WHITESTONE
solar farm

WHITESTONE SOLAR FARM

Volume 6: Environmental Statement

6.11 Chapter 11: Climate Change and Greenhouse Gas Assessment

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Glossary

Term	Meaning
Cable Corridors	Corridors within which the high voltage cables would be laid.
Draft ES	The Draft Environmental Statement which presented the preliminary environmental information relating to the Proposed Development. The Draft ES was prepared to present information for statutory consultation in accordance with current EIA regulation.
ES	The Environmental Statement which presents the environmental information relating to the Proposed Development. The ES has been prepared to present information for formal consultation in accordance with current EIA regulation.
Order Limits	Maximum extent of the Proposed Development comprising the Site and Cable Corridors.
The Applicant	Whitestone Net Zero Ltd.
The Application	The Application will be submitted to the Secretary of State for a Development Consent Order.
The Proposed Development	The proposed Whitestone Solar Farm.
The Site	The land planned to be used for solar PV array and associated infrastructure, BESS, substations, and landscaping and habitat enhancement. The Site is split into W1, W2, and W3.
Whitestone 1 (W1)	The northern parcels of the Whitestone Solar Farm.
Whitestone 2 (W2)	The middle parcels of the Whitestone Solar Farm.
Whitestone 3 (W3)	The southern parcels of the Whitestone Solar Farm.

Acronyms

Acronym	Meaning
AIL	Abnormal Indivisible Load
ALC	Agricultural Land Classification
BESS	Battery Energy Storage System

Acronym	Meaning
CCGT	Combined Cycle Gas Turbine
CCRR	Climate Change Risk and Resilience
CDC	City of Doncaster Council
CEA	Cumulative Effects Assessment
CEMP	Construction Environmental Management Plan
CMIP6	Coupled Model Intercomparison Project Phase 6
DCC	Derbyshire County Council
DCO	Development Consent Order
DEFRA	Department for Environment, Food and Rural Affairs
DEMP	Decommissioning Environmental Management Plan
DESNZ	Department for Energy Security and Net Zero
EA	Environment Agency
EIA	Environmental Impact Assessment
ES	Environmental Statement
FFDI	Forest Fire Danger Index
FRA	Flood Risk Assessment
GCD	Global Climate Database
GHG	Greenhouse Gas
HDD	Horizontal Directional Drilling
ICCI	In-Combination Climate Impacts
IEMA	Institute of Environmental Management and Assessment
ISEP	Institute of Sustainability and Environmental Professionals
IPCC	Intergovernmental Panel on Climate Change
JHA	Job Hazard Analysis
LPA	Local Planning Authority
LSE	Likely Significant Effect
NDC	Nationally Determined Contribution
NEDDC	North East Derbyshire District Council
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NREL	National Renewable Energy Laboratory
NSIP	Nationally Significant Infrastructure Project
oBSMP	Outline Battery Safety Management Plan
oCEMP	Outline Construction Environmental Management Plan
oCTMP	Outline Construction Traffic Management Plan
oDEMP	Outline Decommissioning Environmental Management Plan
oLEMP	Outline Landscape and Ecology Management Plan

Acronym	Meaning
oOEMP	Outline Operational Environmental Management Plan
oSWDS	Outline Surface Water Drainage Strategy
PPG	Planning Policy Guidance
PRoW	Public Rights of Way
PV	Photovoltaics
RMBC	Rotherham Metropolitan Borough Council
SF	Sulphur hexafluoride
SMP	Soil Management Plan
SuDS	Sustainable Drainage Systems
UNFCCC	United Nations Framework Convention on Climate Change
WRI	Water Resources Institute
W1	Whitestone 1
W2	Whitestone 2
W3	Whitestone 3

Units

Units	Meaning
ha	Hectares
kV	Kilovolt
m	Metres
MW	Megawatt

11 CLIMATE CHANGE AND GREENHOUSE GAS ASSESSMENT

11.1 Introduction

11.1.1 This Chapter of the Environmental Statement (ES) has been prepared on behalf of Whitestone Net Zero Ltd ('the Applicant') to evaluate the potential effects of the construction, operation and maintenance, and decommissioning of Whitestone Solar Farm (the Proposed Development) in relation to climate change and Greenhouse Gas (GHG) emissions. The Proposed Development is described in **ES Volume 1, Chapter 5: The Proposed Development [EN0110020/APP/6.5]**.

Order Limits

11.1.2 The extent of the Order Limits are described in **ES Volume 1, Chapter 3: The Site and Surrounding Area [EN0110020/APP/6.3]** and shown in **ES Volume 3, Figure 3.1: Order Limits [EN0110020/APP/6.19]**. The Proposed Development is described in **ES Volume 1, Chapter 5: The Proposed Development [EN0110020/APP/6.5]** and shown spatially on the **Works Plans [EN0110020/APP/2.3]**.

The Proposed Development

11.1.3 The Proposed Development involves the construction, operation and maintenance, and decommissioning of more than 100 megawatt (MW) of solar photovoltaic (PV) array, Battery Energy Storage System (BESS), onsite substations and supporting infrastructure, and grid connection infrastructure. The grid connection infrastructure would connect the Proposed Development to the National Grid at the new 400 kilovolt (kV) National Grid substation proposed on land immediately east of Long Lane, Brinsworth, S60 4JJ (Long Lane 400kV Substation). National Grid have applied to Rotherham Metropolitan Borough Council (RMBC) for the development of this new substation which is intended by National Grid to be operational in time for the Proposed Development to connect in 2029. This substation is therefore not included in the Proposed Development and will be subject to a separate planning application taken forward by National Grid.

11.1.4 As the Proposed Development would have a generating capacity in excess of 100MW, it is considered to be a Nationally Significant Infrastructure Project (NSIP) under the Planning Act 2008.

11.1.5 The Proposed Development would be located within the Order Limits. The Order Limits encompass the total area of the project comprising the Site and Cable Corridors. The Site is specifically the land that is planned to be used for solar PV array and associated infrastructure, BESS, substation, landscaping and habitat enhancement. The Site is split into Whitestone 1 (W1), Whitestone 2 (W2), and Whitestone 3 (W3).

11.1.6 Highway Works are sections of the highway network that will contain localised improvements, such as improvements to road edge where it is deteriorated, or temporary highway and traffic works required to safely accommodate the Abnormal Indivisible Load (AIL) deliveries. These areas will support the movement of construction vehicles on narrower sections of the local highway network within parts of the construction vehicle routes to the Site (as described in **ES Volume 2, Chapter 13: Traffic and Transport [EN0110020/APP/6.13]**).

11.1.7 This Chapter of the ES includes the following sections:

- Legislation, Policy, and Guidance;
- Consultation;
- Assessment Methodology;
- Baseline;
- Embedded Mitigation;
- Assessment of Effects;
- Additional Mitigation and Residual Effects; and
- Cumulative Effects.

11.1.8 This Chapter is supported by the following figure in **ES Volume 3, Figures [EN0110020/APP/6.19]**:

- **Figure 11.1: Point Level Data [EN0110020/APP/6.19]**.

11.1.9 This Chapter is supported by the following information in **ES Volume 3, Appendices [EN0110020/APP/6.20]**:

- **Appendix 11.1: Legislation, Policy and Guidance [EN0110020/APP/6.20];** and
- **Appendix 11.2: SF6 Technical Note [EN0110020/APP/6.20]** .

11.1.10 This Chapter has been authored by ERM. Further details of the authors of this Chapter are outlined in **ES Volume 1, Chapter 1: Introduction [EN0110020/APP/6.1]**.

11.2 Legislation, Policy and Guidance

11.2.1 The treaties, legislation, policy, and guidance related to climate change and GHG emissions, as detailed in **ES Volume 3, Appendix 11.1: Legislation, Policy and Guidance [EN0110020/APP/6.20]**, and relevant to the Proposed Development, are outlined below.

Treaties

11.2.2 International treaties that have been considered include:

- United Nations Framework Convention on Climate Change (UNFCCC) 1992[1];
- Kyoto Protocol 1997[2]; and
- The Paris Agreement 2015[3].

Legislation

11.2.3 National legislation that has been considered includes:

- Schedule 4 and Regulation 5 of The Infrastructure Planning (Environmental Impact Assessment (EIA)) Regulations 2017 (as amended)[4;] ;
- Energy Act, 2013[5];
- Carbon Budget Orders 2009[6], 2011[7], 2016[8], and 2021[9];
- Climate Change Act 2008[10]; and
- Climate Change Act 2008 (2050 Target Amendment) Order 2019[11].

National Planning and Climate Policy

11.2.4 National planning policy that has been considered includes:

- Overarching National Policy Statement (NPS) for Energy (EN-1), (2025)[12];
- NPS for Renewable Energy Infrastructure (EN-3), (2025)[13];
- NPS for Electricity Networks Infrastructure (EN-5), (2025)[14]; and
- National Planning Policy Framework (2024) (NPPF)[15].

11.2.5 National climate policy that has been considered includes:

- Net Zero Strategy, 2021[16];
- Clean Growth Strategy, 2017[17];
- UK Third Climate Change Risk Assessment 2022[18];
- The UK's Nationally Determined Contribution (NDC)[19];
- Clean Power 2030 Action Plan[20];
- British Energy Security Strategy[21];
- Powering Up Britain 2023[22];
- Statutory instruments: Carbon Budget Orders 2009[23], 2011[24], 2016[25], and 2021[26]; and
- Climate Change: Third National Adaptation Programme (2023 – 2029)[27].

Local Policy

11.2.6 The Proposed Development covers four Local Planning Authorities (LPA)s:

- City of Doncaster Council (CDC);
- Derbyshire County Council (DCC);
- North East Derbyshire District Council (NEDDC); and
- Rotherham Metropolitan Borough Council (RMBC).

11.2.7 All four LPAs have declared a climate emergency demonstrating the importance of tackling climate change and reducing GHG emissions. The local planning policy documents considered within this ES are:

- DCC Council Plan 2025-2029[28];
- Doncaster Local Plan 2015 – 2035[29];

- NEDDC Climate Change Strategy 2022 – 2030[30];
- NEDDC Climate Change Action Plan 2024 – 2030[31]; and
- Rotherham Local Plan Core Strategy 2013 – 2028[32].

Guidance

11.2.8 Supporting guidance considered within this ES includes:

- Institute of Sustainability and Environmental Professionals (ISEP) (formally known as the Institute of Environmental Management and Assessment (IEMA)): Assessing Greenhouse Gas Emissions and Evaluating their Significance (2022)[33];
- The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (revised edition) developed by the World Resources Institute and the World Business Council for Sustainable Development (2004)[34].
- UK Government's Environment Reporting Guidelines (2019)[35];
- ISO14064-2 Standard[36];
- ISEP (formally IEMA) Climate Change Adaption Practitioner Guidance (2022)[37];
- ISEP (formally IEMA) Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation 2020[38], (the "ISEP Climate Guidance");
- National Planning Policy Guidance: Flood Risk and Coastal Change(2025)[39];
- Planning Practice Guidance (PPG): Climate Change (2024)[40]; and
- National Renewable Energy Laboratory: Life Cycle Greenhouse Gas Emissions for Solar Photovolatics.[41]

11.3 Consultation

11.3.1 This section provides a summary of the consultation undertaken to date regarding the Proposed Development.

EIA Scoping

11.3.2 A Scoping Opinion was sought from the Planning Inspectorate to determine the content of the assessment, as well as the approach and methods to be used. The outcomes of this exercise were documented in the Scoping Report (**ES Volume 3, Appendix 2.2: EIA Scoping Report [EN0110020/APP/6.20]**), which was submitted to the Planning Inspectorate on 23 April 2025. The Scoping Report captures the findings of the scoping exercise and outlines the technical guidance, standards, best practices, and criteria to be applied in the assessment to identify and evaluate the likely significant effects of the Proposed Development on the climate.

11.3.3 A Scoping Opinion was received from the Planning Inspectorate on 3 June 2025 (**ES Volume 3, Appendix 2.1: EIA Scoping Opinion [EN0110020/APP/6.20**).

11.3.4 **Table 11.1** summarises how this Chapter of the ES addresses key points from the Scoping Opinion comments related to climate change and GHG emissions.

Table 11.1: Scoping Opinion Comments and How They Are Addressed in This ES

Consultee	Issue Raised	How This is Addressed	Where This is Addressed in the ES
Climate Change			
The Planning Inspectorate	**ID 3.6.3: In-Combination Climate Impacts** *"The Scoping Report states that the scope of in-combination climate impacts will be reviewed to determine whether this matter is scoped in. For clarity, the Inspectorate considers that this matter should be scoped in as no evidence to scope this matter out has been provided. In-combination climate impacts are listed in the operational phase of the Proposed Development but should be considered across the full phasing of the development."*	Future climate change projections have been reviewed with relevant chapter authors to confirm in-combination climate impacts. In-combination climate impacts have been considered across the construction, operation and maintenance, and decommissioning phases of the development throughout this Chapter.	The In-Combination Climate Impact (ICCI) Assessment has been scoped into the ES and is addressed throughout this Chapter.
The Planning Inspectorate	**ID 3.6.4: Exacerbation of Climate Change Effects.** "*The Scoping Report does not refer to the exacerbation of climate change effects beyond* *flood risk and the methodology for this is not included in the proposed scope of the Scoping Report section 12.5. The ES should assess any significant effects that are likely to occur from in-combination climate change effects and signpost where*	This Chapter has considered multiple hazards including extreme heat, extreme rainfall, extreme wind, flood risk and flooding, water stress and drought and wildfires. This Chapter has assessed the exacerbation of those climate hazards and their impact on the resilience of the Proposed Development. The same has been conducted for the ICCI Assessment to determine any LSEs. The	Section 11.7 assesses the LSEs that are likely to occur from in-combination climate change.

Consultee	Issue Raised	How This is Addressed	Where This is Addressed in the ES
	this is assessed or provide justification as to why this would not lead to a likely significant effect (LSE).”	methodology for both of these assessments is included in this Chapter.	
Greenhouse Gas			
The Planning Inspectorate	**ID 3.6.5: GHG Emission Sources During Decommissioning** *“Scoping Report Table 12.1 identifies the sources of GHG emissions from construction, operation and decommissioning activities. Scoping Report paragraph 3.6.21 states that decommissioning will be similar to the construction process suggesting similar activities would take place at both construction and decommissioning. However, a number of construction activities that generate GHG emissions are not considered in the decommissioning activities without explanation.* *The ES should identify which GHG emission source activities during construction are applicable during decommissioning and include an assessment of significant effects where they are likely to occur.”*	The GHG Assessment has been carried out in accordance with GHG best practice and reporting guidelines and guided by the ISEP (formally IEMA) Assessing Greenhouse Gas Emissions and Evaluating their Significance, 2022 guidance[33]. The GHG Assessment identifies the activities and emissions associated with each phase (construction, operation and maintenance, and decommissioning) of the Proposed Development to understand the significance of the GHG emissions on the climate. The GHG Assessment identifies the GHG emissions sources identified during construction and those that are applicable to the decommissioning phase and assesses the significance of these GHG emissions sources.	Section 11.7 assess the likely significant effects of GHG emissions associated with the Proposed Development. **Table 11.17** and **Table 11.19** set out the GHG emissions associated with the construction and decommissioning of the Proposed Development, respectively.

