Longfield Solar Farm

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5. Environmental Impact Assessment Methodology

5.1 Introduction

EIA Process

5.1.1 Environmental Impact Assessment (EIA) is the process undertaken to identify and evaluate the likely significant effects of a proposed development on the environment and to identify measures to mitigate or manage any significant negative effects. The EIA should be informed by consultation with statutory consultees, other interested bodies, and members of the public. The purpose of identifying significant effects is to ensure decision makers are able to make an informed judgement on the environmental impacts of a proposal.

5.1.2 The key elements in EIA for Nationally Significant Infrastructure Projects (NSIPs) are:

a. Iterative project design, taking feedback from consultation and applying it to the development design process on an ongoing basis throughout the EIA process;

b. Scoping and ongoing consultation, including consideration of responses and how these should be addressed as part of the EIA;

c. Technical environmental impact assessments, including baseline studies, input to the design process, and identification of potential significant environmental effects;

d. Proposed avoidance and mitigation measures where possible, to prevent or reduce likely significant adverse effects;

e. Consultation on the Preliminary Environmental Information (PEI) Report; and

f. Preparation and submission of the Environmental Statement (ES).

5.1.3 Each of the technical assessments follows a systematic approach, with the principal steps being:

a. Description of baseline conditions;

b. Assessment of likely effects;

c. Identification of appropriate mitigation measures, including design changes;

d. Assessment of residual (likely) environmental effects that remain following mitigation; and

e. Assessment of cumulative effects when considering the Scheme along with other planned developments in the area.

General Assessment Approach

5.1.6 This ES has been prepared to satisfy the requirements of The Infrastructure Planning (EIA) Regulations 2017 (hereafter referred to as 'the EIA Regulations') (Ref 5-1).

5.1.7 In preparing this ES, reference has been made to the following guidance:

a. Planning Inspectorate Advice Note 3: EIA Consultation and Notification (Ref 5-2);

b. Planning Inspectorate Advice Note 7: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements (Ref 5-3);

c. Planning Inspectorate Advice Note 9: Rochdale Envelope (Ref 5-4);

d. Planning Inspectorate Advice Note 11: Working with Public Bodies in the Infrastructure Planning Process (Ref 5-5); and

e. Planning Inspectorate Advice Note 17: Cumulative Effects Assessment (Ref 5-6).

EIA Scoping

5.1.8 The aim of the scoping process is to identify key expected environmental issues at an early stage, to determine which elements of the Scheme are likely to result in likely significant effects on the environment and to establish the extent of survey and assessment requirements for the EIA.

5.1.9 The issues to be addressed within this ES were identified in the ***EIA Scoping Report*** (see ***Appendix 1A*** of the ES [**EN010118/APP/6.2**]) submitted to the Planning Inspectorate in November 2020. The Secretary of State's ***Scoping Opinion*** was received on 16 December 2020 (see ***Appendix 1B*** of the ES **[EN010118/APP6.2]**), including the formal responses received by the Planning Inspectorate from consultees on the EIA Scoping Report.

5.1.10 Key issues raised in the Scoping Opinion are summarised at the start of each technical chapter of the ES and have been considered during the EIA process.

5.1.11 In response to the Scoping Opinion, the EIA and this ES include assessments for the following environmental topics:

a. **Chapter 6:** Climate Change;

b. **Chapter 7:** Cultural Heritage;

c. **Chapter 8:** Ecology;

d. **Chapter 9:** Water Environment;

e. **Chapter 10:** Landscape and Visual Amenity;

f. **Chapter 11:** Noise and Vibration;

g. **Chapter 12:** Socio-Economics and Land Use;

h. **Chapter 13:** Transport and Access;

i. **Chapter 14:** Air Quality; and

j. **Chapter 15**: Human Health.

5.1.12 The EIA Scoping Report (***Appendix 1A*** of the ES **[EN010118/APP/6.2]**) concluded that several topics did not require a full chapter within the PEI Report and this ES because they were not considered to give rise to significant effects. These topics are described in:

a. **Chapter 16:** Other Environmental Topics. This includes:
   i. Glint and Glare
   ii. Ground Conditions;
   iii. Major Accidents or Disasters;
   iv. Telecommunications, Television Reception and Utilities; and
   v. Waste.

5.1.13 Schedule 4 Part 5 of the EIA Regulations (Ref 5-1) requires a description of the likely significant transboundary effects to be provided in an ES. The Scoping Report concludes in Appendix A (Table A1) that the Scheme is not likely to have significant effects on the environment in another European Economic Area (EEA) State. For the avoidance of doubt, this point has been reconsidered at the ES stage, and that consideration confirmed that there are no pathways of effect to other EEA States. Transboundary effects have therefore been scoped out from further assessment within the ES.

5.1.14 Paragraph 4 within Schedule 4 of the EIA Regulations states that the ES should include '*a description of the factors […] likely to be significantly affected by the development: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape'*. These factors are addressed within the relevant chapters listed above.

