SLOUGH MULTIFUEL PROJECT

SLOUGH MULTIFUEL EXTENSION PROJECT

[PINS Ref: EN010129]

Environmental Statement
Volume 1 – Environmental Statement

Chapter 11 - Climate Change and Sustainability

Application Document Reference: [6.2.11]

APFP Regulations 5(2)(a)

Revision Number: 1.0

Planning Act 2008
Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

CONTENTS

TABLES

PLATES

11.0 CLIMATE CHANGE AND SUSTAINABILITY

11.1 Introduction

11.1.1 This chapter of the Environmental Statement (ES) **[Application Document Reference 6.2]** assesses the potential effects of the construction and operation (including maintenance) of the Proposed Project in terms of Climate Change and Sustainability. As well as considering potential effects arising from the Proposed Project, this assessment also considers the potential impact of projected future climate change on the Proposed Project and the surrounding environment. Decommissioning has not been included in this chapter, as it would not represent a material contribution towards the total emissions scoped into the assessment.

11.1.2 Many of the sustainability issues considered in this chapter refer to other topic specific chapters of this ES **[Application Document Reference 6.2]**; therefore, relevant chapters are referenced herein where appropriate.

11.1.3 In addition to a wider review of sustainability, in accordance with the requirements of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2022, guidance from the Institute of Environmental Management and Assessment (IEMA) for climate change mitigation and adaptation has been applied. This chapter addresses two main aspects:

- **Lifecycle greenhouse gas (GHG) assessment** - potential GHG emissions arising from the Proposed Project, including how the Proposed Project would affect the ability of the government to meet its carbon reduction targets.
- **Climate change resilience (CCR) assessment** – the resilience of the Proposed Project to anticipated climate change, including how the Proposed Project design would be adapted to take account for the probable impacts of climate change.

11.1.4 The assessment of cumulative effects on sustainability associated with the Proposed Project and other committed developments in the vicinity are described in **Chapter 13: Effect Interactions [Application Document Reference 6.2.13-ES Chapter 13]** of this ES.

11.1.5 As part of this assessment, the Proposed Project has been considered against several key sustainability themes. This includes a consideration of the methods which will be employed to minimise impacts on several themes such as ecology and air quality, thus contributing to the wider sustainability of the Proposed Project.

11.1.6 The impacts and effects of the Proposed Project are assessed against the future baseline, which includes the Consented Development.

11.2 Legislation and Planning Policy

11.2.1 This section identifies and describes legislation, policy, and guidance of relevance to the assessment of the potential sustainability and climate impacts associated with the construction and operation (including maintenance) of the Proposed Project. Legislation, policy, and other relevant guidance has been considered on an international, national, and local level.

International Legislation, Guidance and Agreements

Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance (2022)

11.2.2 The IEMA report 'Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance' provides guidance on addressing GHG emissions assessment and mitigation in EIA. It sets out the over-arching principles relating to the consideration of climate change mitigation in EIA.

11.2.3 IEMA's updated guidance is a revision of the 2017 guidance, amended to reflect the requirement for deeper cuts in emissions across all sectors of the economy to meet the net-zero target according to the Climate Change Committee (CCC).

IEMA EIA Guide to Climate Change Resilience and Adaptation (2020)

11.2.4 EIA Guide to Climate Change Resilience and Adaptation provides a framework for the consideration of climate change resilience and adaptation in EIA and includes case studies of emerging good practice.

11.2.5 Originally published in 2015, in line with the 2014 amendments to the EU EIA Directive, the 2020 guide has been updated based on developments in practice.

Kyoto Protocol

11.2.6 An international agreement linked to the United Nations Framework Convention on Climate Change (UNFCCC), which commits its Parties by setting internationally binding emission reduction targets. Under Article 4 of the Kyoto Protocol, the EU created an Effort Sharing Regulation that requires the setting of individual binding GHG emission reduction targets for each of its Member States. The current Effort Sharing Decision (ESD) commits the UK to a 37% reduction in GHG emissions for the period 2021 to 2030.

Paris Agreement

11.2.7 At the Conference of the Parties (CoP) 21 in 2015, an agreement (the "Paris Agreement") was reached under the UNFCCC and came into force in November 2016 (0). It pledges long-term temperature goals to keep the increase in global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the increase to 1.5°C. Parties to the agreement also aim to achieve a balance between anthropogenic emissions by sources and removals by sinks of Greenhouse Gases' (GHGs) in the second half of the century.

Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment

11.2.8 This Guidance aims to help EU Member States improve the way in which climate change and biodiversity are integrated in EIAs undertaken across the EU. Despite the fact that the UK is no longer a Member State of the EU, this guidance is still considered relevant in the context of EIAs undertaken in respect of developments in the UK.

EC Non-paper Guidelines for Project Managers: Making Vulnerable Investments Climate Resilient

11.2.9 These Guidelines aim to help developers of physical assets and infrastructure incorporate resilience to current climate variability and future climate change within their projects. Similarly, as above, this guidance is still considered relevant in the context of EIAs undertaken in respect of developments in the UK.

National Legislation

Climate Change Act 2008 / Climate Change Act (2050 Target Amendment) Order 2019

11.2.10 The Climate Change Act 2008 (hereafter referred to as the 'Act') provides a framework to meet its GHG emission reduction goals through legally binding national carbon emission caps within five-year periods. The Act was amended in 2019 to revise the previous 80% reduction target and legislate for a net zero emissions by 2050 (UK Government, 2019). The UK has enacted its 6th carbon budget up until 2037.

11.2.11 This Act defines 'net zero' carbon as *"the amount of net UK emissions of targeted greenhouse gases for a period adjusted by the amount of carbon united, credited or debited for the year 2050".* This means that by 2050, emissions will have to be avoided completely or offset by removal from the atmosphere and/or traded in carbon units.