Consultee	Issue Raised	How This is Addressed	Where This is Addressed in the ES
The Planning Inspectorate	**ID 3.6.6: Impacts from Waste During Construction and Decommissioning** *"Scoping Report Table 12.1 identifies waste generation as a source of GHG emissions during operation but not during construction or decommissioning; only transportation of waste is identified as an impact. This discrepancy is not explained.* *The ES should identify what GHG emission sources are applicable to each phase of the Proposed Development and provide an assessment of significant effects where they are likely to occur."*	The GHG Assessment has been carried out in accordance with GHG best practice and reporting guidelines, guided by the ISEP (formally IEMA) Assessing Greenhouse Gas Emissions and Evaluating their Significance (2022)[25]. **ES Volume 2, Chapter 16: Other Environmental Topics [EN0110020/APP/6.16],** Section 16.2 details the assessment of waste for the Proposed Development. GHG emissions associated with the wastes generated from all phases of the Proposed Development have been included in the GHG assessment.	Section 11.7, identifies what GHG emission sources are applicable to each phase of the Proposed Development and provides an assessment of significant effects where they are likely to occur.

Issues Scoped Out

11.3.5 Following the scoping exercise, some elements were scoped out of assessment in this ES. **Table 11.2** presents the issues scoped out of assessment.

Table 11.2: Issues Scoped Out of the EIA

Potential Effect / Topic	Development Phase	Rationale
Sea level rise	All Phases	The Proposed Development is not located in a coastal area as agreed with the Planning Inspectorate.
Coastal flooding	All Phases	The Proposed Development is not located in a coastal area as agreed with the Planning Inspectorate.

Statutory Consultation

11.3.6 A Statutory Consultation period was held between 16 September and 28 October 2025 in line with Section 42 of the Planning Act 2008. Feedback was sought from the local community and a range of statutory consultee bodies based on the preliminary information and assessments presented in the Draft Environmental Statement (Draft ES).

11.3.7 **Table 11.3** presents feedback from statutory consultees given at Statutory Consultation, and how this is addressed in this ES.

Table 11.3: Statutory Consultation Feedback from the Statutory Consultation Period

Consultee	Consultee Feedback	How This is Addressed	Where This is Addressed in the ES
Rotherham Metropolitan Borough Council	**Energy Storage and Grid Flexibility** *"Consider longer-duration storage option or hybridisation (e.g., flow batteries alongside lithium-ion) to improve resilience and reduce reliance on fossil fuel generation for peak loads. Is there a battery recycling or circular economy plan in place for end-of-life, given the critical mineral use?"*	**ES Volume 1, Chapter 4: Alternatives and Design Evolution [EN0110020/APP/6.4]** and **ES Volume 1, Chapter 5: The Proposed Development [EN0110020/APP/6.5]** present the battery storage design and the alternative design options that have been considered for the Proposed Development. The Proposed Development involves solar panels and BESS and is designed to maximise the amount of clean energy exported to the National Grid and account for other environment impacts including climate change and GHG emissions. **ES Volume 2, Chapter 16: Other Environmental Topics [EN0110020/APP/6.16]** describes the approach to the impacts of waste during construction, operation and maintenance and decommissioning of the Proposed Development. The primary waste stream associated with the Proposed Development will be the solar PV modules and associated electrical infrastructure. Decommissioning will take place after an anticipated 60 years of operation and be undertaken in accordance with a Decommissioning	**ES Volume 1, Chapter 4: Alternatives and Design Evolution [EN0110020/APP/6.4]**; **ES Volume 1, Chapter 5: The Proposed Development [EN0110020/APP/6.5]**; and **ES Volume 2, Chapter 16: Other Environmental Topics [EN0110020/APP6.16]**.

		Environmental Management Plan (DEMP) which is secured by Requirement 15 in Schedule 2 of the **Draft DCO [EN0110020/APP/3.1]**. The DEMP will apply the waste management hierarchy at its core and any material assets will be recycled where practicable to do so.	
Rotherham Metropolitan Borough Council	**Climate Resilience and Risk Management** *"How will soil compaction during construction be mitigated to preserve infiltration and carbon storage potential?"*	Construction activities may lead to temporary soil function loss, compaction, contamination risks, and groundwater disturbance. These potential impacts will be mitigated by implementing best practice construction techniques through the Construction Environmental Management Plan (CEMP) and associated Soil Management Plan (SMP), which is secured by Requirement 4 in Schedule 2 of the **Draft DCO [EN0110020/APP/3.1].** The embedded mitigation methods will preserve infiltration and carbon storage potential.	**ES Volume 2, Chapter 9: Ground Conditions and Land Quality [EN0110020/APP/6.9]** – Additional Mitigation 9.7.12.
Rotherham Metropolitan Borough Council	**Embodied Carbon in Panels and Batteries**: *"The ES accounts for lifecycle GHGs but doesn't mention supplier screening. Specify requirements for low-carbon manufacturing e.g., solar modules produced using renewable electricity, or batteries with recycled content."*	As part of the procurement and contractor selection process, potential contractors will be assessed against multiple criteria including their sourcing of materials and greenhouse gas emissions. As detailed in **ES Volume 1, Chapter 5: The Proposed Development [EN0110020/APP/6.5]**. the design of the Proposed Development has some flexibility as renewable technology	**ES Volume 1, Chapter 5: The Proposed Development [EN0110020/APP/6.5]**.

		continues to develop rapidly, and the performance and design of the solar PV modules, BESS and associated infrastructure may evolve by the time the Proposed Development is constructed.	
Rotherham Metropolitan Borough Council	**Scope 3 Emissions:** *"Strengthen commitments to track and report Scope 3 emissions from construction, maintenance and replacement cycles."*	GHG Assessment has been updated and uses activity data to assess the impact of GHG emissions across each phase of the Proposed Development. In addition, the GHG Assessment calculates and reports the total GHG emissions related to Scope 1, Scope 2 and Scope 3 for all phases of the Proposed Development. Scope 1 GHG emissions arise from sources that are owned or controlled by the Proposed Development; Scope 2: GHG emissions arise from the generation of purchased electricity; and Scope 3 GHG emissions occur as a result of the activities of the Proposed Development, but occur from sources not owned or controlled by the Proposed Development. For further details of the sources of GHG emissions see Section 11.4.	Section 11.4 of this Chapter for the assessment methodology and significance criteria and Section 11.7 of this Chapter for the assessment of GHG emission effects.
Rotherham Metropolitan Borough Council	**Reporting GHG Emissions:** *"Will the project commit to annual public reporting on carbon savings,*	The GHG Assessment reports the anticipated carbon savings (i.e., the GHG emissions avoided and displaced by the Proposed Development). Biodiversity outcomes are described in	Section 11.4 of this Chapter for the assessment methodology and significance criteria and Section 11.7 of this

	energy generation vs forecast, and biodiversity outcomes?"	**ES Volume 2, Chapter 6: Biodiversity and Nature Conservation [EN0110020/APP/6.6]**. The Proposed Development will report on carbon savings, energy generation and forecasts during the lifecycle of the Proposed Development.	Chapter for the assessment of GHG emission effects. **ES Volume 2, Chapter 6: Biodiversity and Nature Conservation [EN0110020/APP/6.6].**
Rotherham Metropolitan Borough Council	**Upgrading Technology:** *"How will technology upgrades (higher efficiency panels, new BESS systems) be integrated over 60 years to avoid technological lock-in?"*	**ES Volume 1, Chapter 5: The Proposed Development [EN0110020/APP/6.5]** presents the design of the Proposed Development. The design has some flexibility as renewable technology continues to develop rapidly, and the performance and design of the solar PV modules, BESS and associated infrastructure may evolve by the time the Proposed Development is constructed. In addition, the design has some flexibility to adapt to future technological advancements to avoid technological lock-in.	**ES Volume 1, Chapter 5: The Proposed Development [EN0110020/APP/6.5]**.
Rotherham Metropolitan Borough Council	*"In paragraph 11.8.17 of the Draft ES, the Applicant calculates the total avoided greenhouse gas emissions from other, more carbon intensive electricity generation displaced by the Proposed Development. The Applicant claims to have used the 2024 UK electricity grid average conversion factor, from the set of conversion factors for company reporting published by the Department for Energy Security and Net Zero, as per*	The GHG Assessment uses the most up to date GHG reporting guidance, emission conversion factors and methodologies. The methodology calculates the total GHG emissions avoided or displaced using guidance by the UK Government. The GHG assessment in Section 11.7 calculates that the total GHG emissions	Section 11.4 of this Chapter for the assessment methodology and significance criteria and Section 11.7 of this Chapter for the assessment of GHG emission effects.

	the citation at footnote 34 in Chapter 11 of the Draft ES. *From information published elsewhere in the consultation literature and as noted above, the Applicant expects electricity generated by the Proposed Development to be sufficient to power 250,000 homes, assuming 3,200 kWh per year per home. As the development is proposed to have a 60-year lifetime, this implies an estimated total lifetime output of* *250,000 × 3,200 × 60 = 48,000,000,000 kWh =* ***48,000 GWh*** *In 2024, the UK electricity grid average conversion factor was* ***0.20705 kgCO_2e*** *per kWh. Following the Applicant's own methodology and the estimated total lifetime output as imputed from other details in its consultation literature and as calculated above, this would imply* *48,000,000,000 × 0.20705 = 9,938,400,000 kgCO_2e =* ***9,938,400 tCO_2e*** *Whereas the Applicant quotes an estimated 16,000,000 tCO_2e total greenhouse gas emissions avoided, as a result of the Proposed Development. Which figure is*	avoided or displaced by the Proposed Development for its 60-year lifetime. The calculation is as follows: • Total annual output Proposed Development * 60 years = approximately 44 TWh; • UK natural gas (Combined Cycle Gas Turbine (CCGT)) conversion factor 2025 is 0.202 kgCO2e divided by 50% load factor; and • Therefore, 44 TWh multiplied by 0.414 kg CO_2e = around 18 million tCO_2e. The assessment of the GHG emissions avoided or displaced has been updated to reflect the current design stage and the latest GHG emission factors (i.e., Department for Energy Security and Net Zero, 2025).	

<table>
<tr><td></td><td>incorrect? 250,000 homes, 3,200 kWh per year per home, 16,000,000 tCO_2e – or all three?”</td><td></td><td></td></tr>
<tr><td>Rotherham Metropolitan Borough Council</td><td>“Similar issues attend a complementary estimate of total greenhouse gas emissions avoided, if the Proposed Development were assumed exclusively to displace electricity that would have been generated from natural gas, presented in paragraph 11.8.18 of the Draft ES.

In its Fuel Mix Disclosure for the 2024 calendar year, the Department for Energy Security and Net Zero estimates the carbon dioxide emissions intensity of different energy sources in the UK electricity generation fuel mix: a small section of the table is reproduced below.

<table><tr><th>Energy Source</th><th>g/kWh</th></tr><tr><td>Natural Gas</td><td>382</td></tr><tr><td>Renewables</td><td>0</td></tr><tr><td>Overall average</td><td>154</td></tr></table>
Albeit these carbon intensities do not consider the global warming potential of greenhouse gases other than carbon</td><td></td><td>Section 11.4 of this Chapter for the assessment methodology and significance criteria and Section 11.7 of this Chapter for the assessment of GHG emission effects.</td></tr>
</table>

	dioxide, CO_2 accounts for 98.98% of the 2024 UK electricity grid average conversion factor for company reporting published by the Department for Energy Security and Net Zero, so any discrepancy is expected to be small. *Applying the carbon dioxide emissions intensity to an equivalent amount of electricity generated from natural gas over the lifetime of the Proposed Development i.e., 48,000 GWh as calculated above, yields an estimate of total greenhouse gas emissions avoided:* *48,000,000,000 × 382 = 18,336,000,000,000 g =* ***18,336,000 tCO_2*** *Whereas the Applicant estimates total greenhouse gas emissions avoided on this basis, as a result of the Proposed Development, as 32,000,000 tCO_2e. Again, how does the Applicant account for this discrepancy?"*		
Rotherham Metropolitan Borough Council	*"In Table 11.14, the Applicant notes that "Construction activities may lead to… Moderate adverse effects expected in relation to permanent soil loss." Soil erosion is a recognised source of carbon emissions (especially over shorter timescales) and yet is absent from greenhouse gas assessment of the*	As detailed in **ES Volume 2, Chapter 9: Ground Conditions and Land Quality [EN0110020/APP/6.9],** the Proposed Development is primarily located in areas with Agricultural Land Classification (ALC) grades between 1 and 4.	Section 11.4 of this Chapter describes the Assessment Study Areas and Section 11.5 details the Baseline conditions.

	construction phase of the project, according to its scope as defined at paragraph 11.5.41 of the Draft ES: • *Extraction, manufacture and transport of materials* • *Emissions associated with the construction processes onsite (including fuel consumed by equipment and vehicles used to construct the Proposed Development; and fuel used in generators for electricity supply during construction)* • *Disposal and/ or recycling of the materials and equipment* *Will the Applicant ensure that the carbon impact of soil loss is accounted for in its [non-draft] Environmental Statement?"*	Given the low carbon content of ALC grades 1-4 soil, the carbon impact of soil loss is not accounted for in this ES as it is not relevant to the Proposed Development.	Section 11.7 of this Chapter presents the assessment of GHG emission effects. **ES Volume 2, Chapter 9: Ground Conditions and Land Quality [EN0110020/APP/6.9].**
Rotherham Metropolitan Borough Council	*"Is the Applicant not concerned that no climate risk affecting the Proposed Development is assessed to be significant (Table 11.13, Draft ES)? An all-green risk register is often a sign of poor risk management, or appraisal.* *An assessment that the consequence of "Increased extreme heat days causing overheating in substations and BESS [battery energy storage systems], leading to thermal shutdowns, fire hazards and operational disruption" is* ***Minor*** *(my*	This Chapter describes the Climate Change Risk and Resilience (CCRR) assessment methodology and significance criteria. Legislation and best practice guidance have both informed the approach taken by the Applicant. The CCRR accounts for embedded mitigation in the assessment of effects and applies the standard EIA approach for significance assessments as described in **ES Volume 1, Chapter 2:**	Sections 11.4 to 11.7 describe the CCRR Assessment methodology, significance criteria and assessment of effects. **ES Volume 1, Chapter 2: EIA Methodology [EN0110020/APP/6.2].**

	emphasis) is hard to credit. Albeit the Applicant has committed to prepare an outline Battery Safety Management Plan, it would do better not to appear to downplay such a risk, in its Environmental Statement. *Since the Applicant does not provide an assessment of climate risks in the absence of embedded mitigation measures, it is not possible to form an impression of their effectiveness. In the interest of transparency, the Applicant should consider publishing risks' assessed significance, with and without embedded mitigation measures."*	**EIA Methodology [EN0110020/APP/6.2]**. The CCRR describes the baseline and future climate conditions associated with extreme heat. Solar, BESS and associated infrastructure have been designed to withstand significantly higher temperatures than the baseline and future climate scenarios. Therefore, the CCRR Assessment, including mitigation measures, is a reasonable assessment of the climate risk of extreme heat.	
Rotherham Metropolitan Borough Council	*"In Tables 11.7 (Climate Baseline Data per Indicator) and 11.8 (Climate Indicator Data for Proposed Order Limits Resolution) the Applicant refers to the McArthur Forest Fire Danger Index (FFDI) as its adopted measure of wildfire risk, within the proposed order limits. Did the Applicant in fact use this measure, or has it applied the alternative Grassland Fire Danger Index, which would seem more appropriate to the Site in question?* *Regardless of which index the Applicant has used in its assessment, would it not have been more appropriate to consult local records held by South Yorkshire Fire and Rescue Service? That a measure has been "widely used in*	The McArthur Forest Fire Danger Index[42] is the most comprehensive database that exists. This index presents the indicators to assess climate-induced wildfires. This index, despite its name, covers all regions across UK. The index also covers many different climate indicators to complete a comprehensive assessment of wildfires based on climate-induced conditions. Local indexes such as the South Yorkshire Fire and Rescue Service present indicators of human-induced wildfires and are not appropriate or relevant to the CCRR Assessment.	Sections 11.4 to 11.7 describe the CCRR Assessment methodology, significance criteria and assessment of effects.

