in situ post decommissioning and are therefore not considered as part of the decommissioning works for the Proposed Development.
- 2.5.4.4 There is potential for the 132kV substations to be left on-site following decommissioning of the Proposed Development and handed over to the Distribution Network Operator. Each aspect chapter considers the worst-case scenario (e.g. agricultural land and landscape assume they remain, traffic and waste assume they are decommissioned). Should this assumption change when drafting the ES, this will be assessed appropriately for the operational and decommissioning stages.
- 2.5.4.5 Any requirements to leave certain elements of other infrastructure, for example access tracks, would be discussed and agreed with landowners as part of the decommissioning process. As this is not confirmed at this stage, the assessment will consider these assets removed during decommissioning; if they remain they will be considered as permanent infrastructure in the assessment reported in the ES.
- 2.5.4.6 Land within the Order Limits would be returned to its original use as far as practicable. Areas of established mitigation will be left in situ for the lifetime of the Proposed Development or other agreed management commitments. Ongoing negotiation with the relevant landowners would identify whether this would be removed by the Applicant during decommissioning or remain in situ, once agreed this will be considered under decommissioning works or as permanent as appropriate in the assessment.
- 2.5.4.7 Up to 99% of materials in a solar PV module are recyclable, with the number of solar panel recycling plants in the UK increasing. Companies which are aligned with the Waste Electrical and Electronic Equipment Recycling (WEEE) Regulations 2013 such as Recycle solar in Scunthorpe, Solar Recycling Solutions in Dartford

and Waste Experts based in Huddersfield are all Approved Authorised Treatment Facilities for solar waste [22].

- 2.5.4.8 The effects of decommissioning are expected to be similar to, or less than, the construction effects. This assessment is based on assumptions as to how decommissioning would take place, as they will be in the ES, and these assumptions are likely to change over time as practices for decommissioning evolve but are likely to result in improvements to the decommissioning process so unlikely to result in impacts which will be greater than reported in this PEIR or the final ES.
- 2.5.4.9 An oDEMP will be submitted in support of the DCO application which sets out the general principles to be followed in the decommissioning of the Proposed Development. These measures, commitments and actions would be carried forward to a detailed DEMP prepared by Applicant, and submitted to the local authority for approval in advance of the commencement of decommissioning works and would include timescales and methods for transportation of materials. A draft of the oDEMP is included in the consultation documentation.

Decommissioning Workforce

- 2.5.4.10 It is anticipated there would be between 50-75% of the average number of construction workers present on site during the decommissioning stage.

2.6 Management plans

- 2.6.1.1 A key control in limiting the impacts upon the environment from the Proposed Development will be a suite of outline management plans submitted with the DCO application, which will describe the measures to be implemented and have been assumed in place in the ES. These plans are then developed to full or detailed management plans by the Applicant in accordance with the outline plans, and would be in place throughout construction, operation and decommissioning (as relevant). The commitment to prepare and consult on these plans is secured via Requirement of the DCO.
- 2.6.1.2 The following outline management plans set out in Table 2-6 will therefore be prepared alongside the ES. Draft Outline Management Plans have been prepared and are available for review and comment as part of statutory consultation.
- 2.6.1.3 It is noted that further management plans may be identified as the Proposed Development progresses and as such this list is not exhaustive.

Table 2-6 Proposed management plans

Management Plan	Purpose	Stage
Outline Construction Environmental Management Plan (oCEMP)	Sets out how adverse environmental impacts will be minimised and managed during construction.	Construction

Management Plan	Purpose	Stage
Outline Construction Traffic Management Plan (oCTMP)	Sets out how construction traffic and staff vehicles will be managed during construction.	Construction
Outline Materials and Waste Management Plan (oMWMP)	Sets out how excavated materials that will be generated during construction of the Proposed Development will be re-used, recycled or disposed of in a manner that is compatible with the Waste Framework Directive [23] and associated regulations. [23]	Construction
Outline Soil Resources Management Plan (oSRMP)	Sets out the overall approach to managing soil resources affected by the Proposed Development.	Construction Operation Decommissioning
Archaeological Mitigation Strategy	Sets out how archaeological remains, both known and currently unknown, will be managed during construction.	Construction
Outline Battery Safety Management Plan (oBSMP)	Sets out the key measures for minimising the chances of a battery fire event, fire spread and potential environmental impacts in the event of a fire. Sets out the proposed operational response to a fire event.	Operation
Outline Landscape and Ecological Management Plan (oLEMP)	Sets out the management of the landscape and ecological features of the Proposed Development.	Construction Operation Decommissioning
Outline Public Rights of Way Management Plan (oPRoWMP)	Sets out how PRoWs would be managed to ensure they remain safe to use, and disruption to users of the PRoW is minimised.	Construction Operation Decommissioning
Outline Operational Environmental Management Plan (oOEMP)	Sets out how adverse environmental impacts will be minimised during operation.	Operation
Outline Decommissioning Environmental Management Plan (oDEMP)	Sets out how negative environmental impacts will be minimised decommissioning.	Decommissioning

3 Alternatives and Design Iteration

3.1 Introduction

- 3.1.1.1 This chapter provides an overview of the alternatives considered in developing the Proposed Development, including the initial site selection and the design development process to date. It summarises the appraisal of reasonable alternatives that has been undertaken, identifies the factors which have been considered, what has informed the design of the Proposed Development, and the main reasons for options selected or discontinued.

3.2 Legislative and policy context

- 3.2.1.1 The consideration of alternatives is undertaken in accordance with legislative requirements and the national policy context for nationally significant energy projects.
- 3.2.1.2 Regulation 14(2)(d) of the EIA Regulations [24] states that the ES must include:
- “A description of the reasonable alternatives studied by the applicant, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment.”*
- 3.2.1.3 Paragraph 2 of Schedule 4 to the EIA Regulations further states that the following information must be included in the ES:
- “A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.”*
- 3.2.1.4 The NPS EN-1 [1] states at paragraph 4.3.9:
- “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. Although there are specific requirements in relation to compulsory acquisition and habitats sites, the NPS does not change requirements in relation to compulsory acquisition and habitats sites.”*
- 3.2.1.5 It confirms that there is no general requirement within the NPS to consider alternatives, or to establish that the Proposed Development represents the best

option. NPS EN-1 does however identify in paragraph 4.3.10 and 4.3.22 the need to comply with any policy or legal requirement to consider alternatives, including those relating to the preparation of an ES or specific legislative requirements under the Conservation of Habitats and Species Regulations 2017 [25].

- 3.2.1.6 This chapter has been prepared in compliance with the requirements of the EIA Regulations to provide a description of the reasonable alternatives studied by the Applicant to date. Any further alternatives studied by the Applicant in developing the design of the Proposed Development following statutory consultation and prior to DCO application submission will be detailed in the ES. This approach is in accordance with NPS EN-1 [1].

3.3 Need for the Proposed Development

- 3.3.1.1 The need for the Proposed Development is defined by its contribution to the delivery of national policy targets for decarbonisation, including meeting Net Zero targets, energy security and ensuring affordability of energy supply.
- 3.3.1.2 The NPSs were established against legal obligations made as part of the Climate Change Act 2008 [4], as amended by the 2050 Target Amendment Order 2019 [5] for the UK to meet Net Zero greenhouse gas (GHG) emissions by 2050. The NPS set out a case for the need and urgency of new energy infrastructure, to support government policy on sustainable development.
- 3.3.1.3 On 17 January 2024, the revised energy NPSs were designated. As set out in Chapter 1, NPS EN-1 [1] identifies at paragraph 4.2.4 that there is a critical national priority (CNP) for the provision of nationally significant low carbon infrastructure. As such, it is considered that there is clear expression in relevant national policy of a needs case which supports the delivery of the Proposed Development.
- 3.3.1.4 As set out in Chapter 1, Section 1.3 further solar development is backed by UK Government policy including the Energy Security Strategy [6], the Energy White Paper: Powering our Net Zero Future [8], The 'Powering Up Britain' policy paper [9]. In July 2024 the Energy Secretary chaired their first Clean Energy Superpower Mission Board, where the drive to make Britain a clean energy superpower with a push for British-based clean, homegrown energy was continued. Following this, the Clean Power 2030 Action Plan [10] was developed in December 2024 to set out a path to decarbonise the electricity grid and strengthen Britain's energy security. The Action Plan sets the objective of reaching 45GW-47GW solar generation capacity by 2030.
- 3.3.1.5 The Proposed Development would provide enough low-carbon energy to meet the equivalent annual needs of around 363,000 typical UK homes. It would therefore make a meaningful contribution to local and national climate commitments, responding to an established need for increased solar capacity and a decarbonised energy system.
- 3.3.1.6 There are strong legislative and policy requirements and need for the Proposed Development which any 'do nothing' scenario would not achieve or comply with,

including the continued combustion of fossil fuels and associated emissions. Therefore, further consideration of any do-nothing scenario is not required.

3.4 Stakeholder Feedback

- 3.4.1.1 The design iteration of the Proposed Development has been informed in part by regular engagement undertaken with relevant statutory consultees, affected landowners, members of the public and local stakeholders. This has included a non-statutory public consultation period, meetings with statutory bodies, and meetings with landowners and local people in response to requests.
- 3.4.1.2 Feedback to date on the design of the Proposed Development was sought through non-statutory consultation carried out between the 9 September to 18 October 2024. The Non-Statutory Consultation Report provided as part of the statutory consultation documentation provides an overview of the feedback received in response to the non-statutory consultation and how the Applicant has had due regard to the matters raised.
- 3.4.1.3 Feedback on the design of the Proposed Development will also be sought through statutory consultation (of which this PEIR is part) and other engagement activities; this will inform further development of the design prior to submission of the DCO application. A Consultation Report submitted with the DCO application will detail all consultation undertaken (as well as other key engagement activities), including a summary of feedback received and how that feedback has been taken into account in developing the design and assessment of the Proposed Development.

3.5 Approach to Alternatives

3.5.1 Scope of Assessment

- 3.5.1.1 This chapter seeks to describe the alternatives studied to date in developing the siting and design of the Proposed Development, taking into account the requirements of the EIA Regulations and the policy position of the NPS. This chapter first provides an account of how the Applicant initially selected the site for the Proposed Development, taking into consideration the specific characteristics of solar farm development and the potential effects on the environment. It then provides an account of the various alternatives considered in the design iteration of the Proposed Development to date, which includes:
- Site layout
 - Substation siting
 - Cable routes
 - Energy storage facilities and other supporting infrastructure
 - Solar technologies
- 3.5.1.2 An important factor when considering alternatives for the Proposed Development is the land acquisition strategy proposed by the Applicant, which seeks to deliver the majority of the Proposed Development through voluntary agreement. The

scope of reasonable alternatives assessed by the Applicant is therefore limited to those which could be deliverable without the need for compulsory acquisition.

- 3.5.1.3 A 'no development' alternative would not provide the additional electricity generation that would be delivered by the Proposed Development and has therefore not been considered further and will not be assessed in the ES.

3.5.2 Site Selection

- 3.5.2.1 The location of the Proposed Development was selected through a staged process to ensure that a site could be identified which would be suitable for solar energy generation and feasible to deliver, whilst avoiding and minimising the potential for harm to the environment and communities.

- 3.5.2.2 The key stages for site selection were:

- Stage 1: Identifying the search area
- Stage 2: Consideration of environmental and planning constraints
- Stage 3: Land assembly
- Stage 4: Initial identification of the Proposed Development layout

- 3.5.2.3 The activities undertaken at each stage are summarised in turn below.

