7 Greenhouse Gases and Climate Change

7.1 Introduction

7.1.1 This chapter of the Environmental Statement ('ES') has been prepared by Cundall Johnston & Partners LLP ('Cundall') on behalf of the Applicant, Colt Hayes Data Centre ('the Applicant'). It assesses the Proposed Development described in Chapter 3 in relation to greenhouse gases and climate change.

7.1.2 This chapter will cover an assessment of the impact of the Proposed Development on the climate and the impact of the climate on the Proposed Development. This involves an impact assessment on the potential effects of the Proposed Development (i.e. greenhouse gas ('GHG') emissions), to establish if the contribution to climate change is significant. This includes a summary of how the Proposed Development could contribute towards mitigating the effects of climate change.

7.1.3 The baseline situation is considered before the likely environmental effects of the Proposed Development are identified during its construction and operational phases. Additional mitigation measures to reduce any environmental effects are identified as appropriate before the residual environmental effects are assessed.

7.1.4 The cumulative GHG impacts are then assessed in conjunction with other relevant projects, considering their combined impact on emissions levels and broader climate implications.

7.1.5 This chapter provides the details of the GHG emissions assessment and has been undertaken in accordance with the guidance within the Institute of Environmental Management and Assessment's (IEMA) EIA Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance – 2nd Edition (2022)[1].

7.1.6 The EIA regulations adopt a principle of proportionality when determining the scope and level of detail required for assessments. This principle is embedded within Schedule 4 which emphasises "likely significant effects" in both paragraphs 4 and 5. This means that not all aspects of climate change must be assessed in every project. For example:

- If a project is determined to have negligible vulnerability to climate change due to robust design or site characteristics, detailed vulnerability analysis may not be required.
- The decision to scope out an aspect must be justified, considering the project's context and potential effects.

7.1.7 However, the 2017 EIA Regulations[2] require consideration of the impact of the Proposed Development on climate and the vulnerability of the Proposed Development to climate change. In order to adhere to the EIA Regulations whilst maintaining a proportionate approach, this chapter primarily focuses on the impact of the Proposed Development on climate, alongside a high-level assessment of the potential vulnerability of the Proposed Development to climate change. The potential vulnerability of the Proposed Development to climate change and the associated impact on GHG emissions is assessed in section 7.8.

7.1.8 The following appendices provide supporting data and analysis for the assessment within this chapter:

- **Appendix 7.1** – Contextualisation of GHG emissions with local and national carbon budgets.
- **Appendix 7.2** – Summary of gas and electricity consumption of the existing site and associated operational GHG emissions.
- **Appendix 7.3** – Summary of estimated energy use and associated operational GHG emissions for the Proposed Development.
- **Appendix 7.4** – Annual estimated operational GHG emissions accounting for projected grid decarbonisation.

Legislation and Planning Policy Context

Legislation

7.1.9 A summary of relevant national and local legislation in relation to GHGs and climate change is given in Table 7.1.

Table 7.1 Legislation related to GHGs and climate change.

Legislation	Context
Climate Change Act 20083 (including the 2050 Target Amendment Order 2019)[4]	This Act, as amended in 2019, commits the UK to reduce its net GHG emissions by at least 100% below 1990 levels by 2050 (the 'UK carbon target', often referred to as 'net zero'). The Act established an independent expert body, the Climate Change Committee (CCC), to advise the Government on the level of those emissions targets and report on progress made to reduce emissions. The Act requires that five-yearly carbon budgets are set and not exceeded to ensure that progress is made towards the long-term target of net zero emissions. The first three carbon budgets were set in 2009, with the fourth, fifth and sixth following in 2011, 2016 and 2021 respectively. The seventh carbon budget is proposed to be set in 2025. The Act also sets out the reporting requirements of the UK Government to produce a UK Climate Change Risk Assessment (CCRA), published every five years, which is the mechanism for gathering and presenting evidence to help understand climate change risks to the UK.
The Building Regulations 2010[5]	In June 2022, significant changes in the Building Regulations came into effect for new homes, extensions, existing buildings, and non-domestic buildings. New homes and buildings in England will have to produce significantly less carbon dioxide (CO_2) under the new rules. Under the new Regulations, CO_2 emissions from new build homes must be 31% lower than current standards and emissions from other new buildings, including offices and shops, must be reduced by 27%. Amendments include:

	• Part F (ventilation)[6] and Part O (overheating)[7] – uplift to ventilation and solar gain reduction requirements to avoid the issue of overheating; • Part L (conservation of fuel and power)[8] • Part S (infrastructure for charging electric vehicles (EV))[9] These updates mark a steppingstone towards the introduction of the Future Homes Standard[10] and Future Buildings Standard in 2025, which will introduce more stringent changes to Parts L and F.

Planning Policy Framework

7.1.10 A summary of planning policy in relation to GHGs and climate change is given in Table 7.2.

Table 7.2 Planning policy related to greenhouse gases and climate change.

Policy	Context
National Planning Policy Framework (NPPF)[11]	The NPPF, paragraph 157 states: "The planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change. It should help to: shape places in ways that contribute to radical reductions in GHG emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure." It also requires in paragraph 159 (b) that new developments should be planned for in ways that "can help to reduce GHG emissions, such as through its location, orientation and design". Furthermore, it is stated in paragraph 162, that local planning authorities should expect new developments to: "Comply with any development plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable; and "take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption." Paragraph 159 (a) states that: "New development should be planned for in ways that:

	"avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure."

Technical Guidance

7.1.11 Further to the planning and statutory requirements, the latest industry guidance has been reviewed and incorporated within the GHG emissions assessment. The relevant industry guidance has been summarised in Table 7.3.

Table 7.3 Technical guidance related to GHGs and climate change.

Policy	Context
UKGBC Net Zero Carbon Buildings Framework Definition[12]	UK Green Building Council (UKGBC) published the Net Zero Carbon Buildings Framework Definition in 2019 to provide the industry with clarity on the definition of net zero carbon buildings.
Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance – 2nd Edition[13]	IEMA provides guidance on GHG emissions assessment, mitigation and reporting within an EIA context and this is the primary source of guidance for assessing significance of GHG emissions. The 2022 guidance further builds upon the 2017 guidance, with key changes including an emphasis on mitigation at the project outset and throughout its lifetime, and more nuanced levels of GHG emissions significance. It provides detail on the application of the five IEMA Principles on Climate Change Mitigation and EIA: "The GHG emissions from all projects will contribute to climate change, the largest inter-related cumulative environmental effect. The consequences of a changing climate have the potential to lead to significant environmental effects on all topics in the EIA Directive (e.g. human health, biodiversity, water, land use, air quality). The UK has legally binding GHG reduction targets – EIA must therefore give due consideration to how a project will contribute to the achievement of these targets. GHG emissions have a combined environmental effect that is approaching a scientifically defined environmental limit, as such any GHG emissions or reductions from a project might be considered to be significant. The EIA process should, at an early stage, influence the location and design of projects to optimise GHG performance and limit likely contribution to GHG emissions."
BS EN 15978:2011 Sustainability of	BS EN 15978 provides the framework for appraising the environmental impacts of the built environment. It sets out the

construction works — Assessment of environmental performance of buildings — Calculation method[14]	principles for whole life assessment of the environmental impacts from built projects based on life cycle assessment (LCA). The scope includes all building related construction products, processes and services, used over the life cycle of the building.
RICS Whole life carbon assessment for the built environment 2nd edition[15]	Underpinning BS EN 15978 is this RICS Professional Standard (RICS PS). The RICS PS serves as a guide to the practical implementation of the BS EN 15978 principles. It sets out technical details and calculation details which inform the assessment methodology and provide some assumptions used.
PAS 2080:2023 – Carbon management in buildings and infrastructure[16]	PAS 2080 provides an approach to reducing GHG emissions from buildings and infrastructure projects, including working with stakeholders throughout the project lifecycle. It provides a common framework for managing whole life carbon when delivering buildings and infrastructure assets.
CIBSE Energy Benchmarking Tool[17]	The CIBSE Energy Benchmarking Dashboard provides benchmark energy consumption figures (gas and electricity) for different types of building typologies and uses.
Tyndall Carbon Budget Tool[18]	The Tyndall Carbon Budget Tool presents climate change targets for UK local authority areas that are based on the commitments in the United Nations Paris Agreement, informed by the latest science on climate change and defined by science-based carbon budget setting. The carbon budgets presented are based on translating the “well below 2°C and pursuing 1.5°C” global temperature target and equity principles in the United Nations Paris Agreement to a national UK carbon budget. The UK budget is then split between sub-national areas using different allocation regimes to determine a ‘fair contribution’ of each local authority area towards achieving the broader UK carbon targets.