Environmental Statement

5.1.15 This ES presents the outcomes of the following EIA activities:

a. Establishing baseline conditions;
b. Consultation with statutory and non-statutory consultees and the contents of the Scoping Opinion;
c. Consideration of relevant local, regional, and national planning policies, guidelines, and legislation relevant to the EIA;
d. Consideration of technical standards for the development of significance criteria and specialist assessment methodologies;
e. Input into the development of design including embedded mitigation;
f. Review of secondary information, previous environmental studies, publicly available information, and databases;
g. Professional judgement;
h. Physical surveys and monitoring;
i. Desk-top studies;

j. Modelling and calculations;

k. Identification of any necessary additional mitigation or monitoring required; and

l. Reference to current guidance.

5.1.16 Each technical chapter follows the same structure for ease of reference, as outlined below:

a. Introduction;

b. Legislation and Planning Policy;

c. Assessment Assumptions and Limitations;

d. Stakeholder Engagement;

e. Assessment Methodology;

f. Baseline Conditions;

g. Embedded Design Mitigation;

h. Assessment of Likely Impacts and Effects;

i. Additional Monitoring, Mitigation and Enhancement Measures;

j. Residual Effects;

k. Cumulative Effects;

l. References; and

m. Figures.

5.2 Rochdale Envelope

5.2.1 As discussed in section 2.4 of ***Chapter 2: The Scheme*** of the ES **[EN010118/APP/6.1]**, a Rochdale Envelope approach is being used to provide flexibility in the ES and the Development Consent Order (DCO), to allow for the most up to date technology possible to be utilised by the Scheme at the time of construction.

5.2.2 In order to establish parameters within the Rochdale Envelope for assessment, a set of "Design Principles" have been established. The Design Principles are appended to the Design Statement **[EN010118/APP/7.3]** and form the Rochdale Envelope limits within which the Scheme can be built and operated. These design principles correspond to the physical areas set out in the works plans **[EN010118/APP/2.2].**

5.2.3 These Design Principles allow for flexibility in the Scheme design. In addition, an ***Illustrative Concept Design*** (**Figure 2-5 [EN010118/APP/6.3]**) has been created to provide a visual representation of a tangible example of a scheme that could be constructed within the Design Principles. This Concept Design enables a robust assessment of likely significant effects to be undertaken within this ES, for topics where the nature of the assessment methodology requires a specific level of detail, namely the landscape and visual, cultural heritage, and noise assessments. The quantity and sizing of equipment shown in this illustrative concept design is captured in the ***Concept Design Appendix*** (**Appendix 2-A [EN010118/APP/6.1]**).

5.2.4 The Concept Design Appendix presents an illustrative example of what could be built under the Design Principles, based on a realistic worst case, and all fall within the bounds of the Design Principles. In many cases, the Concept Design Parameters are the same as the Design Principles, such as the height of PV Panels, which are established as Design Principles – and the Concept Design Parameters align.

5.2.5 It is also important to recognise that in some cases the Concept Design includes 'indicative' design details, rather than maximum parameters. For example, the number of PV Panels in the Concept Design is an indicative number rather than a maximum number, as the maximum Design Principle relates to the total surface area of all the PV Panels rather than the total number of PV Panels. This is appropriate because the surface area of an individual PV Panel and number of them does not have the potential to change the likely significant effects of the Scheme, whereas the maximum total surface area of all PV Panels does. Over time, as technology advances, it is quite possible that PV Panels could change in size, meaning that more or less are required to cover the same area (as limited by the Design Principles and Works Plans **[EN010118/APP/6.3]**). As a result, it is the total surface area of PV Panels that is relevant to the technical assessments and not the number of PV Panels needed to achieve that, hence it is the total surface area of PV Panels that is the relevant parameter (the Design Principle).

5.2.6 As a result, regardless of the approach taken, all chapters have assessed the likely significant effects arising from the worst case parameter within the Design Principles.

5.2.7 The approach taken to the assessment in each technical chapter is explained in the relevant chapter and summarised below in Table 5-1.