	Australia for several decades" (Table 11.7) is hardly proof of its suitability: Australia has a much more dispersed population than the UK, where accidental and deliberate ignition from human disturbance greatly exacerbates background/meteorological wildfire risk."		
Rotherham Metropolitan Borough Council	*"At paragraph 11.6.13 of the Draft ES the Applicant concedes that mean wind speed cannot account for the increases in the frequency and severity of storms and extreme gusts (and their potential damage to electricity infrastructure, including solar panels). Why then has it not chosen a more suitable climate indicator?"*	Wind speed is the most appropriate climate indicator to assess storm severity and extreme gusts. The UK Met Office[43] states that storms and extreme gusts are complex, and storminess is difficult to measure with no compelling trends identified. As a result, the assessment has used mean wind speed as the most appropriate and relevant indicator to assess extreme wind.	Sections 11.4 to 11.7 describe the CCRR Assessment methodology, significance criteria and assessment of effects.
Rotherham Metropolitan Borough Council	*"At paragraph 11.5.28, the Applicant cites a 2012 study by the United States National Renewable Energy Laboratory (NREL) assessing the lifecycle emissions of large-scale solar PV installations. An updated assessment is available, published in March 2024:* https://docs.nrel.gov/docs/fy24osti/87372.pdf*"*	The reference provided of an update to the NREL life cycle assessment is noted. GHG Assessment has been updated and uses activity data where available to assess the impact of GHG emissions across each phase of the Proposed Development. However, the 'median' value of the operation and maintenance phase of the NREL assessment has been used to calculate the GHG emissions that arise from the electricity and fuel use during the operation and maintenance phase of the Proposed Development. The *NREL*	Section 11.4 of this Chapter for the assessment methodology and significance criteria and Section 11.7 of this Chapter for the assessment of GHG emission effects.

		Life Cycle Greenhouse Gas Emissions from Solar Photovoltaics is the most appropriate data source for this calculation.	
Rotherham Metropolitan Borough Council	*"Decision tree criteria presented in Plate 1 (page 15 of Chapter 11, Draft ES) are flawed: a fairer appraisal of climate hazards' likelihood would not consider a hazard unlikely, if it had exceedances across multiple climate change scenarios, but in only one timeframe. It goes against the term's natural interpretation, to determine as unlikely an event which may be very probable across all climate change scenarios by the 2080s, though not before. This could be addressed in a 'Step 2' which asked "Are there exceedances across EITHER multiple timeframes OR multiples SSPs? and so on.* *This is not an abstract point but rather has material consequences for the way climate risks are assessed in the Draft ES."*	It is agreed that the assessment of likelihood methodology should address either multiple timeframes or scenarios. The CCRR likelihood assessment has been updated to evaluate the exceedances across either multiple timeframes or multiple scenarios and the CCRR Assessment reflects these criteria.	Sections 11.4 to 11.7 describe the CCRR Assessment Methodology, Significance Criteria and Assessment of Effects. Specifically, Plate 1 presents the updated CCRR likelihood assessment.
Rotherham Metropolitan Borough Council	*"Albeit the climate risk assessment considers receptors within the Proposed Order Limits, the Proposed Development may be expected to exacerbate some climate risks. Whereas implications for fluvial and pluvial flood risk beyond the Site Boundary are treated in Chapter 10, there is no consideration in the*	There is uncertainty surrounding the impact of solar farms / parks on surface temperatures (e.g., air and land). However, spacing solar PV modules allows for improved airflow, which consequently reduces the likelihood of increased surface temperatures[44], [45], [46].	**ES Volume 1, Chapter 5 : The Proposed Development [EN0110020/APP/6.5]**

	Draft ES of how such extensive development of existing green space may exacerbate near surface air temperatures and hence people's exposure to extreme heat."	There would be a minimum of 3.5m between each row of solar PV modules and as a result, the Proposed Development is not anticipated to exacerbate near surface air temperatures. Users of Public Rights of Way (PRoWs) could be exposed to potential increases in near surface air temperatures, however, the solar PV modules would be located a minimum of 15m from PRoWs. Given the limited duration of exposure and heat dissipation processes the exposure of users of PRoWs to increased near surface air temperature is considered to be extremely unlikely. The effect of the Proposed Development on near surface air temperatures and people's exposure is, therefore, not considered further.	

Other Consultation

11.3.8 No other consultation relating to Climate Change and GHG has been undertaken.

Targeted Consultation

11.3.9 A Targeted Consultation period was held between 4 March and 3 April 2026 on proposed changes to the Order Limits. This included notifying relevant prescribed consultees. Feedback from this Targeted Consultation and the Applicant's response is included the **Consultation Report [EN0110020/APP/5.1]**.

11.3.10 A second Targeted Consultation was held for any individuals that had been identified as land interests after the Statutory Consultation.

11.3.11 No comments were provided by statutory consultees through the Targeted Consultation period in relation to Climate Change and Greenhouse Gases.

11.4 Assessment Methodology and Significance Criteria

11.4.1 This section sets out the scope and methodology used to assess the impact of climate change on the Proposed Development (the Climate Change Risk and Resilience Assessment and the In-Combination Climate Impact Assessment) and to assess the impact of the Proposed Development on GHG emissions (the GHG Assessment).

Study Areas

Climate Change Risk and Resilience

11.4.2 The CCRR assessment (see **Table 11.15**) considers the impact of climate change on the Proposed Development, therefore, the Study Area is the Order Limits of the Proposed Development. The CCRR considers the potential for LSEs of climate change within the Order Limits as per **ES Volume 1, Chapter 3: The Site and Surrounding Area [EN0110020/APP/6.3]**, during the construction, operation and maintenance, and decommissioning phases. This is in line with ISEP (formally IEMA) Climate Guidance[38] and reflects the Scoping Opinion (see **Table 11.1**).

In-Combination Climate Impact Assessment

11.4.3 The ICCI Study Area considers receptors that have been identified in relevant technical chapters which may be impacted by the Proposed Development in combination with future climatic conditions.

Greenhouse Gas Emissions Assessment

11.4.4 GHGs and their contribution to climate change is a global effect and therefore there is no geographical limit to the Study Area. The GHG Assessment covers all direct GHG emissions arising from activities undertaken within the Order Limits during the construction, operation and maintenance, and decommissioning phases of the Proposed Development. It also includes indirect emissions arising

outside the Order Limits, for example, emissions embedded within the construction materials arising as a result of the energy used for their production, as well as emissions arising from the transportation of materials, solar panels, waste, and construction workers. The Study Area also includes activities that may be avoided or displaced as a result of the Proposed Development, such as other grid electricity production activities.

Methodology for the Assessment of Effects

Climate Change Resilience Review

11.4.5 Climate risks were assessed across selected future time horizons (2030s, 2050s, and 2080s) and climate scenarios (SSP1-2.6, SSP3-7.0, SSP5-8.5) (see **Table 11.10 - Table 11.14** in Section 11.5). A long list of risk statements was developed to reflect the climate hazard against the relevant sensitive receptors of the Proposed Development. This spanned standard climate risks, as well as in-combination climate impacts. The sensitive receptors are chosen based on the Proposed Development's location, development type and context, as per the ISEP (formally IEMA) Climate Guidance[38]. The sensitive receptors for the purposes of our assessment are:

- Infrastructure;
- Human Health;
- Environmental; and
- Financial.

11.4.6 The risks were initially rated as Significant or Not Significant based on the likelihood and consequence of each hazard affecting key receptors (see **Table 11.5**). Ratings were then re-evaluated to determine risk, accounting for the embedded mitigation measures for each phase of the Proposed Development. This enables a comprehensive assessment of resilience of the Proposed Development under future climate conditions and if there are any LSEs.

Data Selection and Processing

11.4.7 **Table 11.4** below shows the data resolution per hazard of the climate data that was sourced from ERM's Global Climate Database (GCD), ERM's in-house tool for sourcing climate projections.

11.4.8 Climate indicator data sources are presented in **Table 11.9** in the section describing the data sources for the baseline and future baseline conditions.

Table 11.4: Data Resolution Per Hazard

Resolution	Hazards	Rationale
Order Limits (1,488ha)	Extreme heat Extreme wind Wildfire Water stress and drought Subsidence	Data for these hazards was unavailable or not useful at finer spatial scales.

Resolution	Hazards	Rationale
Per area (W1 327ha, W2 651ha, W3 172ha)	Extreme rainfall	Variation between Site areas and scale of Proposed Development warrants area-level analysis.
Data point (30m)	Flooding	High-resolution data (30m) available through ERM's GCD enables detailed flood modelling at sensitive onsite locations. The data points were selected based on where existing flood zones are located on Site (Environment Agency Flood Risk Map) and the Design Masterplan.

11.4.9 Climate data was interpreted alongside the Proposed Development's, environmental, geological and **ES Volume 3, Figure 5.1: Illustrative Masterplan [EN0110020/APP/6.19]** context.

11.4.10 For the purposes of the ICCI Assessment, the data was cross-referenced with other relevant technical chapters including **ES Volume 2, Chapter 6: Biodiversity and Nature Conservation [EN0110020/APP/6.6]** and **ES Volume 2, Chapter 10: Water Resources and Flood Risk [EN0110020/APP/6.10]**.

Risk Framework and Evaluation

11.4.11 The risk assessment framework was developed in line with ISEP (formally IEMA) Climate Guidance[38], tailored to the Proposed Development's context, climate exposure, and available data.

Consequence (Sensitivity of Receptor)

11.4.12 Consequences were assessed using standardised criteria as per the ISEP (formally IEMA) Climate Guidance[38] to determine the impact on infrastructure, environmental, human health and financial sensitive receptors. **Table 11.5** below shows the standardised criteria used.

Table 11.5: Consequence Criteria to Assess Impact to Sensitive Receptors

Consequence of Impact	Description
Very Large	Infrastructure; Significant permanent damage and/or complete loss of the infrastructure and infrastructure services. Extreme delays to / cancellation of the construction. Human health: Event leading to one or more fatalities onsite. Environmental: Devastating environmental implications and regulatory non-compliance due to protected species/habitat change. Financial: Extreme financial loss and operation is unviable.

Consequence of Impact	Description
Large	Infrastructure; Extensive infrastructure damage and/or major loss of the infrastructure and infrastructure services. Major delays to the construction Human health: Event leading to long term health issues / disabilities (over 14 days lost work). Environmental: Severe environmental implications and potential new environmental compliance obligations. Financial: Major financial loss and additional operating costs.
Moderate	Infrastructure; Limited infrastructure damage and loss of service, damage recoverable by early maintenance and minor repair. Substantial construction interruption (5 days or more). Human health: Event leading to short term stress, medical treatment required (under 14 days lost work). Environmental: Moderate environmental implications and potential for additional mitigation and/or maintenance needs. Financial: Moderate financial loss and additional operating costs.
Minor	Infrastructure; Localised infrastructure service disruptions, no permanent damage, some minor repair work required. Minor construction interruption (5 days or less). Human health: Event leading to minor discomfort and/or first aid treatment. Environmental: Minor environmental implications on landscaping or buffer vegetation and no impacts on protected species/habitats. Financial: Slight financial loss and additional operating costs.
Negligible	Infrastructure; No damage, construction delays or additional operational costs Human health: No injuries or illness. Environmental; No disturbance or disturbance is already within degraded or non-sensitive area. Financial: No financial loss or costs.

Magnitude of Impact

11.4.13 Thresholds for each climate hazard were developed based on magnitude bands, receptor sensitivity, regulatory standards, and professional judgement.

11.4.14 Likelihood was determined using time horizon and scenario-based exceedance frequency method, based on best practice science-based thresholds and professional judgement. This approach tracks how often thresholds are exceeded across scenarios and time horizons. This avoids overreliance on probabilistic percentages, which can oversimplify complex projections. A likelihood decision tree was used to support the determination of likelihood alongside a likelihood matrix. The decision tree process is shown in **Plate 1**. **Table 11.6** describes the method used to assess the likelihood of impact of the climate hazard on the Proposed Development.

Plate 1 Decision Tree Criteria to Assess Likelihood of Climate Hazard Occurring

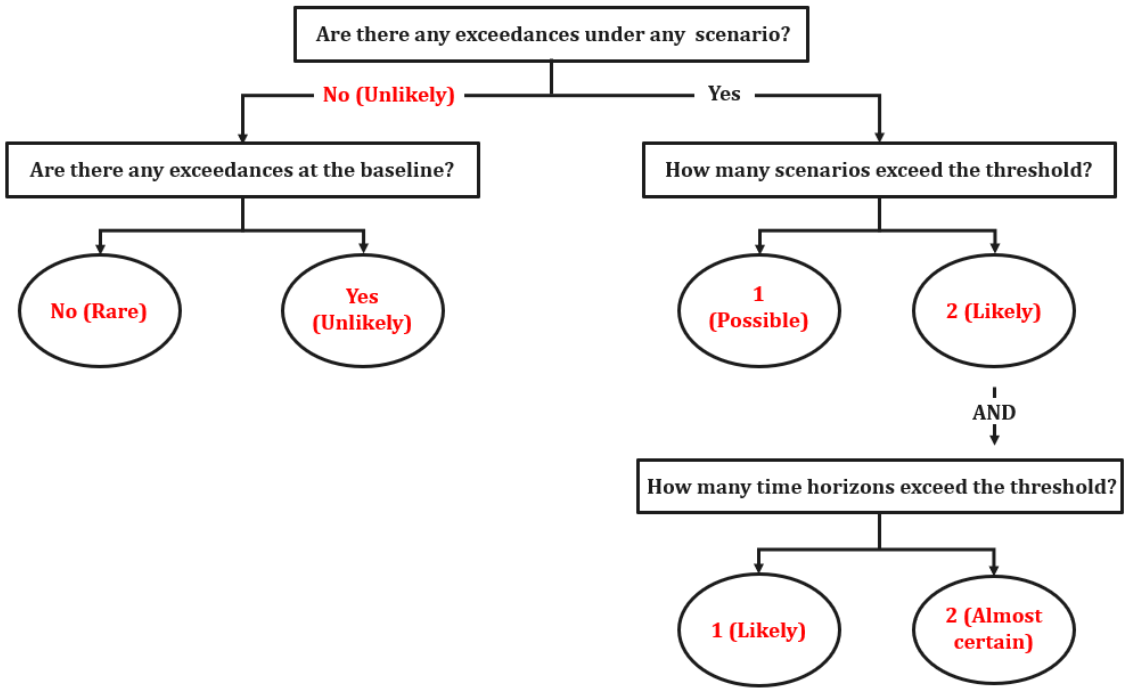

Table 11.6: Measure of Likelihood

Likelihood of Hazard	Description
Almost Certain	The climate hazard is expected to exceed a critical threshold under all scenarios, and across all future time horizons.
Likely	The climate hazard is expected to exceed a critical threshold under multiple scenarios, but only under a specific time horizon.
Possible	The climate hazard may exceed a critical threshold in future, but only under a specific climate scenario and time horizon.
Unlikely	The climate hazard may occur under current conditions but is not projected to exceed a critical threshold in future under any scenario and time horizon.
Rare	The climate hazard is not currently observed and is not projected to exceed a critical threshold in future under all scenarios and time horizons.