UK Carbon Budgets (Committee on Climate Change, 2020)

11.2.12 The Carbon Budgets Orders 2009, 2011 and 2016 set five-yearly, legally binding, carbon budgets. The first five carbon budgets cover to 2032 and follow a trajectory for the UK to meet an 80% carbon reduction target. The sixth carbon budget, covering 2033 to 2037, is the first budget to align with the revised target for the UK to be net zero by 2050.

11.2.13 UK carbon budgets are used alongside IEMA guidance to determine significance of GHG emissions from the Proposed Project, as described in Section 11.3.

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017

11.2.14 The 2017 Regulations state that an EIA (where relevant) must include an assessment of the impact of a project on climate change (mitigation assessment) and information on the vulnerability of the project to climate change.

UK Nationally Determined Contribution

11.2.15 Under Article 4 of the Paris Agreement, parties are required to communicate their intended domestic GHG mitigation targets. In 2020, the UK communicated its new Nationally Determined Contribution to the UNFCCC. Within this, the UK has committed to reducing GHG emissions by at least 68% by 2030 compared to 1990 levels.

Overarching National Policy Statement for Energy (EN-1)

11.2.16 Published by the Department of Energy and Climate Change, this NPS describes the national policy for energy infrastructure in relation to climate impacts and adaptation; adverse effects and benefits; in relation to the EU Directive and Environmental Statement (ES) requirements; in relation to adaptation measures in response to climate projections; in relation to climate projections, flood risk; and the importance of relevant mitigation.

Draft Overarching National Policy Statement for Energy (EN-1).

11.2.17 Released in September 2021 for consultation, Part 4.7 considers combined heat and power, and details that using less fuel to generate the same amount of heat and power reduces emissions, in particular CO_2. The Government is committed to the reduction of CO_2 emissions.

Draft National Policy Statement for Renewable Energy Infrastructure (EN- 3)

11.2.18 Draft published in September 2021 by Department of Energy and Climate Change, denotes the importance of an increase in low carbon electricity generation, with most of this likely to come from renewables, including biomass and EfW.

The National Planning Policy Framework

11.2.19 The revised National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these are expected to be applied. Policies of relevance to climate change and sustainability assessment as presented herein include those achieving sustainable development and meeting the challenge of moving to a low carbon economy, climate change, flooding, and coastal change. This Framework states that the planning systems should support this transition by supporting low carbon energy and associated infrastructure.

National Planning Policy Guidance on Climate Change

11.2.20 Guidance published by the Ministry of Housing, Communities and Local Government describes how to identify suitable mitigation and climate adaptation measures to incorporate into the planning process. Stating *"effective spatial planning is an important part of a successful response to climate change as it can influence the emission of greenhouse gases... Planning can also help increase resilience to climate change impact through the location, mix and design of development."*

Local Strategies and Plans

11.2.21 Local strategies and plans identify the need to consider and, where appropriate, mitigate GHG emissions associated with new development. New development should aim for reduced or zero carbon development by incorporating renewable or

low carbon energy sources and maximising energy efficiency where practicable and should build in resilience to projected climate change impacts.

Slough Borough Council's Climate Change Strategy and Action Plan

11.2.22 The council has published proposals on how to eliminate the borough's contribution to climate change and how to achieve it over the next 20 years. The plans are to tackle five key areas including what the council and other stakeholders in the borough can do and focuses on the following:

- reducing emissions from our estate and operations
- reducing energy consumption and emissions by promoting energy efficiency measures, sustainable construction, renewable energy sources, and behaviour change
- reducing emissions from transport by promoting sustainable transport, reducing car travel and traffic congestion, and encouraging behaviour change
- reducing consumption of resources, increasing recycling, and reducing waste
- supporting council services, residents, and businesses to adapt to the impacts of climate change

Slough Borough Council's Climate Change Strategy Vision

11.2.23 The council has set a target of borough-wide carbon neutrality by 2040, with an ambitious stretch target of 2030. This target complies with the UK's national target of net zero emissions by 2050 and a reduction of 78% of emissions by 2035 relative to 1990.

11.3 Assessment Methodology

Determination of the Baseline

GHG Emissions Impact Assessment – Baseline

11.3.1 For the purposes of the GHG emissions impact assessment, the baseline conditions are also defined as a 'Do Nothing' scenario, where the Proposed Project does not go ahead but the Consented Development is built out and operational.

11.3.2 The baseline comprises of carbon stocks and sources of GHGs within the Site. The methodology for calculating GHG emissions and removals is consistently used across the baseline, construction, and operational phases of the Proposed Project.

11.3.3 In line with ISO14064 and principles of the GHG Protocol, the GHG emissions have been calculated by multiplying activity data by its relevant emission factor:

- Activity data x GHG emissions factor = GHG volume

11.3.4 Activity data is a quantifiable measure of activity, such as operating hours or volumes of fuels used. Emission factors convert the activity data into GHG volumes. Activity data has been sourced from client data. Where specific data is not available, a mix of assumptions and industry benchmarks have been used to fill data gaps. Where this is not possible, then a qualitative approach to assessing the GHG impacts has been followed, in line with the IEMA guidance.

11.3.5 Emission factors have been sourced from publicly available sources, Defra, and the Bath University Inventory of Carbon and Energy (ICE). Carbon emissions and sinks through land use change have been calculated by using the EU Commission's Guidelines for Land Carbon Stocks.

11.3.6 In line with the ISO standard 14064 and the principles of the GHG Protocol when calculating GHG emissions, the seven Kyoto Protocol GHGs have been considered, specifically:

- Carbon dioxide (CO_2);
- Methane (CH_4);
- Nitrous oxide (N_2O);
- Sulphur hexafluoride (SF_6);
- Hydrofluorocarbons (HFCs);
- Perfluorocarbons (PFCs); and
- Nitrogen trifluoride (NF_3).

11.3.7 These gases are broadly referred to in this report under an encompassing definition of 'GHGs', with the unit of tCO_2e (tonnes CO_2 equivalent) or $MtCO_2e$ (million tonnes of CO_2 equivalent).