Table 5-1 Technical Assessments undertaken by disciplines

Technical Chapter	*What the chapter has assessed*
Environmental Statement Chapter 6 - Climate Change	The climate assessment has been based almost entirely on the Design Principles. The assessment of embodied carbon is a special case within the chapter, as it is based on an assumed number of battery cubes which is not fixed by the Design Principles. This part of the assessment is therefore based on a BESS that is able to supply the grid at an assumed 400 MW for four hours, for a total capacity of 1,600 MWh, as illustrated in the Concept Design. The BESS capacity is not limited by the Design Principles but increasing the peak power capacity of the BESS would reduce the number of battery cubes and increase the number of inverters and transformers within the BESS compound, which would in turn lower the embodied emissions. It is therefore not expected that there would be a worse scenario for the assessment of embodied carbon than the battery arrangement that has been assessed in the chapter; other configurations are expected to have the same or lower embodied carbon.
Environmental Statement Chapter 7 - Cultural Heritage	The Design Principles have been assessed for underground archaeology, based on the maximum areas that will be disturbed. A realistic visual impression of the Scheme needed to be assessed for above ground heritage, and therefore the assessment of above ground heritage has been based on the Concept Design layout, with the structures shown at the maximum heights allowed by the Design Principles. Consideration has been given to the flexibility allowed by the Rochdale Envelope (maximum parameters set out in the Design Principles); the Concept Design is considered to be the worst case scenario for assessment of impacts on above ground heritage assets.
Environmental Statement Chapter 8 - Ecology	The Concept Design has been assessed to allow an assessment of a specific, deliverable Scheme and calculation of the BNG metrics, which requires a definitive design. Consideration has been given to the Design Principles and flexibility allowed by the Rochdale Envelope, such as if Phase 2 of the BESS is not built and solar PV is installed in its place. The Concept Design does not have a smaller footprint than the Design Principles, and therefore the conclusions of the assessment are not affected by the flexibility allowed by the Design Principles.
Environmental Statement Chapter 9 – Water Environment	The Concept Design has been assessed to allow an assessment of a specific, deliverable Scheme and calculation of the drainage metrics, which requires a definitive design. A review of the Concept Design against the Design Principles has confirmed that constructing and operating the Scheme in other ways allowed by the Design Principles would not result in a greater impact to the water environment than the Concept Design.
Environmental Statement Chapter 10 - Landscape & Visual	The LVIA needs to illustrate a specific scheme and therefore assesses the potential effects resulting from the Concept Design layout, with the structures shown at the maximum heights allowed by the Design Principles. A review of the Concept Design against the Design Principles confirmed that constructing and operating the Scheme in other ways allowed by the Design Principles would not result in a greater impact to landscape character or visual amenity than the Concept Design. For example, for LVIA, building Phase 2 of the BESS is the same or greater impact than solar PV, landscaping, or habitat areas.
Environmental Statement Chapter 11 - Noise & Vibration	The Noise and Vibration Chapter assesses a hybrid of the Concept Design and Design Principles. The modelling requires specific locations for operational phase noise sources which has been achieved by modelling the Concept Design (with infrastructure at maximum heights allowed by the Design Principles) and adding an additional 25 BoSS/Solar Station locations with centralised inverters (the noisier type of inverters), to ensure the maximum number of locations and area of BoSS equipment allowed by the Design Principles has been modelled. Where lateral movements of the BoSS/Solar Stations are allowed by the Rochdale Envelope and Works Plans, the noise levels are controlled by a requirement to the DCO to demonstrate the Scheme achieves or betters the predicted noise levels at sensitive receptors in the ES.
Environmental Statement	This chapter is based on employment numbers applicable to the Design Parameters, which allows a denser scheme than the Concept Design. The

Chapter 12 - Socio-Economics	difference in employment numbers between the Design Principles and Concept Design is expected to be immaterial, however, given their similar scale. The loss of Best and Most Versatile land and the impact on Public Rights of Way is based on the Design Principles.
Environmental Statement Chapter 13 - Transport & Access	The Design Principles for the Scheme have been assessed. There are not expected to be any new, different or worse effects than what has been assessed for any scheme built within the Design Principles. The transport impact assessment is based on the worst-case parameters in terms of daily construction staff and HGVs during the peak phase of construction (based on the Design Principles).
Environmental Statement Chapter 14 - Air Quality	The Design Principles have been assessed with respect to the air quality impact assessment. The transport impact assessment has been based on the worst-case parameters (associated with the Design Principles) in terms of daily construction staff and HGVs during the peak phase of construction. Optionality within the parameters of the Design Principles (such as the Concept Design) would not result in worse effects than in the conclusions of this assessment.
Environmental Statement Chapter 15 – Human Health	The Design Principles have been assessed for transport, air quality, socio-economics and noise. For noise, this has been achieved by taking a hybrid approach based on the Concept Design but having regard to the Design Principles, and adding 25 BoSS / centralised inverter locations to the Concept Design to ensure the maximum allowed noise sources during operation have been modelled. A DCO requirement has been included to ensure the modelled noise levels are achieved for any other scheme that could be constructed and operated within the Design Principles. The transport, socio-economics and air quality assessments are based on the Design Principles.
Environmental Statement Chapter 16 - Other Issues	The glint and glare assessment (Appendix 10G) has been based on the Illustrative Concept Design, so that a specific solar PV setup can be modelled. The narrower rows allowed by the Design Principles and extra solar PV panels if Phase 2 of the BESS and some BoSS / Solar Stations are not built would not affect the conclusions of the assessment. The conclusions of the glint and glare assessment therefore remain valid for any scheme that could be constructed within the Design Principles. The assessment of major accident and disasters (including battery fire), telecommunications, waste, and ground conditions are all based on the Design Parameters and are valid for the Concept Design as well. The assessment of battery fire has been based on a specific 400MW for 4 hrs design as illustrated by the Concept Design, but it is not expected that a BESS with greater peak capacity would pose a different risk or have a greater impact, given a fire would be localised to a single or small group of cells and would not affect the entire BESS compound.