3.5.3 Stage 1: Identifying the Search Area

- 3.5.3.1 In order to focus the site selection process, an initial search corridor had to be defined. The Applicant identified optimal locations for solar farms of a nationally significant scale based on two key factors: the irradiance and yield; and the availability of grid connection capacity.

Irradiance and Yield

- 3.5.3.2 Solar irradiance refers to the amount of energy from the sun that reaches the surface of the earth and is measured by the amount of sunlight received per square metre (W/m^2). The amount of solar irradiance impacts on the potential yield of a solar farm, affecting the amount of sunlight falling on the solar PV modules to be converted to energy. The irradiance and subsequent yield of an area is influenced by factors such as its location, climate/weather patterns, altitude and topography. Whilst there are clear differences in such factors globally, there are also national variations leading to some areas of the UK being more suited to solar energy than others.

- 3.5.3.3 The East of England has suitable levels of irradiance to gain a viable yield from current solar panel technology. For this reason, this region was identified as a potential location for solar development by the Applicant.

Grid Connection Capacity

- 3.5.3.4 In order for the Proposed Development to be feasible, it requires a connection to the national grid through which the energy it generates would be delivered and would contribute to the national energy supply.
- 3.5.3.5 A grid connection offer has been secured from National Grid for High Grove Solar, which states that the Grid Connection will be via a new 400kV substation connected, via a ‘T’ connection, to the existing overhead line (OHL) between Necton and Norwich Main.
- 3.5.3.6 The grid connection capacity has informed both the site location and the overall size of the Proposed Development, as it has been sized for the availability of this connection capacity. In doing so, it seeks to ensure that the delivery of solar energy can be provided to the national grid when the construction of the solar farm is complete.
- 3.5.3.7 Having established the agreed grid connection for the Proposed Development, an area of search of 20km either side of Necton substation and 6km either side of the existing OHL was used to identify site locations for the solar farm. This area of search was defined by the extent to which a solar farm of the proposed scale could be viable, taking into account the distance from the grid connection and cost of underground cable. This ‘area of search’ enabled the site selection process to progress onto Stage 2.

3.5.4 Stage 2: Consideration of Environmental and Planning Constraints

- 3.5.4.1 A constraints mapping exercise was undertaken in order to assess potential locations for siting the Proposed Development within the search area. This was undertaken using Geographic Information Systems (GIS) software and the analysis reviewed the following constraints within the search area:
- Brownfield land register (previously developed land)
 - Agricultural Land Classification
 - Ecological designations:
 - Biosphere Reserves
 - Environmentally Sensitive Areas (ESAs)
 - National Nature Reserves
 - Local Nature Reserves (LNRs)
 - Local Wildlife Sites (LWSs)
 - Nature Improvement Areas (NIAs)
 - Proposed Ramsar sites
 - Ramsar sites
 - Royal Society for Protection of Birds (RSPB) reserves
 - Sites of Special Scientific Interest (SSSI)

- Special Areas of Conservation (SAC)
- Special Protection Area (SPA)
- National and Community Forest
- Flood Zones
- Cultural Heritage:
 - Registered Battlefields
 - Conservation Areas
 - Country Parks
 - Heritage at Risk
 - Listed Buildings
 - Registered Parks and Gardens
 - Roman Roads and Antiquity Lines
 - Scheduled Monuments
 - World Heritage Sites
- Landscape designations:
 - Greenbelt
 - National Landscapes
 - Countryside and Rights of Way (CRoW) Act 2000 Designations
 - National Parks
- Public Rights of Way (PRoW)

3.5.4.2 A map of environmental constraints is provided in Figure 2.7 of the PEIR.

3.5.4.3 In considering the mapped constraints, the Applicant made a high level judgement on the potential environmental effects of the Proposed Development, taking into account the Applicant's previous experience and values as a responsible developer. Factors such as the spatial extent of constraints in relation to the area of search and the feasibility of deliverable environmental mitigation were considered by the Applicant as part of this evaluation. Table 3-1 summarises how the consideration of key constraints outlined above is reflected in the subsequent stage of land assembly and identification of the draft Order Limits.

Table 3-1 Summary of Stage 2 output reflected in land assembly

Stage 2 Constraint	Relationship to Order Limits
Brown field land register	No suitable brownfield land within search area
Agricultural Land Classification (ALC)	Mix of ALC Grades, including Best and Most Versatile (BMV) which can be considered in design development
Ecological designations	All internationally and nationally designated sites have been avoided in site selection. Ancient woodland has been avoided and/or excluded from the draft Order Limits. A single local designation, a County Wildlife Site, is within the draft Order Limits but direct impact can be avoided through considered design.

Stage 2 Constraint	Relationship to Order Limits
Flood zones	The majority of the draft Order Limits are in Flood Zone 1. Some minor instances of Flood Zones 2 and 3 located in the Northern and Southern Panel Areas.
Cultural heritage	There are no Registered Battlefields, Conservation Areas, Country Parks, Registered Parks and Gardens, World Heritage Sites or Listed Buildings within the draft Order Limits. There are three Scheduled Monuments within the draft Order Limits, and one Roman Road with direct impacts to be avoided through considered design.
Landscape designations	There are no Greenbelts, National Landscapes, CRoW Designations or National Parks within or near the draft Order Limits.
PRoW	There are numerous PRoW within the draft Order Limits. The National Cycle Network (NCN) Route 13 runs along the boundary of the Eastern Panel Area. Peddars Way and Norfolk Coast Path National Trail runs along the boundary of the Central Panel Area.

3.5.5 Stage 3: Land Assembly

- 3.5.5.1 Through the analysis undertaken in Stage 2, the Applicant identified a refined area of land parcels that could be suited to solar development. Alongside analysis of environmental and planning constraints, the Applicant began engagement with landowners in the area of search to receive expressions of interest in solar development. From the outset, the Applicant has sought to deliver the Proposed Development via landowner agreement rather than requiring compulsory acquisition. The Applicant approached landowners with a sufficient area of land for panel areas, mitigation and enhancement to seek to enter into an option agreement.

3.5.6 Stage 4: Initial Identification of the Proposed Development Layout

- 3.5.6.1 Stage 2 and Stage 3 of the site selection process established that within the search area, there was sufficient available land, secured via agreement, located outside of major environmental and planning constraints. This was considered to fulfil the requirement to deliver a viable solar farm and the process progressed to developing an initial layout design for the Proposed Development.
- 3.5.6.2 Initially, all land subject to agreement was proposed for use as solar panel areas. This initial design confirmed that there was sufficient land to meet the capacity of the available grid connection.
- 3.5.6.3 Initial environmental surveys and appraisals were undertaken by the Applicant from November 2023 in preparation of the EIA Scoping Report. The aim of these surveys and appraisals was to enable the project team to analyse the baseline to help shape the definition of the draft Order Limits and to identify areas of higher and lower sensitivity to inform refinement of the location of the Panel Areas.

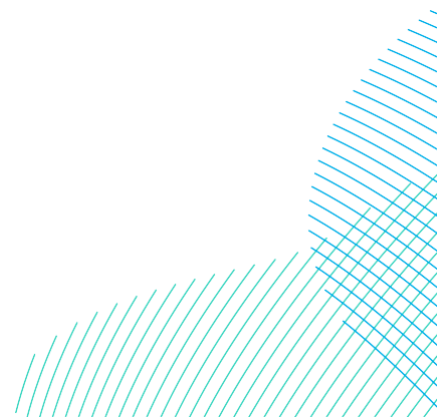
- 3.5.6.4 A Zone of Theoretical Visibility (ZTV) was prepared to appraise the potential visibility of the Proposed Development. Initial fieldwork was then carried out to verify the findings of the desk study and ZTV. Then an extensive review of the study area was then undertaken to identify landscape and visual receptors with the potential to be affected by the Proposed Development within the draft Order Limits.
- 3.5.6.5 A design study was carried out alongside EIA scoping to conceptualise the landscape design. The Applicant's environmental design lead set out the broad approach and a series of high level design principles within which the outline design was been developed. These are summarised below:
- Integrate the Proposed Development into the pattern of the wider landscape, retaining and reinstating historic field patterns where practicable.
 - Protect and enhance existing habitats and green infrastructure and design new features to connect and link to the wider network.
 - Retain and enhance public access to the countryside and connecting existing PRow with proposed permissive recreational routes.
- 3.5.6.6 The initial appraisals and design study led to the early definition and application of an initial set of design principles and embedded mitigation measures to guide the Proposed Development which are set out in Chapter 2, paragraph 2.4.9.3 of this PEIR. As a result of this exercise, five distinct Panel Areas within the draft Order Limits were identified.
- 3.5.6.7 Having identified the Panel Area layout, the Applicant identified cable corridor search areas within which underground cables between the Panel Areas could be located. Further information on the consideration of cable route options is provided in section 3.8.
- 3.5.6.8 Having concluded Stage 4 of the site selection process, the Applicant had identified the initial boundary of the draft Order Limits and a site layout comprising Panel Areas and Cable Corridors, taking account of high-level environmental constraints, and detailed consideration of the impacts of elements of the Proposed Development on specific receptors in the local environment. This design was the basis for undertaking further environmental and technical assessment ahead of undertaking the EIA Scoping Report.