11.3.8 The identified receptor for GHG emissions is the global climate. As the effects of GHGs are not geographically constrained, all GHG emissions have the potential to result in a cumulative effect in the atmosphere. In order to assess the impact of GHG emissions from Proposed Project, UK Carbon Budgets have been used as a proxy for the climate.

CCR Assessment - Baseline

11.3.9 The CCR review has qualitatively reviewed the Proposed Development's resilience to climate change. This has been completed in liaison with the project design team and the other EIA technical disciplines by considering the UKCP18 projections (Met Office, 2020) for the geographical location and timeframe of the Proposed Project (including construction and operation).

11.3.10 The CCR review has been undertaken for the Proposed Project to identify potential climate change impacts on the Proposed Project and associated receptors, and to consider their potential consequence and likelihood of occurrence, taking account of the measures incorporated into the design of the Proposed Project.

11.3.11 The current baseline for the CCR assessment is based on historic climate data obtained from the Met Office recorded by the closest meteorological station to the Proposed Project (Heathrow Airport, approximately 8 miles from the Proposed Project) for the period 1981-2010).

11.3.12 The future baseline for the CCR assessment is based on future UK Climate Projections 2018 (UKCP18). This projection data provides probabilistic indications of how global climate change is likely to affect areas of the UK using pre-defined climate variables and time periods.

11.3.13 For the CCR assessment, UKCP18 probabilistic projections for pre-defined 20-year periods for the following average climate variables have been obtained and will be further analysed:

- mean annual temperature;
- mean summer temperature;
- mean winter temperature;
- maximum summer temperature;
- minimum winter temperature;
- mean annual precipitation;
- mean summer precipitation; and
- mean winter precipitation;

11.3.14 UKCP18 probabilistic projections have been analysed for the 25km grid square within which the Proposed Project is located. These figures are expressed as temperature/precipitation anomalies in relation to the 1981-2000 baseline. This baseline was selected as it provides projections for 20-year time periods (e.g., 2020-2039) for the parameters analysed within the assessment compared to the 30-year land-based projections that would be generated from the 1981 - 2010 baseline.

11.3.15 UKCP18 uses a range of possible scenarios, classified as Representative Concentration Pathways (RCPs), to inform differing future emission trends. These RCPs *'… specify the concentrations of greenhouse gases that will result in total radiative forcing increasing by a target amount by 2100, relative to preindustrial levels'*. RCP8.5 is considered to be the worst-case global scenario with the greatest concentration of GHGs in the atmosphere and has been used as the purposes of this assessment as a worst-case scenario.

Project Environment

11.3.16 The alternative environment is a 'Do Something' scenario with the delivery of the Proposed Project, which includes the construction and operation of the Proposed Project.

Scope of Assessments

GHG Emissions Impact Assessment – Scope

11.3.17 The scope of the assessment includes activities that will emit GHGs as a part of the Proposed Project and are detailed in Table 11.1.

Table 11.1: Potential Sources of GHG Emissions

Lifecycle stage	*Activity*	*Primary emission sources*
Product Stage	Use of products and/or materials required to build the proposed extension works	Embodied GHG emissions within the construction materials
Construction process stage	On-site construction activity including emissions from construction compounds. Water Use Travel of construction workers Disposal of waste materials generated by the construction process.	GHG emissions from grid electricity use during construction. GHG emissions from fuel consumed by construction vehicles and plant use. GHG emissions from the provision and treatment of water. GHG emissions arising from the fuel use for vehicles transporting workers to the construction site. Emissions arising from the treatment of waste. Emissions arising from the transportation of the waste to the place of treatment.
Operation stage	Operation and maintenance of the Proposed Project	Emissions arising from fuel consumed by maintenance vehicles and plant. Residue recycling. Embodied GHG emissions within the materials used for maintenance. Grid electricity use during operation of the development (lighting/signs)

11.3.18 Bottom ash from residue recycling processes, can absorb CO_2 during its 6-week maturation period, however it is not possible to calculate the impact on the Proposed Project, as it will not be a material contribution of emissions for the Proposed Project.

CCR– Scope

11.3.19 The receptor for the CCR assessment is the construction and operation of the Proposed Project itself, including associated users (construction workers and employees).

11.3.20 As the construction phase is relatively short (approximately two months) and is expected to occur in the immediate future (2024), it is not anticipated that there will be any significant impacts during the construction phase. The CCR review therefore focusses on the operational phase.

11.3.21 The potential impacts for the CCR review are based upon the United Kingdom Climate Projections 2018 (UKCP 18) data. Climatic parameters to be taken into account include those identified in Table 11.2.

Table 11.2: Scope of the CCR Assessment

Parameter	*Scoped In/Out*	*Rationale for Scoping Conclusion*
Extreme weather events	In	The Proposed Project may be vulnerable to extreme weather events such as storm damage to structures and assets.
Increased average temperatures and incidence of heatwaves	In	Extremes in temperatures may result in heat stress of materials and structures.
Increased frequency of heavy precipitation events	In	The Proposed Project may be vulnerable to changes in precipitation, for example, land subsidence and damage to structures and drainage systems during periods of heavy rainfall.
Increase in strong wind events	Out	The Proposed Project is not expected to alter the wind environment and therefore is not expected to have a significant impact within the red line boundary.
Sea level rise	Out	The Proposed Project is not located in an area that is susceptible to sea level rise.

11.3.22 The identification and assessment of climate change resilience within EIA is an area of emerging practice. There is no single prescribed format for undertaking such assessments; therefore, the approach adopted to undertaking and reporting the assessment has drawn on good practice from other similar developments and studies and is aligned with existing guidance such as that of IEMA.