5.3 Spatial Scope

5.3.1 The assessment chapters of this ES (***Chapters 6** to **15***) describe their spatial scope, including their rationale for determining the specific area within which the assessment is focussed. The study areas are a function of the nature of the impacts and the locations of potentially affected environmental resources or receptors. Justification for the spatial scope considered appropriate is documented in each topic chapter (***Chapters 6** to **15*** of the ES).

5.4 Determining the Baseline Conditions

5.4.1 In order to predict the potential environmental effects of the Scheme, it is important to determine the baseline environmental conditions that currently exist within the Order limits and the identified study area, in the absence of any development.

5.4.2 Detailed environmental baseline information has been collected and the methodology for the collection process is detailed within each technical chapter of the ES. The baseline information has been gathered from various sources, including:

a. Online / digital resources;

b. Data searches, e.g. GroundSure, Historic Environment Record, etc.;

c. Stakeholder engagement;

d. Baseline site surveys; and

e. Environmental information submitted in support of other planning applications for developments in the vicinity.

5.4.3 Consideration will also be given to how the baseline conditions would evolve in the absence of the Scheme, known as the 'future baseline', in respect of any planned developments. These are the conditions against which the construction, operational, and decommissioning activities are assessed. For most assessments the future baseline will be the same as the present-day baseline, but for ***Chapter 13: Transport and Access*** **[EN010118/APP/6.1]** this incorporates trip movements associated with other developments into the future baseline (in line with the approach agreed with Essex County Highways).

5.5 Development of Design, Impact Avoidance and Mitigation

5.5.1 The design process for the Scheme has been heavily influenced by the findings of early environmental appraisals and the EIA process. The Scheme has had several measures incorporated into the design to avoid, minimise, or mitigate environmental impacts. The key aspects where the design has evolved are described in ***Chapter 3: Alternatives and Design Evolution*** of the ES **[EN010118/APP/6.1]**. These include measures needed for legal compliance, as well as measures that implement the requirements of good practice guidance documents. The initial assessment has been undertaken on the basis that these measures are incorporated in the design and construction practices (i.e. they are 'embedded mitigation'). Embedded mitigation measures for the construction phase are set out in the Outline Construction Environmental Management Plan (OCEMP) **[EN010118/APP/7.10])**, including measures such as construction and exclusion zones in relation to retained vegetation, ensuring a tidy and neat working area, covering stockpiles and storing topsoil in accordance with good practice measures.

5.5.2 Implementation of embedded mitigation relied upon in the assessment will be secured in the DCO, including by ensuring the works described in Schedule 1 of the DCO are restricted to their corresponding works areas shown on the Works Plans [**EN010118/APP/2.2**], DCO requirements requiring compliance of detailed design of the Scheme with the Design Principles, or through DCO requirements requiring compliance with a management strategy, plan, or document.

5.5.3 Consideration has been given to any 'additional mitigation' over and above the embedded mitigation that may be required to mitigate any significant adverse effects identified following the assessment of the Scheme inclusive of its embedded mitigation. Each topic chapter will explain how any additional

mitigation is secured, either via a specific DCO requirement or via a management strategy, plan, or document secured by a DCO requirement. The residual effects (after the implementation of mitigation) have then been assessed and are presented in each topic chapter. Significant residual effects are also summarised in ***Chapter 18: Summary of Environmental Effects*** of the ES **[EN010118/APP/6.1]**. Where sufficient embedded mitigation has been incorporated into the design, it may not be necessary to propose additional mitigation.

5.5.4 As part of the development of the Scheme, three categories of planting have been proposed:

a. Advanced Mitigation Planting (planted 2021/2022)

b. Construction Day 1 Planting (planted at the beginning of construction); and

c. Residual Mitigation Planting (planted at the end of construction)

5.5.5 As set out in ***Chapter 10: Landscape and Visual Amenity*** of this ES **[EN010118/APP/6.1]**, where it was found to be beneficial to undertake planting early, in order to maximise growth prior to the Scheme's operation, this has been included as Advanced Mitigation Planting. This will be carried out in the 2021/2022 planting season. In instances where planting required to mitigate adverse effects on people's views could not be undertaken in 2021/2022, it would be undertaken at the beginning of the construction phase. This planting is referred to as Construction Day 1 Planting. All remaining planting, referred to as Residual Mitigation Planting, would be undertaken at the end of the construction phase.