Significance Criteria

11.4.15 The significance of effect for the CCRR Assessment is determined as a function of the likelihood of a climate change hazard occurring and the consequence of the impact to the receptor if the hazard occurs as described in **Table 11.7**.

Table 11.7: Significance of Effects Matrix

Likelihood of Hazard Occurring	Consequence of Hazard Occurring				
	Negligible	**Minor**	**Moderate**	**Large**	**Very Large**
Unlikely	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Rare	Not Significant	Not Significant	Not Significant	Significant	Significant
Possible	Not Significant	Not Significant	Significant	Significant	Significant
Likely	Not Significant	Not Significant	Significant	Significant	Significant
Almost Certain	Not Significant	Significant	Significant	Significant	Significant

ICCI Assessment

11.4.16 The ICCI Assessment methodology has been developed in line with the ISEP (formally IEMA) Climate Guidance[38]. The guidance defines an ICCI effect as: *"When a projected future climate impact (e.g. increase in temperatures) interacts with an effect identified by another topic and exacerbates its impact*."

11.4.17 An ICCI Assessment identifies how identified receptors in the surrounding environment are affected by the Proposed Development in combination with future climate change conditions. Climate change impacts relevant to the Proposed Development will also be primarily assessed through the other relevant topics of the ES.

11.4.18 The Proposed Development's sensitive receptors (Infrastructure, Human Health, Environmental, Financial) were reviewed to:

- Identify receptors exposure to multiple hazards; and
- Evaluate whether these receptors exhibit high vulnerability to compound events.

11.4.19 Based on the hazard and receptor mapping, a set of plausible in-combination risk statements per technical chapter were developed. These statements were informed by:

- Environmental context of the Proposed Development;
- Engagement with relevant topic chapter authors; and
- Professional judgement.

11.4.20 Risks are then rated as per professional judgement to be deemed Significant or Not Significant.

Greenhouse Gas Assessment

11.4.21 The GHG Assessment identifies and calculates the GHG emissions associated with all the phases of the Proposed Development. It categorises GHG emission by scope in accordance with best-practice reporting guidance, as follows:

- Scope 1: GHG emissions arise from sources that are owned or controlled by the Proposed Development such as consumption of diesel for use in vehicles (for example, excavators) stationary equipment (e.g generators) or plant and machinery (e.g power tools);
- Scope 2: GHG emissions that arise from the generation of purchased electricity. This can involve electricity consumed in buildings, plant and machinery, electrical maintenance and inspection tools; and
- Scope 3: GHG emissions that occur as a result of the activities of the Proposed Development but occur from sources not owned or controlled by the Proposed Development. For instance, fuel and energy associated with the extraction, refining and transport of raw materials; disposal of wastes; and the recycling of materials at the end of their life.

11.4.22 To conduct the GHG Assessment, activity data such as the quantity of raw materials used and the units of solar and BESS equipment was gathered.

11.4.23 The activity data were then multiplied by the most appropriate conversion factors, with the results reported in tonnes of carbon dioxide equivalent (tCO_2e). The following methodology was applied:

11.4.24 Activity data x GHG emissions factor = GHG emissions (tCO_2e).

11.4.25 Where activity data were not available, alternative approaches were taken using generic or publicly available secondary information that best represents the Proposed Development and its activities. Further details on the assumptions, exclusions and limitations are presented in Section 11.5.

11.4.26 The individual quantification calculations were then summed to form a total GHG emission inventory for the Proposed Development and its activities.

11.4.27 The GHG Assessment applied the most up-to-date conversion factors as detailed by non-financial reporting guidance, specifically the UK Government Department for Energy Security and Net Zero (DESNZ) and Department for Environment, Food and Rural Affairs (DEFRA) conversion factors for company reporting[47]; One Click LCA Software[48]; and Ecoinvent Life Cycle Assessment Emission Factor Database[49].

Significance Criteria

11.4.28 Any GHG emissions released to the atmosphere are classified as an impact to climate change due to the importance of limiting GHG emissions to the atmosphere as set out by the Paris Agreement[50] and the UK Government's net zero ambitions.

11.4.29 To understand the significance of the Proposed Development on the climate the net GHG emissions impact of the Proposed Development were evaluated against the ISEP (formally IEMA) significance criteria detailed in **Table 11.8** below.

Table 11.8: Example of Significance Criteria Relevant to GHG Emissions Assessments

Significance	Significance Criteria
Major Adverse	The project's GHG impacts are not mitigated or are only compliant with do-minimum standards set through regulation, and do not provide further reductions required by existing local and national policy for projects of this type. A project with major adverse effects is locking in emissions and does not make a meaningful contribution to the UK's trajectory towards net zero.
Moderate Adverse	The project's GHG impacts are partially mitigated and may partially meet the applicable existing and emerging policy requirements but would not fully contribute to decarbonisation in line with local and national policy goals for projects of this type. A project with moderate adverse effects falls short of fully contributing to the UK's trajectory towards net zero.
Minor Adverse	The project's GHG impacts would be fully consistent with applicable existing and emerging policy requirements and good practice design standards for projects of this type. A project with minor adverse effects is fully in line with measures necessary to achieve the UK's trajectory towards net zero.
Negligible	The project's GHG impacts would be reduced through measures that go well beyond existing and emerging policy and design standards for projects of this type, such that radical decarbonisation or net zero is achieved well before 2050. A project with negligible effects provides GHG performance that is well '*ahead of the curve*' for the trajectory towards net zero and has minimal residual emissions.
Beneficial	The project's net GHG impacts are below zero and it causes a reduction in atmospheric GHG concentration, whether directly or indirectly, compared to the without-project baseline. A project with beneficial effects substantially exceeds net zero requirements with a positive climate impact.

Basis of Assessment

Climate Change Resilience Review and ICCI Assessment

11.4.30 The construction phase is expected to span approximately 24 to 36 months. The CCRR and ICCI Assessment will be based off the worst-case scenario of 36 months. The operational phase is anticipated to be 60-years (from 2029) and decommissioning between 12-24 months. Using the worst-case scenario the duration of 24 months will be applied.

11.4.31 **ES Volume 1, Chapter 5: The Proposed Development [EN0110020/APP/6.5]** presents a summary of the design information for the Proposed Development, which informs this assessment and reflects the current design stage. These include:

- All infrastructure and assets associated with the Proposed Development; and

- Identification of existing climate resilience measures for each risk that have been incorporated into the Proposed Development's design or in development for infrastructure and assets.

Greenhouse Gas Assessment

11.4.32 The GHG Assessment is based on a proposed 36-month construction phase, 60-year operational phase and a proposed 24-month decommissioning phase (i.e., worst-case scenarios where the duration is not specifically set).

11.4.33 The Proposed Development will generate renewable electricity, and this is assumed to have zero GHG emissions associated with the generation of the electricity. However, the construction, operation and maintenance, and decommissioning of the Proposed Development will release GHG emissions and these are described below:

- Construction: This includes the extraction, manufacture and transport of raw materials (i.e., concrete, aggregates and steel) and equipment (i.e. solar PV panels, inverters, BESS units and transformers) to the Proposed Development (defined as embodied GHG emissions); emissions associated with construction processes (including fuel consumed by equipment and vehicles used to construct the Proposed Development; fuel used in generators for electricity supply during construction); and the disposal and/or recycling of the materials and equipment;
- Operation and Maintenance: The GHG emissions associated with the operation and maintenance of the Proposed Development involves the embodied emissions associated with the replacement of solar PV panels, inverters and BESS equipment as well as the shipping of the equipment to the Proposed Development; the fuel consumed by maintenance equipment and vehicles; the supply of electricity to the installed plant and equipment; and the disposal and / or recycling of materials and equipment; and
- Decommissioning: This would involve the GHG emissions associated with the fuel consumption of plant, machinery and vehicles during the decommissioning phase and disposal and/ or recycling of materials and equipment.

11.4.34 The GHG emissions associated with the Proposed Development were assessed against existing and future baselines and the UK Carbon Budgets to provide a comparison of the impact of the Proposed Development on the climate. The result is presented in Section 11.7.

11.4.35 In addition, the GHG emissions avoided or displaced by the Proposed Development were calculated using an equivalent baseline to provide a comparison of the impact of the Proposed Development on the climate. The equivalent baseline for the GHG emissions avoided or displaced refers to the GHG emissions associated with the use of a higher GHG emissions alternative, such as natural gas power generation (i.e., combined-cycle gas turbine (CCGT)), as a suitable alternative to renewable electricity generation.

Assumptions, Exclusions and Limitations

Climate Change Resilience Review

11.4.36 Assumptions around climate projections reflect currently available data and guidance. The assumptions are as follows:

- There is inherent uncertainty in future emissions pathways, which can influence the range and severity of projected climate impacts;
- Some climate hazards are assessed using data with coarse spatial resolution, due to limitations in data availability or model accuracy at finer scales;
- Where data gaps exist, professional judgement has been applied to interpret results and inform the assessment of significance;
- The methodology does not apply probabilistic weighting to different climate scenarios; all scenarios are treated equally;
- The definition of impact thresholds can influence assessment outcomes and is partly based on expert judgement, particularly where regulatory benchmarks are absent; and
- Future time horizons and socio-economic pathways have been treated interchangeably to simplify the analysis, which may not fully reflect nuanced differences between scenarios.

In-Combination Climate Impact Assessment

11.4.37 There is greater uncertainty in projecting the timing and intensity of in-combination impacts. The interaction of multiple variables, each with its own severity and magnitude, can lead to compounded effects and reduced reliability of assumptions.

11.4.38 Therefore, assessment of in-combination impacts is better suited as a qualitative assessment, which relies on professional judgement, context of the Proposed Development and existing environmental conditions.

11.4.39 Not all possible combinations were assessed, only those deemed most plausible or impactful through the initial hazard and receptor mapping process.

Greenhouse Gas Assessment

11.4.40 It is assumed that during the construction phase a range of plant, equipment and vehicles will be used. The GHG Assessment estimates the fuel consumption of the construction activities using industry-average data adjusted to reflect the duration and scale of the Proposed Development. The activities covered include fuel used by bulldozers, excavators, skid-steer loaders, dump trucks, trenchers, rollers, telehandlers, piling machines, diesel generators, horizontal directional drilling (HDD) equipment and site vehicles.

11.4.41 For the embodied emissions calculation in the construction and operation and maintenance phase a worst-case scenario has been assumed for the manufacture and transport of solar PV panels and battery equipment. As a result, the life cycle assessment for these components assume that the equipment will be manufactured in China and shipped to the UK through the Suez Canal. As a result, the GHG conversion factors represent the distance and fuel used for the delivery of this equipment.

11.4.42 **ES Volume 1, Chapter 5: The Proposed Development [EN0110020/APP/6.5]** describes the number of times and the type of equipment that will be replaced during the 60-year lifetime of the Proposed Development. This has informed the embodied GHG emissions calculation in the operation and maintenance phase.

11.4.43 Limited project-specific information is available regarding the fuel use and electricity consumption for the operation and maintenance of the Proposed

Development. Therefore, the GHG Assessment used the median values from the GHG intensity for a standard solar PV system presented by NREL[41] to calculate the GHG emissions for these activities in this phase. This approach is considered appropriate for a utility-scale solar photovoltaic development and provides a proportionate basis for assessment.

11.4.44 The decommissioning phase assumes that it would involve activities broadly comparable to those undertaken during the construction phase. Fuel consumption has therefore been estimated on a comparable basis, with adjustments made to reflect the shorter duration of this phase. It is assumed the PV panels will be recycled at decommissioning, as described in **ES Volume 1, Chapter 5: The Proposed Development [EN0110020/APP/6.5]**.

Addressing Uncertainty

11.4.45 The availability and level of detail of activity data at the current stage of project design determined the emission sources and categories included within the GHG Assessment. As a result, the GHG Assessment estimates the GHG emissions that are reasonably expected to arise from the construction, operation and maintenance, and decommissioning of the Proposed Development.

11.5 Baseline

Data Sources

Climate Change Resilience Review and In-Combination Climate Impact Assessment

Existing Baseline Data Sources

11.5.1 Existing climate conditions within the Study Area have been defined and identified using a number of approaches and sources, including:

- ERM GCD baseline data derived from a range of sources including the Intergovernmental Panel on Climate Change (IPCC) Coupled Model Intercomparison Project Phase 6 (CMIP6)[51] and Fathom Data™[52] for pluvial and fluvial flood data;
- Physical climate risk results data published by all LPAs within Order Limits, such as within Local Plans[53],[54] ,[55] , or government agencies, such as the Environment Agency (EA) Flood Risk Mapping, refer to **ES Volume 2, Chapter 10: Water Resources and Flood Risk [EN0110020/APP/6.10]** and **ES Volume 3, Appendix 10.2: Flood Risk Assessment [EN0110020/APP/6.20]** (FRA) according to the EA flood data; and
- Data produced as a result of the EIA conducted for other technical chapters, such as the **ES Volume 2, Chapter 10: Water Resources and Flood Risk [EN0110020/APP/6.10]**.

Future Baseline Data Sources

11.5.2 Future baseline climate conditions for 2030, 2050 and 2080 across three climate scenarios, SSP1-2.6, SSP3-7.0, SSP5-8.5 have been considered for the purposes of this assessment.

11.5.3 The time horizons were selected for appropriately spaced data intervals for the lifetime of the Proposed Development. The climate scenarios were selected to provide an appropriate snapshot of potential future climate scenarios and are defined as follows:

- SSP1-2.6 (Low Emissions) – Sustainability-focused pathway with rapid decarbonisation, strong global cooperation, and limited warming (~1.5–2 °C by 2100);
- SSP3-7.0 (High Emissions) – Fragmented, regionally focused world with continued fossil fuel use and limited climate action; high warming (~3–4 °C by 2100); and
- SSP5-8.5 (Very High Emissions) – Fossil-fuel-driven growth with minimal mitigation; very high warming (>4 °C by 2100)[56].

11.5.4 The projections for the future baseline time horizons and climate scenarios within the Study Area have been defined by the following data sources:

- ERM GCD baseline and future baseline data derived from a range of sources including the IPCC CMIP6 and Fathom Data™ for pluvial and fluvial flood data (see **Table 11.10**, **Table 11.11**, **Table 11.12**, **Table 11.13** and **Table 11.14** for future baseline projections); and
- Identifying receptors that will be impacted by the Proposed Development in combination with the future climatic conditions.