11.3.23 The methodology for the CCR assessment is summarised Plate 11.1.

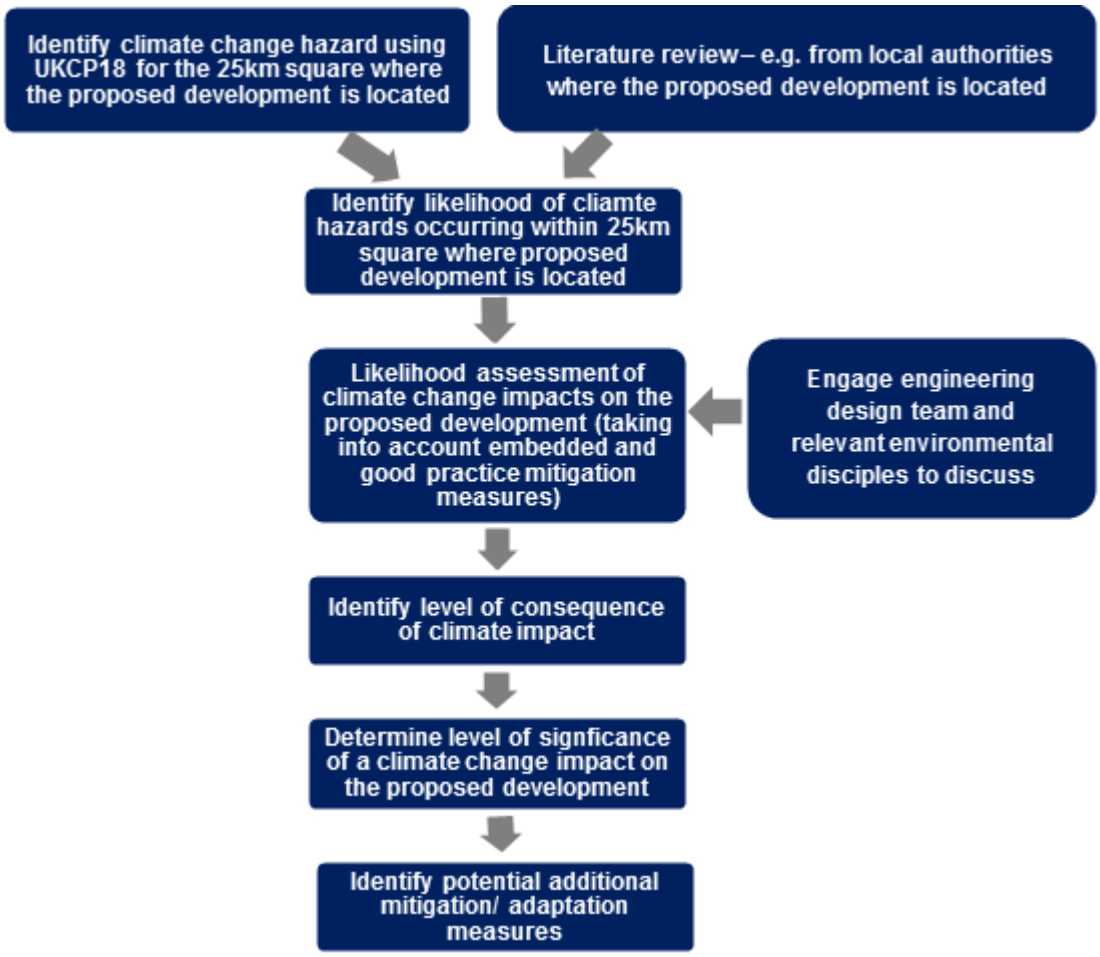

Plate 11.1: Summary of the CCR Assessment Methodology

11.3.24 Once potential impacts have been identified, the likelihood and consequence of each impact occurring to each receptor (where relevant) are assessed for the selected future time frame for operation.

11.4 Significance Criteria

GHG Emissions Impact Assessment – Significance Criteria

11.4.1 There are no specific criteria for determining the significance of GHG emissions for EIAR. The IEMA guidance on GHG in ESs states that *"any GHG emissions or reductions from a project might be considered to be significant".* The guidance also states it is down to the professional judgment of the practitioner to determine how best to contextualise and assess the significance of a project's GHG impact and assign the level of significance. The guidance identified two major considerations when assessing the significance of a project's GHG emissions: alignment to a trajectory towards net zero by 2050, and mitigation of GHG emissions.

Alignment to 2050 net zero trajectory

11.4.2 The guidance states that the crux of assessing significance is *"not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone,*

but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050". The trajectory of GHG emissions associated with the Proposed Project has therefore been factored into the assessment criteria.

GHG mitigation

11.4.3 The IEMA guidance also emphasises the importance of implementing GHG mitigation measures to help minimise GHG emissions, regardless of the magnitude of emissions, and states that the level of mitigation should be used to assess the significance of GHG emissions. This has therefore also been factored into the assessment criteria for the GHG assessment.

Significance criteria

11.4.4 Based on the above considerations, and in line with criteria outlined in the IEMA guidance, the following significance criteria has been used to assess the significance of GHG emissions arising as a result of the Proposed Project.

Table 11.3: GHG assessment significance criteria

Level of Significance	*Description*
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

Level of Significance	*Description*
	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.

11.4.5 It is suggested in the IEMA guidance that sectoral, local, or national carbon budgets can be used, as available and appropriate, to contextualise a project's GHG impact and determine the level of significance. The approach adopted for the purposes of this assessment is outlined below.

The UK Carbon Budget

11.4.6 The UK's national carbon budgets produced by the Committee on Climate Change (2017) have therefore been used to determine and contextualise the magnitude of GHG emissions from the Proposed Project, demonstrating the level of impact of the additional GHG emissions due to the Proposed Project on the UK's ability to meet its reduction targets.