7.2 Assessment methodology

7.2.1 The GHG emissions assessment for the Proposed Development has been conducted in accordance with the latest guidance outlined in the Institute of Environmental Management & Assessment (IEMA) (2022, 2nd Edition) Assessing Greenhouse Gas Emissions and Evaluating their Significance.[1] This methodology ensures a consistent and robust approach to quantifying emissions and evaluating their contribution to the overall carbon footprint of the Proposed Development. The assessment considers both the construction phase (including the demolition of the existing development), and the operational phase, using established industry benchmarks and best-practice methodologies to estimate emissions and identify potential mitigation opportunities.

Potential Receptors

7.2.2 GHG emissions have a global effect rather than directly affecting any specific local receptor to which a level of sensitivity can be assigned. The global climate is therefore the only receptor for the GHG emissions assessment. The receptor has a high sensitivity, given the severe consequences of global climate change and the contributions of all GHG emission sources.

Predicting Effects

7.2.3 The assessment presents a reasonable worst-case scenario, ensuring that the predicted GHG emissions account for uncertainties in design detail while providing a robust evaluation of potential impacts. This methodology aligns with the latest IEMA GHG guidance[1], BS EN 15978:2011[14] and the RICS Professional Standard[15], ensuring consistency with industry best practice.

7.2.4 The same methodology has been applied across all elements of the Proposed Development, including the substation, LON06 (full application) and LON07, LON08 and the Innovation Hub (outline application). This approach ensures a consistent and robust assessment, using the available design information to estimate emissions in line with industry standards. Where detailed design information is not yet available, the assessment has been informed by benchmark data and professional experience, ensuring a representative evaluation of potential GHG impacts.

7.2.5 The assessment includes both regulated and unregulated energy use:

- Regulated energy use refers to energy consumption controlled under Building Regulations Part L, including heating, cooling, ventilation, lighting, and hot water.
- Unregulated energy use refers to energy consumption not covered by Building Regulations, such as plug loads, IT equipment, data processing, and small power usage.

7.2.6 Given the nature of the development as a data centre, unregulated energy use is a significant component of overall operational emissions, particularly from IT servers and cooling systems. Where operational energy figures were determined, these were calculated following the TM54 methodology, incorporating professional experience and benchmark data from similar developments to ensure a comprehensive and representative assessment of potential emissions.

Significance Criteria

7.2.7 The current IEMA guidance for assessing GHG emissions states that:

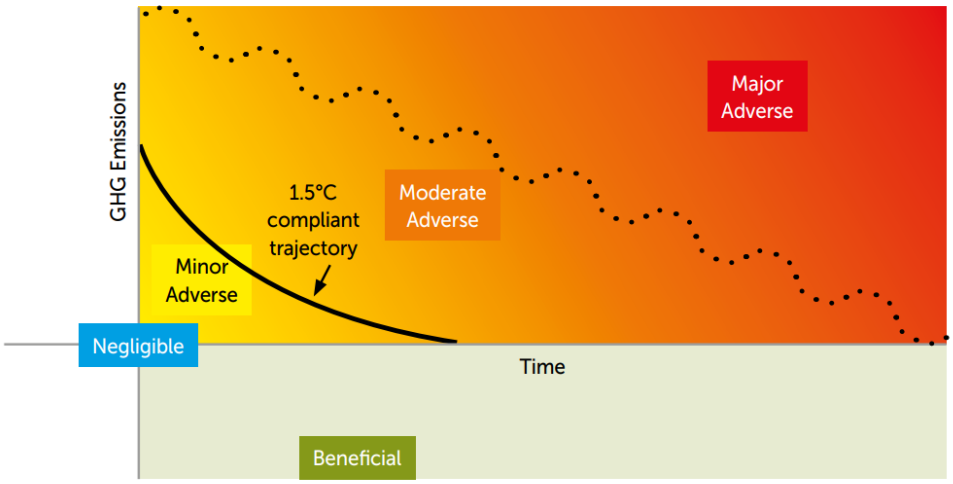
"The crux of significance is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050".[1]

7.2.8 The significance of the GHG emissions arising from the Proposed Development is determined based on the criteria in Table 7.4 developed from the IEMA GHG guidance[1]. In the context of the GHG emissions assessment, **Major Adverse**, **Moderate Adverse** and **Beneficial** effects are considered to be **Significant**. **Minor Adverse** and **Negligible** effects are considered to be **Not Significant**.

Table 7.4 GHG emissions assessment significance based on IEMA guidance.

Significance	Significance Criteria
Major Adverse	The Proposed Development does not make a meaningful contribution to the UK Government meeting its carbon budgets/targets. Adverse GHG impacts are not mitigated/do-minimum and are not compliant with the requirements of national, regional and local policy.
Moderate Adverse	The Proposed Development falls short of contributing to the UK Government meeting its carbon budgets/targets. Adverse GHG impacts are partially mitigated and partially meet the requirements of national, regional and local policy.
Minor Adverse	The Proposed Development is fully in line with the trajectory of the UK Government meeting its carbon budgets/targets. Adverse GHG impacts are mitigated with good practice design standards and meet the requirements of national, regional and local policy.
Negligible	The Proposed Development has minimal residual GHG emissions and is 'ahead of the curve' for the trajectory of the UK Government meeting its carbon budgets/targets. GHG impacts are mitigated through measures that go beyond good practice design standards and the requirements of national, regional and local policy.
Beneficial	The Proposed Development has net GHG emissions below zero, causing a direct or indirect reduction in atmospheric GHG emissions which has a positive impact on the UK Government meeting its carbon budgets/targets.

Figure 7.1 Different levels of significance plotted against the UK's net zero compatible trajectory, extracted from the IEMA guidance.[1]



7.2.9 The UK Net Zero Carbon Buildings Standard (UKNZCBS)[19] is a framework developed to define what it means for a building to be net zero in operation. It sets mandatory energy performance limits and carbon targets for different building types to ensure alignment with the UK's legally binding net zero by 2050 target.

7.2.10 The targets within the UKNZCBS are derived from UK carbon budgets, the Paris Agreement trajectory and sectoral decarbonisation pathways, including those established by the Climate Change Committee (CCC) scenarios, CIBSE (Chartered Institution of Building Services Engineers) guidance and Science-Based Targets Initiative (SBTi) methodologies. These targets are designed to ensure that buildings do not exceed their share of allowable carbon emissions as the UK transitions to net zero.