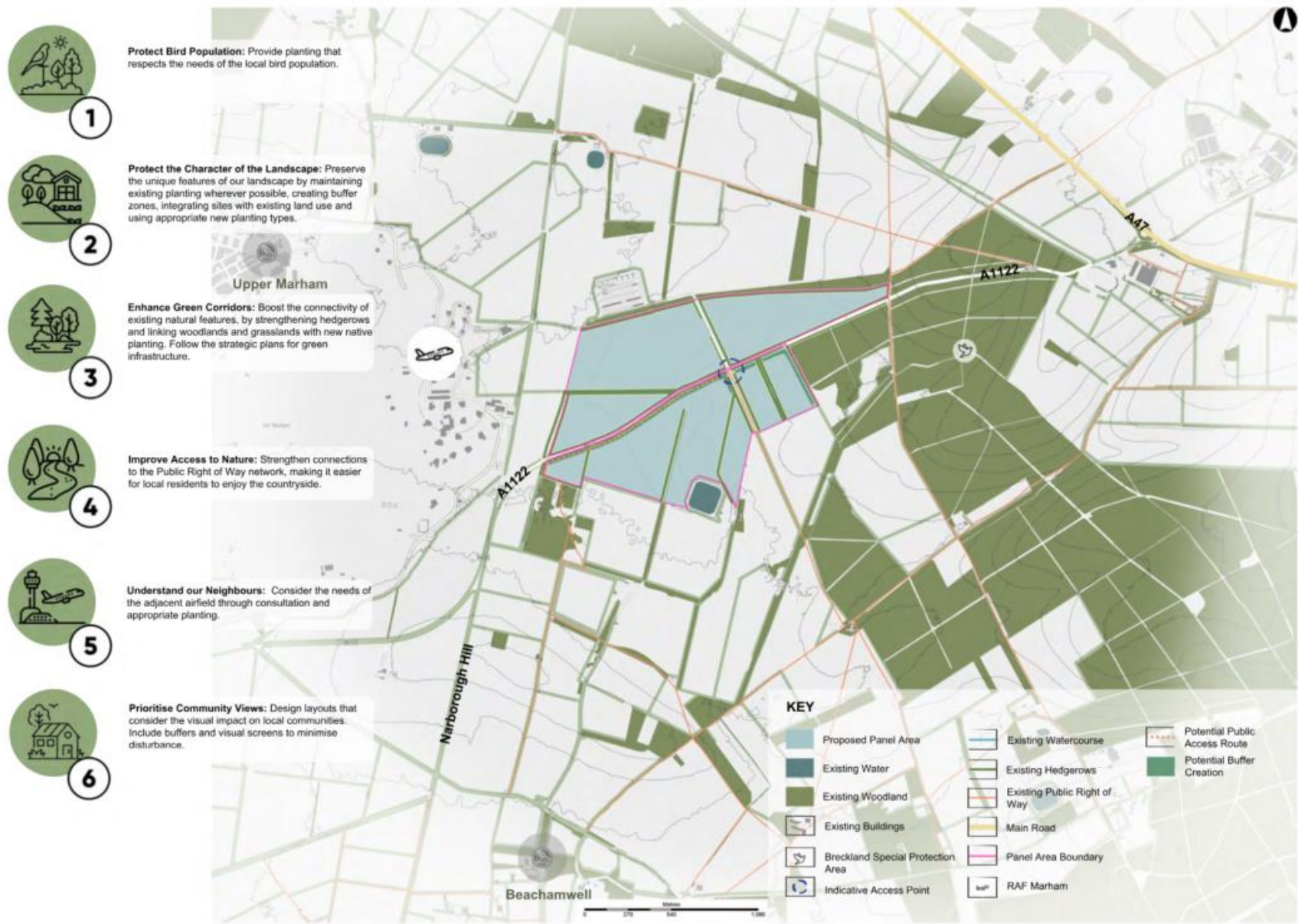
3.6 Alternative Site Layouts

3.6.1 Design Iteration: Project Inception to EIA Scoping

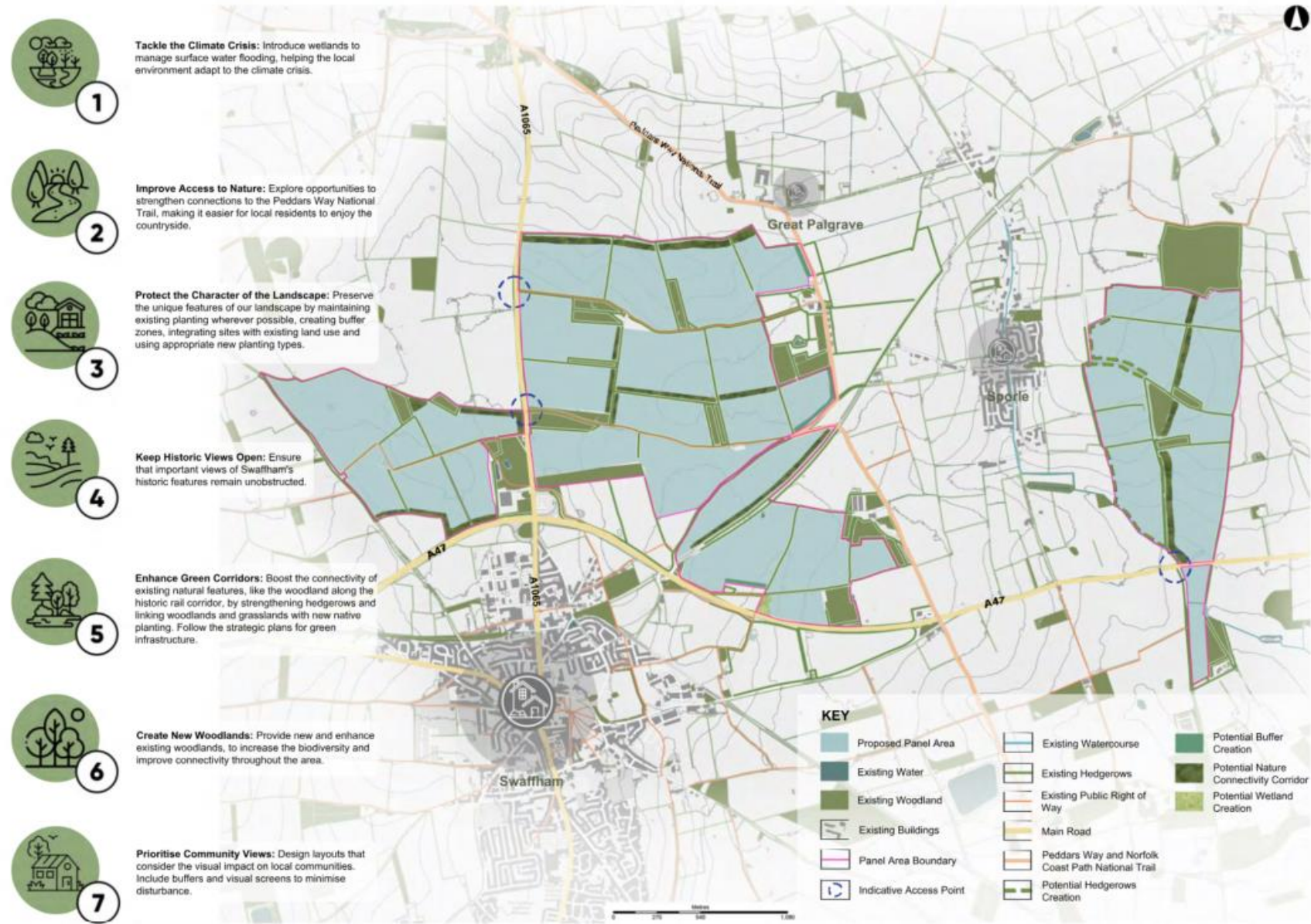
- 3.6.1.1 Environmental surveys and assessments commenced in November 2023 and the design of the Proposed Development has aimed to avoid environmental impacts where possible and to integrate the Proposed Development into the wider landscape from the outset. This approach included the development and application of an initial set of design principles and embedded mitigation measures to guide the design of the Proposed Development.

- 3.6.1.2 A Landscape Concept Plan was also prepared at EIA Scoping stage to illustrate the intentions of use within the draft Order Limits as shown in Insets 3-1 to 3-5 below. This was developed in collaboration with landowners, ecologists and landscape architects to ensure a coherent design approach and avoid loss or damage to biodiversity, nature and communities as well as ensure a biodiversity net gain.