5.5.6 Where a likely significant adverse effect has been identified, requirements for monitoring have been proposed within the relevant technical chapter in line with the EIA Regulations (Ref 5-1). These sometimes include monitoring the effectiveness of mitigation, to ensure the conclusions of the ES remain valid. In the unlikely event the monitoring identifies a greater effect than identified in the ES, for example if planting has been damaged by high winds, remedial action will be agreed with Chelmsford City Council (CCC) and Braintree District Council (BDC) to rectify the issue. In addition, where feasible, environmental enhancements, which are improvements to the environment that are not required to reduce adverse effects, have been embedded in the Scheme design. These measures are set out within the Concept Design Appendix and the Design Statement, and will be secured through the Outline Landscape and Ecological Management Plan (OLEMP), Outline Construction Management Plan (OCEMP), Outline Operational Environmental Management Plan (OOEMP), and the Decommissioning Strategy.

5.6 Temporal Scope: Timescales and Assessment Years

Construction Phase Effects

5.6.1 For the purposes of the assessment, the construction phase effects are those effects that result from activities during enabling works, construction, and commissioning activities. This covers sources of effects such as construction traffic, noise and vibration from construction activities, dust generation, site runoff, mud on roads, risk of fuel / oil spillage, and the visual intrusion of plant

and machinery on site. Some aspects of construction-related effects will last for longer than others. For example, impacts related to earth moving are likely to be relatively short in duration compared with the construction of energy infrastructure and landscaping activities, which are likely to persist throughout the entire construction period.

Operational Phase Effects

5.6.2 Operational effects are the effects that are associated with operational and maintenance activities during the generating lifetime of the Scheme. This includes the effects of the physical presence of the Solar Farm Site, and its operation, use, and maintenance. Timescales associated with these enduring effects are as follows:

a. Short term – endures for up to 12 months;

b. Medium term – endures for 1 - 5 years;

c. Long term – endures for more than 5 years;

d. Reversible Long-Term Effects – long-term effects, which endure throughout the lifetime of the Scheme, but which cease once the Scheme has been decommissioned; and

e. Permanent Effects – effects which cannot be reversed following decommissioning (e.g. where buried archaeology is permanently removed during construction).

Decommissioning Phase Effects

5.6.3 Decommissioning effects are changes resulting from activities beginning and ending during the decommissioning stage. This covers sources of effects such as decommissioning site traffic, noise and vibration from decommissioning activities, dust generation, site runoff, mud on roads, risk of fuel / oil spillage, and the visual intrusion of plant and machinery on site, for example. Typically, decommissioning phase effects are similar in nature to the construction phase, although may be of shorter duration and slightly lower intensity.

5.6.4 Decommissioning phase effects are set out and assessed separately to construction and operation phase effects in each of the technical chapters. In some cases, the technical chapter will provide a concise assessment explaining that the effects during decommissioning are expected to be less than or the same as those predicted during construction.

Assessment Years

5.6.5 The assessment considers the environmental impacts of the Scheme at key stages in its construction and operation and, as far as practicable, its decommissioning.

5.6.6 The baseline year is taken to be the present-day and has been based on surveys carried out from January 2020 and throughout 2020 and 2021. There have been no known noticeable changes onsite during the previous 24 months since these surveys took place that would change the conclusions of the ES. As described above, ‘future baseline’ conditions are also predicted for each assessment scenario, whereby the conditions anticipated to prevail at a certain point in the future (assuming the Scheme does not progress) are

identified for comparison with the predicted conditions with the Scheme. This can include the introduction of new receptors and resources into an area, or new development schemes that have the potential to change the baseline, where these form committed developments. Committed developments are those with current planning permission or allocated in adopted development plans, which have been considered within each technical chapter as part of their cumulative assessment.

5.6.7 The assessment scenarios considered for the purposes of the EIA (and detailed in this ES) are as follows:

a. Existing Baseline (2020) – this is the principal baseline against which environmental effects will be assessed;

b. Future Baseline (No Scheme) in 2025-2026, 2041 (for landscape, visual and heritage setting only), and 2065 (to assess construction, operation, and decommissioning impacts), against which the environmental effects of the Scheme will be assessed. These assessment years are explained below.

c. Construction (not earlier than 2024 – 2026) (With Scheme):

i. The peak construction years for the purpose of the EIA is anticipated to be 2025; this assumes commencement of construction not earlier than Q1 2024 and that the Scheme is built out rapidly over a 24-month period. This is a likely worst case from a traffic generation point of view because it compresses the trip numbers into a shorter duration and represents the greatest impact on the highway network. A lengthened construction phase would likely result in lower traffic, air quality, and noise impacts; therefore, the likely worst-case scenario has been assessed within the ES. Where it is not a worst-case, such as if a longer construction period leads to a reduced number of workers being required or extends the duration that construction noise is experienced by local residents, this is clearly stated and discussed in the relevant assessment chapter.

ii. The Battery Energy Storage System (BESS) may be constructed in two phases, with the first phase taking approximately 12-18 months during construction of the Solar Farm Site and in parallel with the Longfield Substation and the Grid Connection Route, and the second phase taking approximately 12-18 months an estimated five years later. The assumption is that the BESS will be constructed within the entire area shown on the Concept Design, however if the second phase of the BESS is not considered required, then there may be a slightly larger area of Solar PV Arrays built in the place of the second stage BESS. The technical assessments have assessed the reasonable worst-case scenario, which for some chapters will be the BESS being built out in its entirety during the main construction works and prior to operation. For example, this would be the case for Traffic and Transport, where it is usually worse to assume a compressed construction period (which generates more HGV movements per day during peak construction). Where the worst-case assumption is having the