7.2.11 The IEMA guidance on the significance of GHG emissions states that significance is not just about the magnitude of emissions, but rather whether a project contributes to reducing emissions relative to a baseline consistent with a net zero trajectory.

7.2.12 The UKNZCBS sets quantifiable performance thresholds (such as maximum operational energy use intensity (EUI) (kWh/m^2/year) and Power Usage Effectiveness (PUE)) for different building types.

7.2.13 These thresholds define what is considered a net zero-compatible trajectory, ensuring that a building operates efficiently within the UK's carbon budgets.

7.2.14 If a proposed development meets or exceeds these limits, it can be considered as aligned with the UK's net zero trajectory.

7.2.15 In determining whether a new-build data centre such as the Proposed Development aligns with the UK's net zero trajectory, the UKNZCBS sets specific PUE targets based on the data centre's utilisation level. PUE is a key metric for measuring energy efficiency, calculated as the ratio of total facility energy consumption to the energy used by IT equipment. A lower PUE indicates greater efficiency, as a larger proportion of energy is directed toward IT operations rather than supporting systems such as cooling and power distribution.

7.2.16 The UKNZCBS categorises data centres based on the utilisation of IT space (m^2), defining two levels of efficiency targets:

- Low Utilisation (<50% of IT space utilised) – Data centres operating with less than half of their IT floor space actively in use. These facilities often have excess capacity for future scaling or redundancy, leading to a higher PUE target due to the relative inefficiency of running cooling, power and infrastructure systems for a partially filled space.
- High Utilisation (≥50% of IT space utilised) – Data centres where at least half of the IT space is actively in use. These facilities often achieve greater operational efficiency because a higher proportion of the total energy consumption is dedicated to IT equipment rather than auxiliary systems, resulting in lower PUE targets.

7.2.17 Table 7.5 outlines the mandatory PUE limits/targets for a new-build data centre as determined by the UKNZCBS. If a proposed development meets or exceeds these limits, it can be considered as aligned with the UK's net zero trajectory.

Table 7.5 PUE targets for new build data centre developments according to the UKNZCBS.[19]

Year	PUE Limit/Target	
	Low Utilisation	High Utilisation
2025	1.4	1.2
2026	1.4	1.2
2027	1.39	1.19
2028	1.38	1.18
2029	1.38	1.18
2030	1.37	1.17
2031	1.36	1.16
2032	1.36	1.16
2033	1.35	1.15
2034	1.34	1.14
2035	1.34	1.14
2036	1.33	1.13
2037	1.32	1.12
2038	1.32	1.12
2039	1.31	1.11
2040	1.3	1.1
2041	1.3	1.1
2042	1.3	1.1
2043	1.3	1.1
2044	1.3	1.1
2045	1.3	1.1
2046	1.3	1.1
2047	1.3	1.1
2048	1.3	1.1
2049	1.3	1.1
2050	1.3	1.1

7.2.18 The Innovation Hub falls under the 'Science and Technology' building typology according to the UKNZCBS requirements. Instead of a PUE threshold, this type of building is assessed based on its energy use intensity (EUI) (kWh/m^2/year).

7.2.19 Table 7.6 outlines the EUI limits/targets for a new-build science and technology building as determined by the UKNZCBS. If a proposed development meets or exceeds these limits, it can be considered as aligned with the UK's net zero trajectory.

Table 7.6 EUI targets for new build science and technology developments according to the UKNZCBS.[19]

Year	EUI Limit/Target (kWh/m^2/year)
2025	305
2026	297
2027	289

2028	280
2029	272
2030	264
2031	255
2032	247
2033	239
2034	230
2035	222
2036	214
2037	205
2038	197
2039	189
2040	180
2041	180
2042	180
2043	180
2044	180
2045	180
2046	180
2047	180
2048	180
2049	180
2050	180

Further Contextualisation of GHG Emissions

7.2.20 To provide additional contextualisation for the GHG emissions associated with the Proposed Development, the estimated operational energy emissions have been assessed against both national and local decarbonisation budgets. This approach follows the IEMA guidance, which states that the significance of GHG emissions is not determined by their absolute magnitude, but rather by whether a project is in line with the UK's trajectory to net zero.

7.2.21 While this comparison has therefore not been used to determine significance, it provides valuable context for understanding how the Proposed Development fits within the broader carbon reduction commitments at both the local and national levels.

7.2.22 The scale of the GHG emissions associated with the Proposed Development have therefore been contextualised by considering national and local decarbonisation targets. The primary basis for contextualisation is the UK carbon budgets and the London Borough of Hillingdon carbon budgets outlined in Table 7.7.

Table 7.7 The local and national carbon budgets relevant to the Proposed Development.

Carbon Budget Period	UK Carbon Budget ($MtCO_2e$)	London Borough of Hillingdon Carbon Budget ($MtCO_2e$)
2023-2027 (4th)	1,950	3.1
2028-2032 (5th)	1,725	1.6
2033-2037 (6th)	965	0.8
2038-2042 (7th)	535	0.4
2043-2100 (Projected)	749	0.4

7.2.23 The carbon budgets for the London Borough of Hillingdon have been extracted from the Tyndall Carbon Budget Tool developed by the Tyndall Centre for Climate Change Research.[18] The tool presents climate change targets for the UK local authority areas that are based on the commitments in the United Nations Paris Agreement, informed by the latest science on climate change and defined by science-based carbon budget setting. The carbon budgets presented are based on translating the "well below "2°C and pursuing 1.5°C" global temperature target and equity principles in the United Nations Paris Agreement to a national UK carbon budget. The UK budget is then split between sub-national areas using different allocation regimes to determine a 'fair contribution' of each local authority area towards achieving the broader UK carbon targets.

7.2.24 According to the Tyndall Centre's assessment, the total recommended carbon budget for the Hillingdon area for the period of 2023-2100 is 6 $MtCO_2e$. To translate this into near to long-term commitments, a CO_2e reduction pathway of 12.5% each year was applied. A full breakdown of the Hillingdon carbon budgets from 2023-2100 can be found in **Appendix 7.1**.

7.2.25 The UK carbon budgets have been obtained from the Climate Change Committee (CCC).[20] The 4th, 5th and 6th carbon budgets are official figures published by the UK Government and enshrined in legislation. The 7th budget was recently released as advisory guidance from the CCC but has not yet been legislated. As the remaining UK carbon budgets from 2043-2100 are yet to be determined and published, the same annual emissions reduction rate of 12.5% was applied to provide projected carbon budgets for the UK over this period. A full breakdown of the UK carbon budgets from 2023-2100 can be found in **Appendix 7.1**.

Consultation

7.2.26 Discussions with the London Borough of Hillingdon Council have informed the scope and methodology of this assessment. In particular, the EIA Screening Opinion (Appendix 1.3) provided guidance on the scope of the Climate Change Assessment. The Screening Opinion confirmed that direct and indirect operational carbon emissions, including both regulated and unregulated energy use, are within the scope of the EIA, whereas wider emissions associated with the supply chain are not required due to the lack of specificity and consistent measurability. This aligns with Policy SI2 of the London Plan, which requires an assessment of both regulated and unregulated operational energy use determined through the application of benchmarking and energy assessment.

7.2.27 Consultations with the council also confirmed that embodied carbon does not need to be included within the EIA. However, the council advised that it should be addressed separately through a Whole Life Carbon Assessment (WLCA) to support the planning application. As stated by the council:

"Embodied carbon does not need to be scoped into the EIA, but it should be covered by a Whole Life Carbon Assessment to support the application."

7.2.28 These discussions took place between November and December of 2024, as part of pre-application engagement and formal responses provided in the Screening Opinion. The assessment of direct and indirect emissions, including both regulated and unregulated energy use, has been undertaken in line with the IEMA guidance, ensuring compliance with the EIA Regulations and the expectations set out by the council.