11.4.7 The UK carbon budgets are in place to restrict the amount of GHG emissions the UK can legally emit in a defined five-year period. In assessing the significance of future GHG emissions, it is important to consider how they could affect the UK's ability to meet its carbon budgets. The UK is currently in the 3rd carbon budget period, which runs from 2018 to 2022, as detailed in Table 11.4. The 3rd, 4th and 5th Carbon Budgets reflect the previous 80% reduction target by 2050. As the Proposed Project will be operating beyond 2050, emissions have therefore also been compared against net zero in 2050. The 6th carbon budget, legislated for in June 2020, aligns with the legislated 2050 net zero commitment.

11.4.8 The overall construction programme for the Proposed Project (approximately two months, Q4 2024) falls within the 4th carbon budget.

11.4.9 Table 11.4 shows the current UK carbon budgets up to 2037, highlighting a reduction in the amount of greenhouse gas the UK can legally emit going into the future. Any source of emissions contributing to the UK's carbon inventory will have a more significant impact on the UK carbon budgets in the future.

Table 11.4: Relevant Carbon Budgets for the GHG Emissions Assessment

Carbon Budget	*Total Budget ($MtCO_{2e}$)*
3rd (2018-2022)	2,544
4th (2023-2027)	1,950
5th (2028-2032)	1,725
6th (2033-2037)	965

CCR Assessment -Significance Criteria

11.4.10 Criteria used to determine the likelihood of an event occurring, based on its probability and frequency of occurrence, are detailed in Table 11.5.

Table 11.5: CCR Assessment – Definition of Likelihood for Climate Change Hazard

Level of Likelihood	*Definition of Likelihood*
Very likely	90-100% probability that the hazard will occur
Likely	66-90% probability that the hazard will occur
Possible, about as likely as not	33-66% probability that the hazard will occur
Unlikely	0-33% probability that the hazard will occur.
Very Unlikely	0-10% probability that the hazard will occur.

***The event is defined as the climate event (such as heatwave) and the hazard (such as overheated electrical equipment) occurring in combination*

11.4.11 The consequence of an impact has been measured using the criteria detailed in Table 11.6.

Table 11.6: CCR Assessment - Description of Likelihood for Climate Change Hazard

Consequence of Impact	*Description*
Very high	Permanent damage to structures/assets; Complete loss of operation/service; Complete/partial renewal of infrastructure; Serious health effects, possible loss of life; Extreme financial impact; and Exceptional environmental damage.
High	Extensive infrastructure damage and complete loss of service; Some infrastructure renewal; Major health impacts; Major financial loss; and Considerable environmental impacts.
Medium	Partial infrastructure damage and some loss of service; Moderate financial impact; Adverse effects on health; and Adverse impact on the environment.
Low	Localised infrastructure disruption and minor loss of service; No permanent damage, minor restoration work required; and Small financial losses and/or slight adverse health or environmental effects.
Very low	No damage to infrastructure; No impacts on health or the environment; and No adverse financial impact.

11.4.12 Engagement has been undertaken with relevant environmental disciplines and the engineering design team to discuss the CCR assessment and identify mitigation measures for incorporation into the design of the Proposed Project where applicable.

11.4.13 For the reasons set out in this chapter in Section 11.6, measures to adapt the Proposed Project due to potential climate change consequences arising as a result of the Proposed Project are not considered to be necessary.

11.4.14 As there is no single prescribed format for determining CCR, the approach adopted for the CCR review of the Proposed Project has drawn on good practice from other similar developments and studies and is aligned with existing guidance such as that published by IEMA.

11.4.15 In consideration of the nature and scale of this Proposed Project, a qualitative approach has been undertaken. Therefore, significance criteria to review CCR measures have not been applied.

Study Area

GHG Emissions Impact Assessment – Study Area

11.4.16 The GHG Study Area includes all GHG emissions from within the Site boundary arising during all stages of the construction and operation of the Proposed Project. It will also include emissions arising from offsite activities which are directly related to the onsite activities, such as transport, and treatment of materials and waste disposal.

CCR Assessment – Study Area

11.4.17 The Study Area for the CCR review is the Proposed Project Site itself.

11.5 Stakeholder Engagement

11.5.1 An EIA Scoping Report was prepared by AECOM (refer to **Appendix 1A [Application Document Reference 6.4.1 – EIA Scoping Report]** and submitted to the Planning Inspectorate in November 2021. The EIA Scoping Report sets out the proposed approach to the EIA and is intended to facilitate discussions regarding the scope of the EIA.

11.5.2 In response to the EIA Scoping Report, the Planning Inspectorate prepared a Scoping Opinion document (refer to **Appendix 1A [Application Document Reference 6.4.1 – EIA Scoping Report]).** Specific comments raised by the Planning Inspectorate in relation to climate change are listed in Table 11.7.

11.5.3 No comments were received from any stakeholders relevant to this chapter during statutory consultation.

Table 11.7: Comments raised by the Planning Inspectorate in the Scoping Opinion

ID	*Applicant's proposed matters to scope out*	*Inspectorate's comments*	*Location where addressed in this ES*
3.5.1	Climate change resilience assessment – temperature change.	Table 11.3 of the Scoping Report sets out that when using Representative Concentration Pathway (RCP) 8.5, temperatures are projected to rise between the years of 2060 and 2089 in all climate variable scenarios. The Scoping Report does not set out whether any operational changes would be required to accommodate the temperature increases. For example, it is not clear whether the output of the pumps associated with Cooling Tower 8 would need to be increased during periods of higher temperatures which could lead to greater noise levels and effects on receptors. It is also unclear what effect the higher temperatures will have on ecological receptors. Additionally, Table 11.6 of the Scoping Report provides no evidence explaining whether the materials and machinery in the operational phase of the Proposed Project will be able to operate in higher temperatures. Therefore, at this stage the Inspectorate cannot agree to scope this matter out	The scope of the CCR assessment is detailed within Table 11.4 of this chapter and includes temperature change.
3.5.2	Climate change resilience assessment – sea level rise.	Table 11.6 of the Scoping Report asserts that the site is not located in an area that is susceptible to sea level rise. The Inspectorate agrees that sea level rise can be scoped out of the in-combination climate change assessment on this basis.	Noted
3.5.3	Climate change resilience assessment – precipitation change.	The justification provided in Table 11.6 for scoping out this matter is that no significant effects are likely to arise as "the flow of precipitation to ground will not be significantly hindered". The Inspectorate notes that the Flood Risk Assessment (FRA) provided for the consented scheme	The scope of the CCR assessment is detailed within Table 11.4 and includes precipitation change. Precipitation has been included to