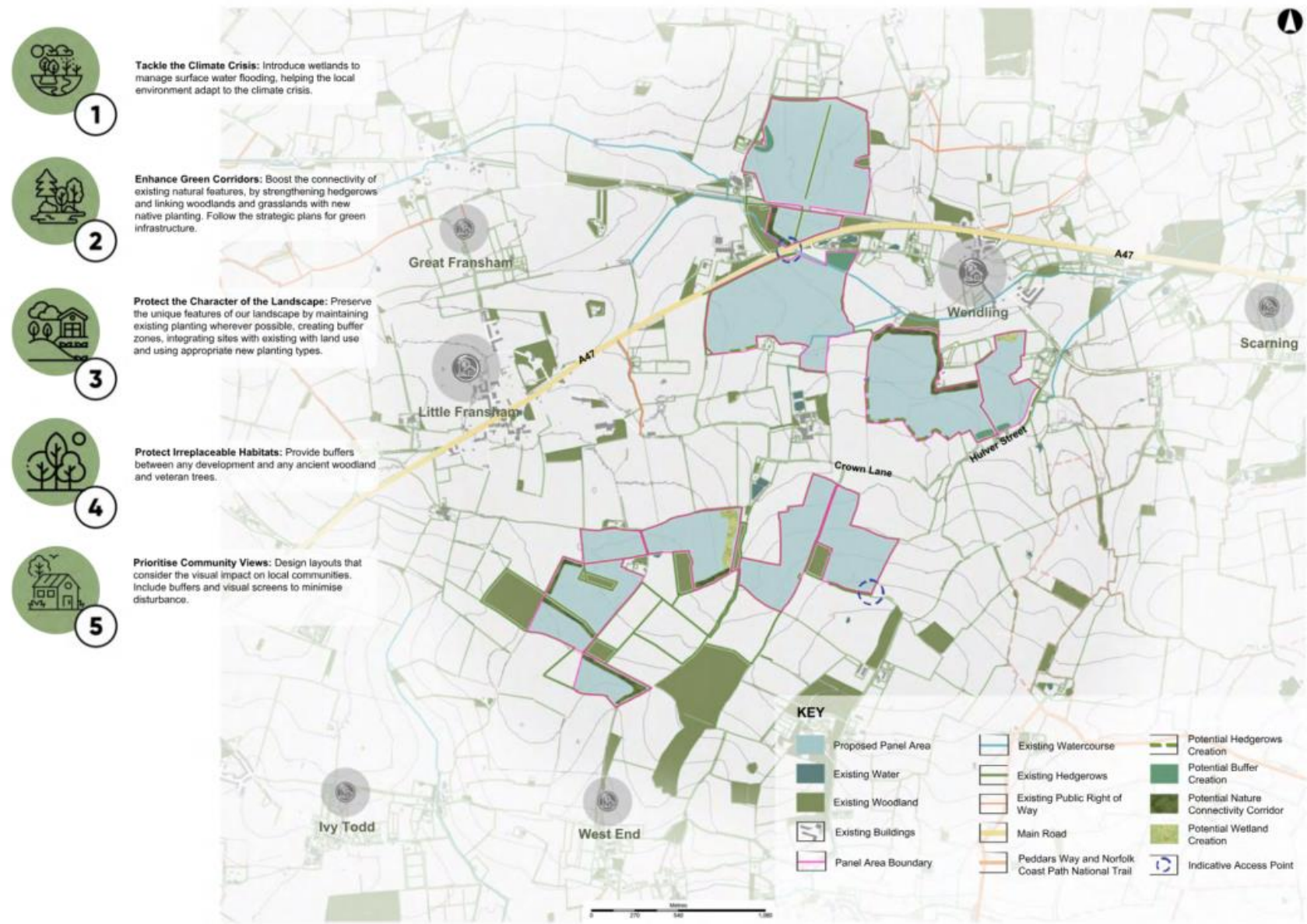




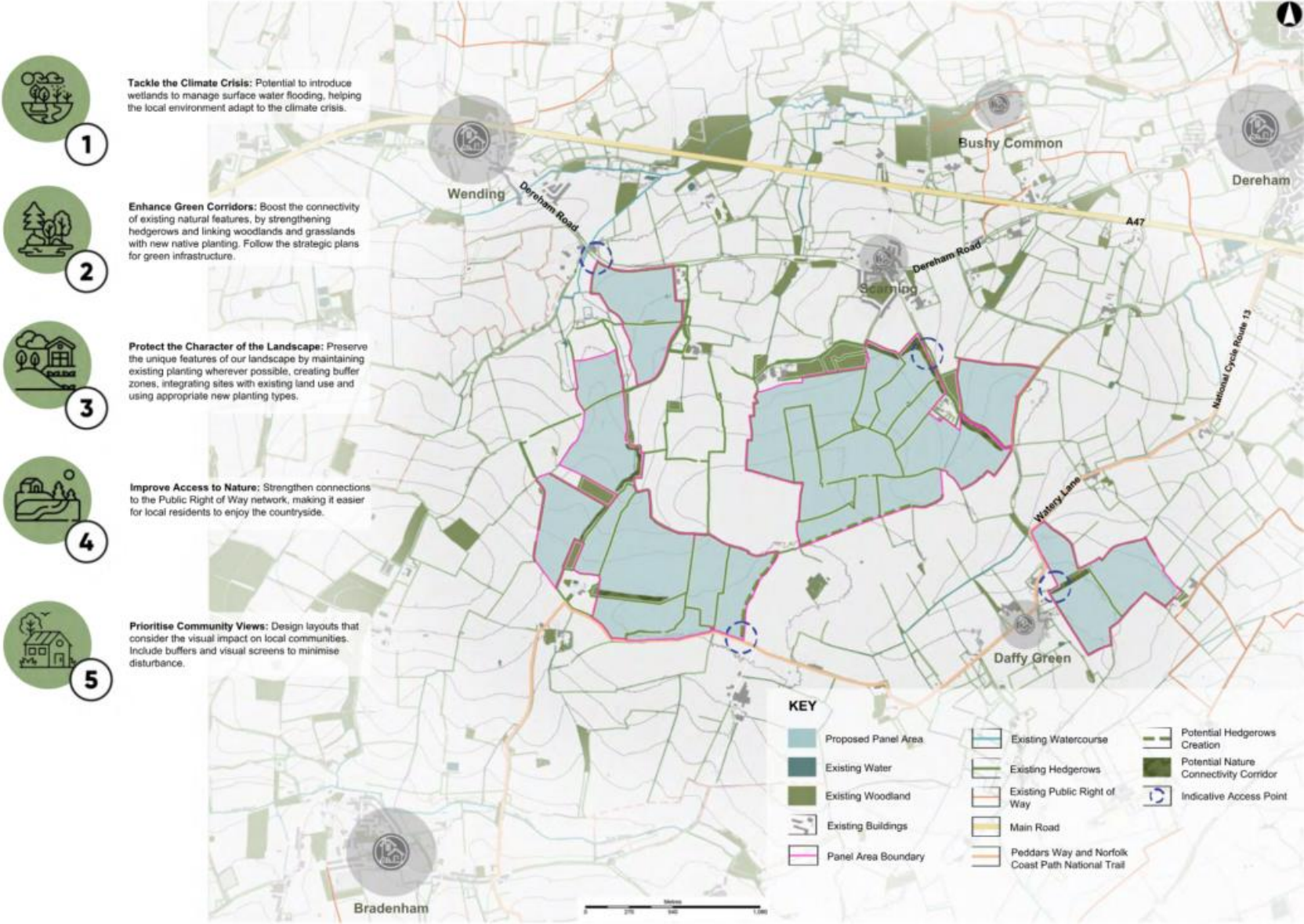
Inset 3-1 Landscape Concept Plan at EIA Scoping – Western Panel Area



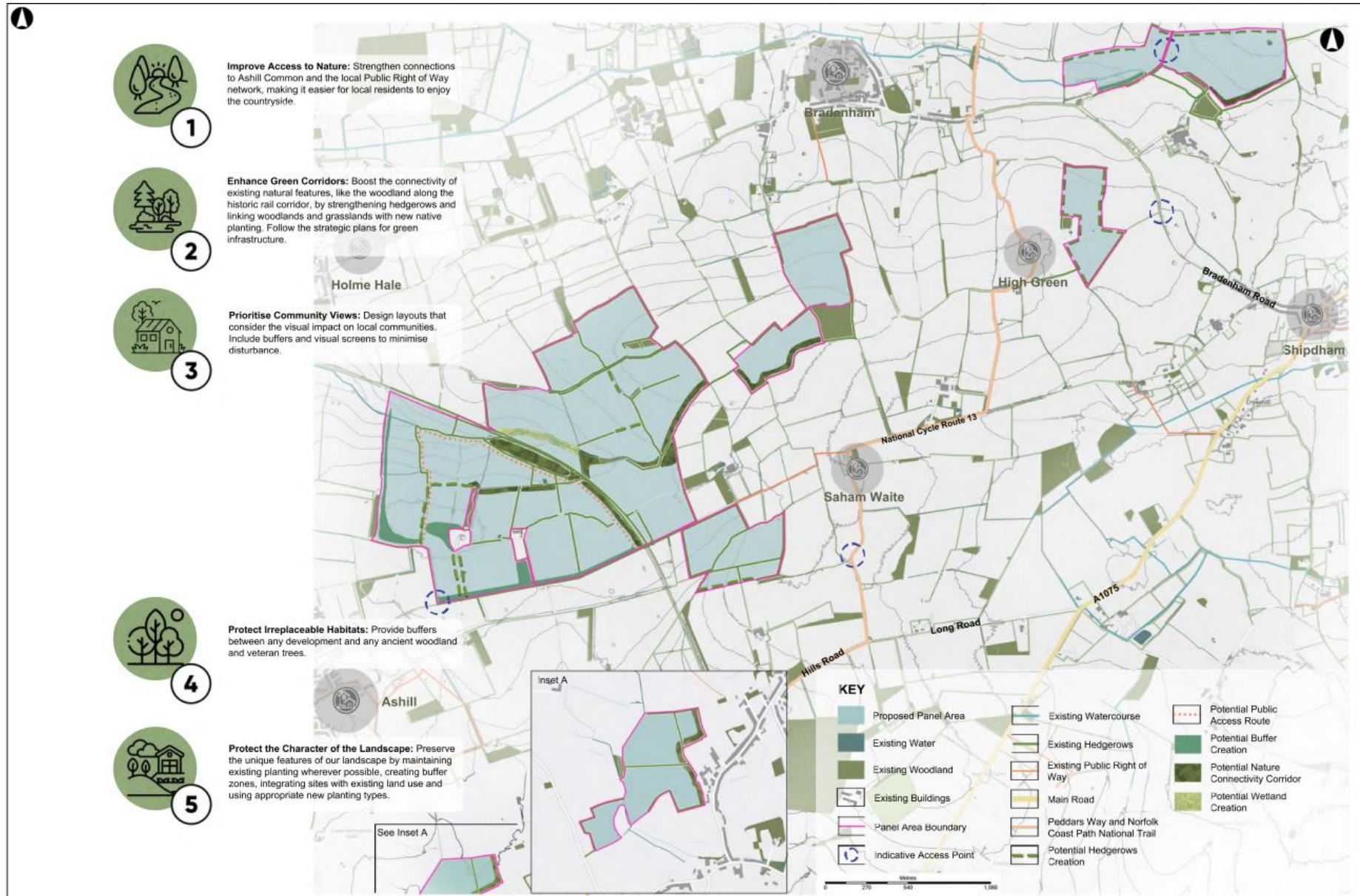
Inset 3-2 Landscape Concept Plan at EIA Scoping – Central Panel Area



Inset 3-3 Landscape Concept Plan at EIA Scoping – Northern Panel Area



Inset 3-4 Landscape Concept Plan at EIA Scoping – Eastern Panel Area



Inset 3-5 Landscape Concept Plan at EIA Scoping – Southern Panel Area

3.6.2 Design Iteration: EIA Scoping to PEIR

- 3.6.2.1 The EIA Scoping Report was submitted on 6 September 2024 and following this the Applicant undertook a non-statutory consultation which ran between 9 September to 18 October 2024. The EIA Scoping Opinion (issued by the Planning Inspectorate 17 October 2024), feedback from the non-statutory consultation period, survey results and landowner engagement were taken into account during development of the design presented at the statutory consultation and this PEIR.
- 3.6.2.2 Two design stages including specialist design workshops were undertaken following the receipt of the EIA Scoping Opinion and the undertaking this preliminary assessment.
- 3.6.2.3 The first design stage focused on identifying and reviewing potential design changes and mitigation requirements for the Proposed Development following the receipt of the EIA Scoping Opinion and results of the initial environmental surveys. An interim design was provided by the Applicant's engineers for review and comment by the environmental team. Following comments, this design was updated and a multidisciplinary workshop was held to discuss the results of ongoing environmental surveys, environmental assessment and feedback from the non-statutory consultation and engagement with technical stakeholders and near neighbours. Mitigation requirements and enhancement opportunities identified from a multi-disciplinary perspective were also discussed. Views were sought on each change to the Proposed Development design to ensure it would not result in unintended harmful effects to other aspects of the environment.
- 3.6.2.4 Following this design iteration and optioneering process, the Panel Area and Cable Corridor layouts were fixed for statutory consultation. This design has formed the basis of this PEIR and is the basis of statutory consultation, as shown on the Outline Environmental Masterplan.
- 3.6.2.5 Whilst not exhaustive, a list of the key changes made to the layout as a result of the design iteration process described above, and the reasons why, is provided below:
- Provision of additional hedgerow and woodland planting to enhance landscape integration, visual screening and habitat connectivity.
 - Increased buffers between roads, residential properties, local businesses and Panel Areas in some locations.
 - Omission of panels from some fields and provision of additional mitigation and environmental enhancement areas.
 - Addition of more permissive paths across the draft Order Limits to enhance the area for recreational enjoyment.
 - Application of revised access routes and points.
 - Siting infrastructure away from sensitive receptors identified through ecological, geophysical and noise surveys.

- 3.6.2.6 These changes were made in response to further technical assessment, stakeholder feedback and ongoing engagement, as outlined above. The design will continue to be refined prior to submitting the DCO application in order to take into account feedback from statutory consultation and further environmental and technical assessment. The future design iteration of the Proposed Development will be recorded and reported upon in the DCO application, primarily within the ES and the Consultation Report. Additionally, a draft DAD has been produced and is available at this statutory consultation stage to set out the project design principles to be secured and implemented through the DCO. This document will be updated following the close of the statutory consultation and submitted with the DCO application.

3.6.3 Panel Area Layout

- 3.6.3.1 The solar PV modules would be located within the Panel Areas across the draft Order Limits. Environmental constraints within and surrounding the draft Order Limits have been taken into account in relation to the layout of the Panel Areas. The following minimum offsets and buffers have been applied in relation to solar PV modules:

- 15m buffer from woodland and ancient woodland;
- 50m buffer from Ecological designated sites (SSSI, SAC, SPA), County Wildlife Sites (CWS) and Local Nature Reserves (LNR);
- 5m buffer from hedgerows;
- 10m buffer from Scheduled Monuments;
- 5m buffer from PRow, National Trails and the National Cycle Network;
- 50m buffer from residential properties;
- 9m from bank top riparian boundaries and watercourses (except where crossing); and
- 250m from historic landfill.

3.6.4 Consideration of Energy Storage Facilities and Other Supporting Infrastructure

- 3.6.4.1 The Proposed Development would include BESS to store surplus energy on site, as described in Chapter 2 of this PEIR. Other supporting infrastructure is also required such as fencing and gates; CCTV; lighting; access tracks; drainage; and, storage containers. The location of this infrastructure takes into account the following principles:

- Lighting is focussed on key areas (e.g. substation) and is motion sensor controlled so would only ever be on intermittently;
- CCTV is to be oriented so that it points into the Panel Areas, rather than providing surveillance of the wider area;
- Access tracks are likely to be crushed gravel;

- Container structures for supporting infrastructure would be grey or a similar neutral colour; and
- Any 132kV substations to be sited adjacent to existing woodlands where possible, to allow for natural visual screening.

3.6.4.2 Environmental constraints within and surrounding the draft Order Limits have been taken into account in relation to the layout of the supporting infrastructure.

3.6.4.3 The minimum offsets and buffers referred to in paragraph 3.6.3.1 have been applied in relation to key supporting infrastructure, including BESS, inverters and on-site substations. Where supporting infrastructure has the potential to generate noise (inverters and substations), this would be subject to an increased buffer and would be placed at least 200m from residential properties.

3.6.4.4 In locating infrastructure other than panels, the following sensitive receptors have been avoided as far as reasonably possible:

- BMV agricultural land (ALC Grades 1 to 3a);
- Areas with a high risk of flooding (Flood Zones 2 and 3);
- Areas that have high potential for below ground archaeological remains as identified by geophysical survey and Scheduled Monuments; and
- Protected species and habitats identified by ecological surveys.

3.6.4.5 Further information on the siting of supporting infrastructure and the design principles underpinning their appearance and location is provided in the draft DAD.