Assumptions and Limitations

7.2.29 The GHG emissions assessment has been undertaken using the best available data based on the fixed design parameters of the Proposed Development. For LON06, where a detailed design has been submitted, the assessment has utilised the available design information. For LON07, LON08 and the Innovation Hub, while the application is outline, the assessment is based on the fixed design parameters set within the application.

7.2.30 However, as the specific technical specifications, plant selections and operational details have yet to be finalised, certain assumptions have been necessary to ensure a robust and representative assessment. These assumptions align with industry benchmarks and comparable data centre projects, ensuring a reasonable worst-case scenario is considered in the absence of finalised details.

1) Operational Energy Use Assumptions:

- The assessment follows the TM54 methodology, using industry benchmarks and data from similar developments to estimate energy consumption.
- A PUE of 1.35 has been assumed for each data centre building as part of the operational energy modelling. This represents a conservative assumption based on the fixed design parameters of the Proposed Development, as well as the inherent measures and energy strategies outlined within the Energy and Sustainability Statement (See Appendix 3.6). This assumption has been adopted to provide a reasonable worst-case scenario in line with IEMA guidance, ensuring a robust estimation of operational energy use and associated GHG emissions. In practice, data centre developments of this scale and nature typically achieve lower PUEs through cooling technologies and energy efficiency optimisations such as those included in the current design of the Proposed Development.
- These assumptions provide a reasonable worst-case scenario, ensuring emissions are not underestimated. Further energy modelling may refine these figures as the design progresses.

2) Grid Decarbonisation Assumptions:

- GHG emissions have been calculated using UK Government projections for electricity grid decarbonisation provided by the Department for Energy Security and Net Zero (DESNZ).
- While actual grid performance may vary, these forecasts are the most up-to-date and align with the UK’s legally binding net zero targets.
- Any variations in future decarbonisation rates would not undermine the assessment, as the methodology reflects current policy commitments.

3) Assessment Timeframe:

- A 60-year design life has been assumed, following BS EN 15978:2011 and the RICS Professional Standard.
- The actual lifespan may differ due to technological advancements or refurbishment, but this assumption provides a reasonable worst-case scenario with regards to lifetime operational GHG emissions.

4) Scope of the Assessment:

- Embodied carbon emissions are not included within the EIA, in line with the agreed scope, and are instead covered in the Whole Life Carbon Assessment (WLCA) supporting the planning application.
- This means emission from material extraction, transport, construction (A1-A5) and decommissioning (C1-C4) are not included in this assessment.
- However, GHG emissions from demolition of the existing site, construction plant, and transport associated with construction activities are included within the EIA assessment, as these fall outside the definition of embodied carbon and are instead considered direct construction-phase emissions in line with IEMA guidance.
- The WLCA provides a complementary analysis, ensuring all major carbon impacts are accounted for within the wider planning submission.

7.3 Baseline conditions

Current Baseline

7.3.1 The current baseline represents the estimated operational energy consumption and associated GHG emissions of the existing developments on the Site. Given the absence of measured energy consumption data, the baseline has been determined using benchmarks from the CIBSE Energy Benchmarking Dashboard, which provides typical energy consumption values for different building types in kWh/m^2/year for both electricity and gas consumption.

7.3.2 Each existing unit has been modelled as its closest corresponding building type, based on size, function, and expected energy demands, ensuring a reasonable and representative estimate of its operational energy use. As direct fuel consumption data was unavailable, an assumption of fossil fuel use for heating has been applied to each unit, consistent with typical operational energy sources for buildings of this nature and to provide a reasonable worst-case scenario with regards to operational energy emissions.

7.3.3 To estimate the total operational energy consumption for each unit, benchmarks for both gas and electricity consumption (in kWh/m^2/year) were applied, multiplying each by the approximate floor area of the respective unit. The sum of these two energy sources provides the total estimated energy use for each unit.

7.3.4 For vacant units, an operational energy consumption of zero has been assumed, and these have therefore not been included in the calculation.

7.3.5 To determine the baseline GHG emissions, the 2024 UK Government conversion factors have been applied to the estimated gas and electricity consumption. 2024 was taken as the baseline year to ensure that the emissions estimates reflect the most recent carbon intensity factors available at the time of assessment. The factors applied are as follows:

- 2024 Electricity GHG Conversion Factor = 0.20705 kgCO_2e per kWh.
- 2024 Gas GHG Conversion Factor = 0.1820 kgCO_2e per kWh.

7.3.6 The total estimated operational GHG emissions for each unit were calculated by applying these factors to the respective energy consumption values and summing the results. The total estimated operational energy emissions of the existing development is outlined in Table 7.8, with a full breakdown for each unit outlined in **Appendix 7.2**.

Table 7.8 Summary of the estimated emissions associated with the current site use.

Emissions Source	2024 Baseline Consumption (kWh)	Associated Emissions (kgCO_2e)
Electricity Consumption	1,101,200	332,896
Gas Consumption	1,820,100	228,003
Total	**2,921,300**	**560,900**

Future Baseline

7.3.7 GHG emissions are expected and required to reduce in the future. The UK Government has set a net zero target which requires the UK to reduce GHG emissions by 100% below 1990 levels by 2050. Policy has been implemented at national and local levels to achieve targets for decarbonisation. The future baseline considers relevant policy, as well as the UK and London Borough of Hillingdon carbon budgets over the lifetime of the Proposed Development.

7.3.8 In accordance with the IEMA guidance (Section 5.3, Step 2), which highlights that "future baseline should report on operational GHG emissions and how these may change over time". This assessment therefore accounts for the expected decarbonisation of the UK electricity grid, as outlined in 7.5.20, in which projected GHG emissions have been calculated using the projected GHG conversion factors provided by the Department of Energy Security and Net Zero (DESNZ). This ensures the assessment reflects anticipated reductions in electricity-related emissions over the lifetime of the Proposed Development and is outlined in further detail in **Appendix 7.4**.

7.4 Inherent Mitigation

7.4.1 The Proposed Development incorporates inherent mitigation measures within its design and operational approach to reduce GHG emissions, which are outlined in greater detail within the Energy and Sustainability Statement (Appendix 3.6) that supports the planning application. These measures have been considered within this assessment and form an integral part of the design for which consent is being sought.

7.4.2 These measures are reflected in the assessment and will be important to retain throughout the development process to support overall emission reductions.

Construction Phase

7.4.3 Although embodied carbon emissions have been scoped out of the EIA, it is anticipated that standard industry measures will be in place during construction to minimise unnecessary energy use and associated emissions, including:

- Implementation of a Construction Environmental Management Plan (CEMP) to ensure that energy efficiency, material use, and waste management are controlled on-site.

- Application of best practice construction logistics to minimise transport emissions, including efficient routing and consolidated deliveries.