GHG Assessment

Existing and Future Baseline Data Sources

11.5.5 **ES Volume 1, Chapter 5: The Proposed Development [EN0110020/APP/6.5]** presents a summary of the design information for the Proposed Development which is relevant to the GHG emissions and has been used to inform the GHG Assessment.

11.5.6 The GHG Assessment has been based on the currently available design information, for example, information included within the **Outline Design Parameters [EN0110020/APP/7.3]** and **ES Volume 1, Chapter 5: The Proposed Development [EN0110020/APP/6.5]**.

11.5.7 The construction GHG Assessment made use of the following information sources:

- Unit data associated with the equipment installed at the Proposed Development (i.e. solar panels, inverters, transformers, cable, and BESS) to calculate embodied GHG emissions;
- Weight and volume data associated with the raw materials used during construction (such as aggregates, concrete, and steel) to calculate GHG embodied emissions; and
- Volume data associated with surplus soil to landfill.

11.5.8 The operation and maintenance phase of GHG Assessment made use of the following information sources:

- Unit data associated with the replacement of equipment installed (i.e. solar panels, inverters and batteries) to calculate embodied GHG emissions;
- Weight data associated with the disposal of the equipment; and

- The NREL study to calculate the GHG emissions associated with the energy and electricity consumption associated with this phase.

11.5.9 Limited information regarding the decommissioning of the Proposed Development is available at this stage. Decommissioning activities remain broadly similar to those during construction stage and involve similar equipment and traffic levels. The decommissioning GHG Assessment made use of the following sources of data from the construction phase:

- Fuel use data for plant, equipment and vehicles; and
- Weight data associated with the disposal of the equipment and raw materials.

CCRR Assessment and ICCI Assessment

Existing Baseline Conditions

11.5.10 Baseline climate conditions have been determined through a baseline climate change risk assessment which was carried out in late May / early June 2025 and reviewed in March 2026. The most recent baseline climate data for each hazard is outlined in **Table 11.9** below. The data is sourced from ERM's GCD.

Table 11.9: Climate Baseline Data per Indicator.

Climate Hazard	Possible Indicators	Indicator Definition	Source	Unit	Baseline Years	Baseline
Extreme Heat	Maximum daily temperature	The maximum daily maximum temperature	CMIP6	Celsius	1985-2014	31.3
	Warm Spell Duration Index	The annual number of days contributing to unusually warm events where 6 or more consecutive days experience a maximum temperature (TX) of greater than the 90th percentile of the historical period for that time of year.	CMIP6	Days	1985-2014	21.4
	Number of days >30 degrees	Number of days when maximum temperatures exceeds 30 degrees Celcius	CMIP6	Days	1985-2014	1.1
	Number of days >35 degrees	Number of days when maximum temperatures exceeds 35 degrees Celcius	CMIP6	Days	1985-2014	0.0
Flooding	1 in 100-year pluvial flood inundation depth	The maximum inundation depth experienced within a 'DxD'm area that is associated with a 1-in-100-year pluvial flooding event. Where D= the size of the buffer zone in meters and X = a number of years.	Fathom 3.0™	Metres	2020	Ranges between 0.17 – 2.27
	1 in 500-year pluvial flood inundation depth	The maximum inundation depth experienced within a 'DxD'm area that is associated with a 1-in500-year pluvial flooding event. Where D= the size of the buffer zone in meters.	Fathom 3.0™	Metres	2020	Ranges between 0.37 – 2.71
Extreme Rainfall	1 in 100-year maximum 1 day rainfall	Maximum amount of precipitation to fall across 1-day, associated with a 1 in 100-year return period	CMIP6	Millimetres	1985-2014	52.2

Climate Hazard	Possible Indicators	Indicator Definition	Source	Unit	Baseline Years	Baseline
	1 in 100-year maximum 5-day rainfall	Maximum amount of precipitation to fall across 1 day, associated with a 1 in 500-year return period	CMIP6	Millimetres	1985-2014	92.4
Extreme Winds	Mean daily windspeed	Mean daily mean windspeed	CMIP6	Metres/second	1985-2014	4.5
Water Stress and Drought	Consecutive dry days	Maximum annual number of consecutive dry days when precipitation is less than 1 millimeter.	CMIP6	Days	1985-2014	23.9
	Water Resources Institute (WRI) Water stress	Water stress is an indicator of competition for water resources and is defined informally as the ratio of demand for water by human society divided by available water.	WRI Aqueduct v4.0	Categorical	1979-2019	Low – Medium (10-20%)
Wildfire	Forest Fire Danger Index (FFDI)	The annual number of days with wildfire enhancing climatic conditions. This index is based on the McArthur FFDI; widely used in Australia for several decades) and combines a record of dryness, based on rainfall and evapotranspiration rate, with meteorological variables for wind speed, temperature, and humidity.	CMIP6	Days	1985-2014	0
Subsidence	Shrink-swell subsidence (consecutive dry days and consecutive wet days)	The maximum annual number of consecutive dry days when precipitation is less than 1 millimeter. The maximum annual number of consecutive wet days when precipitation is greater than or equal to 1 millimeter. Shrink-swell subsidence is calculated by obtaining the sum of the number of dry days and number of wet days and dividing by 2.	CMIP6	Days	1985-2014	16.8

Future Baseline Conditions

11.5.11 The future baseline climate conditions that may be expected to occur in the locality of the Proposed Development are outlined in **Table 11.10**, **Table 11.11**, **Table 11.12**, **Table 11.13** and **Table 11.14**.

11.5.12 The climate data used in the assessment was assessed at different spatial resolutions. This was dependent on the nature of the climate hazard and what is required to be assessed. Therefore, the climate data for future baseline conditions will be divided into three categories: data for the area within the Order Limits (**Table 11.10**), area level data which comprises of W1 and W2 parcels and W3 parcels (**Table 11.11** and **Table 11.12**) respectively and point level data (individual points within W1 -W3 as shown in **ES Volume 3, Figure 11.1: Point Level Data for W1-W3 [EN0110020/APP/6.19]**, **Table 11.13** and **Table 11.14**).

11.5.13 The CCRR and the ICCI Assessments involve the attribution of climate indicator data to each climate hazard. A qualitative description of the future baseline climate conditions per hazard is outlined below.

Order Limits Data

Table 11.10: Climate Indicator Data for Order Limits Resolution

Indicator	Unit	Baseline	2030			2050			2080		
			SSP1-2.6	SSP3-7.0	SSP5-8.5	SSP1-2.6	SSP3-7.0	SSP5-8.5	SSP1-2.6	SSP3-7.0	SSP5-8.5
Maximum Daily Temperature	Celsius	31.3	33.1	32.5	32.6	33.7	32.7	35.3	32.9	35.3	35.4
Warm Spell Duration Index	Days	21.4	35.6	44.7	44	47	61.7	81.3	45.8	116.8	139.7
Number of Days >30 Degrees	Days	1.1	2.5	2.6	3.7	3.3	4.0	7.9	3.0	11.5	15.9
Number of Days >35 Degrees	Days	0	0.1	0.2	0.4	0.3	0.6	0.7	0.2	2.2	2.7
Mean Daily Windspeed	m/s	4.5	4.4	4.5	4.5	4.3	4.4	4.4	4.4	4.1	4.4
Shrink-Swell Subsidence (Consecutive Dry Days and Consecutive Wet Days)	Days	16.8	16.2	18.0	18.4	17.9	18.5	19.4	17.6	18.1	20.0
Wildfire	Forest Fire Danger Index (Days)	0	0	0	0	0	0	0	0	0	0.5
Consecutive Dry Days	Days	23.9	23.1	26.5	26.7	27.0	27.4	29.4	26.2	27.2	32.5

Indicator	Unit	Baseline	2030			2050			2080		
			SSP1-2.6	SSP3-7.0	SSP5-8.5	SSP1-2.6	SSP3-7.0	SSP5-8.5	SSP1-2.6	SSP3-7.0	SSP5-8.5
WRI Water Stress	Categorical	Low - Medium (10-20%)	Low-Medium (10-20%)	Low-Medium (10-20%)	Low-Medium (10-20%)	Low-Medium (10-20%)	Low-Medium (10-20%)	Low-Medium (10-20%)	Low-Medium (10-20%)	Low-Medium (10-20%)	Medium-High (20-40%)

Area Level Data

Table 11.11: W1 and W2 Extreme Rainfall Data

Indicator	Unit	Baseline	2030			2050			2080		
			SSP1-2.6	SSP3-7.0	SSP5-8.5	SSP1-2.6	SSP3-7.0	SSP5-8.5	SSP1-2.6	SSP3-7.0	SSP5-8.5
1 in 100-year maximum 1-day rainfall	mm	52.2	50.04	54.75	52.68	58.76	64.85	60.31	94.24	98.69	92.60
1 in 500-year maximum 1-day rainfall	mm	59.11	51.72	52.14	53.01	58.63	61.26	60.64	94.92	99.96	93.03
1 in 100-year maximum 5-day rainfall	mm	92.4	51.73	58.36	53.67	58.64	68.85	61.30	94.87	101.28	93.87
1 in 500-year maximum 5-day rainfall	mm	107	109.49	118.10	108.55	110.17	119.37	108.80	110.13	121.34	109.29

Table 11.12: W3 Extreme Rainfall Data

Indicator	Unit	Baseline	2030			2050			2080		
			SSP1-2.6	SSP3-7.0	SSP5-8.5	SSP1-2.6	SSP3-7.0	SSP5-8.5	SSP1-2.6	SSP3-7.0	SSP5-8.5
1 in 100-year maximum 1-day rainfall	mm	52.73	53.11	50.07	54.87	53.25	50.51	55.62	53.24	51.18	56.23
1 in 500-year maximum 1-day rainfall	mm	59.81	60.18	55.51	63.48	60.32	55.95	63.54	60.31	56.62	63.66
1 in 100-year maximum 5-day rainfall	mm	102.75	104.93	101.74	100.10	105.74	102.71	100.81	105.69	104.39	103.12
1 in 500-year maximum 5-day rainfall	mm	131.57	131.57	121.88	120.57	131.57	124.04	122.15	131.57	127.38	125.22

Point Level Data

Table 11.13: 1 in 100 Year Pluvial Flood Inundation Depth

1 in 100-year Pluvial Flood Inundation Depth	Coordinates (Latitude, Longitude)	Unit	Baseline	2030			2050			2080		
				SSP1-2.6	SSP3-7.0	SSP5-8.5	SSP1-2.6	SSP3-7.0	SSP5-8.5	SSP1-2.6	SSP3-7.0	SSP5-8.5
Whitestone 1a	53.4706, -1.2359	m	0.87	0.88	0.88	0.88	0.88	0.89	0.90	0.89	0.91	0.92
Whitestone 2a	53.3910, -1.3300	m	0.45	0.45	0.45	0.45	0.45	0.46	0.47	0.46	0.48	0.49
Whitestone 2b	53.3891, -1.3062	m	0.50	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.52
Whitestone 2c	53.3696, -1.2556	m	0.17	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.19
Whitestone 2d	53.3572, -1.2408	m	0.29	0.30	0.30	0.30	0.30	0.30	0.31	0.30	0.32	0.33
Whitestone 3a	53.3272, -1.2684	m	0.62	0.62	0.62	0.62	0.62	0.63	0.64	0.63	0.65	0.67

Whitestone 3b	53.3285, -1.2706	m	0.74	0.74	0.74	0.74	0.74	0.75	0.76	0.75	0.77	0.79
Whitestone 3c	53.3109, -1.2746	m	2.27	2.27	2.27	2.27	2.27	2.28	2.28	2.28	2.29	2.31

Table 11.14: 1 in 500 Year Pluvial Flood Inundation Depth

1 in 500-year Pluvial Flood Inundation Depth	Coordinates (Latitude, Longitude)	Unit	Baseline	2030			2050			2080		
				SSP1-2.6	SSP3-7.0	SSP5-8.5	SSP1-2.6	SSP3-7.0	SSP5-8.5	SSP1-2.6	SSP3-7.0	SSP5-8.5
Whitestone 1a	53.4706, -1.2359	m	1.33	1.35	1.35	1.35	1.36	1.39	1.40	1.37	1.46	1.50
Whitestone 2a	53.3910, -1.3300	m	0.86	0.88	0.88	0.88	0.89	0.91	0.92	0.90	0.97	1.02
Whitestone 2b	53.3891, -1.3062	m	0.66	0.67	0.67	0.67	0.68	0.69	0.70	0.68	0.73	0.75
Whitestone 2c	53.3696, -1.2556	m	0.37	0.38	0.38	0.38	0.39	0.40	0.41	0.39	0.43	0.45
Whitestone 2d	53.3572, -1.2408	m	0.90	0.93	0.93	0.94	0.96	1.00	1.02	0.96	1.12	1.19
Whitestone 2e	53.3563, -1.2408	m	0.50	0.53	0.53	0.54	0.56	0.60	0.62	0.56	0.72	0.79
Whitestone 3a	53.3272, -1.2684	m	1.23	1.25	1.25	1.25	1.26	1.29	1.30	1.27	1.36	1.39
Whitestone 3b	53.3285, -1.2706	m	1.35	1.37	1.37	1.37	1.38	1.41	1.42	1.39	1.48	1.51
Whitestone 3c	53.3109, -1.2746	m	2.71	2.73	2.73	2.73	2.74	2.77	2.78	2.75	2.85	2.90

Extreme Heat

11.5.14 The Proposed Development's regional maximum daily temperatures will increase steadily over the next few decades. Projections indicate that the duration of warm spells will increase proportionally more than other temperature-related indicators, even by the near-term period around 2030. This could result in more frequent and prolonged heatwaves, in the near term but particularly under higher emissions scenarios. Extreme heat can place additional stress on solar infrastructure, including degradation of material surfaces and increased energy demands for cooling. Prolonged heat exposure also poses direct risk to human health, which could impact workers, visitors and employees during the operational lifetime of the Proposed Development.

Flooding

11.5.15 1 in 100-year and 1 in 500-year pluvial inundation depths in certain areas across the Proposed Development will generally increase across future time horizons under all climate scenarios. Data points were chosen to be representative of areas containing or adjacent to solar related infrastructure (see **ES Volume 3, Figure 11.1: Point Level Data for W1-W3 [EN0110020/APP/6.19]**). The primary areas of concern are in W1 (Whitestone 1a) and W3 (Whitestone 3a, Whitestone 3b, and Whitestone 3c). This is where inundation depths of more than 0.6m are observed for the baseline and are projected to occur across all future time horizons and under all climate scenarios, according to Fathom 3.0™ modelling data. W2 (Whitestone 2a, Whitestone 2b) will record inundation depths exceeding 0.3m across all future time horizons and under all climate scenarios. It is also important to note that Whitestone 2c, nearby to the carp fishery in W2, under 1 in 100-year pluvial flood conditions have a baseline inundation depth of 0.17m and will see a projected increase of 11.8% to 0.19m by 2080 under a SSP5-8.5 scenario (see Section 11.5.3 for definition of SSP5-8.5). These points where inundation depths are projected to increase across operational lifetime of the Proposed Development, could pose a risk to solar infrastructure onsite.

11.5.16 This data has been cross-referenced with **ES Volume 2, Chapter 10: Water Resources and Flood Risk [EN0110020/APP/6.10]**, which contains the Flood Risk Assessment conducted in accordance with EA Flood Risk Assessment data and guidelines. While the flood-related data collected in this Chapter is important to identify broad trends of flood risk across the future baseline, design and associated mitigations will be based upon findings from **ES Volume 2, Chapter 10: Water Resources and Flood Risk [EN0110020/APP/6.10]**. This will be considered when determining the likely significant effects of flood risk to the Proposed Development.