3.6.5 Cable Route Alternatives

Principles of Cable Route Selection

3.6.5.1 33kV cables are required to connect the solar PV modules and Panel Areas to the proposed 132kV on-site substations, and 132kV cables then connect the 132kV substations to the 400kV substation.

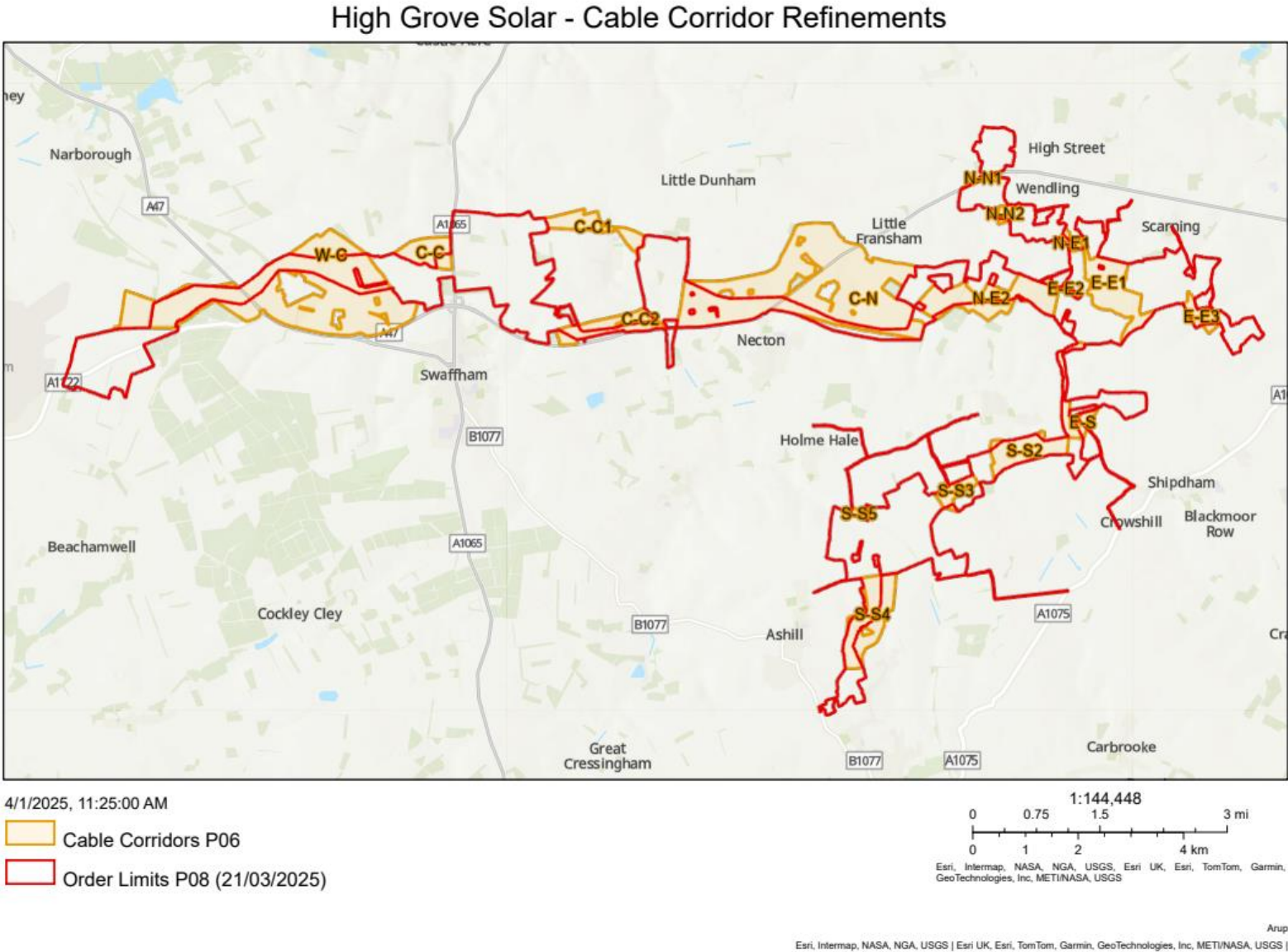
3.6.5.2 There are three main options for the routing of cables in solar farm developments:

- 1) All cables installed along existing road routes (on-road routes)
- 2) All cables installed through greenfield land (off-road routes)
- 3) A hybrid approach with cables utilising both greenfield land and existing road routes

3.6.5.3 As a starting principle for determining cable routes, the Applicant's first preference is to avoid impacts to local communities that may result from routes along existing roads, such as disruption to local access during the works. Avoiding routes along existing roads also has engineering benefits. In comparison, it is considered that the potential for environmental impacts from using off-road routes is low considering the limited area of land required and the short-term nature of construction, with any agricultural land affected able to be returned to agriculture post construction.

Cable Route Options

- 3.6.5.4 The initial cable routes considered in EIA Scoping included wide corridors between Panel Areas and individual land parcels to ensure that potential receptors and significant effects were identified to inform the scope of the assessment and allow flexibility in the routing to avoid potential constraints and impacts.
- 3.6.5.5 In developing the Proposed Development design ahead of statutory consultation, the Applicant has sought to identify options for the cable routes through greenfield land. As part of this, the Applicant has engaged with landowners and identified preferred cable routes through each Cable Corridor identified in scoping, therefore reducing the width of the corridors, route uncertainty, and to allow the potential impacts to be refined and assessment undertaken.
- 3.6.5.6 The aim of the cable corridor refinements was to avoid easements running through the most environmentally/ecologically sensitive areas and the buffer zones identified within the design principles. To determine this, initially a desk-based review of known environmental, ecological, land and engineering constraints was undertaken. A desk based ecological baseline RAG (Red, Amber, Green) appraisal was undertaken to determine the least ecologically sensitive parts of the corridors. The results of these desk-based analyses were combined to identify the preferred narrowed cable corridor, avoiding and minimising potential impacts, while maintaining the flexibility required at pinch points and to allow local diversion if unknown constraints were identified at later stages as more information is gathered.
- 3.6.6 The following offsets and buffers have been applied to the Cable Corridors:
- 15m buffer from woodland and ancient woodland;
 - 50m buffer from Ecological nationally designated sites (SSSI, SAC, SPA);
 - 10m buffer from Scheduled Monuments;
 - 10m from bank top riparian boundaries and watercourses; and
 - 250m from historic landfill.
- 3.6.6.1 Inset 3-6 presents a comparison of cable corridor refinements undertaken. P06, or those identified in the orange shading, was the proposed cable corridor at non-statutory consultation. P08, or those identified via the red line boundary, indicates the refined corridor.



Inset 3-6 Cable Corridor Refinements

3.7 Alternative Solar Technologies

- 3.7.1.1 As noted in Chapter 2 of the PEIR, to date the Applicant has kept different solar technologies under review and consideration for the Proposed Development. In doing so, a worst-case scenario has formed the basis of the assessment. The primary options available are a fixed panel or a tracking panel system. The Applicant intends to retain flexibility for the final technology to be selected at detailed design stage and will account for this in the ES.

3.8 Access Alternatives

- 3.8.1.1 Access alternatives are being developed through engagement with landowners and relevant highway authorities. Proposed access alternatives that are under consideration are presented in the Outline Environmental Masterplan. The final access routes and alternatives considered will be assessed and presented in the ES.

3.9 Summary

- 3.9.1.1 In accordance with the EIA Regulations, this chapter has set out reasonable alternatives studied by the Applicant in both the site selection undertaken at the outset of the project and in the ongoing design iteration process.
- 3.9.1.2 It has set out the main reasons for selecting the chosen option and how the effects of the Proposed Development on the environment have been taken into account. Where options are still under consideration, it has been identified how and when the options will undergo further assessment to lead to selection of a single option. The ES will report on any design iteration that takes place between publication of this PEIR and the submission of the DCO application, and outline any optionality that remains at that stage.

4 Approach to the EIA

4.1 Introduction

- 4.1.1.1 This chapter provides an overview of the approach to the preliminary EIA, including the approach to the EIA assessment scenarios and general methodology used to provide consistency across assessment aspects.
- 4.1.1.2 An EIA is a staged, iterative process, the final findings of which will be reported in an ES submitted in support of the application for a DCO which would grant consent for the Proposed Development to be constructed, operated and decommissioned. This PEIR describes the findings of a preliminary assessment of the likely significant effects of the of the Proposed Development and has been undertaken in accordance with the EIA Regulations and relevant guidance, and each of the stages are described in the following sections.
- 4.1.1.3 This preliminary assessment has been undertaken using information available at the time of writing and has been prepared to provide the information reasonably required for readers to develop an informed view of the likely significant environmental effects of the Proposed Development.
- 4.1.1.4 The scope and adopted methodologies of assessment for each of the investigated environment aspects are outlined in the corresponding aspect chapters (Chapters 5-15) where they depart from this general methodology.
- 4.1.1.5 Methodologies relating to any surveys undertaken as part of these specific investigations are also outlined in each of these aspect chapters.

4.2 General EIA Approach

- 4.2.1.1 An EIA is a systematic process that examines the likely significant effects (beneficial or detrimental) on the environment resulting from the future construction, operation and decommissioning of a proposed development. The findings of an EIA are presented in a document known as an ES, which can then be used to inform decision makers and the public about the possible environmental implications of a development and help the decision maker (in the case of a DCO, the relevant Secretary of State (SoS)) determine the application for development consent. The EIA Regulations set out the procedures to be followed in relation to EIAs which must be undertaken for NSIPs in England and Wales.
- 4.2.1.2 The EIA Regulations require that preliminary environmental information, referred to in Regulation 14(2), is provided as part of the duty to consult under the Planning Act 2008 (the Act). This PEIR has been prepared in accordance with the EIA Regulations and the location of required information in this document is provided as detailed in Table 4-2, of this PEIR.
- 4.2.1.3 The main stages of the EIA process are as follows:

- **EIA Screening:** Screening is normally undertaken to determine whether a proposed project constitutes 'EIA development', in cases where it is not clear if a project requires an EIA to be undertaken. In this case, the Applicant concluded that the Proposed Development was described in Schedule 2 of EIA Regulations and had the potential to result in significant environmental effects. Therefore, the Applicant informed the Planning Inspectorate that they intended to submit an ES with the DCO application, making the Proposed Development EIA Development.
- **EIA Scoping:** Scoping refers to the process of consultation with the Planning Inspectorate and relevant consultees to identify the necessary scope of assessment and the methodology for be employed for any particular development, described in further detail below.
- **PEIR:** The PEIR (this document) sets out the information that 'is reasonably required for the consultation bodies to develop an informed view of the likely significant environmental effects of the development' (Regulation 12(2)(b) of the EIA Regulations) as set out in Planning Inspectorate Advice Note Seven, Section 8.3 [12].
- **ES:** The ES presents the results of the EIA undertaken for a proposed development. It sets out the likely significant effects that would result if the proposed development was implemented, and any proposed mitigation to reduce those significant effects. An ES is submitted as part of the application for development consent and is taken into account during the decision making process.

4.2.2 EIA Scoping

- 4.2.2.1 EIA Scoping is the process of identifying the issues to be considered within the ES and establishing the scope of the assessment. Although scoping is not a mandatory requirement under the EIA Regulations, it is recognised as a useful preliminary procedure which helps to identify the main effects that a proposed development is likely to have on the environment and should therefore be assessed and reported in the ES.
- 4.2.2.2 An EIA Scoping Report was prepared and submitted to Planning Inspectorate on 6 September 2024 with a request for the SoS to adopt a scoping opinion in relation to the Proposed Development. In considering the request for a scoping opinion, the SoS consulted with the relevant statutory stakeholder bodies. The Scoping Opinion was issued by the Planning Inspectorate on 17 October 2024. The EIA Scoping Report and Scoping Opinion are provided in Appendices 4.1 and 4.2.
- 4.2.2.3 A table outlining the key issues raised in the Scoping Opinion and how and where they are addressed in the ES or other DCO application documentation will be included in the ES.