Operational Phase

The Energy and Sustainability Statement (Appendix 3.6), outlines the key energy efficiency and sustainability measures incorporated into the Proposed Development. These measures have been designed to reduce operational energy demand and the associated GHG emissions while aligning with industry best practice. Based on the current design, the following inherent mitigation measures are incorporated into the scheme:

- **Data Centre Efficiency Measures** – The facility is expected to be designed with a PUE target appropriate for a development of this nature, ensuring that IT operations are supported as efficiently as possible, as well as industry-standard cooling and power distribution strategies being applied to reduce unnecessary energy consumption.
- **Building Envelope Design** – The building's envelope will be optimised to reduce thermal loads on HVAC systems, performing better than Building Regulation standards to enhance energy efficiency.
- **Minimised Solar Gain** – Glazed areas for data halls have been minimised to limit solar gain, reducing the need for cooling and lowering energy demand.
- **Hybrid Cooling System** – The Proposed Development will incorporate a highly efficient hybrid cooling system using water-cooled chillers, meeting substantial cooling loads while consuming significantly less energy than conventional cooling systems.
- **High Efficiency Lighting and Controls** – The Proposed development will utilise high-efficiency lighting, coupled with occupancy sensors, to reduce emissions associated with lighting in unoccupied areas.
- **Building Management System (BMS) and Metering** – Electrical and mechanical systems will be tightly monitored, metered and controlled with a full BMS allowing energy use to be tracked and enabling real-time efficiency improvements.
- **On-Site Renewables** – The Proposed Development includes on-site solar PV, contributing to its renewable energy mix and reducing reliance on grid electricity.
- **Heat Recovery** – Waste heat will be recovered and used within office and administrative areas, improving overall energy efficiency. Additionally, provisions have been made for the potential export of heat to external developments, supporting wider decarbonisation efforts.

7.5 Potential effects prior to additional mitigation

7.5.1 The likely significant GHG emission effects that have been taken forward for assessment in the ES are summarised in Table 7.9. This is based upon the different lifecycle phases defined within BS EN 15978:2011 Sustainability of Construction Works.[14]

7.5.2 As outlined in **7.2.26**, embodied carbon has been scoped out of the EIA. Operational energy use (B6) is therefore the only lifecycle stage that has been scoped in and included in this assessment. The GHG emissions associated with the other lifecycle stages have been calculated within the WLCA that supports the planning submission.

Table 7.9 Stages of the Proposed Development according to the BS EN 15978:2011 Sustainability of Construction Works.[14]

Phase	Main Stages of Proposed Development Lifecycle	Sources of GHG Emissions	Scoped In/Out
Construction	Product Stage; Raw material supply, transport and manufacture (A1-A3)	The embodied GHG emissions associated with the raw material assets required to construct the Proposed Development. The carbon emissions generated at this stage arise from extracting the raw materials from the ground, their transport to the point of manufacture, and then the primary energy used from transforming the raw materials into construction products. Embodied carbon is outside the scope of the EIA and therefore has not been included in this assessment.	Scoped Out (Covered by supporting WLCA)
	Construction Process Stage: The transport and installation process (A4-A5)	The transport of construction materials, resources, and equipment from the point of purchase to the site of works, as well as the commuting of the workforce during the construction process. The emissions associated with the construction and installation process of the temporary works, ground works, landscaping and permanent works (including fuel and electricity consumption). The emissions associated with site water demand and waste management associated with waste arising from the Proposed Development (including transport, processing and final disposal). Embodied carbon is outside the scope of the EIA and therefore has not been included in this assessment.	Scoped Out (Covered by supporting WLCA)
Operation	Boundary of Use Stage: Installed products and materials (B1)	Called ‘use’, this represents the carbon emitted directly from the fabric of products and materials once they have been installed as part of the infrastructure and it is in normal use. Refrigerant based	Scoped Out (Covered by supporting WLCA)

		emissions are scoped out of the assessment due to a low anticipated impact. Embodied carbon is outside the scope of the EIA and therefore has not been included in this assessment.	
	Maintenance, Repair, Replacement and Refurbishment (B2-B5)	This stage represents the works activities and new materials for the maintenance, repair, replacement, and refurbishment of the infrastructure during the use stage. Embodied carbon is outside the scope of the EIA and therefore has not been included in this assessment.	Scoped Out (Covered by supporting WLCA)
	Operational Energy Use (B6)	The emissions resulting from the energy used by the Proposed Development to enable it to deliver its service during operation.	Scoped In
	Operational Water Use (B7)	The emissions resulting from the consumption of water required by the Proposed Development to operate and deliver its service.	Scoped Out (Covered by supporting WLCA)
Decommissioning	End of Life: Deconstruction, transport, waste processing for recovery and disposal (C1-C4)	This Represents the on-site activities of deconstructing, dismantling and demolishing the Proposed Development. All GHG emissions due to transport to disposal and / or until the end-of-waste state of waste materials arising. Activities associated with treatment and processing for recovery, reuse and recycling of waste materials. This stage also includes the GHG emissions resulting from the final disposal of demolition materials. Embodied carbon is outside the scope of the EIA and therefore has not been included in this assessment.	Scoped Out (Covered by supporting WLCA)
General	Benefits and Load Beyond the System Boundary (D)	This stage includes the avoided carbon emissions associated with the Proposed Development including the potential for re-use, recovery and recycling of materials and/or the energy and associated GHG	Scoped Out (Covered by supporting WLCA)

		emissions beyond the system boundary. Embodied carbon is outside the scope of the EIA and therefore has not been included in this assessment.	

Construction Phase

7.5.3 As embodied carbon has been scoped out of the EIA, the potential effects prior to additional mitigation during the construction phase are limited to temporary energy consumption associated with site activities, including the demolition of the existing development and enabling works such as the removal of drainage infrastructure, removal of slab/foundations, and site remediation. The raw material extraction, manufacturing and transportation of construction materials (A1-A3), as well as construction process emissions (A4-A5), are therefore outside the scope of this assessment and are instead covered in the WLCA that supports the planning submission.

7.5.4 While operational energy use (B6) is the only scoped in stage, some GHG emissions could arise from energy use during the construction phase, including the demolition of the existing development and enabling works. These emissions are expected to come from temporary power generation, fuel use for demolition and construction machinery, site accommodation, and logistics operations. However, these emissions are expected to be short-term and relatively low compared to the operational emissions over the lifetime of the Proposed Development.

7.5.5 The scale of emissions from temporary construction activities, including the demolition of the existing development and the enabling works, is expected to be small relative to the operational phase because:

- Site activities, demolition and enabling works are temporary and will cease after construction is complete.
- Operational energy demand is continuous over the lifetime of the development, with high energy intensity associated with data processing and cooling systems.
- Fuel use for demolition, enabling works and construction is unlikely to be comparable to the electricity demand of an operating data centre.

7.5.6 This aligns with section 5.4 of the IEMA guidance which supports focusing assessments on the most significant sources of emissions and taking a proportionate approach, particularly where emissions are temporary and of limited magnitude. It notes that the level of detail in the GHG assessment should align with the scale of the emissions in question. Temporary construction-phase emissions, including those from demolition and enabling works, are inherently short-lived and often much smaller in scale compared to the ongoing, long-term operational emissions of a datacentre.

7.5.7 This is also supported by section 6.3 of the IEMA guidance, which notes the importance of considering emissions within the broader context of long-term operational impacts and their contribution to achieving net-zero objectives. Given these factors, temporary **construction-phase emissions are expected to fall within the Negligible to Minor Adverse category. These emissions are not expected to result in significant GHG effects prior to additional mitigation.**

Operational Phase

7.5.8 For the purposes of the GHG emissions assessment, a 60-year design life has been assumed for the Proposed Development, as per the guidance within BS EN15978:2011[14] and the RICS Professional Standard.[15] This presents a reasonable worst-case scenario with regards to the emissions associated with the operation of the Proposed Development. Over the assumed 60-year design life, operational energy emissions are expected to contribute significantly to the whole life emissions of the Proposed Development.

7.5.9 The operational energy figures have been estimated following to the TM54 methodology, drawing on professional experience and data from similar developments. However, given the early stage of the project and the limited design information available, these figures are based on technical assumptions informed by benchmark figures from projects of comparable design and operation, to provide a representative assessment of the potential emissions. A breakdown of the figures can be found in **Appendix 7.3**.