BESS phased, with construction works in the BESS after approximately 5 years in parallel with the operational Scheme, this is noted in the relevant chapter and has been assessed. Where only the first phase of the BESS is constructed and the second phase not built, but instead constructed with Solar PV Arrays, this is considered to be of lesser impact than the entire BESS area being built out, and therefore not considered further within the technical assessments.

d. Operation (not earlier than 2026) (With Scheme). This is the opening year of the Scheme; it assumed that the Scheme will be operational by end of Q1 2026.

e. Decommissioning (assumed for the purposes of the assessment to be up to 24 months not earlier than 2066) – this would be the year when decommissioning would commence based on a typical 40 year lifetime. The DCO Application allows a degree of flexibility on the decommissioning date to allow maximum renewable energy generation from the site, should the Scheme still be operating efficiently after 40 years.

5.6.8 A future year of 2041 (i.e. not earlier than 15 years post opening of the Scheme) will also be considered for landscape and visual amenity, in terms of the maturation of vegetation (i.e. 15 years after the operational assessment year to allow for the consideration of mitigation planting).

5.7 Effect Significance Criteria

5.7.1 The evaluation of the significance of an effect is important; it is the significance that determines the resources that should be deployed in avoiding or mitigating a significant adverse effect, or conversely, the actual value of a beneficial effect. The overall environmental acceptability of the Scheme is a matter for the Secretary of State to determine, having considered the environmental information set out in the ES. Where it has not been possible to quantify effects, qualitative assessments will be carried out based on available knowledge and professional judgment. Where uncertainty exists, this will be noted in the relevant topic chapter.

5.7.2 The significance of effects will be determined by reference to criteria for each assessment topic. Specific significance criteria for each technical discipline has been developed, giving due regard to the following as relevant:

a. Sensitivity or value of the receptor or resource (described as high, medium, low, and very low);

b. Extent and magnitude of the impact (described as high, medium, low, and very low);

c. Effect duration (see Section 5.6.2), and whether effects are temporary, reversible or permanent;

d. Effect nature (whether direct or indirect, reversible or irreversible, beneficial or adverse);

e. Whether the effect occurs in isolation, is cumulative or interacts with other effects;

f. Performance against any relevant environmental quality standards; and

g. Compatibility with environmental policies.

5.7.3 Where definitive quality standards do not exist, significance will be based on the:

a. Local, district, regional or national scale or value of the resource affected;

b. Number of receptors affected;

c. Sensitivity of these receptors; and

d. Duration of the effect.

5.7.4 In order to provide a consistent approach to expressing the outcomes of the various studies undertaken as part of the EIA, and thereby enable comparison between effects upon different environmental topics, the following terminology is used in the ES to define residual effects:

a. **Adverse** – detrimental or negative effects to an environmental / socio-economic resource or receptor; or

b. **Negligible** (also referred to as 'neutral' for some topics) – imperceptible effects to an environmental / socio-economic resource or receptor; or

c. **Beneficial** – advantageous or positive effects to an environmental / socio-economic resource or receptor.

5.7.5 Where adverse or beneficial effects are identified, these will be assessed against the following scale:

a. **Minor** – slight, very short or highly localised effect of no significant consequence;

b. **Moderate** – noticeable effect (by extent, duration or magnitude) which is usually considered significant; and

c. **Major** – considerable effect (by extent, duration or magnitude) of more than local significance or in breach of recognised acceptability, legislation, policy or standards; considered significant.

5.7.6 Each of the technical chapters provides the criteria, including sources and justifications, for quantifying the different categories of effect. Where possible, this will be based upon quantitative and accepted criteria (for example, noise assessment guidelines), together with the use of value judgment and expert interpretation to establish to what extent an effect is environmentally significant.

5.7.7 Table 5-2 illustrates an example of the classification of effects matrix.

Table 5-2 Example matrix to classify environmental effects

Sensitivity or value of resource /	*Magnitude of impact*			
	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

5.7.8 Following the classification of an effect, clear statements will be made within the topic chapters as to whether that effect is significant or not significant. As a rule, major and moderate effects are generally considered to be significant (as shown by the shaded cells in Table 5-2 above), whilst minor and negligible effects are considered to be not significant. However, professional judgement will be applied, including taking account of whether the effect is permanent or temporary, its duration / frequency, whether it is reversible, and / or its likelihood of occurrence. Generic definitions for the classification of effects are shown in Table 5-3.