- 4.2.2.4 Following receipt of the Planning Inspectorate's Scoping Opinion and associated consultee responses, engagement has been undertaken with stakeholders including Planning Inspectorate to inform further EIA work to be undertaken and provide clarifications. A summary of the comments on scope which have been assessed in this PEIR, or will be subject to further refinement as part of the ES, is presented in Table 4-1.

Table 4-1 Summary of proposed scope of EIA

Aspect	Scoped in / out of the ES	Notes / Rationale
Agricultural land and soils	Scoped in	Chapter 5 of this PEIR. Draft ALC report is provided as Appendix 5.1. The results of ongoing surveys will be appended to the ES. oSRMP is provided as a standalone document, a draft is available at PEIR.
Air Quality	Scoped out	Standalone construction dust assessment to be appended to the ES.
Biodiversity	Scoped in	Chapter 6 of this PEIR. Draft supporting survey reports provided as Appendices 6.1, 6.2 and 6.4 – 6.5. Habitats Regulations Assessment (HRA) Screening provided as Appendix 6.3. HRA Appropriate Assessment to be appended to the ES.
Climate change	Scoped in	Chapter 7 of this PEIR.
Cultural heritage and archaeology	Scoped in	Chapter 8 of this PEIR. Draft Geophysical Survey Report provided as Appendix 8.1. Draft Archaeological Management Strategy will be provided as a standalone document with the ES.
Electric, magnetic and electromagnetic fields	Scoped out	N/A
Glint and Glare	Scoped in	Chapter 9 of this PEIR.
Ground conditions	Scoped out	Desk Based Preliminary Risk Assessment (PRA) to be appended to the ES
Human health	Scoped out	N/A
Landscape and visual	Scoped in	Chapter 10 of this PEIR.
Major accidents and disasters	Scoped out	N/A
Noise and vibration	Scoped in	Chapter 11 of this PEIR.

Aspect	Scoped in / out of the ES	Notes / Rationale
		Noise Monitoring Data is provided as Appendix 11.1
Socio-economics	Scoped in	Chapter 12 of this PEIR. oPRoWMP is provided as a standalone document, a draft is available at PEIR.
Traffic and transport	Scoped out (if supporting evidence can be provided)	Chapter 13 of this PEIR. Transport Statement to be appended to the ES. oCTMP is provided as a standalone document, a draft is available at PEIR.
Water resources and flood risk	Scoped in	Chapter 14 of this PEIR. Preliminary Flood Risk Assessment (FRA), Drainage Strategy and WER Compliance Assessment provided as Appendices 14.1 – 14.3.
Waste	Scoped out	oMWMP to be provided with the DCO application.
Cumulative Effects	Scoped in	Chapter 15 of this PEIR.

4.2.3 The PEIR

- 4.2.3.1 This PEIR contains preliminary information that has been identified so far during the EIA process and clearly sets out what additional work remains to be done to complete an ES. This PEIR is being consulted upon as part of the statutory consultation (See Section 4.3).

Table 4-2 Summary of proposed scope of the EIA

Information required to be included as part of the PEIR (Regulation 14(2) of the EIA Regulations)	Relevant Sections in this PEIR
(a) A description of the proposed development comprising information on the site, design, size and other relevant features of the development	Chapter 2 The Proposed Development Figures 2.1 to 2.13
(b) A description of the likely significant effects of the proposed development on the environment	Chapters 5 to 13
(c) A description of any features of the proposed development, or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment	Chapters 5 to 13
(d) A description of the reasonable alternatives studied by the applicant, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment	Chapter 3 Alternatives and Design Evolution
(e) A non-technical summary of the information referred to in sub-paragraphs (a) to (d) in this table	Non-Technical Summary (Standalone Document)
(f) Any additional information specified in Schedule 4, relevant to the specific characteristics of the particular development or type of development and to the environmental features likely to be significantly affected	Chapter 2 The Proposed Development Chapters 5 to 14

4.2.3.2 The requirements of Regulation 14(2) summarised above are expanded on by Schedule 4 of the EIA Regulations (as identified at sub-paragraph (f)). The detailed requirements of Schedule 4 are addressed in the chapters of this PEIR, and will be addressed in the ES.

4.2.4 Policy and Guidance

4.2.4.1 In preparing this PEIR reference has been made to relevant guidance and advice. This has included the following:

- Overarching National Policy Statement (NPS) for Energy (EN-1) [1];
- NPS for Renewable Energy Infrastructure (EN-3) [2];
- NPS for Electricity Networks Infrastructure (EN-5) [3];
- National Planning Policy Framework (NPPF) [13];

- Planning Inspectorate's Advice Page: Nationally Significant Infrastructure Projects: Advice on the Preparation and Submission of Application Documents [26];
- Planning Inspectorate's Advice Page: Nationally Significant Infrastructure Projects: Advice on Cumulative Effects Assessment [27];
- Planning Inspectorate's Advice Page: Nationally Significant Infrastructure Projects: Advice on Habitats Regulations Assessments [28];
- Planning Inspectorate's Advice Page: Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive [29];
- Planning Inspectorate's Advice Page: Nationally Significant Infrastructure Projects: Advice on Transboundary Impacts and Process [30];
- Planning Inspectorate Advice Note Seven: Environmental Impact Assessment: process, preliminary environmental information and environmental statement [12]; and
- Planning Inspectorate Advice Note Nine: Rochdale Envelope [19].

4.2.5 Assumptions and Limitations

4.2.5.1 In accordance with the EIA Regulations, difficulties encountered during assessment work and limitations and assumptions used for individual assessment areas set out in this PEIR and will be in the subsequent ES.

4.2.5.2 General limitations at this PEIR stage include:

- Baseline conditions are specific to each aspect of the environment and are considered to be accurate at the time when surveys are undertaken, however, it is recognised that environmental conditions may change during the course of the Proposed Development and these are described as appropriate as part of the future baseline.
- The preliminary assessment presented in this PEIR is based on survey work completed at the time of writing. Each aspect chapter clearly sets out what additional surveys will be undertaken prior to submission of the DCO application, where there remains surveys to complete.
- The preliminary assessment presented in this PEIR is based on construction information available at the time of writing based on the construction phases and programme described in Section 4.4;
- The assessment of cumulative effects is dependent on the availability of information at the time of assessment in relation to other identified developments.

4.2.5.3 Best practice guidance from IEMA informed the assessment. Relevant to this PEIR is a growing emphasis on undertaking proportionate assessments which reflect those aspects of the environment with potential to have significant effects and clarify those areas where there is little reasonable potential for this to occur.

- 4.2.5.4 Unless stated otherwise, any references to legislation within the PEIR is as amended and in force at the time of compiling the PEIR. These references will be reviewed and revised, if required, as part of the ES.

4.2.6 Parameters, Uncertainty and Flexibility

- 4.2.6.1 As discussed in Chapter 2 Proposed Development, final detailed design decisions have yet to be taken for the Proposed Development. This is important as the technology for solar PV and BESS advances and to maintain flexibility to meet the changing demands of the UK market, prior to construction. The 'Rochdale Envelope' approach has therefore been applied within the EIA process to ensure a robust assessment of the likely significant environmental effects of the Proposed Development, in accordance with the Planning Inspectorate's Advice Note Nine: The Rochdale Envelope [19]. This involves assessing the maximum (and where relevant, minimum) parameters for the elements where flexibility is sought, recognising that the worst-case parameter for one technical assessment may differ from another. Where this approach is applied, this has been confirmed within the relevant chapters of this PEIR.
- 4.2.6.2 These parameters have been used in the assessment of significance of effects in each of the Chapters 5 to 13 and they describe the parameters applied in relation to that particular discipline. As the Proposed Development's design evolves, key elements of the design may be fixed, however, at this stage some aspects of the Proposed Development remain uncertain or retain a degree of optionality and/or flexibility to allow significant effects to be identified and assessed while the appropriate design development and decisions are progressed as further information is gathered and feedback from various consultees sought. The key areas of uncertainty and flexibility, and any optionality that remain at this stage, and how this is addressed in this PEIR include:
- **Cable Routes** – as described in section 3.6.5 the likely cables routes proposed to connect the Panel Areas have been subject to an options appraisal and refinement from the initial corridors outlined at EIA Scoping to the refined corridors now shown in the draft Order Limits and considered in this assessment. However, these refined corridors still retain a degree of flexibility above the typical 30-40m minimum working width, to allow for unknown constraints, landowner discussions, and local diversions if required when ground conditions are fully understood. The current assumed corridors range from a minimum of 100m, to around 300m or more, wide at this stage, which allows baseline and impacts to be identified, and likely significant effects assessed, while maintaining flexibility in the final route without the need for Limits of Deviation to be defined.
 - **Access location and routes** - initial indicative access locations have been identified and internal access tracks accounted for in the development of the illustrative design and parameters. These access locations have been used to investigate feasible routes to and from the Proposed Development during construction and operation and these potential routes have been used to assess potential impacts associated with road traffic. The routes are subject to further

consideration and engagement with stakeholders, and will be used to identify appropriate management measures to be secured as part of the DCO application rather than define precise routes so that flexibility can be retained in the future when appropriate management plans are developed and agreed with the planning authority as detailed design and construction information is available.

- **Fixed or tracking PV panels** – the final technical specification of the PV panels to be installed is yet to be defined. Chapter 2 section 2.4.2 describes parameters and technical information for both tracking and fixed and both are considered in this PEIR. This approach ensures the worst-case scenario in terms of identifying potentially significant environmental effects is considered.
- **Illustrative locations of 132kV substations, BESS, Inverters, Transformers, and Customer Switchgears within Panel Areas** – Illustrative locations for onsite infrastructure, including the 132kV substation, BESS, inverters and transformers, as described in sections 2.4.3 and 2.4.5, have been included in the design and shown on the Outline Environmental Masterplan provided with the consultation documentation. These illustrative locations have been used to inform assessment and consultation. However, flexibility is required to identify their precise locations at detailed design stage, within the parameters of the assessment. The Applicant will secure the relevant parameters assessed in the ES as part of the DCO application.
- **Decommissioning** – The design life of the Proposed Development is 40 years, therefore, at this stage there is some uncertainty in the final plans for certain pieces of equipment which could be retained, with responsibility transferred to a third party, or included in the Applicant's decommissioning proposals. The 132kV substations could either be removed as part of decommissioning or handed over to the Distribution Network Operator. In addition, access tracks could either be removed or handed over to landowners subject to agreement. Therefore, where relevant, each assessment reported in this PEIR considers both scenarios to ensure the worst reasonable case environmental effect are assessed and reported.

4.2.6.3 It is likely that flexibility will need to be maintained for some aspects of the Proposed Development for the DCO application. Where flexibility is to be retained in the application, the Applicant will secure measures as part of the DCO to ensure the final design remains within the likely worst case envelope as assessed in the ES.

4.3 Consultation and Engagement

4.3.1 Overview

4.3.1.1 Effective and meaningful engagement and consultation with stakeholders is an essential aspect of developing the design of the Proposed Development and of undertaking a comprehensive EIA. Consultation is an ongoing process, and the publication of this PEIR forms an important part of that process.