7.5.10 For LON06, LON07 and LON08, a PUE of 1.35 has been modelled. This is considered to be conservative assumption, with data centres of this scale and nature typically able to achieve lower PUEs due to advances in energy-efficient cooling and high-performance IT infrastructure.

7.5.11 The target year for assessing alignment with the UKNZCBS efficiency limits has been set as 2029. This is based on the indicative construction phasing, which is considered to be in line with the following:

- Demolition: Commencing May 2025
- Enabling Works: December 2025-2026
- LON06 Construction Start: June 2026
- Completion: 2029

7.5.12 As the indicative phasing outlines an estimated completion year of 2029, this has been used as the benchmark for evaluating compliance with the UKNZCBS efficiency requirements. For a new-build data centre expected to operate in 2029, the UKNZCBS sets a PUE target of 1.38 for low-utilisation facilities.

7.5.13 For each of LON06, LON07 and LON08, a PUE of 1.35 has been modelled, resulting in each building being more efficient the UKNZCBS target for low-utilisation data centres in 2029 under this assumption.

7.5.14 The Innovation Hub falls under the ‘Science and Technology’ building typology according to the UKNZCBS requirements. Instead of a PUE threshold, this type of building is assessed based on its operational energy intensity (kWh/m^2/year). This has been determined to be 150 kWh/m^2/year, which is more efficient that the UKNZCBS limits for 2029 (272 kWh/m^2/year), indicating that it is also in alignment with the UK’s net zero trajectory.

7.5.15 Table 7.10 summarises the UKNZCBS thresholds for data centres and science and technology buildings and how the Proposed Development compares.

Table 7.10 How the Proposed Development compares to the UKNZCBS energy efficiency requirements.

Building	UKNZCBS Limit/Target (2029)	Proposed Development Estimated Efficiency	Alignment with UK Net Zero Trajectory
LON06	PUE ≤ 1.38	PUE = 1.35	Within Target
LON07	PUE ≤ 1.38	PUE = 1.35	Within Target
LON08	PUE ≤ 1.38	PUE = 1.35	Within Target
Innovation Hub	≤ 272 kWh/m^2/year	150 kWh/m^2/year	Within Target

7.5.16 Since each building within the Proposed Development meets or exceeds the UKNZCBS efficiency targets within their respective categories, the Proposed Development is considered to be aligned with the UK's net zero trajectory according to this stage of the project design.

Further Contextualisation of GHG Emissions

7.5.17 Understanding the potential GHG impact of the Proposed Development requires placing emissions in context. The estimated GHG emissions have been calculated based on projected operational energy use and adjusted using projected grid decarbonisation factors.

7.5.18 This methodology ensures that emissions are not underestimated, following TM54 guidance and industry benchmarks to provide a representative reasonable worst-case scenario. This contextualised approach helps to align the assessment with long-term climate commitments at both national and local levels. Comparing the estimated lifetime GHG emissions to regional and national carbon budgets highlights the relative contribution of the Proposed Development.

7.5.19 Table 7.11 provides a summary of the estimated operational energy use for each building, with a total annual consumption of 1,396,601,907 kWh.

Table 7.11 Summary of the total annual operational energy consumption for the Proposed Development.

Building	Estimated Operational Energy Intensity (kWh/m^2)	Gross Internal Area (m^2)	Total Annual Operational Energy (kWh)
LON06	13,945	23,238	324,057,842
LON07	14,465	39,295	568,394,044
LON08	10,356	25,883	268,033,915
Innovation Hub	150	1,907	286,054
Total	38,916	90,322	1,160,771,855

7.5.20 To account for the continual decarbonisation of UK electricity grid over the assumed years of operation of the Proposed Development (2029-2088), the annual predicted electricity consumption was multiplied by the projected GHG conversion factors provided by the Department for Energy Security and Net Zero.[21] The total estimated lifetime GHG emissions for each building is outlined in Table 7.12, with a detailed breakdown of the emissions associated with each year outlined in **Appendix 7.4**.

Table 7.12 Summary of the total estimated operational GHG emissions for the Proposed Development.

Building	Total Estimated Operational GHG Emissions (tCO_2e)
LON06	277,718
LON07	487,114
LON08	229,705
Innovation Hub	245
Total	994,781

7.5.21 To provide further contextualisation, the estimated lifetime operational GHG emissions have been compared to both local and national carbon budgets for the same period. This is outlined in Table 7.13 below.

Table 7.13 Contextualisation of the GHG emissions associated with the operational phase of the Proposed Development.

	Total Lifetime GHG Emissions (tCO_2e)	London Borough of Hillingdon Carbon Budget 2029-2088	UK Carbon Budget 2029-2088
Total Emissions (tCO_2e)	994,781	2,834,717	3,627,389,902
Percentage of Carbon Budget (%)	N/A	35.1%	0.027%

7.5.22 The results indicate that the operational energy emissions of the Proposed Development could account for 35.1% of the London Borough of Hillingdon carbon budget over the assumed operational period. However, at a national level, the emissions represent only 0.027% of the UK's total carbon budget for the same period.

Consideration for Back-up Generators

7.5.23 The backup generators included as part of the Proposed Development will undergo routine testing to ensure their reliability in the event of grid power failures. The testing regime consists of monthly generator start-up tests at 50% load and an annual full-load test at 100% capacity.

7.5.24 For the purposes of this assessment, only the emissions associated with generator testing have been included. Emergency use of the generators has not been modelled, as it is inherently unpredictable in both frequency and duration, making it impossible to quantify emissions with the accuracy required for this EIA according to the IEMA guidance. The IEMA guidance advises that GHG assessments should be based on robust, proportionate, and realistic methodologies rather than highly speculative worst-case scenarios. Since the generators are intended for backup use only and not routine operation, it would not be appropriate to model their emissions at full capacity on a continuous or regular basis with regards to GHG emissions.

7.5.25 To provide a reasonable worst-case assessment, it has been assumed that the generators will run on diesel fuel, which has a 2024 GHG conversion factor of 0.25197 $kgCO_2e$ per kWh. Given that projected emission factors for diesel beyond 2024 are not currently available, this factor has been applied consistently across the full operational lifetime of the development (2029-2088).

7.5.26 Using the total annual operational energy use for LON06, LON07 and LON08 of 1,160,485,801 kWh, the estimated energy consumption associated with generator testing has been determined based on percentage load assumptions per test session.

7.5.27 Overall, the estimated annual emissions from generator testing are approximately **217 tCO_2e** per year, leading to a cumulative total of approximately **13,018 tCO_2e** over the 60-year operational period. When considered in the context of the total operational GHG emissions of the Proposed Development, these emissions represent a small fraction of the overall carbon footprint.

7.5.28 While this estimate provides a reasonable worst-case assessment, it is acknowledged that future decarbonisation of fuel sources, potential improvements in generator efficiency, or operational changes may reduce actual emissions over time. The feasibility of alternative backup power solutions, including lower-carbon fuels or battery storage, could be explored as the project progresses.

7.5.29 Given the limited scale of emissions from generator testing relative to the overall operational emissions of the Proposed Development, and considering the significance criteria outlined in Table 7.4, these emissions are considered to result in a Minor Adverse effect and are therefore not significant in EIA terms.

Consideration for the Substation

7.5.30 The Proposed Development includes a substation that will facilitate the distribution of electricity to the data centres and Innovation Hub. The substation itself does not significantly contribute to operational GHG emissions, as its primary function is to step down and distribute electricity, rather than directly consuming large amounts of energy.