ID	*Applicant's proposed matters to scope out*	*Inspectorate's comments*	*Location where addressed in this ES*
		concluded that the site layout had been designed to accommodate surface water from storms plus climate change. On this basis and that an FRA will be submitted as part of the DCO application from the Proposed Project, the Inspectorate agrees that this matter can be scoped out.	allow for a Flood Risk Assessment (FRA) (refer to **Appendix 12A**, **[Application Document Reference 6.4.13 – Preliminary Flood Risk Assessment].** The reference to scoping out of precipitation in the scoping report was associated with an in-combination climate change impact (ICCI) assessment which was scoped out in its entirety.
3.5.4	Climate change resilience assessment – wind.	It is noted that the external massing of the Proposed Project will be that of the Consented Development, on this basis the Inspectorate considers that further consideration of wind impacts may be scoped out.	The scope of the CCR assessment is detailed within Table 11.4 and wind is scoped out.
3.5.5	Climate Change Resilience Review- sea level rise.	Table 11.7 of the Scoping Report (**Appendix 1A [Application Document Reference 6.4.1 – EIA Scoping Report]** asserts that the site is not located in an area that is susceptible to sea level rise. The Inspectorate agrees that sea level rise can be scoped out of the climate resilience review assessment.	Noted.

11.6 Baseline Conditions

GHG Emissions Impact Assessment

11.6.1 The baseline environment for the GHG assessment is a 'business as usual' scenario where the Proposed Project is not undertaken. The baseline comprises of existing sources of GHG emissions within the boundary of the existing Site

described in **Chapter 2: Proposed Project [Application Document Reference 6.2.2 – ES Chapter 2]** of this ES and Section 11.3 Assessment Methodology. The Proposed Project Site is located within the Slough Heat and Power CHP site and includes the Consented Development.

Climate Change Resilience Assessment

11.6.2 The CCR assessment considers the impact of climate on the Proposed Project by looking at likely changes to the climate over the life of the Proposed Project. The baseline describes the current climate, whilst the project-scenario describes the likely climate during the project-phases.

11.6.3 The current climatic baseline (1991 to 2020) for the location is listed in Table 11.8.

Table 11.8: Historic Climate Data

Climatic Variable	*Month*	*Value*
Average annual maximum daily temperature (˚C)	-	15.67
Warmest month on average (˚C)	July	23.89
Coldest month on average (˚C)	February	2.65
Mean annual rainfall levels (mm)	-	614.98
Wettest month on average (mm)	November	66.63
Driest month on average (mm)	March	38.78

11.6.4 The Met Office historic 30-year averages for the 'South England' region identify gradual warming between 1961 and 2020, with increased rainfall also. Information on mean maximum annual temperatures and mean annual rainfall is summarised in Table 11.9.

Table 11.9: Historic 30-year Averages for Temperature and Rainfall for England South

Climate Period	*Climatic Variable*	
	Mean Maximum Annual Temperatures (˚C)	***Mean Annual Rainfall (mm)***
1961 - 1990	13.30	761.15
1971 - 2000	13.63	776.02
1981 - 2010	13.99	791.41
1991 - 2020	14.36	808.04

11.6.5 Projected variables are presented in Table 11.10 and Table 11.11.

Table 11.10: Projected Changes in Temperature Variables (°C), 50% Probability (10% and 90% Probability in Parenthesis)

Climate Period	*Time Period*	
	2020 - 2039	***2030 - 2049***
Mean annual air temperature anomaly at 1.5m (°C)	+1.0 (+0.3 to +1.7)	+1.3 (+0.6 to +2.2)
Mean summer air temperature anomaly at 1.5m (°C)	+1.2 (+4 to +2.0)	+1.5 (+0.4 to +2.6)
Mean winter air temperature anomaly at 1.5m (°C)	+0.9 (0 to +1.9)	+1.3 (0.1 to +2.5)
Maximum summer air temperature anomaly at 1.5m (°C)	+1.2 (+0.2 to +2.4)	+1.6 (+0.3 to +3.0)
Minimum winter air temperature anomaly at 1.5m (°C)	+0.9 (-0.1 to +1.9)	+1.2 (0 to +2.5)

Table 11.11: Projected Changes in Precipitation Variables (%), 50% Probability (10% and 90% Probability in Parenthesis)

Climate Period	*Time Period*	
	2020 - 2039	***2030 - 2049***
Annual precipitation rate anomaly (%)	+1.7 (-3.0 to +6.7)	-0.3 (-4.8 to +4.6)
Summer precipitation rate anomaly (%)	-4.9 (-24.4 to +15.4)	-8.8 (-29.5 to +12.0)
Winter precipitation rate anomaly (%)	+3.7 (-5.3 to +13.6)	+4.7 (-4.6 to +14.6)

11.6.6 Using the climate variable likelihood data for future baselines and the definitions for likelihood, the likelihood of occurrence of potential climate hazards are detailed in Table 11.12.