- 4.3.1.2 The Applicant engaged with stakeholders including local councils, elected representatives, statutory environmental bodies, and local interest groups in order to enable the sharing and consideration of local knowledge and technical advice from an early stage of the Proposed Development. The comments made during this engagement were taken into account to inform the design of the Proposed Development prior to statutory consultation which includes this PEIR.
- 4.3.1.3 The issues raised through the statutory consultation (April to June 2025) and how these have been considered and addressed within the design evolution of the Proposed Development and the EIA will be set out in the ES where appropriate otherwise they will be covered in the Consultation Report published with the DCO application.
- 4.3.1.4 Compliance with the requirements of the Act and the EIA Regulations will be evidenced in the Consultation Report and ES submitted with the DCO application, in addition to details of the pre-application consultation undertaken throughout the design and assessment of the Proposed Development.
- 4.3.1.5 Consultation with statutory consultees and stakeholders is ongoing to help inform the content of the ES and the design of the Proposed Development.
- 4.3.1.6 A number of meetings have taken place with stakeholders to share information on the Proposed Development and the approach to environmental assessment including, but not limited to, the following:
- Norfolk County Council and Breckland Council, including aspect specific discussions with:
 - The Lead Local Flood Authority (LLFA);
 - County Archaeologist;
 - Landscape Officer;
 - Highways Officer;
 - Biodiversity Officer;
 - Local Fire Rescue Service
 - The Planning Inspectorate;
 - Environment Agency;
 - RSPB;
 - Natural England;
 - Anglian Water
- 4.3.1.7 Aspect specific consultation and engagement is included within each of the aspect Chapters 5 - 15.
- 4.3.1.8 In addition to engagement with relevant statutory consultees, the Applicant has been in regular discussions with local landowners affected by the Proposed Development.

- 4.3.1.9 Non-statutory consultation was undertaken from 9 September to 18 October 2024 and provided individuals and interested parties an early opportunity to formally have their say by sharing their views and local knowledge. The feedback received during this initial non-statutory consultation informed and shaped the ongoing design development and evolution of the proposals. For more information on the non-statutory consultation, see the Non-Statutory Consultation Report.

4.4 Baseline Conditions

4.4.1 Existing Baseline

- 4.4.1.1 To predict the potential environmental effects of the Proposed Development, it is important to establish the baseline conditions that currently exist within the draft Order Limits and its surroundings, in the absence of any development.
- 4.4.1.2 Detailed environmental information relating to the existing environmental baseline has been collected. This baseline information has been gathered from various sources, including:
- Online/digital resources
 - Data searches, e.g., Local Biological Record Centres, Historic Environment Record.
 - Baseline site surveys
 - Available environmental information submitted in support of other planning applications for development in the vicinity.
- 4.4.1.3 The current environmental and physical conditions of the relevant study areas ('the baseline') have been established so that a comparison of future changes as a result of the Proposed Development can be understood, and potentially significant effects can be identified, where relevant to the assessment methodology.
- 4.4.1.4 Site visits, walkover surveys and initial desk-based baseline data collection have been undertaken to determine the baseline conditions. Details of specific visits and survey results are provided in individual assessment chapters of this PEIR (Chapters 5 to 15). Where further studies remain to be complete they are made clear in the relevant assessment chapters of this PEIR. The full results from all baseline data collection and surveys will be described within the ES.
- 4.4.1.5 The baseline conditions used within the assessment and information used to define it are detailed within Chapters 5 to 14 of this PEIR, with any relevant limitations and assumptions.

4.4.2 Future Baseline

- 4.4.2.1 Due to the relatively short timescales required to construct of the Proposed Development, the EIA has been carried out in relation to existing conditions however, where relevant, the environmental conditions in the future have been considered so that the impact of the Proposed Development can be appropriately

assessed against the baseline conditions that would occur in the future without the Proposed Development being constructed and operated i.e. the 'future baseline'. Where future conditions are considered relevant, and likely to change to the extent that they need to be considered, they are described at the end of the baseline section of each technical assessment chapter of the PEIR.

- 4.4.2.2 The future baseline can also change as a result of other developments being constructed within the study areas or zones of influence used in the assessment of a proposed development. Chapter 15 of this PEIR on cumulative effects describes how other developments are identified, information gathered, and cumulative effects assessed. The cumulative assessment follows advice from the Planning Inspectorate of Cumulative Effects Assessment [27], which states:

"Where other existing and, or approved developments are expected to be completed before construction of the proposed NSIP and the effects are fully determined, effects arising from them should be considered as part of the baseline and may be considered as part of both the construction and operational assessment."

If the effects of other existing and, or approved development under construction are not yet fully determined, for example the outcome of mitigation is being monitored and is not yet known, it may be appropriate to consider these in the CEA."

- 4.4.2.3 The other developments identified as part of the cumulative effects assessment included the following developments which are planned to be complete before construction of the Proposed Development, and have effects determined, and should therefore be considered as part of the future baseline:

- Norfolk Vanguard (Planning Inspectorate Ref. EN010079)
- Norfolk Boreas (Planning Inspectorate Ref. EN010087)
- East Bilney Quarry (Norfolk County Council and Breckland Council Ref. FUL/2023/0030 / C/3/2010/3028)
- Land to South of Field Lane (Norfolk County Council Ref. FUL/2023/0029)
- East Bilney Quarry (Norfolk County Council Ref. FUL/2023/0031)
- Land South of B1108 (Norfolk County Council Ref. FUL/2024/0041 / FUL/2020/0050)
- Dudgeon Onshore Substation (Breckland Council Ref. 3PL/2012/0703/F)
- Land to the South of Lynn Road (Norfolk County Council Ref. FUL/2023/0047)

4.4.3 Spatial and Temporal Scope

- 4.4.3.1 Spatially, the area over which effects could occur may be wider than the draft Order Limits. The appropriate study area has been determined for each environmental aspect and set out in PEIR Chapters 5 to 14. Specific study areas are defined in each aspect section and allow for assessment of indirect as well as direct effects, together with off-site factors, such as traffic routes, where relevant. They are also used to inform the assessment of cumulative effects in Chapter 15.

- 4.4.3.2 Specific temporal periods are defined for the assessment of baseline conditions and the impacts of the Proposed Development. In doing so, consideration is given to the worst-case durations of construction and operational activities. Where relevant, consideration is given to the duration it could take for environmental design measures to become established and effective. Timeframes for which mitigation measures are likely to have achieved their desired outcome will be defined within the ES.
- 4.4.3.3 The assessment considers effects at the construction, operation and decommissioning phases. The definitions of these are presented in Table 4-3. The future baseline scenario describes the changes from the current baseline scenario as far as natural changes can be established, although it is noted without the Proposed Development that the draft Order Limits would continue to be used for agricultural purposes.

Table 4-3 Baseline scenarios

Baseline scenarios	Description
Construction phase – current baseline (Year One)	This relates to all works associated with construction of the Proposed Development, comprising installation of the solar PV modules, cabling and onsite supporting equipment such as the BESS, transformers, inverters and substations. The construction phase is expected to take up to 2.5 years.
Operational phase – future baseline (from Year Three)	This relates to effects once the Proposed Development is installed and in use. The opening year when the Proposed Development is to become operational, and future year scenario after the opening year when the mitigation measures are likely to have achieved their desired outcome (for example, landscape planting within 15 years). The design life of the Proposed Development is 40 years.
Decommissioning phase – future baseline (from Year 40)	This relates to effects at the end of operation as the Proposed Development is shut down. The decommissioning year will take place following the operation of the Proposed Development, which is expected to be 40 years from the date of energisation. Decommissioning is expected to take 12-24 months.

4.5 Assessment of Effects

4.5.1 Significance of Effect

- 4.5.1.1 The EIA process requires the identification of the likely significant environmental effects of the Proposed Development. This includes the consideration of the likely environmental effects (beneficial or adverse) during the construction, operation and decommissioning of the Proposed Development.

- 4.5.1.2 The likely effect that the Proposed Development may have on identified environmental receptors is influenced by a combination of the sensitivity (or importance) of the receptor and the predicted magnitude of impact on the receptor, or change from the baseline conditions.

4.5.2 Assigning Value of Receptors

- 4.5.2.1 Receptors are defined as the physical resource or 'user group' that would experience an effect' of the Proposed Development, and these are identified as part of developing the baseline conditions.
- 4.5.2.2 The environmental effect of the Proposed Development on receptors depends on the spatial relationship between the source of the effect and the receptor, as well as the environmental sensitivity of a receptor.
- 4.5.2.3 Assignment of environmental sensitivity of a receptor generally depends on the vulnerability, recoverability and value/importance of the receptor. The environmental sensitivity (or importance) is determined using categories defined for each aspect specific methodology. A typical general example is set out in Table 4-4 to illustrate the process.

Table 4-4 *Indicative environmental sensitivity of a receptor*

Sensitivity	Criteria
High	High importance and rarity, international level and very limited potential for substitution; unable to tolerate change.
Medium	High or medium importance and rarity, regional level and limited potential for substitution; limited capacity to tolerate change.
Low	Low or medium importance and rarity; and local level; capable of tolerating some change.
Negligible	Very low importance or rarity and local level; high capacity for change.

- 4.5.2.4 Where specific criteria for sensitivity/value have been used in accordance with best practice for any given technical assessment, these are set out and used in the individual environmental aspect assessment.

4.5.3 Magnitude of Impact

- 4.5.3.1 Magnitude of impact is defined by the extent of change from the identified baseline conditions, irrespective of the value/sensitivity of a receptors.
- 4.5.3.2 The categorization of the magnitude of impact takes into account the following factors where relevant:
- Extent;
 - Duration;
 - Frequency; and

- Reversibility.

4.5.3.3 Impacts are defined as either beneficial or adverse. A general typical set of magnitude criteria which can be used in assessment outlined in Table 4-5 as an example to illustrate the process.

Table 4-5 Indicative magnitude of impact

Magnitude	Criteria
High	Total loss or major alteration to key elements/features of the baseline (i.e., pre-development) conditions.
Medium	Partial loss or alteration to one or more key elements/features of the baseline (i.e., pre-development) conditions
Low	Minor shift away from baseline (i.e., pre-development) conditions.
Negligible	Very slight change from baseline (i.e., pre-development) conditions

4.5.3.4 Where other specific categories criteria of for magnitude have been used in accordance with best practice for any given technical assessment, these are set out and used in the individual environmental topic assessment.

4.5.4 Assigning Significance

4.5.4.1 The overall significance of the effect is assigned by the combination of both sensitivity of the receptor and magnitude of impact. The level of significance is determined in each of the environmental topic assessments and considers relevant topic-specific legislation, planning policy and guidance. Levels of significance of effects generally follow the example matrix outlined in Table 4-6 and are either beneficial or adverse.

Table 4-6 Matrix to classify environmental effects

		Magnitude of Impact			
Sensitivity of receptor		High	Medium	Low	Very Low
	High	Major	Major	Moderate	Minor
	Medium	Major	Moderate	Minor	Negligible
	Low	Moderate	Minor	Negligible	Negligible
	Very Low	Minor	Negligible	Negligible	Negligible

4.5.4.2 A general description of the effect conclusions of Negligible, Minor, Moderate and Major is provided in Table 4-7. Typically Moderate or Major effects are considered significant in EIA terms, and Negligible or Minor effects are not significant. The conclusions of the significance of each impact considers embedded design, and good practice and additional mitigation measures, depending of the stage of assessment, as defined in section 4.6.

- 4.5.4.3 This matrix approach is provided as an example guide and is not prescriptive; professional judgement can be applied in determining significance of effect and the assessment is supported by a clear narrative to justify the conclusions reached.
- 4.5.4.4 The topic assessments can adopt this general approach to assigning significance, however typically industry specific guidance is applied to topics where available and specific criteria are stated in the individual topic chapters.
- 4.5.4.5 The likely residual effects of the Proposed Development are set out for each topic assuming implementation of all mitigation measures identified. This includes an assessment of significance of those effects in accordance with the identified criteria.