7.5.31 Any transmission and distribution losses associated with the substation are already accounted for within the GHG conversion factors used to estimate operational emissions. Additionally, any auxiliary power consumption associated with the substation is expected to be minor compared to the energy demand of the data centre buildings.

7.5.32 As such, while the substation is an integral part of the Proposed Development, its impact on the overall GHG emissions assessment is negligible, and the primary source of operational emissions remains the electricity demand from the data centre buildings themselves.

Significance of GHG Emissions

7.5.33 According to IEMA guidance, the significance of GHG emissions is not based on the magnitude of GHG emissions, but rather whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050. Given that the Proposed Development meets or exceeds the UKNZCBS efficiency limits for each building, it is considered to be consistent with the UK's decarbonisation trajectory according to the early stage design assumptions used in this assessment.

7.5.34 However, the absolute emissions remain a significant proportion (35.1%) of the London Borough of Hillingdon carbon budget, meaning the impact at a local level could be considered moderately adverse. Based on the IEMA significance criteria:

- The Proposed Development aligns with the UK's net zero trajectory, meaning it is not classified as Major or Moderate Adverse at a national level.
- Given its proportion of the London Borough of Hillingdon carbon budget, the effect could be considered Minor to Moderate Adverse locally.

Final Significance Rating: Minor to Moderate Adverse (Not Significant at a National Level, Potentially Significant Locally).

7.5.35 While the Proposed Development aligns with UK-wide decarbonisation objectives, the scale of its operational GHG emissions means it represents a notable contributor to local carbon budgets. However, the inherent mitigation measures embedded within the scheme ensure that the Proposed Development follows a trajectory consistent with national decarbonisation goals. No additional mitigation is therefore required, however there may be opportunities over time to enhance energy efficiency and reduce emissions further throughout ongoing operational optimisations and technological advancements, in line with industry best practice. This could be explored as part of future energy strategy reviews, rather than as a requirement of the planning process.

7.6 Additional Mitigation

7.6.1 The assessment has considered both inherent mitigation measures incorporated into the Proposed Development and any additional mitigation that is necessary to reduce GHG emissions. As outlined in 7.4, the Proposed Development includes a range of energy efficiency, renewable energy and operational measures that align with best practice and national decarbonisation objectives.

7.6.2 Given the embedded design efficiencies, the Proposed Development is already anticipated to contribute towards net zero objectives in line with relevant UK carbon reduction policies. **No significant adverse effects have been identified that would necessitate additional mitigation beyond the measures already incorporated.**

Construction Phase

7.6.3 As set out in 7.2.27, embodied carbon emissions have been scoped out of this EIA, meaning the construction phase is not expected to result in significant GHG effects within the scope of this assessment. Therefore, **no additional mitigation is required for construction-related emissions.**

7.6.4 However, it is acknowledged that temporary emissions will arise from energy use on-site, including temporary power generation, construction plant fuel consumption, and workforce transport. While these emissions are expected to be minor in comparison to operational phase emissions, standard industry practices can be applied to help manage and reduce emissions where feasible. These could include:

- Utilisation of Grid Electricity Where Feasible – Where possible, construction activities could use mains electricity instead of diesel generators to reduce emissions.
- Fuel Efficiency Measures – Encouraging the use of efficient construction equipment and, where practical, lower-carbon fuels or hybrid/electric plant.
- Monitoring and Reporting – Ensuring energy and fuel use monitoring is incorporated into construction management plans, helping to identify opportunities for further efficiency improvements.

7.6.5 These measures do not constitute additional mitigation requirements but rather general good practice in line with standard construction environmental management approaches.

Operational Phase

7.6.6 **No additional mitigation is required for the operational phase**, as the Proposed Development has been designed to minimise GHG emissions through inherent design measures. The embedded efficiencies within the scheme already support UK net zero targets, ensuring alignment with relevant policies and industry standards.

7.6.7 However, it is acknowledged that energy efficiency improvements can continue to be explored during detailed design and operation, particularly as technological advancements emerge over time. Considerations could include:

- Optimising Building Management System (BMS) performance to ensure effective monitoring and energy efficiency improvements over the lifetime of the development.
- Maintaining and reviewing energy efficiency strategies to align with future technological improvements in data centre operations.
- Ensuring best practice energy management protocols are followed as part of the operational energy strategy.

These considerations do not represent new mitigation requirements but rather standard operational best practices that would be expected for a development of this nature.

7.7 Residual effects

Construction Phase

7.7.1 Embodied carbon emissions have been scoped out of the EIA, and construction-phase emissions are expected to be limited to temporary site energy use, workforce transport and material logistics.

7.7.2 The inherent mitigation measures, including the implementation of a CEMP, the use of grid electricity where feasible and best-practice logistics management, will help minimise these emissions.

7.7.3 Given the temporary nature and limited scale of construction-phase emissions, and with the assumed mitigation measures in place, the residual effects of GHG emissions from construction are expected to be **Negligible (Not Significant).**

Operational Phase

7.7.4 The GHG emissions associated with the operational energy use of the Proposed Development were initially assessed as **Minor to Moderate Adverse**, primarily due to the absolute magnitude of emissions and their proportion of the London Borough of Hillingdon carbon budget (35.1%), despite its alignment with the UK's net zero trajectory.

7.7.5 The residual effects are expected to remain the same for the following reasons:

- No additional mitigation measures beyond those already embedded in the design have been proposed or deemed necessary, as the Proposed Development aligns with national decarbonisation objectives and best practice energy efficiency standards.
- The primary driver of operational emissions is electricity consumption, and while grid decarbonisation is expected to progressively reduce carbon intensity over time, this remains outside the control of the Proposed Development.

- The inherent mitigation measures - including advanced cooling strategies, high-efficiency building systems, and on-site renewable energy generation - already ensure that the Proposed Development operates as efficiently as practicable within the constraints of its function as a data centre.
- The scale and nature of data centre operations mean that absolute emissions will remain high compared to less energy-intensive development types, despite efficiency measures in place.
- The assessment has been undertaken using a conservative approach, ensuring that potential uncertainties in energy performance are accounted for in the significance determination.

7.7.6 Taking these factors into account, the residual effects of operational GHG emissions are expected to remain **Minor to Moderate Adverse** at the local level and **Minor Adverse** at the national level.

7.7.7 Final Determination of Significance:

- Local Scale: Residual effect: **Minor to Moderate Adverse (Not Significant to Potentially Significant)**.
- National Scale: Residual effect: **Minor Adverse (Not Significant).**

7.8 Implications of Climate Change

7.8.1 This section considers how projected climate change trends, based on UKCP18 projections under the RCP 8.5 high-emissions scenario, may influence the GHG emissions associated with the Proposed Development and whether climate change could alter the predicted effects identified in this assessment. The analysis covers three key timeframes:

- 2020s (construction period)
- 2050s (medium-term, early-mid operational phase)
- 2080s (long-term, late operational phase)

7.8.2 The UKCP18 climate projections for the South West indicate:

- Rising mean air temperatures, with summer temperatures increasing by up to 2.4°C (2050s) and 4.9°C (2080s).
- Changes in precipitation patterns, with summer rainfall decreasing by up to 40.5% by the 2080s, while winter precipitation increases by up to 10.9% by the 2050s and 24.5% by the 2080s.
- Slight reductions in summer wind speeds and small increases in winter wind speeds, with limited impacts expected for energy performance.

Construction Phase

7.8.3 Climate change is not expected to materially impact GHG emissions during construction, as the baseline conditions (2020s) remain close to present-day climate. However, projected higher summer temperatures and reduced precipitation could influence construction activities, potentially increasing temporary energy demand for site cooling and dust suppression. These impacts are expected to be minor and temporary, with no change to the **Negligible (Not Significant)** residual effect identified for construction-phase emissions.