Table 5-3 Generic effect descriptions

Effect	*Generic description*
Major	These effects may represent key factors in the decision-making process. Potentially associated with sites and features of national importance or likely to be important considerations at a regional or district scale. Major effects may relate to resources or features which are unique and which, if lost, cannot be replaced or relocated.
Moderate	These effects, if adverse, are likely to be important at a local scale and on their own could have a material influence on decision making.
Minor	These effects may be raised as local issues and may be of relevance in the detailed design of the project but are unlikely to be critical in the decision-making process.
Negligible	Effects which are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error. These effects are unlikely to influence decision making, irrespective of other effects.

5.7.9 Section 5.5 of this chapter sets out how mitigation measures have been incorporated into the Scheme and how these will be secured. For any significant adverse effects identified, consideration has been given to what additional mitigation would be feasible in order to try and avoid or minimise the effect, for example the commitment to provide early planting in 2022 (the Advanced Mitigation Planting) to establish structural planting and maximise levels of growth by the time of construction.

5.7.10 The topic chapters in this ES highlight any ‘residual’ effects, which are the effects which remain following the implementation of suitable mitigation

measures and classify these in accordance with the effect classification terminology given above.

5.7.11 It should be noted that some technical disciplines may utilise different criteria when undertaking assessments due to differences in industry accepted guidelines and specifications. Where this is the case, the technical topic will discuss how the assessment methodology or classification of effects differs for the general EIA methodology as described in this section and provide justification.

Assessment of Construction and Decommissioning Effects

5.7.12 The assessment of construction and decommissioning effects will be undertaken based on existing knowledge, techniques and equipment. A 'reasonable worst-case' scenario will be used with respect to the envisaged construction methods, location (proximity to sensitive receptors), phasing and timing of construction activities.

5.7.13 As described above, the assessment of construction and decommissioning effects assumes the implementation of standard good practice measures, for example the use of dust suppression measures on haul roads, using containers with 110% capacity to store fuel and other chemicals onsite, etc. The purpose of this is to focus on the Scheme-specific effects, rather than generic construction effects that can be easily addressed using generic good practice mitigation measures. Construction and decommissioning assumptions, including what has been assumed in terms of good practice measures, is set out in the topic chapter, and are secured through the Outline Construction Environmental Management Plan (OCEMP) and Decommissioning Strategy. The ES identifies and assesses construction and decommissioning effects that are likely to remain after these mitigation measures are in place.

5.8 Interaction and Cumulative Effects

5.8.1 In accordance with the EIA Regulations (Ref 5-1), 'cumulative effects' will be considered. These are effects that result from changes caused by reasonably foreseeable actions together (i.e. cumulatively) with the Scheme.

5.8.2 For the cumulative impact assessment, two types of impact are considered:

a. The combined effect of individual impacts from the Scheme, for example noise effects and pollution effects from the Scheme affecting a single receptor (these are referred to as 'effect interactions'); and

b. The combined effects of several development schemes which may, on an individual basis be insignificant but, cumulatively with the Scheme, have a new or different likely significant effect (these are referred to as 'cumulative effects').

Effect Interactions

5.8.3 There is no established EIA methodology for assessing and quantifying effect interactions that lead to combined effects on sensitive receptors, however the European Commission (EC) has produced guidelines for assessing effect interactions *"which are not intended to be formal or prescriptive, but are*

designed to assist EIA practitioners in developing an approach which is appropriate to a project…" (Ref 5-7).

5.8.4 AECOM has reviewed these guidelines and has developed an approach which uses the defined residual effects of the Scheme to determine the potential for effect interactions that lead to combined effects.

5.8.5 The EIA predicts beneficial and adverse effects during construction, operation, and decommissioning of the Scheme, which are classified as minor, moderate, or major. Several effects on one receptor or receptor group could theoretically interact or combine to produce a combined significant overall effect.

5.8.6 An exercise which tabulates the effects on receptors or receptor groups has been undertaken and is presented in ***Chapter 17: Effect Interactions*** of the ES **[EN010118/APP/6.1]** to determine the potential for effect interactions and therefore any combined effects. Only adverse or beneficial residual effects classified as minor, moderate, or major have been considered in relation to potential effect interactions. Residual effects classified as negligible are excluded from the assessment of the effect interactions as, by virtue of their definition (see Table 5-2), they are considered to be imperceptible effects on an environmental / socio-economic resource or receptor which would not have the potential to lead to effect interactions.

Cumulative Effects with Other Developments

5.8.7 The Planning Inspectorate's Advice Note 17 on the assessment of cumulative effects (Ref 5-6) identifies a four-stage approach. Adopting that approach, as appropriate, the Applicant's methodology for the assessment of cumulative effects is as follows:

Stage 1 – Establish the National Significant Infrastructure Project's Zone of Influence and identify long list of 'other developments'

5.8.8 A review of other developments has been undertaken, initially encompassing a 'Zone Of Influence (ZOI)' of 10km from the centre of the Order limits. This incorporates the maximum study areas for the technical assessments (which is 4km for landscape and visual effects) and an additional 6km to allow for other developments within a 10km radius, in case their ZOI includes the receptors affected by the Scheme. The long list includes all identified EIA and NSIP developments, large scale major, and key Local Development Plan.