Table 11.12 Potential Climate Hazards /and Likelihood of Occurrence (from UKCP18 Projections)

Climate Period	*Potential Hazard*	*Time Period*	
		2020 - 2039	***2030 - 2049***
Mean annual air temperature anomaly at 1.5m (°C)	Increase in mean annual air temperature	Very Likely	Very Likely
Mean summer air temperature anomaly at 1.5m (°C)	Increase in mean summer air temperature	Very Likely	Very Likely
Mean winter air temperature anomaly at 1.5m (°C)	Increase in mean winter air temperature	Very Likely	Very Likely
Maximum summer air temperature anomaly at 1.5m (°C)	Increase in maximum summer air temperature	Very Likely	Very Likely
Minimum winter air temperature anomaly at 1.5m (°C)	Increase in minimum winter air temperatures	Likely	Very Likely
Annual precipitation rate anomaly (%)	Decrease in annual precipitation rate	Likely	Possible
Summer precipitation rate anomaly (%)	Decrease in summer precipitation rate	Possible	Likely

11.6.7 The entire Proposed Project and surrounding area in the immediate vicinity of the Site is located within Flood Zone 1. Flood Zone 1 is land assessed as having a less than 1 in 1000 annual probability of flooding from rivers or the sea (<0.1% Annual Exceedance Probability or AEP). The flood risk is discussed further in **Chapter 12: Other Issues [Application Document Reference 6.2.12 – ES Chapter 12]**

11.6.8 Under RCP 8.5 a rise in mean annual air temperature increase of 1.3°C by the period 2030–2049 is predicted and therefore it is **very likely** the Proposed Project will be subject to an increase in mean annual air temperature by 2050. This impact, along with that of increased storms and extreme weather events will be analysed further within the ES.

11.7 Embedded Design Mitigation

11.7.1 This section describes the embedded and good practice mitigation that has been incorporated into the Proposed Project design or assumed to be in place before undertaking the assessment. This embedded mitigation is necessary for the Proposed Project. Some of the embedded mitigation measures described in this ES are already secured as part of the Consented Development, and the DCO proposes to also require the Proposed Project to comply with them. This section may also identify some mitigation measures which are in place as part of the Consented Development and which are relevant to the topic being assessed, but which are not required for the Proposed Project and therefore are not 'embedded mitigation' for the purpose of the assessment of the Proposed Project. Such measures are described in order to provide context of the future baseline against which the Proposed Project is being assessed.

11.7.2 The Proposed Project will incorporate the greenhouse gas mitigation measures and climate change risk adaption measures outlined in the existing CEMP (refer to **Appendix 2A [Application Document Reference 6.4.4 – Existing CEMP for Consented Development]** which was approved for the Consented Development. The CEMP details the measures that would be undertaken during construction to mitigate the temporary effects on the Proposed Project.

11.7.3 For climate change resilience, as the assessment of effects is limited to the impact on the Proposed Project, there will be no specific adaption measures required.

11.7.4 In terms of greenhouse gas emissions measures incorporated into the Proposed Project design include using building materials that are locally sourced to reduce emissions from transportation.

11.7.5 The CEMP comprises good practice methods that are established and effective measures to which the Consented Development and Proposed Project will be committed.

11.8 Assessment of Significant Effects

GHG Impact Assessment

Construction

11.8.1 The assessment of construction phase GHG emissions considers any additional GHG emissions caused by the Proposed Project as against those identified from the Consented Development.

11.8.2 An assessment of the Proposed Project has been carried out based on a mix of qualitative and quantitative consideration of available information.

11.8.3 The total GHG emissions from the construction of the Proposed Project, excluding GHG emissions already arising due to the Consented Development, are estimated to be in the order of 10.77 tCO2e. The primary GHG emission sources and the breakdown of the estimated GHG emissions are presented in Table 11.13.

Table 11.13: Summary of Total GHG Emissions from the Construction Phase of the Proposed Project

Lifecycle stage	*Proposed Project Construction Emissions (tCO_{2e})*	*Associated GHG impact*
Product (Embodied carbon)	3.5	The pipe will be 20m in length and 250mm diameter. The embodied GHG emissions of this has been quantified.
Transport of construction materials to the Proposed Project Site	1.57	Transport of materials and waste will be by HGV, with associated GHG emissions.
Worker commuting	5.70	Worker commuting is expected to be by car to site, travelling approximately 30km both ways.
Total	**10.77**	

Operation

The Proposed Project is anticipated to increase the amount of electricity generated from the equivalent tonnage of waste derived fuel (WDF) compared to the Consented Development. There will be no change in overall emissions from combustion of the WDF. However, operating the plant at higher combustion inlet air temperatures will result in a 20% improvement in output, which equates to a 5% increase in efficiency, which in turn will reduce the carbon intensity of the power generated.

CCR Assessment

11.8.4 In consideration of the nature and scale of this Proposed Project, a qualitative approach has been undertaken. Therefore, significance criteria to review CCR measures have not been applied as it is not material.

11.9 Summary of Overall GHG Emission Effects of the Proposed Project

11.9.1 GHG emissions from the Proposed Project have been put into context with regard to UK Climate Budgets published by the CCC and legislated for by parliament (2020). Table 11.14 presents the contribution construction emissions from the Proposed Project will make against the relevant five-year UK Carbon Budgets where the emissions arise. Decommissioning has not been contextualised in terms of GHG emissions, as they will not be material for the Proposed Project. Emissions have been calculated as their percentage contribution to each carbon budget. The relevant carbon budgets for this assessment is the 4th (2023 – 2027).

Table 11.14: Contribution of the Proposed Project to the UK National Carbon Budgets

Carbon budget (years)	*Carbon budget ($MtCO_{2e}$)*	*Emissions from the Proposed Project construction during the budget period ($MtCO_{2e}$)*
3rd: 2018 – 2022	2544	n/a
4th: 2023 – 2027	1950	0.00001252
5th: 2028 – 2032	1725	n/a
6th : 2033 – 2037	950	n/a

11.9.2 Within the 4th carbon budget year in which the construction of the Proposed Project is due to take place, the Proposed Project has a beneficial impact associated with the more efficient facility, albeit of a negligible magnitude. The impact of the construction emissions would still be negligible if the construction of the Proposed Project was to occur in the 5th or 6th carbon budgets.