Operational Phase

7.8.4 Over the lifetime of the Proposed Development, **rising temperatures and changing precipitation patterns may influence operational energy demand** and the effectiveness of mitigation measures:

- **Increased Cooling Demand** – Rising temperatures, particularly in summer, may increase the energy demand for data centre cooling systems. However, the Proposed Development already incorporates high-efficiency hybrid cooling technology, which can help offset increased demand.
- **Grid Decarbonisation Effects** – The GHG intensity of grid electricity is expected to decline significantly due to the UK's commitment to a low-carbon power sector. This would reduce the carbon footprint of operational energy use over time, further lowering the residual GHG emissions impact.
- **Renewable Energy Integration** – The inclusion of on-site solar PV and provisions for waste heat recovery could become increasingly valuable in reducing reliance on grid electricity, particularly as peak cooling demand increases in hotter summers.

7.8.5 Given these factors, while climate change may increase cooling-related energy demand, this impact is expected to be offset by improvements in grid decarbonisation and energy efficiency measures. The residual effect of operational GHG emissions is not expected to change from the **Minor to Moderate Adverse (Not Significant to Potentially Significant)** determination at a local level, while the national-level effect remains **Minor Adverse (Not Significant).**

7.9 Cumulative effects

7.9.1 This section considers the potential cumulative effects of the Proposed Development in combination with other existing or approved projects within its zone of influence (ZOI), in accordance with Schedule 4(5)(e) of the 2017 EIA Regulations. The assessment follows IEMA guidance, which states that the significance of GHG emissions is determined by alignment with the UK's decarbonisation strategy rather than absolute emissions alone.

7.9.2 Following the IEMA guidance, to determine which developments should be included in this cumulative assessment, the following factors were considered:

- Relevance of the emissions profile – developments with similar operational energy demands and GHG emission sources were prioritised.
- Shared infrastructure or dependencies – developments that interact with the same energy networks or mitigation strategies were considered.
- Potential for overlapping construction impacts – developments that could contribute to cumulative short-term construction phase emissions were assessed.
- Consistency with UK and local carbon reduction targets – consideration was given to whether cumulative impacts could undermine local carbon budgets.

7.9.3 Based on these criteria, the following developments have been including in this cumulative assessment:

- **LON04 and LON05** (38421/APP/2021/4045) – a data centre campus comprising two additional data centre buildings (Use Class B8) and associated energy, security and infrastructure facilities.

- **Ark Data Centre** (75111/APP/2020/1955) – A data centre development (Use Class B8) that includes two MV Energy Centres, a HV Sub-Station and security systems.

7.9.4 Other developments in the Cumulative Development Schedule were reviewed and excluded for reasons outlined in Table 7.14.

Construction Phase

7.9.5 The construction of the Proposed Development, LON04/LON05, and Ark Data Centre could overlap, leading to short-term cumulative increases in demolition and construction-related GHG emissions, in particular from:

- Demolition of existing developments or structures.
- Site preparation and material transport.
- Demolition and construction machinery fuel consumption.
- Energy use from temporary site power requirements.

7.9.6 However:

- Embodied carbon emissions have been scoped out of the EIA and are instead addressed in the WLCA that supports the planning application.
- Construction-phase operational emissions are expected to be temporary, with standard industry measures in place to minimise energy use and emissions, including:
  - Use of grid electricity where feasible.
  - Sustainable logistics planning.
  - Implementation of a CEMP.

7.9.7 Since these measures align with standard practice for developments of this scale and nature, the cumulative effect of construction-related operational GHG emissions is not expected to be materially different from the effects assessed for each development individually. **No significant cumulative impact** is therefore anticipated during the **construction phase**.

Operational Phase

7.9.8 The operation of the Proposed Development alongside LON04/LON05 and Ark Data Centre will result in a cumulative increase in energy demand, as these developments are expected to have high operational electricity consumption due to the nature of data centre operations. However:

- The significance of GHG emissions is not determined by absolute emissions alone but whether a development aligns with the UK's net zero trajectory (IEMA guidance).
- The Proposed Development has been assessed against the UK Net Zero Carbon Buildings Standard (UKNZCBS) and is found to be in line with national decarbonisation budgets.
- The magnitude of emissions from the cumulative data centre developments does not alter this alignment, meaning the total emissions do not affect the significance rating of the Proposed Development.

- However, the cumulative energy demand across all three data centre developments will increase the proportion of the London Borough of Hillingdon's carbon budget being consumed, which may increase the relative local impact.

7.9.9 While cumulative emissions will increase the proportion of the local carbon budget consumed, this does not alter the alignment of the Proposed Development with the UK's net zero trajectory, as assessed against the national decarbonisation targets and best practice standards. As such, **the residual significance of the Proposed Development's GHG emissions does not change due to cumulative effects**, thought the overall pressure on local carbon budgets may increase.

7.9.10 **No additional cumulative mitigation measures are therefore considered necessary at this stage** beyond those already integrated into the assessment.

Justification for Exclusion of Other Developments

7.9.11 The following developments were reviewed but not included in the cumulative assessment, based on scale, nature and relevance to the GHG emissions assessment, based on the IEMA guidance:

Table 7.14 Basis for the exclusion of other developments from the cumulative GHG assessment

Development	Reasons for Exclusion from Cumulative Assessment
Former Nestle Factory	This is a residential-led mixed-use development, including housing, retail, offices, and public spaces. The primary sources of GHG emissions from this development are anticipated to relate to domestic heating, cooling, and transport emissions, which do not significantly interact with the energy demands of the Proposed Development. Additionally, residential developments have different emissions mitigation strategies (e.g. insulation, heating efficiency) that do not overlap with those relevant to data centres.
151 Clayton Road	The installation of two external chillers and transformers is not expected to result in significant additional GHG emissions relative to those associated with the Proposed Development. The emissions associated with this project are minor in comparison to the scale of the Proposed Development and do not contribute meaningfully to cumulative effects.
15-17 Uxbridge Road Hayes Middlesex, UB4 OJN	This is an apart-hotel, with energy demands driven by guest accommodation, HVAC systems, and lighting. The emissions profile of this development is fundamentally different from that of a data centre, meaning it does not contribute to cumulative GHG effects in a meaningful way.

7.10 Summary

Table 7.15 Summary of effects

Receptor	Receptor sensitivity	Description of potential impact	Proposed mitigation	Residual effect	Significant / not significant
Construction Phase					
Global Climate	High	Temporary GHG emissions from demolition and construction site energy use, material transport, and workforce travel.	No additional mitigation proposed beyond standard construction management best practices.	Negligible	Not Significant
Operation Phase					
Global Climate	High	GHG emissions from operational energy use, contributing to local and national carbon budgets.	No additional mitigation proposed as the Proposed Development has been designed to align with UK net zero objectives and best practice standards.	Minor to Moderate Adverse	Not Significant (National Level), Potentially Significant (Local Level)

7.11 Mitigation commitments Summary

Table 7.16 Summary for Securing Mitigation

Identified receptor	Type and purpose of additional mitigation measure (prevent, reduce, offset, enhance)	Means by which mitigation may be secured (e.g. planning condition / legal agreement)	Delivered by	Auditable by
Construction Phase				
Global Climate	No additional mitigation proposed beyond standard construction management best practices.	N/A	N/A	N/A
Operation Phase				
Global Climate	No additional mitigation required beyond the inherent measures incorporated into the Proposed Development.	N/A	N/A	N/A

7.12 References

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