Table 4-7 *Indicative significant criteria for use within the EIA*

Significance Criteria	
Major	These effects are likely to be key factors or important considerations at a regional or district scale but, if adverse, are potential concerns to the project, depending upon the relative importance attached to the issue during the decision-making process. They are generally, but not exclusively associated with sites and features of national importance and resources/features which are unique and which, if lost, cannot be replaced or relocated.
Moderate	These effects, if adverse, while important at a local scale, are not likely to be key decision-making issues. Nevertheless, the cumulative effect of such issues may lead to an increase in the overall effects on a particular area or on a particular resource.
Minor	These effects may be raised as local issues but are unlikely to be of importance in the decision-making process. Nevertheless, they are of relevance in the detailed design of the project.
Negligible	Effects which are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

4.6 Mitigation Measures

- 4.6.1.1 This PEIR includes a description of the measures envisaged to avoid and reduce or mitigate adverse effects identified. If necessary, monitoring may also have been prescribed.
- 4.6.1.2 In line with IEMA Guidance [31] [32] [33] and professional best practice, consideration will be given to key types of mitigation:
 - Embedded mitigation** – Measures that form part of the engineering design, developed through the iterative design process. The first stage of assessment is undertaken with embedded mitigation in place. A Design Approach Document will be produced with the DCO application which will define the design

principles for the Proposed Development to be secured and implemented through the DCO; a draft is provided for statutory consultation.

- **Good practice** – Standard approaches and actions commonly used or required on infrastructure projects to avoid or reduce environmental impacts, and typically applicable across the whole project regardless of whether an EIA is undertaken or not. Management plans will incorporate standard good practice to be applied during the construction, operation and decommissioning of the Proposed Development and their development and implementation can be secure by Requirement of the DCO. The first stage of assessment is undertaken with good practice in place.
- **Further mitigation** – Any additional project specific measures identified during the EIA to avoid, reduce or offset potential impacts that could otherwise result in effects considered significant in the context of the EIA Regulations. Essential mitigation will be identified by environmental topic specialists, where required, taking into account the embedded mitigation and good practice commitments. The residual effects assessment is undertaken with further mitigation in place.

4.6.1.3 At this stage in the project, the Proposed Development has been through design development which has identified mitigation measures and design principles that have been embedded into the design and layout of the Proposed Development. In addition, Outline Management Plans will be provided as part of the DCO application, as a mechanism for securing required mitigation measures, and are therefore considered to be embedded or good practice mitigation. This will include the Outline CEMP, which includes practices to manage contractor activities and minimise nuisance effects that the contractor will be obliged to implement. For further details on Outline Management Plans, see below.

4.7 Other Supporting Studies and Management Plans

4.7.1.1 The DCO application will be supported by several technical assessments and management plans undertaken in line with specific and relevant policy or legislation. These provide additional information to inform the design, the potential effects of the Proposed Development and any mitigation measures. An outline of these are provided below for information.

4.7.1.2 For a description of the proposed construction, operation and decommissioning management plans, see Chapter 2 Proposed Development of this PEIR.

4.7.2 Habitats Regulations Assessment

4.7.2.1 The European Habitats Directive was transposed into UK legislation through the Conservation of Habitats and Species Regulations 2017 (the “Habitats Regulations”). These regulations set out procedures for dealing with the effects of development on the national site network, which comprises Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). These are collectively

referred to as “European sites”. As a matter of policy, the Government applies the same procedures to possible SPAs, possible SACs, Ramsar sites and proposed Ramsar sites.

- 4.7.2.2 Under Regulation 63 of the Habitats Regulations, an appropriate assessment is required where a plan or project (in this case an NSIP) is likely to have a significant effect upon a European site, either individually or in combination with other projects. This information takes the form of a Report.
- 4.7.2.3 Further to this, Regulations 64 and 68 provides that where an appropriate assessment has been carried out and results in a negative assessment (that is, the development will adversely affect the integrity of the site(s) despite any proposed avoidance or mitigation measures or if uncertainty remains), consent can only be granted if there are no alternative solutions, there are Imperative Reasons of Overriding Public Interest (IROPI) for the development, and compensatory measures have been secured.
- 4.7.2.4 An HRA Screening has been completed and is provided in Appendix 6.3 to this PEIR. This concluded that, it cannot be satisfactorily demonstrated that significant effects are unlikely to occur to qualifying habitats and species associated with the Breckland SPA, River Wensum SAC, Broadland Ramsar and The Broads SAC. Therefore, a HRA Appropriate Assessment will be prepared and submitted with the DCO application.

4.7.3 Water Framework Directive Assessment

- 4.7.3.1 The Water Framework Directive (WFD) (2000) was transposed into domestic law by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 (the “WER Regulations”). It provides a structure for the protection and enhancement of surface fresh water, estuaries, coastal waters and groundwater.
- 4.7.3.2 The WFD Regulations aim to enhance the current status of all waterbodies (with a target to achieve Good Ecological Status) and prevent deterioration of waterbodies from their current status due to pollution. The requirements of the WFD Regulations have been taken into account when planning all activities that may impact the water environment.
- 4.7.3.3 Chapter 14 Water Resources and Flood Risk details all surface water and groundwater receptors located within the study area of the Proposed Development. This includes a description of existing water quality, water quantity and WFD Status.
- 4.7.3.4 A Preliminary WER Compliance Assessment has been completed, in line with the methodology outlined in the EIA Scoping Report and is provided in Appendix 14.3 to this PEIR. Reconnaissance walkover surveys will be undertaken to confirm the receptor value of the affected watercourses, likely impacts and therefore the appropriate crossing method, in consultation with the Environment Agency. However, it is considered that the Proposed Development can be delivered in compliance with WER objectives and is not expected to increase pollution to the

water bodies draining the area in the draft Order Limits. Further assessment will be undertaken and reported in the ES.

4.7.4 Flood Risk Assessment

- 4.7.4.1 A Preliminary Flood Risk Assessment (FRA) has been undertaken in accordance with the NPPF. This FRA is provided as Appendix 14.1 to the PEIR and has considered flood risk both to and from the Proposed Development. It demonstrates how this risk is intended to be managed in the future, including with the influence of climate change.
- 4.7.4.2 The majority of land within the draft Order Limits is located within Flood Zone 1, an area with a low probability of flooding from rivers and the sea, with some minor instances of Flood Zones 2 and 3 located in the Northern and Southern Panel Areas.
- 4.7.4.3 At this stage, in line with both NPS EN-1 and the NPPF, a Sequential Test was conducted to demonstrate there were no reasonably available sites in areas of lower risk, and that the Proposed Development will be safe for its lifetime without increasing flood risk elsewhere.
- 4.7.4.4 The Proposed Development has applied a sequential approach to site layout to avoid placing critical electrical components (such as BESS and substations) in areas of flood risk, as determined by the available Flood map for planning and Flood Risk from Surface Water maps.
- 4.7.4.5 The Sequential Test concluded that there are no other sites reasonably available within the search radius that are a lower flood risk, and consequently that the Sequential Test has been satisfied for the Proposed Development. For more information on the Sequential Test, see Appendix 14.1 Preliminary FRA.
- 4.7.4.6 The Environment Agency published new national risk information for flooding and coastal erosion (NaFRA) on 25 March 2025 [34], but has not been incorporated into the preliminary assessment at this stage but will be for the ES. Should sensitive elements be identified to occupy areas of high or medium flood risk (from any source), then the siting of sensitive elements, as part of the overall sequential approach to site layout, will be revised taking into account the latest available information.

4.7.5 Transport Statement

- 4.7.5.1 A Transport Statement (TS) will be included with the DCO application. This will include the assessment of the surface traffic impacts of the Proposed Development during construction and operational traffic. The assessment will consider local, regional, and national policy context, and consider the impact of construction and operational traffic. This will report their likely impacts on network and junction capacity, and potential to impact on journey times and highways safety.

4.7.6 Management Plans

4.7.6.1 A series of outline management plans will also be provided with the DCO application, including:

- oCEMP
- oCTMP
- oMWMP
- oSRMP
- Archaeological Mitigation Strategy
- oBSMP
- oLEMP
- oPRoWMP
- oOEMP
- oDEMP

4.7.6.2 Draft outline management plans have been prepared and are available for Statutory Consultation. For more information on the outline management plans, see Section 2.6.

4.8 Monitoring

4.8.1.1 Where relevant, monitoring measures have been identified in each aspect assessment where required to ensure the ongoing efficacy of measures to mitigate significant effects as a result of the Proposed Development. These measures have been outlined in each individual aspect chapter of this PEIR (Chapters 5 to 13 of this PEIR), and will be secured (where necessary) through the DCO.

4.9 Cumulative Effects

4.9.1.1 Schedule 4 of the EIA Regulations, (Regulation 14(2)) require that an ES includes a description of the cumulation of effects. These effects are typically distinguished into two types:

- In-combination effects from the interrelationship between different environmental effects of the Proposed Development (intra-project)
- Cumulative effects from the interrelationship between different projects along with the Proposed Development (inter-project)

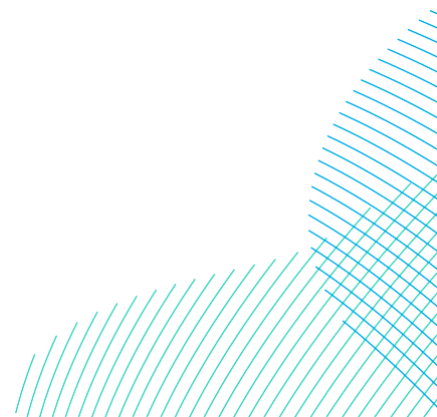
4.9.2 In-combination Effects

4.9.2.1 In-combination effects, or intra-project effects, occur when a resource, receptor or group of receptors are potentially affected by more than one source of direct environmental impact resulting from the same development. For example, a community may be affected by noise and dust effects resulting from the construction phase activities of a single development.

- 4.9.2.2 Where relevant in-combination effects are considered within each relevant environmental aspect chapter and are collated in Chapter 15 Cumulative Effects Assessment.

4.9.3 Cumulative Effects Assessment

- 4.9.3.1 Cumulative effects, or inter-project effects, occur when a resource, receptor or group of receptors are potentially affected by more than one development at the same time. For example, the construction traffic effects of a development in isolation may not be significant, but when combined with the construction traffic effects of another development (using the same geographical area at the same time) may result in significant cumulative effects on the surrounding highway network.
- 4.9.3.2 Chapter 15 of this PEIR provides an overview of the approach to undertaking the in-combination effects and cumulative effects assessment and the preliminary assessment of cumulative effects.
- 4.9.3.3 Section 4.4.2 includes a list of the identified developments which are planned to be complete before construction of the Proposed Development, and have effects determined, and should therefore be considered as part of the future baseline (and therefore not within the cumulative effects assessment).

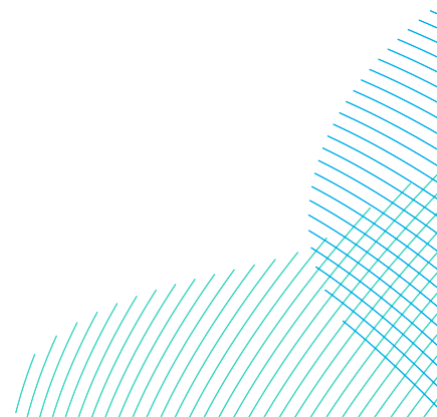


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