11.9.3 The magnitude of impact of the receptor (the global climate) in relation to the Proposed Project is therefore considered to be **minor adverse** and as such, the significance of the GHG emissions impact of the Proposed Project is considered to have a beneficial impact and is therefore **not significant**. In line with IEMA significance criteria and presented in Table 11.3, the Project's GHG impacts are fully consistent with applicable existing and emerging policy requirements and good practice design standards. The Proposed Project is fully in line with measures necessary to achieve the UK's trajectory towards net zero.

11.10 Additional Mitigation and Enhancement Measures

11.10.1 The management of GHG emissions and CCR impacts, and the application of mitigation/adaption measures during construction will be enforced through the existing CEMP.

11.10.2 It is not anticipated that there will be a need for additional mitigation/adaption or enhancement measures during operation and construction of the Proposed Project in respect of either GHG emissions or CCR, as it is not material.

11.11 Residual Effects and Conclusions

11.11.1 A summary of the current estimate of GHG emissions produced during the construction of the Proposed Project has been detailed in Section 11.8. The intensity of GHG will reduce over the lifespan of the project.

11.11.2 No residual CCR impacts have been identified.

11.11.3 There will be residual GHG emissions. However, the increased gross energy generation from 50MWe to 60Mwe with no increase in the volume of WDF combusted will result in a reduction in the carbon intensity of the power generated.

11.11.4 All GHG emissions could be considered significant (IEMA, 2022). GHG emissions from the construction of the Proposed Project contribute considerably less than 1% of any carbon budget currently published (refer to Table 11.14). Based on the above and taking into consideration Table 11.2, the Proposed Project contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050.

11.11.5 A summary of residual effects on climate change (GHG) and their significance is provided in Table 11.15.

Table 11.15 Summary of Residual Effects

Description and Type of Effect	*Significance of Effect (prior to mitigation)*	*Summary of mitigation measure (standard, additional, monitoring)*	*Residual effect (following mitigation)*	*Overall significance classification (significant or not significant)*
Construction				
GHG emissions from the construction of the Proposed Project	Negligible	N/A	Negligible	Not significant
Operation				
GHG emissions from operation of the Proposed Project	Negligible	N/A	Beneficial	Not significant

11.12 Cumulative Effects

11.12.1 The identified receptor is the global climate and all development results in GHG emissions. Effects are not geographically constrained which means all development has the potential to result in a cumulative effect on GHG emissions. For this reason, it is not possible to define a study area and carry out a cumulative effects assessment for GHG emissions.

11.12.2 As a result, consideration of the effects of the Proposed Project, together with other developments on GHG emissions, is considered to be negligible or beneficial and therefore no cumulative effects are anticipated in respect of the Climate during the construction and operational phases.

11.13 References

IEMA (2022) Assessing Greenhouse Gas Emissions and Evaluating their Significance. 2nd edition.

IEMA (2020) IEMA EIA guide to Climate Change Resilience and Adaptation.

Committee on Climate Change (2017) UK Carbon Budgets

British Standards Institution (2011) PAS 2050:2011. Specification for the assessment of the life cycle greenhouse gas emissions of goods and services

Department of Energy and Climate Change (2013) Guidance on Annual Verification for emissions from Stationary Installations

HMSO (2008) The Planning Act 2008, Chapter 29.

Local Plan for Slough - Strategic Flood Risk Assessment.

Official Journal of the European Union (2014) Directive 2014/52/EU of the European Parliament and of The Council Of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment [online].

Regulation (EU) 2018/842 Of the European Parliament And Of The Council of 30 May 2018 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No 525/2013 [Online] (2018). Official Journal L156 p. 26.

UNFCCC (2016) Conference of the Parties, Report of the Conference of the Parties on its twenty-first session, held in Paris from 30 November to 13 December 2015. FCCC/CP/2015/10 [online].

EU Commission (2013) Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment [online].

EU Commission (2011). Non-paper guidelines for project managers: making vulnerable investments climate resilient [online].

UK Government (2019) The Climate Change Act 2008 (2050 Target Amendment) Order 2019 [online].

Committee on Climate Change (2017) UK Carbon Budgets.

HMSO (2017). Her Majesty's Stationary Office. The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.

HM Government (2020). United Kingdom of Great Britain and Northern Ireland's Nationally Determined Contribution [Online].

Department of Energy and Climate Change (2011a). Overarching National Policy Statement for Energy (EN-1). July 2011 [Online].

Department of Energy and Climate Change (2011b). National Policy Statement for Fossil Fuel Electricity Generating Infrastructure (EN-2). July 2011 [Online].

Department for Business, Energy and Industrial Strategy (2021). Draft National Policy Statement for Renewable Energy Infrastructure (EN-3).

Department for Environment, Food and Rural Affairs (DEFRA), 2014. Energy recovery for residual waste. A carbon based modelling approach. [Online].

National Planning Policy Framework (publishing.service.gov.uk).

Ministry of Housing, Communities and Local Government (2019b). National Planning Policy Guidance on Climate Change [Online].

Slough Borough Council (2020). Climate Change Strategy and Action Plan.

Slough Borough Council (2020). Climate Change Strategy Vision [Online].

BSI (2019a) BS EN ISO 14064-1:2019. Greenhouse gases. Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals.

BSI (2019b) BS EN ISO 14064-2:2019. Greenhouse gases. Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements.

WRI & WBCSD (2015) The GHG Protocol. A Corporate Accounting and Reporting Standard. Revised Edition [online].

BEIS (2022) Greenhouse Gas Reporting: Conversion Factors 2022 [online].

Bath University (2019) The ICE Database. Version 3.0. [Online].

EU Commission (2010) Commission Decision of 10 June 2010 on Guidelines for the Calculation of Land Carbon Stocks for the Purpose of Annex V to Directive 2009/28/EC [online].

The Met Office (2020a) Historic climate data [online].

The Met Office (2020b) UK Climate Projections User Interface [online].

IEMA (2020). Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation [Online].