Extreme Rainfall

11.5.17 Under baseline conditions (1985–2014), rainfall events of high intensity and short duration are relatively infrequent but have the potential to cause localised flooding, particularly in areas with impermeable surfaces or limited attenuation capacity. Future projections indicate that extreme rainfall is generally expected to increase across all three assessment Sites (W1, W2, and W3). Heavier one-day and five-day rainfall events are particularly projected under higher emissions scenarios (e.g., SSP5-8.5), with an upward trend in the frequency and intensity of short-duration, high-intensity events. Sites W1 and W2 show consistent increases across all time horizons (2030s, 2050s, 2080s), suggesting a strong signal of

intensification, while W3 displays more variable trends, including projected decreases in five-day totals and mixed results for one-day events depending on the emissions scenario. Some anomalies, such as projected decreases in 1-in-500-year rainfall for the 2080s under high-emission scenarios, reflect modelling uncertainty, especially for rare extremes.

Extreme Wind

11.5.18 Extreme wind events, while relatively infrequent in the region, can pose risks to infrastructure, particularly in exposed or elevated areas, and to lightweight or temporary structures. The Proposed Development regional mean windspeeds will demonstrate minimal to no increases across future time horizons under all climate scenarios. It is important to note a limitation of the data, which is that while mean wind speeds may remain stable, extreme gust events associated with Atlantic storm systems could still occur sporadically and may not be fully captured by mean wind projections.

Wildfire

11.5.19 Wildfire is currently considered a low-risk hazard at the existing baseline in the region, due to its relatively temperate climate, moderate precipitation levels (which is projected to increase at the Site), and limited expanses of fire-prone vegetation such as heathland or dense coniferous forest. The baseline incidence of wildfire events in this area remains infrequent and typically small in scale, with limited impact on infrastructure or human health. Across all future time horizons under all climate scenarios, the number of forest fire days is not expected to increase annually in the vicinity of the Proposed Development. This suggests that, under current climate scenarios, wildfire does not pose a significant or escalating threat to the Proposed Development or its surroundings.

Water Stress and Drought

11.5.20 Consecutive dry days are projected to increase across all future time horizons and climate scenarios, except for SSP1-2.6 in the 2030s, where a slight decrease is expected. WRI Water Stress levels have a low to medium baseline and are generally projected to show minimal change, with only a modest increase under the worst-case scenario (SSP5-8.5) by the 2080s. This trend suggests a growing likelihood of extended dry periods, particularly in summer months, which may reduce soil moisture availability and strain water supply systems

Subsidence

11.5.21 Consecutive dry days and consecutive wet days are expected to increase in duration generally across future time horizons under all climate scenarios. Given the Proposed Development main soil type is clay, these alternating conditions can lead to soil shrinkage during prolonged dry periods, followed by rapid rehydration and expansion during intense rainfall, which places stress on foundations, underground services, and surface structures.

GHG Assessment

Existing Baseline Conditions

11.5.22 The Proposed Development is split into the Site and Cable Corridors. W1 covers approximately 327ha of predominantly agricultural land, W2 covers approximately 651ha of predominantly agricultural and W3 covers an area of approximately 172ha of mixed land use, bisected in the south by the M1. Except for W3, the current land use of the Site predominantly consists of arable land, managed trees and hedgerows. The baseline agricultural GHG emissions are dependent on the soil and vegetation types present and the fuel used for the operation of any plant and machinery on the Site.

11.5.23 For the GHG Assessment, the existing baseline is a scenario whereby the Proposed Development is not implemented. The existing baseline comprises existing carbon stock and sources of GHG emissions within the boundary of the existing activities onsite. On this basis, the baseline activities onsite will be assumed to be generating zero emissions of CO_2e.

Future Baseline Conditions

11.5.24 The future baseline is the same as the existing baseline for the GHG Assessment whereby the net change in GHG emissions is calculated based on the zero-baseline scenario.

11.5.25 In addition, the GHG Assessment also understands the impact of ongoing fossil fuel use in the energy sector if the Proposed Development was not implemented by calculating the GHG emissions displaced or avoided by generating renewable electricity against an equivalent baseline. The equivalent baseline refers to the GHG emissions associated with the use of natural gas-fired power generation using CCGT as a suitable alternative to renewable electricity generation. The displaced or avoided GHG emissions describe the amount of GHG emissions saved by the Proposed Development and the contribution towards the targets and ambitions of the UK Government.

11.6 Embedded Mitigation

11.6.1 This section outlines the embedded mitigation measures relevant to climate change impacts across all phases of the Proposed Development and have been considered as part of the assessment. The embedded mitigation measures will be secured through the **ES Volume 3, Appendix 2.3: Commitments Register [EN0110020/APP/6.20]**) and the relevant outline management plans (see the **outline Construction Environmental Management Plan (oCEMP) [EN0110020/APP/5.9]**, the **outline Operational Environmental Management Plan (oOEMP) [EN0110020/APP/5.10]** and the **outline Decommissioning Environmental Management Plan (oDEMP) [EN0110020/APP/5.11]**.)

Climate Change Resilience Review and In-Combination Climate Impacts

Construction

Health and Safety of Site Workers and Visitors Under Extreme Heat Conditions

11.6.2 The Applicant has submitted an **oCEMP [EN01100200/APP/5.9]** which is secured by Requirement 4 in Schedule 2 of the **Draft DCO [EN0110020/APP/3.1]**. A Construction Health and Safety Plan and other relevant fieldwork specific Job Hazard Analysis (JHAs) will be developed prior to the commencement of construction. This will ensure that site workers, employees and visitors are taking necessary safety measures to avoid health impacts due to operating in extreme heat conditions.

Flooding Causing Blocked Access Routes

11.6.3 The Applicant has submitted an **oCEMP [EN0110020/APP/5.9]** which has outlined the mitigation measures identified in **ES Volume 2, Chapter 10: Water Resources and Flood Risk [EN0110020/APP/6.10]** relating to climate change and flood risk.

Operation and Maintenance

Extreme Heat Causing Solar Panel Material Degradation

11.6.4 Solar panels are manufactured to withstand temperatures in climate zones such as the Middle East, etc. Therefore, the risk of material degradation being accelerated under increased extreme heat days in the Proposed Development area is unlikely. While there are issues with lower efficiency of energy generation when panel surfaces are damaged, the consequence is minimal, and consequences of material degradation would be mitigated through standard maintenance schedules in operation.

Extreme Heat Causing Overheating in BESS and Substations

11.6.5 The BESS and Substations are designed to operate under ambient temperatures up to 35 degrees Celsius and up to 50 degrees Celsius with an approximate 10% reduction in energy generation. Considering the number of days above 35 degrees is relatively low in 2030 and 2050 across all scenarios (see **Table 11.10**) and increases incrementally up to 2080, the exposure to this risk is generally low. Additionally, maintenance and retrofit schedules (dependent on design life of the substation and BESS assets) should mitigate any thermal shutdowns, fire hazards and operational disruptions as assets are maintained and / or replaced. An **outline Battery Safety Management Plan (oBSMP) [EN0110020/APP/5.15]** which is secured by Requirement 8 in Schedule 2 of the **Draft DCO [EN0110020/APP/3.1]**. The oBSMP has considered thermal runaway, and associated controls.

Flooding Causing Damage to Site Infrastructure

11.6.6 The magnitude and severity of flood risk to the solar and associated infrastructure will be sufficiently mitigated by the Flood Risk Assessment and design mitigations that are determined from this. As per **ES Volume 2, Chapter 10: Water Resources and Flood Risk [EN0110020/APP/6.10]**, the proposed mitigation measures are:

- Critical electrical infrastructure within the Proposed Development (substation, BESS, inverters) will be subject to a sequential design approach and located with Flood Zone 1 which is defined as land having less than a 1 in 1,000 annual probability (<0.1%) of flooding from rivers or the sea;
- PV arrays will be subject to a sequential design approach and located within Flood Zone 1 wherever feasible. Where panels are to be located in Flood Zone 2 or 3 (land with a 1 in 1,000 and 1 in 100 annual probability of flooding respectively) panels would be installed a minimum of 300mm above levels for the 1 in 100-year (plus an appropriate climate change allowance) event, in accordance with EA guidance;
- PV arrays will be installed on metal frames driven into the ground, thereby reducing their footprint within the floodplain. Where alternative mounting solutions, such as concrete ballasts, are necessary due to elevated flood risk or archaeological sensitivity, their impact on flood risk will be assessed and appropriately mitigated within **ES Volume 3, Appendix 10.2: Flood Risk Assessment [EN0110020/APP/6.20]**;
- Electrical infrastructure compounds will include a surface water drainage system which will be designed to attenuate and release runoff up to a 1 in 100-year (plus climate change allowance) scenario without increasing the rate of runoff leaving the Site. The drainage system will be designed in accordance with Sustainable Drainage Systems (SuDS) principles and local and national SuDS guidance. During extreme rainfall events the location of electrical infrastructure will be drained by this system, which will mitigate against potential pluvial flooding. Details are provided in the **Outline Surface Water Drainage Management Strategy (oSWDS) [EN0110020/APP/5.17]** submitted as part of this Application and secured by Requirement 14 in Schedule 2 of the **Draft DCO [EN0110020/APP/3.1].**; and
- Construction compounds will be located within Flood Zone 1 (see **ES Volume 3, Figure 10.4: Flood Zones [EN0110020/APP/6.19]**).

Water Stress and Drought Causing Water Deficits for BESS and Substation Cooling Systems

11.6.7 Water required for cooling of the BESS and substations is maintained in a closed cooling system. Therefore, water supply required to operate these assets is low and provides resilience to the assets in periods of water stress and drought conditions in the region.

Water Stress and Drought Causing Water Deficits for Landscaping Requirements

11.6.8 An **oOEMP [EN0110020/APP/5.9]** has been developed and submitted as part of this Application and is secured by Requirement 13 in Schedule 2 of the **Draft DCO [EN0110020/APP/3.1]**. This will manage the Proposed Development's

responsibilities to maintain biodiversity value of the Site and surrounding areas in periods of water stress.

Decommissioning

11.6.9 A Decommissioning Environmental Management Plan (DEMP) will be developed at the cessation of operations at the Site, in line with relevant legislation at the time. An **oDEMP [EN0110020/APP/5.11]** has been submitted as part of this Application and is secured by Requirement 15 in Schedule 2 of the **Draft DCO [EN0110020/APP/3.1]**.

GHG Emissions

11.6.10 To reduce GHG emissions from the construction, operation and maintenance, and decommissioning, the Proposed Development will integrate embedded mitigation measures into the Proposed Development's design. The mitigations will be implemented through the **oCEMP [EN0110020/APP/5.9]** which has been submitted as part of this Application and is secured by Requirement 4 in Schedule 2 of the **Draft DCO [EN0110020/APP/3.1]**.

11.6.11 During construction, GHG emissions associated with worker movements will be mitigated by the following:

- The implementation of a Worker Travel Plan;
- Worker arrival and departure times;
- Limited and allocated car parking;
- Car sharing; and
- A minibus service.

11.6.12 The Proposed Development will make a commitment to reducing embodied carbon throughout its lifetime via the supply chain. Where possible to implement, examples of these commitments are outlined below:

- Engineering design considerations will reduce the GHG emissions associated with the materials used in the Proposed Development's design and during construction (for example minimising the use of SF_6 containing equipment in the design where possible);
- During both the construction and operational and maintenance phases of the Proposed Development, lower GHG emitting technologies will be utilised where practicable; and
- Wastes will be recycled and disposed of locally and excavated materials and soils will be reused to minimise the use of natural resources.

11.7 Assessment of Effects

Climate Change Resilience Review

11.7.1 Risks, informed by professional judgement, IPCC climate data and ISEP (formally IEMA) Climate Guidance[38], to the construction, operation and maintenance and decommissioning phases due to climate change are outlined in **Table 11.15** below.

Table 11.15: Climate Risk Assessment and Determination of Likely Significance

Risk Statement	Indicator	Sensitive Receptor	Embedded Mitigation Measure	Likelihood	Consequence	Significance
Construction						
Increased extreme heat days causing health and safety hazards for workers, staff and visitors onsite, leading to construction delays	Number of days >30 degrees	Human health	The Applicant will develop a Construction Health and Safety Plan (as referenced in the **oCEMP [EN0110020/APP/5.9]**) and will entail measures to reduce, mitigate or avoid health and safety hazards due to extreme heat.	Possible	Minor	Not Significant
Flooding causing blockage of worker access routes and Public Rights of Way across the Site, leading to health and safety risks and reduced connectivity	1 in 100-year Pluvial Flood Inundation Depth 1 in 500-year Pluvial Flood Inundation Depth	Human health	An **oCEMP [EN0110020/APP/5.9]** has been submitted as part of this Application and includes the mitigation measures which will be incorporated into the CEMP to minimise flood risk as result of the Proposed Development. Further details on the mitigation measures are detailed in **ES Volume 2, Chapter 10: Water Resources and Flood**	Possible	Minor	Not Significant

Risk Statement	Indicator	Sensitive Receptor	Embedded Mitigation Measure	Likelihood	Consequence	Significance
			Risk [EN0110020/APP/6.10]).			
Operation and Maintenance						
Increased extreme heat days causing material degradation to solar panels and associated infrastructure, leading to increased maintenance costs	Warm Spell Duration Index	Infrastructure	Solar panels are manufactured to withstand temperatures in climate zones such as the Middle East, etc. Therefore, the risk of material degradation being accelerated under increased extreme heat days in the Proposed Development area is unlikely. While there are issues with lower efficiency of energy generation when panel surfaces are damaged, the consequence is minimal, and consequences of material degradation would be mitigated through standard	Unlikely	Minor	Not Significant

Risk Statement	Indicator	Sensitive Receptor	Embedded Mitigation Measure	Likelihood	Consequence	Significance
			maintenance schedules in operation.			
Increased extreme heat days causing overheating in substations and BESS, leading to thermal shutdowns, fire hazards and operational disruption	Maximum daily temperature	Infrastructure	The BESS and Substations are designed to operate under ambient temperatures up to 35 degrees Celsius and up to 50 degrees Celsius with an approximate10% reduction in energy generation. Considering the number of days above 35 degrees is relatively low is relatively low in 2030 and 2050 across all scenarios (see **Table 11.10**) and increases incrementally up to 2080, the exposure to this risk is generally low. Additionally, maintenance and retrofit schedules	Unlikely	Minor	Not Significant

Risk Statement	Indicator	Sensitive Receptor	Embedded Mitigation Measure	Likelihood	Consequence	Significance
			(dependent on design life of the substation and BESS assets) should mitigate any thermal shutdowns, fire hazards and operational disruptions as assets are maintained and / or replaced.			
Flooding causing internal damage to solar panels and associated infrastructure, substations and BESS, leading to disruption of service, early maintenance, investment in additional mitigations and increased operational costs	1 in 100-year Pluvial Flood Inundation Depth 1 in 500-year Pluvial Flood Inundation Depth	Infrastructure	The BESS and all the Substations are located within Flood Zone 1. Solar panels and associated infrastructure located within Flood Zones 2 and 3 will be assessed and impact mitigated in the Flood Risk Assessment (**ES Volume 2, Chapter 10: Water Resources and Flood Risk [EN0110020/APP/6.10]** and **ES Volume 3, Appendix 10.3 Flood Risk Assessment [EN0110020/APP/6.20]**).	Possible	Minor	Not Significant

Risk Statement	Indicator	Sensitive Receptor	Embedded Mitigation Measure	Likelihood	Consequence	Significance
Extreme rainfall causing temporary or prolonged disruption to energy generation from solar panels and associated infrastructure, leading to reduced productivity of energy generation and increased operational costs.	1 in 100-year maximum 5 day rainfall	Infrastructure	All sensitive and electrical equipment on the solar panel will be elevated by legs or mounted on raised frames. The BESS and all the Substations are located within Flood Zone 1. Solar panels and associated infrastructure located within Flood Zones 2 and 3 will be assessed and impact mitigated in the Flood Risk Assessment (**ES Volume 2, Chapter 10: Water Resources and Flood Risk [EN0110020/APP/6.10]** and **ES Volume 3, Appendix 10.3 Flood Risk Assessment [EN0110020/APP/6.20]**).	Unlikely	Minor	Not Significant
Extreme winds causing structural damage to solar panels and associated infrastructure, leading to safety	Mean daily windspeed	Infrastructure	An **oOEMP [EN0110020/APP/5.9]** has been submitted as part of this Application. In addition, solar	Unlikely	Minor	Not Significant

Risk Statement	Indicator	Sensitive Receptor	Embedded Mitigation Measure	Likelihood	Consequence	Significance
hazards, production loss and increased maintenance costs.			infrastructure has been designed to withstand the wind loading expected as per panel design standards.			
Increased water stress durations and drought events causing water deficits for operation and cooling of substations and BESS, leading to reduced asset lifespan, increased and early maintenance costs and intermittent system shutdowns.	Consecutive dry days	Infrastructure	Water required for cooling of the BESS and the substations is maintained in a closed cooling system. Therefore, water supply required to operate these assets is low and provides resilience to the assets in periods of water stress and drought conditions in the region.	Unlikely	Moderate	Not Significant
Increased water stress durations and drought events causing water deficits for landscaping requirements onsite, leading to reduced biodiversity value.	Consecutive dry days	Environmental	An **outline Landscape and Ecology Management Plan (oLEMP) [EN0110020/APP/5.13]** has been developed and submitted as part of this Application and is secured by Requirement 9 in Schedule 2 of the **Draft DCO [EN0110020/APP/3.1]**.	Unlikely	Minor	Not Significant

Risk Statement	Indicator	Sensitive Receptor	Embedded Mitigation Measure	Likelihood	Consequence	Significance
			The oLEMP contains information regarding the management of the Proposed Development's responsibilities to maintain biodiversity value of the Site and surrounding areas in periods of water stress. The oLEMP will be developed and updated to a detailed Landscape and Ecology Management Plan (LEMP) prior to the commencement of construction.			
Increased wildfire events causing damage to solar infrastructure and flora and fauna onsite and workers exposure to smoke, leading to acute and chronic health and safety risks and operational costs	FFDI	All	An **oOEMP [EN0110020/APP/5.10]** has been developed and submitted as part of this Application. The oOEMP includes procedures for mitigating environmental hazards and safety risk involving fire management plan and incident response plan.	Rare	Minor	Not Significant

Risk Statement	Indicator	Sensitive Receptor	Embedded Mitigation Measure	Likelihood	Consequence	Significance
Increased occurrences of subsidence causing degradation to landscaped areas onsite, leading to reduced biodiversity value	Shrink-swell subsidence (consecutive wet and dry days combination)	Environmental	An **oLEMP [EN0110020/APP/5.13]** has been developed and submitted as part of this Application and is secured by Requirement 9 in Schedule 2 of the **Draft DCO [EN0110020/APP/3.1]**. The oLEMP manages the Proposed Development's responsibilities to maintain landscaped areas of the Site and surrounding areas.	Rare	Minor	Not Significant
Increased occurrences of subsidence causing damage to and misalignment of solar panels, their trackers and associated infrastructure foundations, leading to potential service disruptions and	Shrink-swell subsidence (consecutive wet and dry days combination)	Infrastructure	An **oOEMP [EN0110020/APP/5.10]** has been developed and submitted as part of this Application. The oOEMP includes procedures for mitigating	Rare	Minor	Not Significant

Risk Statement	Indicator	Sensitive Receptor	Embedded Mitigation Measure	Likelihood	Consequence	Significance
increased maintenance and operational costs.			environmental hazards and safety risk.			
Increased occurrences of subsidence causing damage to underground assets (Cable Corridor), leading to early repairs and increased operational costs.	Shrink-swell subsidence (consecutive wet and dry days combination)	Infrastructure	An **oOEMP [EN0110020/APP/5.10]** has been developed and submitted as part of this Application. The oOEMP includes procedures for mitigating environmental hazards and safety risk.	Rare	Minor	Not Significant
Decommissioning						
The risks associated with decommissioning are anticipated to be similar to that of the construction phase. An **oDEMP [EN0110020/APP/5.11]** has been developed and submitted as part of this Application. The detailed DEMP will be developed at the time of decommissioning, in accordance with the relevant legislation at the time.						

Construction

11.7.2 There is no potential for any likely significant effects on the Proposed Development due to future climate changes. Climate-related effects arising during the construction stage will be temporary. All effects are likely to be of Minor consequence and can be managed through effective CEMP (and associated Construction Health and Safety Plan protocols), which will be secured by requirement 4 in Schedule 2 of the **Draft DCO [EN0110020/APP/3.1]**.

Operation and Maintenance

11.7.3 There is no potential for any likely significant effects on the Proposed Development, due to future climate changes in the operation and maintenance phase. There is possibility for extreme heat, flooding and water stress and drought to impact the Proposed Development, but the consequences are Minor as the embedded mitigation measures reduce the severity of the risk.

Decommissioning

11.7.4 There is no potential for any likely significant effects on the Proposed Development due to future climate changes. While future projections up to 2080 demonstrate longer warm spell durations, increases in number of days per year exceeding 35 degrees Celsius, increases in flooding inundation depths and extreme rainfall and increased consecutive dry days and water stress conditions, there is inherent uncertainty in predicting the likelihood and severity of conditions. The decommissioning timeline is expected to be short and of similar exposure to climate impacts as the construction phase. If the severity of future climate changes increases as our projections state, this can be managed under the mitigation measures identified in the Climate Change Risk Assessment (see **Table 11.15**) for relevant decommissioning risks.

In-Combination Climate Impacts Assessment

11.7.5 The aim of the ICCI assessment is to assess whether the impacts of the Proposed Development on environmental receptors are likely to be significantly different under projected future climate conditions compared with those under existing baseline conditions. The assessment of these impacts is outlined in **Table 11.16** under construction, operation and maintenance, and decommissioning.

11.7.6 The parameters considered by the technical disciplines in the preparation of the ICCI assessment are:

- Extreme weather events (heatwaves, storm surges, wildfire and drought);
- Temperature changes;
- Rainfall changes; and
- Changes in wind patterns.

Table 11.16: In-Combination Climate Impacts Assessment and Determination of Significance

Technical Topic	Summary of effects identified in ES	In -Combination Climate Change Impacts and Effects	Potential ICCI Effect
Biodiversity and Nature Conservation	Construction activities may affect designated sites, ancient woodland, and species such as bats, badgers, and birds, but these would be mitigated through buffers, ecological surveys, and targeted measures. The Proposed Development has been designed with a structured mitigation hierarchy to avoid, reduce, and offset ecological impacts. Operational impacts would be managed via lighting and noise controls, with long-term habitat enhancements contributing to a minimum 10% biodiversity net gain. Decommissioning is anticipated replicate construction-phase mitigation to maintain low environmental impact.	Future climate change has the potential to affect habitats established by the Proposed Development through the LEMP. However, the LEMP will include measures within it to enhance habitat resilience to climate change. An **oLEMP [EN0110020/APP/5.13]** has been submitted as part of this Application.	No Likely Significant ICCI Effects
Landscape and Visual	During construction, the Proposed Development is expected to cause temporary changes to landscape character and visual amenity through the introduction Site Infrastructure, resulting in Moderate to Major adverse effects in several areas. Operational impacts include reduced openness and tranquillity, with Site infrastructure visible to residents and users of local roads and Public Rights of Way. However, by Year 15, mitigation planting and maturing vegetation would have integrated the Proposed Development into the landscape, reducing the prominence of infrastructure and improving biodiversity and habitat connectivity. Decommissioning is expected to mirror construction but with reduced disturbance, and	Future climate change has the potential to affect habitats established for the purpose of visual screening by the Proposed Development through the LEMP. However, the LEMP will include measures within it to enhance habitat resilience to climate change. An **oLEMP [EN0110020/APP/5.13]** has been submitted as part of this Application.	No Likely Significant ICCI Effect

Technical Topic	Summary of effects identified in ES	In -Combination Climate Change Impacts and Effects	Potential ICCI Effect
	mitigation measures such as the DEMP would guide restoration to pre-development conditions.		
Cultural heritage and Archaeology	During construction, the main impacts involve physical disturbance to subsurface archaeological remains and Minor indirect effects like vibration and temporary changes to heritage settings. Mitigation includes exclusion zones, micro-siting, non-intrusive construction methods, and environmental management plans. In the operational phase, no direct physical effects are expected, but visual impacts on heritage assets may occur; these would be mitigated through planting and infrastructure repositioning. Decommissioning is expected to have similar or lesser impacts than construction, with most indirect effects reversed through Site restoration.	It is not considered likely the climate change would cause any additional impact on buried archaeology across the Proposed Development as once infrastructure is in situ there is no impact. Future climate change has the potential to affect habitats established for the purpose of visual screening by the Proposed Development through the LEMP. However, the LEMP will include measures within it to enhance habitat resilience to climate change. An **oLEMP [EN0110020/APP/5.13]** has been submitted as part of this Application.	No Likely Significant ICCI Effect
Ground conditions and Land quality	Construction activities may lead to temporary soil function loss, compaction, contamination risks, and groundwater disturbance, with Moderate adverse effects expected in relation to permanent soil loss and ground stability. Considering embedded and additional mitigation, the significance of adverse effects in all phases all assessed as **Minor or Negligible significance**.	Changes to future climate such as higher peak temperatures or more intense rainfall may affect soil structure and/or soil quality. The management plans, including the Soil Management Plan and OEMP, will ensure any future changes in climatic conditions are effectively managed. An Outline Soil Management Plan has been included within the **oCEMP**	No Likely Significant ICCI Effect

Technical Topic	Summary of effects identified in ES	In -Combination Climate Change Impacts and Effects	Potential ICCI Effect
		[EN0110020/APP/5.9]. An **oOEMP [EN0110020/APP/5.10]** has also been submitted as part of this Application.	
Water Resources and Flood Risk	During construction, risks include pollution, sediment release, and altered groundwater flow, which could affect water quality and increase flood risk. Mitigation includes an **oCEMP [EN0110020/APP/5.9]** with watercourse buffers, best practice drainage designs, spill prevention, and SuDS. Operationally, infrastructure would be sited to avoid flood zones, and runoff would be managed to prevent increased flood risk. Fire risk at the BESS is addressed through containment measures. Decommissioning impacts are expected to be similar but less severe, with continued environmental controls and retention of compatible drainage features.	Future climate change, including increased rainfall, has the potential to increase flood risk in combination with the Proposed Development. However future climate change scenarios are considered in the design of the Proposed Development, the **outline oOEMP [EN0110020/APP/5.10]**, the **oBSMP [EN0110020/APP/5.15]**, and the **oSWDS [EN0110020/APP/5.17]**.	No Likely Significant ICCI Effect
Air Quality	With mitigation, dust and traffic impacts during construction are predicted to be Not Significant. Operational traffic volumes are very low and scoped out of further air quality assessment. Decommissioning impacts are anticipated to mirror those of construction, with similar mitigation ensuring low or Negligible effects. Human health receptors are moderately sensitive, with high dust soiling potential near residences. Mitigation measures embedded in the **oCEMP [EN0110020/APP/5.9]** and **oDEMP [EN0110020/APP/5.11]**, which are secured by Requirements 4 and 15 respectively in Schedule	Air quality is predicted to improve in the future, owing to lower emissions from road vehicles and heating and cooling plant as progressively lower emission technologies become available. As such, it is anticipated air quality would not be significantly affected by future climate change.	No Likely Significant ICCI Effect

Technical Topic	Summary of effects identified in ES	In -Combination Climate Change Impacts and Effects	Potential ICCI Effect
	2 of the **Draft DCO [EN0110020/APP/3.1]** will reduce dust and emissions to negligible levels through site management, dust suppression, vehicle controls, and waste handling.		
Traffic and Transport	The Proposed Development would result in temporary increases of traffic flows, including HGVs. However, the significance of impacts of temporary traffic generated by the construction of the Proposed Development on all road links and junctions assessed are considered to be Negligible or Minor, and are therefore, Not Significant. Embedded mitigation measures detailed within the **outline Construction Traffic Management Plan (oCTMP) [EN0110020/APP/5.12]** will be implemented.	Future climate change is not likely to directly affect road usage and as such would not impact upon traffic and transport receptors. Future climate change may increase frequency in winter storms, which may have a small impact on road safety, but the changes would not be sufficiently substantial to lead to significant effects on road safety.	No Likely Significant ICCI Effect
Noise and Vibration	Embedded mitigation measures include adherence to working hours, equipment maintenance, silencers, and traffic routing, all formalised via the **oCEMP [EN0110020/APP/5.9], oOEMP [EN0110020/APP/5.10]** and **oDEMP [EN0110020/APP/5.11]** which are secured by Requirements 4, 13 and 15 respectively in Schedule 2 of the **Draft DCO [EN0110020/APP/3.1].** The assessment presented in **ES Volume 2, Chapter 14: Noise and Vibration [EN0110020/APP/6.14]** concludes not significant impacts across all phases of the Proposed Development.	Climate change would not materially affect the noise and vibration assessment (**ES Volume 2, Chapter 14: Noise and Vibration [EN0110020/APP/6.14]**). Changes to future climate such as higher peak temperatures or more intense rainfall may have a small influence on the baseline noise and vibration conditions but this is not expected to be noticeable or lead to any change in impacts.	No Likely Significant ICCI Effect

Technical Topic	Summary of effects identified in ES	In -Combination Climate Change Impacts and Effects	Potential ICCI Effect
Socio-economics and Use	The Proposed Development is expected to deliver Minor beneficial effects during construction through job creation and economic activity, with Negligible impacts during operation. Temporary disruptions to tourism and recreation may occur due to access changes and increased accommodation demand, though these are considered Not Significant. Agricultural land would be temporarily used, including areas of high value, but being made available again to arable farming post-decommissioning will limit long-term effects. Socio-cultural impacts from a transient workforce are anticipated to be short-term and Negligible. Embedded mitigation measures, including the **oCEMP [EN0110020/APP/5.9], oOEMP [EN0110020/APP/5.10], oDEMP [EN0110020/APP/5.11]** and **oCTMP [EN0110020/APP/5.12]** which are secured by Requirements 4, 13, 15 and 5 respectively in Schedule 2 of the **Draft DCO [EN0110020/APP/3.1]**, would help minimise adverse effects across employment, tourism, land use, and community infrastructure.	Climate change impact on populations' ability to work or the overall economy cannot be quantified. The Proposed Development is contributing to the UK's net zero targets and therefore is not anticipated to have a negative impact on socio-economics.	No Likely Significant ICCI Effect

11.7.7 Future climate projections have been reviewed and the sensitivity of receptors to both climate change and the Proposed Development have been examined, before commenting on the adequacy of the climate change resilience measures built into the Proposed Development. As a result of the mitigation measures incorporated into the Proposed Development's design and good practice measures, no Significant ICCIs during construction, operation and maintenance, or decommissioning phases have been identified.

Greenhouse Gas Assessment

11.7.8 The GHG Assessment understands the impact of GHG emissions associated with the Proposed Development by calculating:

- The estimated GHG emissions associated with the construction, operation and maintenance and decommissioning of the Proposed Development; and
- The estimated GHG emissions displaced or avoided by generating renewable electricity from the Proposed Development.

11.7.9 The GHG Assessment calculates and assesses the impact of the GHG emissions associated with all phases of the Proposed Development and accounts for the mitigation measures outlined in Section 11.6 and 11.8 of this Chapter.

11.7.10 The total GHG emissions (tCO_2e) from the construction, operation and maintenance, and decommissioning of the Proposed Development are estimated to be around 1,036,000 tCO2e. Approximately 41% of the GHG emissions arise during the construction phase, the operation and maintenance phase contributes 57%, and the decommissioning phase contributes to 2%.

11.7.11 To put the total GHG emissions from the construction, operation and maintenance, and decommissioning of the Proposed Development into context, the GHG emissions intensity of the Proposed Development was calculated and estimated at 23 gCO_2e/kWh. This is well below the GHG intensity for a gas-fired CCGT, which is 490 gCO_2e/kWh.

11.7.12 In summary, the greatest sources of GHG emissions are from the embodied GHG emissions associated with the use of raw materials and equipment in the construction and the replacement of equipment during the operation and maintenance phase. The sources of GHG emissions are described in further detail below:

Construction

11.7.13 The greatest sources of GHG emissions for the construction phase arise from the embodied GHG emissions associated with the equipment and raw materials installed and used at the Proposed Development. A small volume of GHG emissions arise from fuel consumption and the wastes that arise from this phase.

11.7.14 **Table 11.17** provides a breakdown of the GHG emissions associated with construction.

Table 11.17:Summary of the Estimated GHG Emissions Associated with Construction of the Proposed Development

Source of GHG Emissions from Construction Activities	Total Estimated GHG Emissions (tCO2e)*	Percentage Contribution of GHG Emissions (%) in Construction
Construction GHG Emissions		
Fuel consumption data associated with construction equipment and vehicles	26,000	6.1
Embodied emissions associated with equipment and raw materials	400,000	93.7
Waste	1,000	0.2
Total Construction GHG Emissions	**427,000**	**100**
*The availability of activity data determined the sources of, and categories of GHG emissions reported in this GHG Assessment. As a result, the GHG Assessment presents an estimation of the GHG emissions associated with the Proposed Development. NOTE: All results are rounded up for a conservative estimation.		

Operation and Maintenance

11.7.15 The majority of GHG emissions for the operation and maintenance phase are associated with the replacement of the solar PV panels, inverters and BESS, along with the disposal of this replacement equipment. The GHG emissions are detailed in **Table 11.18**.

Table 11.18 Summary of Estimated GHG Emissions Associated with the Operation and Maintenance of the Proposed Development

Source of GHG Emissions from Operation and Maintenance Activities	Total Estimated GHG Emissions (tCO_2e)*	Percentage Contribution of GHG Emissions (%) in Operation and Maintenance
Operation and Maintenance GHG Emissions		
Electricity consumption	158,600	26.9
Replacement of solar PV panels, inverters and BESS equipment	431,000	73.1
Waste	400	<0.1
Total Operation and Maintenance GHG Emissions	**590,000**	**100**
*The availability of activity data determined the sources of, and categories of GHG emissions reported in this GHG Assessment. As a result, the GHG Assessment presents an estimation of the GHG emissions associated with the Proposed Development. NOTE: All results are rounded up for a conservative estimation.		

Decommissioning

11.7.16 The decommissioning phase will be the reverse of the construction phase and will involve a similar number of vehicles and equipment. The main sources of GHG emissions from this phase are related to the fuel used to run plant and equipment to decommission the Proposed Development and journeys made by site vehicles; along with the disposal of equipment and materials used to construct the Proposed Development. **Table 11.19** provides a breakdown of the GHG emissions for decommissioning.

Table 11.19 Summary of the Estimated GHG Emissions Associated with the Decommissioning of the Proposed Development

Source of GHG Emissions from Decommissioning Activities	Total Estimated GHG Emissions (tCO2e)*	Percentage Contribution of GHG Emissions (%) in Decommissioning
Decommissioning GHG Emissions		
Fuel use in plant, equipment and vehicles	18,000	95
Disposal of waste equipment, plant and materials	1,000	5
Total Decommissioning GHG emissions	**19,000**	**100**
*The availability of activity data determined the sources of, and categories of GHG emissions reported in this GHG Assessment. As a result, the GHG Assessment presents an estimation of the GHG emissions associated with the Proposed Development. NOTE: All results are rounded up for a conservative estimation.		

Summary

11.7.17 The key sources of GHG emissions were categorised by scope in accordance with GHG reporting standards and guidance. Scope 1 covers GHG emission sources from activities at the Site and Cable Corridors such as stationary and mobile combustion; scope 2 covers Site and Cable Corridor activities that require the purchase of electricity and cooling; and scope 3 refers to activities that arise as a result of the Proposed Development which do not take place on the Site and/ or Cable Corridors.

11.7.18 The total GHG emissions (tCO2e) for each scope are outlined in **Table 11.20** and summarised below.

Table 11.20: Summary of the Estimated GHG Emissions Associated with the Proposed Development Categorised by Scope

Estimated GHG Emissions Categorised by Scope	Total Estimated GHG Emissions (tCO_2e)*	Percentage Contribution of GHG Emissions (%)
Scope 1 (total) **Broken down as:**	**44,000**	**4.3**
Construction	26,000	-

Operation and maintenance	-	-
Decommissioning	18,000	-
Scope 2 (total) **Broken down as:**	**158,600**	**15.3**
Construction	-	-
Operation and maintenance	158,600	-
Decommissioning	-	-
Scope 3 (total) **Broken down as:**	**833,400**	**80.4**
Construction	401,000	-
Operation and maintenance	431,400	-
Decommissioning	1,000	-
Total Estimated GHG Emissions	**1,036,000**	**100**
*The availability of activity data determined the sources of, and categories of GHG emissions reported in this GHG Assessment. As a result, the GHG Assessment presents an estimation of the GHG emissions associated with the Proposed Development.		

11.7.19 To understand the significance of the GHG emissions associated with the Proposed Development the GHG emissions are compared to the existing and future baseline and the UK Carbon Budgets.

11.7.20 The impact of the Proposed Development on the existing and future baselines is the release of around 1,036,000tCO_2e from all phases of the Proposed Development.

11.7.21 The UK Carbon Budgets restrict the amount of GHG emissions the UK can legally emit during a set period. The GHG emissions associated with each phase of the Proposed Development have been shown against the relevant Carbon Budget time period in **Table 11.21**.

11.7.22 The GHG emissions associated with all phases of the Proposed Development are split according to the period of time that the GHG emissions take place, this is as follows:

- GHG emissions associated with construction are assigned to the 4th (2023-2027) and the 5th Carbon Budget (2028-2032);
- The GHG emissions associated with operation and maintenance is reported in the 6th Carbon Budget (2033-2037); and
- The decommissioning GHG emissions are reported in the 6th Carbon Budget (2033-2037).

11.7.23 It should be noted that the UK Carbon Budgets have not been set beyond 2037, therefore all GHG emissions that arise beyond 2037 have been included in the 6th Carbon Budget.

11.7.24 Based on the GHG Assessment it is not anticipated that the total GHG emissions from the Proposed Development's construction, operation and maintenance and decommissioning will impact the overall ability for the UK Government to meet its climate targets and Carbon Budgets.

11.7.25 From the results of the GHG emissions assessment it can be concluded that the likely impact of the Proposed Development on the climate is consistent with the ISEP (formally IEMA) definition '**Negligible'** and '**Not Significant'** whereby "*The project's GHG impacts would be reduced through measures that go well beyond existing and emerging policy and design standards for projects of this type, such that radical decarbonisation or net zero is achieved well before 2050. A project with negligible effects provides GHG performance that is well 'ahead of the curve' for the trajectory towards net zero and has minimal residual emissions*".

Table 11.21: Summary of the Estimated GHG Emissions Associated with Each Phase of the Proposed Development Against the Relevant UK Carbon Budget Period

UK Carbon Budget Period	UK Carbon Budget Total ($MTCO_2E$*)	Proposed Development's Contribution to the Relevant Carbon Budget ($MtCO_2E$*)	% Emissions Against the Carbon Budget
4th Carbon Budget (2023-2027)	1,950	0.14	<0.1
5th Carbon Budget (2028-2032)	1,725	0.28	<0.1
6th Carbon Budget (2033-2037)	965	0.61	<0.1

*million tonnes of carbon dioxide equivalent ($mtCO_2e$)

Note: Carbon Budgets have not been set beyond 2037, therefore all emissions beyond 2037 have been included in the 6th Carbon Budget.

GHG Emissions Displaced by the Proposed Development

11.7.26 The Proposed Development is expected to provide a substantial contribution to the regional and national net zero ambitions by providing renewable electricity. It is assumed that the Proposed Development would avoid or displace the combustion of GHG emissions from other forms of more GHG intensive grid-connected electricity in the UK (such as gas-fired CCGT power stations).

11.7.27 To calculate the GHG emissions displaced, the equivalent fossil fuel (natural gas) power generation GHG emission factor was multiplied by the estimated total lifetime output from the Proposed Development. The total GHG emissions avoided by the Proposed Development during its 60-year lifespan was calculated at an estimated 18,000,000tCO2e.

11.7.28 If the Proposed Development displaced the equivalent mix of power generation on the UK grid then the equivalent GHG emissions avoided can be estimated at 7,000,000tCO2e (calculated using the UK grid GHG emissions factor multiplied by the total lifetime output from the Proposed Development).

11.7.29 As a result, it is expected that the Proposed Development would provide a net climate benefit by displacing or avoiding GHG emissions that would arise from more GHG intensive grid connected electricity generation.

11.7.30 From the results of the GHG emissions assessment it can be concluded that the likely impact of the Proposed Development on the climate is consistent with the ISEP (formally IEMA) definition '**Beneficial**' and '**Significant'** whereby "*the project's net GHG impacts are below zero and it causes a reduction in atmospheric GHG concentration, whether directly or indirectly, compared to the without-project baseline. A project with beneficial effects substantially exceeds the net zero requirements with a positive impact*".

GHG Assessment of Likely Significant Effects

11.7.31 To understand the impact of the Proposed Development the GHG emissions associated with the Proposed Development were evaluated against the baseline case, whereby, if the Proposed Development was not to go ahead more GHG intensive power generation (such as gas-fired CCGTs) would generate electricity over the 60-year lifetime of the Proposed Development.

11.7.32 Overall, the GHG Assessment concluded that the Proposed Development would provide a net climate benefit, by offsetting around 16,964,000tCO_2e, consistent with the ISEP (formally IEMA) definition '**Beneficial**' and '**Significant**'.

Table 11.22: Summary of the Net Impact of the Estimated GHG Emissions for the Proposed Development

Source	Total Estimated GHG Emissions (tCO_2e)
Total estimated GHG emissions from the construction, operation and decommissioning of the Proposed Development	1,036,000
Total estimated GHG emissions associated with the equivalent natural gas (CCGT) for the Proposed Development (using the natural gas GHG emissions conversion factor)	18,000,000
Net impact on the climate from the Proposed Development*	16,964,000

11.8 Additional Mitigation Measures and Residual Effects

Additional Mitigation

11.8.1 Additional mitigation measures relating to Climate Change and GHG impacts are not considered to be necessary.

Residual Effects

11.8.2 As no additional mitigation measures are required, residual effects remain as concluded in the assessments provided in Section 11.7.

11.9 Cumulative Effects

11.9.1 The Proposed Development supports regional and national net zero ambitions by providing renewable electricity to the UK grid. The Proposed Development cumulatively with other renewable developments would have a positive effect on GHG emissions as it would contribute to the UK's net zero ambitions.

11.9.2 The CCRA is specific to the Study Area and all phases of the Proposed Development, as a result a Cumulative Effects Assessment (CEA) is not considered to be relevant to the CCRR in accordance with ISEP (formally IEMA) guidance. In addition, the CCRR concludes that the Proposed Development is resilient to future climate change projections.

11.9.3 The ICCI Assessment, by nature, assesses the cumulative effects of climate change in relation to the environmental topics considered Significant in other chapters. The relevant chapter in this ES assesses the cumulative effects relevant to that environmental topic and according to guidance relevant too that environment topic. As a result, a separate CEA is not relevant to the ICCI Assessment.

11.9.4 The global atmosphere is the receptor of GHG emissions, and as a result, it is not possible to define a Study Area for the CEA in relation to the GHG Assessment. Therefore, in line with ISEP (formally IEMA) guidance, any effects resulting from GHG emissions, be it from the Proposed Development itself or from other developments, are not geographically constrained instead they are global, and therefore, a CEA is not considered to be applicable to the GHG Assessment.

11.9.5 Intra- and inter-cumulative effects are, therefore, not considered further in this Chapter.

11.10 Summary

Statement of Significance

Climate Change Resilience Review

11.10.1 During construction, operation and maintenance phase, there are no likely significant effects from climate change hazards that would impact receptors within the Order Limits of the Proposed Development.

In-Combination Climate Impact Assessment

11.10.2 There are no significant effects from in-combination climate impacts across all phases of the Proposed Development.

Greenhouse Gas Assessment

11.10.3 The GHG emissions from the Proposed Development's construction, operation and decommissioning (scopes 1, 2 and 3) were estimated at around 1.04mtCO_2e for the Proposed Development. When compared with the relevant UK Carbon Budgets the assessment concluded that it these emissions would not impact the UK climate targets and Carbon Budgets. It was concluded that the likely impact of the Proposed Development's construction, operation and decommissioning on the

climate is consistent with the ISEP (formally IEMA) definition '**Negligible**' and '**Not Significant**'.

11.10.4 To reduce GHG emissions from the construction, operation and decommissioning of the Proposed Development, mitigation measures will be incorporated into the design of the Proposed Development. The mitigations will be implemented through the **oCEMP [EN0110020/APP/5.9]**.

11.10.5 The GHG Assessment also identified that over the Proposed Development's 60-year lifetime it would avoid around 18.0mtCO_2e by displacing or reducing GHG emissions from more GHG intensive power generation (such as gas-fired CCGT power stations).

11.10.6 The GHG Assessment concluded that the Proposed Development would provide a net climate benefit, by offsetting around 16.96mtCO_2e, consistent with the ISEP (formally IEMA) definition '**Beneficial**' and '**Significant**'.

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