5.8.9 This chapter of the ES is accompanied by ***Figure 5-1 Cumulative Schemes*** **[EN010118/APP/6.3]**, illustrating the location of other known developments (cumulative projects) in the local area that have the potential to change the impacts associated with the Scheme.

5.8.10 The long list of 'other developments' included in the assessment of cumulative effects were reviewed and developed in consultation with the local planning authorities, statutory consultees, and other relevant organisations, in 2021 and updated in 2022.

5.8.11 The other developments included in the initial long-list were then based on the following criteria determined by AECOM and agreed with the councils, in order to generate a focussed long-list on other developments that have the potential for cumulative effects along with the Scheme:

a. Submitted applications not yet determined or development currently under construction that meets one of (c) to (g);

b. Approved applications under the Planning Act 2008 or other regimes which have not yet been implemented (covering the past five years and taking account of those that received planning consent over three years ago and are still valid but have not yet been implemented), and meets one of (c) to (g);

c. On the National Infrastructure Planning Programme of Projects and within 4km of the Order limits;

d. Applications for EIA development and within 4km of the Order limits. This includes any sites that have been registered or achieved a positive EIA screening opinion;

e. Development whether EIA or non-EIA identified in the relevant Development Plan such as Allocated Sites, within 4km;

f. Other EIA or non EIA applications for solar development, excluding householder or small-scale roof mounted solar developments, within 4km of the Order limits; and

g. Other EIA or non-EIA schemes that did not meet the above criteria but which a statutory stakeholder specifically requested to be included.

Stage 2 – Identify shortlist of 'other developments' for Cumulative Effects Assessment

5.8.12 At Stage 2, any developments of a nature or scale without the potential to result in cumulative impacts were excluded, following discussion with the local planning authorities and consideration of the likely ZoI for each environmental topic. The Long List of Cumulative Schemes (***Appendix 5A***) has informed the short list presented within each technical chapter of this ES, which for each technical discipline is topic specific, and based on their own methodology and justification.

5.8.13 A shortlist of cumulative developments has been prepared for each technical chapter of the ES based on:

a. The scale of the other developments;

b. The developments that fall within the ZoI of specialists topics; and

c. If there is the potential for any temporal overlap between the Scheme and other developments.

Stage 3 – Information gathering

5.8.14 Information relating to other developments presented in ***Appendix 5A:*** Long List of Cumulative Schemes have been collected from the appropriate source (which may include the local planning authorities, the Planning Inspectorate or directly from the applicant / developer) and include, but are not limited to:

a. Proposed design and location information;

b. Proposed programme of construction, operation and / or decommissioning; and

c. Environmental assessments that set out baseline data and effects arising from 'other developments'.

Stage 4 – assessment

5.8.15 The assessment includes a list of those developments considered to have the potential to generate a cumulative effect together with the Scheme, documented in a matrix which includes the following:

a. A brief description of the development;

b. An assessment of the cumulative effect with the Scheme;

c. Proposed additional mitigation applicable to the Scheme necessary to minimise a potential cumulative effect; and

d. The likely residual cumulative effect.

5.8.16 The approach for determining the significance of any cumulative effect are based upon the criteria presented in Section 5.7, which takes into account:

a. The duration of effect, i.e. will it be temporary or permanent;

b. The extent of effect, e.g. the geographical area of an effect;

c. The type of effect, e.g. whether additive or synergistic;

d. The frequency of the effect;

e. The 'value' and resilience of the receptor affected; and

f. The likely success of mitigation.

5.8.17 Negligible effects from the Scheme are not considered in the cumulative assessment; it is not expected that these effects, which are generally miniscule or imperceptible by nature, would contribute to and elevate the effects associated with other developments. Where there are minor, moderate, or major effects associated with the Scheme and there exists the potential for these to be affected by impacts from other developments, a statement is made in the relevant technical chapter on whether the cumulative effect is different to the residual effect associated with the Scheme.

5.8.18 Where the cumulative effect differs to the residual effect, the chapter clarifies whether the cumulative effect is anticipated to be significant or not significant.

5.9 References

Ref 5-1 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017).

Ref 5-2 Planning Inspectorate (2018) Advice Note 3: EIA Notification and Consultation.

Ref 5-3 Planning Inspectorate (2020) Advice Note 7: EIA: Process, Preliminary Environmental Information and Environmental Statements.

Ref 5-4 Planning Inspectorate (2018); Advice Note 9: Using the Rochdale Envelope.

Ref 5-5 Planning Inspectorate (2017); Advice Note 11: Working with Public Bodies in the Infrastructure Planning Process.

Ref 5-6 Planning Inspectorate (2019); Advice Note 17: Cumulative Effects Assessment. Cumulative effects assessment relevant to nationally significant infrastructure projects.

Ref 5-7 European Commission (1999) Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions.