7 Climate Change

7.1 Introduction

7.1.1 This chapter provides an assessment of potential impacts on and due to climate change. It details the methodology followed, a review of the baseline conditions in the defined study area, and the results of the assessment.

7.1.2 Under The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (the '2017 EIA Regulations') as amended, applicants are required to include in the ES where relevant to the development "*a description of the likely significant effects of the development resulting from, inter alia:* […] *the impact of the development on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the development to climate change*" (Schedule 4, paragraph 5(f)).

7.1.3 Climate change in the context of development projects is typically considered in three parts, as is suggested by the wording in Schedule 4:

- the impact of greenhouse gas emissions (GHGs) caused directly or indirectly by the Proposed Development, which contribute to climate change;
- risks to the development caused by the changing climate and resilience or adaptation options; and
- inter-related effects (such as changes in the sensitivity or resilience of receptors due to climate change) that in turn could influence the significance of other environmental effects of the development on those receptors.

7.1.4 This chapter is supported by the following technical appendix and additional reports submitted with the planning application.

- Appendix 7.1 with details of GHG emission calculations and carbon budgets
- HDR-0474-XX-XX-REP-MD-000004-P01 UP4 Whole Life Carbon Assessment
- HDR-0474-XX-XX-REP-MD-000002-P01 UP4 Sustainability Statement
- HDR-0474-XX-XX-REP-MD-000001-P01 UP4 Energy and Overheating Statement
- HDR-0474-XX-XX-REP-MD-000003-P01 UP4 Circular Economy report

7.1.5 GHG emissions are normally expressed as carbon dioxide equivalents, explained in the methodology section below, and are therefore often referred to as 'carbon' as a shorthand (e.g. when speaking of 'low-carbon power' or 'carbon reduction targets').

7.2 Assessment Methodology

Legislative and Policy Context

7.2.1 Under the guidance used in this assessment, climate change policy and legislation at a local and national level forms part of the context used to judge the significance of GHG emission effects, together with published advice of experts concerning the adequacy of that policy and on measures needed to successfully implement it.

7.2.2 There is a great deal of legislation and policy which concerns climate change, energy, transport, the built environment and management of the natural environment in general, which is not exhaustively listed here; this summary instead focuses on aspects of legislation or policy where these matters intersect to be of most relevance to the Proposed Development.

Kyoto Protocol

7.2.3 The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change (UNFCCC), which set legally binding emission reduction targets for the 192 parties to the Kyoto Protocol[1]. The targets cover the emissions of seven greenhouse gases, namely: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), nitrogen trifluoride (NF_3), hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride (SF_6). These gases are commonly referred to as the 'Kyoto basket' of greenhouse gases. Under the Kyoto Protocol and UNFCCC, the UK initially committed to an emissions reduction target of 12.5% reduction compared to base year levels from 2008-2012 (the first commitment period).

Paris Agreement

7.2.4 The Paris Agreement is a legally binding international treaty on climate change, adopted by 196 parties at the UN Climate Change Conference (COP21) in 2015. Its overarching goal is to hold "*the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels*"[2]. It was reaffirmed by the Glasgow Pact[3] in 2021 at COP26.

7.2.5 Under Article 4 of the Paris Agreement, parties are required to communicate their intended domestic GHG mitigation targets. The UK's updated Nationally Determined Contribution (NDC) under the Paris Agreement (revised in September 2022 in light of the Glasgow Climate Pact) commits the UK to reducing economy-wide GHG emissions by at least 68% by 2030 compared to 1990 levels. At COP29 in November 2024, the UK pledged to make its next NDC an 81% reduction on 1990 levels by 2035[4].

Net Zero Legislation and Associated National Policy

7.2.6 The Climate Change Act 2008 (as amended in 2019)[5] commits the UK government to reducing GHG emissions by at least 100% of 1990 levels by 2050: a net zero target. The Act requires the UK government to set interim carbon budgets for the UK[6], in view of the urgency to reduce GHG emissions and severe consequences of more than a 1.5°C rise in global average temperature. The Climate Change Act 2008 also established the Climate Change Committee (CCC) with a statutory role to give advice to government on carbon budgets, to report on progress in reducing carbon, and to give advice on climate risks and adaptation. Although not itself setting government policy, the CCC's recommendations or identification of policy gaps are relevant to consider in this assessment. The CCC works alongside [7] the Office for

[1] United Nations (1998): Kyoto Protocol to the United Nations Framework Convention on Climate Change https://unfccc.int/resource/docs/convkp/kpeng.pdf, accessed 11/03/2025
[2] United Nations (2015): Paris Agreement, https://unfccc.int/sites/default/files/english_paris_agreement.pdf, accessed 11/03/2025
[3] United Nations (2021): Glasgow Pact, https://unfccc.int/process-and-meetings/the-paris-agreement/the-glasgow-climate-pact-key-outcomes-from-cop26, accessed 11/03/2025
[4] Prime Minister's National Statement at COP29: 12 November 2024, https://www.gov.uk/government/speeches/prime-ministers-national-statement-at-cop29-12-november-2024, accessed 11/03/2025
[5] Climate Change Act 2008 (c. 27) as amended by The Climate Change Act 2008 (2050 Target Amendment) Order 2019. [Online] Available at: https://www.legislation.gov.uk/ukpga/2008/27/contents. Accessed 11/03/2025
[6] A carbon budget places restrictions on the total amount of GHGs that can be emitted. The budget balances the input of CO_2 to the atmosphere by emissions from human activities, by the storage of carbon (i.e. in carbon reservoirs on land or in the ocean).
[7] CCC and OEP (2022): Memorandum of Understanding between the CCC and the OEP. [Online] Available at: https://www.theccc.org.uk/wp-content/uploads/2022/08/CCC_OEP_MoU-_.pdf accessed 06/02/24

Environmental Protection (OEP), established under the Environment Act 2021[8], which has a monitoring and enforcement role for public authorities' plans and actions under environmental legislation.

7.2.7 At present, the Fourth, Fifth and Sixth Carbon Budgets, set through The Carbon Budget Orders 2011, 2016 and 2021, are 1,950 $MtCO_2$ for 2023 to 2027, 1,725 $MtCO_2$ for 2028 to 2032 and 965 $MtCO_2$ for 2033 to 2037. The Sixth Carbon Budget is the first that is consistent with the UK's net zero target, requiring a 78% reduction in GHG emissions by 2035 from 1990 levels. The UK's updated Nationally Determined Contribution (NDC) under the Paris Agreement to the United Nations Framework Convention on Climate Change (UNFCCC), revised in September 2022 in light of the Glasgow Climate Pact, commits the UK to reducing economy-wide GHG emissions by at least 68% by 2030 compared to 1990 levels.

7.2.8 Under s.14 of the Climate Change Act 2008, the UK government must report on its proposals and policies for meeting each carbon budget. The Carbon Budget Delivery Plan 2023[9] is the present such report. The plan indicates that the quantified emission reductions predicted form the implementation of current policies are expected to be sufficient to deliver the Fourth and Fifth Carbon Budgets but may fall short of the Sixth Carbon Budget. However, in May 2024, the Delivery Plan was found to be unlawful following a judicial review and so the Secretary of State is required to produce a new plan within 12 months (i.e. by 2 May 2025).

7.2.9 The Net Zero Strategy (Build Back Greener)[10], as revised in 2022 after court challenge, set out the UK's plans to achieve net zero emissions by 2050. Alongside this target is the ambition to fully decarbonise the UK's power system by 2035 and achieve a substantial increase in low carbon heating uptake by that time, with further detail set out in the UK's Heat and Buildings Strategy[11], which suggests that heat pumps may be particularly suited to non-domestic buildings that are not on the gas grid.

7.2.10 Progress on the Net Zero Strategy policies was captured in early 2023 by the Powering Up Britain: Net Zero Growth Plan policy paper[12]. Headline policies are around decarbonising transport through the zero emissions vehicle mandate and continuing the transition to heat pump use for building heating.

7.2.11 In response to the National Infrastructure Assessment report (2018)[13], which was superseded by The Second National Infrastructure Assessment report (2023)[14] a National Infrastructure Strategy[15] was prepared to set out the UK Government's long-term infrastructure plans in accordance with the UK's 2050 net zero target. This is expected to be revised when the new National Infrastructure and Service Transformation Authority is established in 2025. The current

[8] The Environment Act 2021. [Online] Available at: https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted. Accessed 06/02/24
[9] DESNZ (2023): Carbon Budget Delivery Plan. [Online] Available at: https://www.gov.uk/government/publications/carbon-budget-delivery-plan, accessed 11/03/2025
[10] BEIS (2021, updated 2022): Net Zero Strategy: Build Back Greener. [Online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1033990/net-zero-strategy-beis.pdf. Accessed 13/12/2022
[11] BEIS (2021): Heat and Buildings Strategy. [Online] Available at: https://www.gov.uk/government/publications/heat-and-buildings-strategy, accessed 11/03/2025
[12] DESNZ (2023): Powering Up Britain: The Net Zero Growth Plan, https://assets.publishing.service.gov.uk/media/642556c560a35e000c0cb167/powering-up-britain-net-zero-growth-plan.pdf, accessed 11/03/2025
[13] National Infrastructure Commission (2018): National Infrastructure Assessment. [Online] Available at: https://nic.org.uk/studies-reports/national-infrastructure-assessment/national-infrastructure-assessment-1/, accessed 11/03/2025
[14] National Infrastructure Commission (2023): The Second National Infrastructure Assessment. [Online] Available at: https://nic.org.uk/studies-reports/national-infrastructure-assessment/second-nia/, accessed 11/03/2025
[15] HM Treasury (2020): National Infrastructure Strategy. [Online] Available at: https://www.gov.uk/government/publications/national-infrastructure-strategy, accessed 11/03/2025

strategy includes measures to aid the decarbonisation of buildings and transport, key items being:

- consulting on future building standards, with higher standards to be introduced for non-domestic buildings;
- an announced future ban on the sale of petrol and diesel cars and vans, and support for research into decarbonisation of HGVs; and
- kickstarting the delivery of a core rapid charging network across motorways and key A road service stations.

7.2.12 The Decarbonising Transport (A Better, Greener Britain) strategy of 2021 and the associated 'Transitioning to zero emission cars and vans: 2035 delivery plan' [16] indicated that the government would consult on phasing out non-zero-emission vehicles including HGVs, support freight decarbonisation through modal shift to greater use of the rail network, and support research and development into options such as hydrogen fuel. It noted the need to develop charging infrastructure nationally, including in workplaces and homes.

7.2.13 A 2020 policy announcement[17] had indicated that sales of new petrol and diesel cars and vans (non-hybrid) would be banned by 2030 and would need to be fully zero emission by 2035. A 2021 policy announcement[18] was that new HGVs would be required to be zero-emission by 2040. Subsequently however, in 2023, a further policy announcement[19] revised the ban on new petrol and diesel car and van sales to 2035. This is managed through a zero emission vehicle mandate[20], and although the ban on the sale of new internal combustion-engined vehicles has been delayed until 2035, the mandate still requires vehicle manufactures to sell at least 22% zero emission vehicles from 4 January 2024, with this figure incrementally rising up until the 2035 milestone, with interim targets of 80% of new zero emission cars and 70% of new vans by 2030.

Advice of the Climate Change Committee

7.2.14 The Climate Change Committee has a statutory role under the Climate Change Act 2008 to provide advice to the government on setting carbon budgets, monitoring UK progress in meeting them, and on evidence-based policy measures that could be used for their achievement.

7.2.15 In the latest review of UK progress in meeting carbon budgets[21], the overriding advice of the CCC has been that there remain important policy gaps and a lack of uptick in pace in carbon reduction. Despite a significant reduction in emissions in 2023, the UK is not on track to hit the NDC target of reducing emissions by 68% of 1990 levels by 2030; only a third of the emissions

[16] DfT and OZEV (2021): Transitioning to zero emission cars and vans: 2035 delivery plan. [Online] Available at: https://www.gov.uk/government/publications/transitioning-to-zero-emission-cars-and-vans-2035-delivery-plan, accessed 11/03/2025
[17] DfT (2020): Government takes historic step towards net-zero with end of sale of new petrol and diesel cars by 2030. [Online] Available at: https://www.gov.uk/government/news/government-takes-historic-step-towards-net-zero-with-end-of-sale-of-new-petrol-and-diesel-cars-by-2030, accessed 11/03/2025
[18] DfT (2021): UK confirms pledge for zero-emission HGVs by 2040 and unveils new chargepoint design. [Online] Available at https://www.gov.uk/government/news/uk-confirms-pledge-for-zero-emission-hgvs-by-2040-and-unveils-new-chargepoint-design, accessed 11/03/2025
[19] DfT (2023): Government sets out path to zero emission vehicles by 2035. [Online] Available at: https://www.gov.uk/government/news/government-sets-out-path-to-zero-emission-vehicles-by-2035, accessed 11/03/2025
[20] DfT (2023): A zero emission vehicle (ZEV) mandate and CO2 emissions regulation for new cars and vans in the UK. [Online] Available at: https://www.gov.uk/government/consultations/a-zero-emission-vehicle-zev-mandate-and-co2-emissions-regulation-for-new-cars-and-vans-in-the-uk, accessed 11/03/2025
[21] Climate Change Committee (2024): 2024 Progress Report to Parliament, https://www.theccc.org.uk/publication/progress-in-reducing-emissions-2024-report-to-parliament/, accessed 11/03/2025

reductions required to achieve the 2030 target are currently covered by credible plans. The 2024 progress report indicates that action is needed across all sectors of the economy, with low-carbon technologies becoming the norm.

7.2.16 The Committee's previous budget advice was on setting the Sixth Carbon Budget[22]. Headline points in the 'Balanced Pathway' of measures suggested for making the Sixth Carbon Budget feasible are introduction of low-carbon heating technologies and improved building energy performance, and reduction in the carbon intensity of cars and HGVs (with the necessary supporting charging and alternative fuelling infrastructure).

7.2.17 The Committee's latest budget advice was on setting the Seventh Carbon Budget[23]. The recommended limit on the UK's GHG emissions over the five-year period 2038-2042 is 535 $MtCO_2e$, including emissions from shipping and international aviation. The budget emphasises the role of electrification and low-carbon electricity supply in emissions reductions and reiterates the headline points in the 'Balanced Pathway' noted above. Measures for making the Seventh Carbon Budget feasible are: emphasis on low-carbon electricity supply, the mass up-take of EVs, low-carbon heating technologies, and industrial electrification. It also emphasises the use of low-carbon fuels where electrification is not possible, new woodland creation and peatland restoration, and engineered carbon removals through capture, use and storage of biogenic carbon.

Building Regulations

7.2.18 Minimum standards for buildings are set by the Building Regulations 2010 (as amended) and the various Approved Documents, of which Parts L, G, F and O (ventilation, water efficiency, fuel and power and overheating) are the most relevant. They are amended periodically to tighten performance standards required for new buildings.

7.2.19 Of note, changes to Part L (conservation of fuel and power) and Part F (ventilation) via the 'Future Homes Standard' (FHS) and 'Future Buildings Standard' (FBS) are expected in the near future, to come into effect in 2025. These are expected to set new performance standards such that "*new homes and non-domestic buildings have high fabric standards, use low-carbon heating and are 'zero-carbon ready' (meaning no further work will be needed for them to have zero carbon emissions once the electricity grid has fully decarbonised)".*

7.2.20 While consultation closed in March 2024, a response is yet to be published. The stringency of this standard and technical details are therefore not finalised and may not provide the level of ambition required to future-proof for net zero, as explored for example by the UK Green Building Council[24]. Importantly, the FHS and FBS are focused on the occupational / operational phase of a building lifetime: embodied carbon is described as being out of scope, and subject to a future consultation on an approach to measuring and reducing this in due course.

7.2.21 As an interim measure, in 2021 Part L of the UK Building Regulations was amended in order to improve the energy efficiency and reduce the GHG emissions of new buildings to a lesser level than the Future Buildings Standard.

[22] Climate Change Committee (2020): Sixth Carbon Budget, https://www.theccc.org.uk/publication/sixth-carbon-budget/, accessed 03/10/24.
[23] Climate Change Committee (2025): Seventh Carbon Budget. [Online] Available at: https://www.theccc.org.uk/wp-content/uploads/2025/02/The-Seventh-Carbon-Budget.pdf, accessed 11/03/2025
[24] UKGBC (2024): UKGBC response to the Future Homes and Buildings Standard. [Online] Available at: https://ukgbc.org/wp-content/uploads/2024/02/FHS-consultation-final.pdf, accessed 11/03/2025

Climate Change Risk, Resilience and Adaptation

7.2.22 Under s. 56 of the Climate Change Act 2008, the UK government publishes a five-yearly national climate risk assessment, the latest being from 2022[25]. This is developed based on advice from the Climate Change Committee.

7.2.23 The national priority risk areas identified (most relevant to development projects) are:

- *"Risks of climate-related failure of the power system;*
- *Risks to supply of food, goods and vital services due to climate-related collapse of supply chains and distribution networks; and*
- *Risks to human health, wellbeing and productivity from increased exposure to heat in homes and other buildings."*

7.2.24 The response to climate risks through resilience and adaptation actions are set out in the National Adaptation Programme (NAP) under s. 58 of the Climate Change Act 2008, with the most recent being NAP3 published in 2023[26]. With respect to health, communities and the built environment it notes that the main climate risks are those resulting from high temperatures, changes to air quality and flooding.

Other National and Local Planning Policy and Guidance

National Planning Policy Framework

7.2.25 The revised National Planning Policy Framework (NPPF) 2024[27] states with regard to climate change that the core planning principle of the NPPF is that the planning system should:

"…support the transition to net zero by 2050 and take full account of all climate impacts including overheating, water scarcity, storm and flood risks and coastal change. It should help to: shape places in ways that contribute to radical reductions in greenhouse gas 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." (paragraph 161).

7.2.26 'Low-carbon' technologies are defined in the NPPF at page 77-78 as "*…those that can help reduce emissions (compared to conventional use of fossil fuels)."*

7.2.27 In paragraphs 161 (quoted above) and 162, the NPPF refers to the need for planning to provide climate adaptation and resilience:

"Plans should take a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for flood risk, coastal change, water supply, biodiversity and landscapes, and the risk of overheating and drought from rising temperature." (paragraph 162).

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[25] Defra (2022): UK Climate Risk Assessment 2022. [Online] Available at: https://www.gov.uk/government/publications/uk-climate-change-risk-assessment-2022, accessed 11/03/2025
[26] Defra (2023): The Third National Adaptation Programme (NAP3) and the Fourth Strategy for Climate Adaptation Reporting. [Online] Available at: https://www.gov.uk/government/publications/third-national-adaptation-programme-nap3, accessed 11/03/2025
[27] DLUHC (2024): National Planning Policy Framework. [Online] Available at: https://assets.publishing.service.gov.uk/media/67aafe8f3b41f783cca46251/NPPF_December_2024.pdf, accessed 11/03/2025

London Plan

7.2.28 The London Plan contains planning policies relevant to all development within London. With respect to the Proposed Development and climate change, Policy SI 2 Minimising greenhouse gas emissions states that major development

- should be net zero-carbon by reducing operational energy through accordance with energy hierarchy;
- should achieve a *"minimum on-site reduction of at least 35 per cent beyond Building Regulations",* and that *"non-residential development should achieve 15 per cent through energy efficiency measures";*
- *"should calculate and minimise carbon emissions from any other part of the development, including plant or equipment, that are not covered by Building Regulations";* and
- *"should calculate whole lifecycle carbon emissions through a nationally recognised Whole Life-Cycle Carbon Assessment and demonstrate actions taken to reduce life-cycle carbon emissions."*

7.2.29 The policy also notes that *"where it is clearly demonstrated that the zero-carbon target cannot be fully achieved on-site, any shortfall should be provided, in agreement with the borough, either: through a cash in lieu contribution to the borough's carbon offset fund, or off-site provided that an alternative proposal is identified and delivery is certain."*

7.2.30 In relation to transport GHG emissions, Policy T7 Deliveries, servicing and construction notes that *"to support carbon-free travel from 2050, the provision of hydrogen refuelling stations and rapid electric vehicle charging points at logistics and industrial locations is supported."*

Whole Life-Cycle Carbon Assessments – London Plan Guidance

7.2.31 The London Plan Guidance (LPG): Whole Life Cycle Carbon Assessments (WLCA) notes that all developments are expected to compare their WLC baseline against the most relevant benchmark of those listed in Appendix 2 of the guidance. Benchmarks are provided for the following building types:

- offices;
- residential;
- schools, universities etc.; and
- retail.

7.2.32 None of these is fully applicable to the Proposed Development, but the offices category has been considered the most relevant in the Whole-Life Carbon Assessment (WLCA) following the LPG, which is submitted with the planning application. For offices, the LPG WLCA notes the following benchmarks:

Table 7.1 LPG WLCA benchmarks for offices

WLCA Module	WLC Benchmark ($kgCO_2e/m^2$)	Aspirational WLC Benchmark ($kgCO_2e/m^2$)
Modules A1-A5 (excluding sequestered carbon)	<950	<600
Modules B-C (excluding B6 & B7)	<450	<370

WLCA Module	WLC Benchmark ($kgCO_2e/m^2$)	Aspirational WLC Benchmark ($kgCO_2e/m^2$)
Modules A-C (excluding B6 & B7 including sequestered carbon	<1,400	<970

Hillingdon Local Plan

7.2.33 The Hillingdon Local Plan[28] sets out polices which determine how development will be controlled within the borough. The plan is formed of two parts: Part 1, Strategic Policies; and Part 2, Development Management Policies. Relevant policies from each are listed below.

Local Plan: Part 1, Strategic Policies

7.2.34 Strategic objective 11 of the Local Plan: Part 1 related to addressing the impacts of climate change, and minimising emissions of carbon and local air quality pollutants from new development and transport.

7.2.35 Policy BE1: Built Environment states that all new developments should, amongst other things, *"Maximise the opportunities for all new homes to contribute to tackling and adapting to climate change and reducing emissions of local air quality pollutants."* It notes that reduction in carbon dioxide emissions are required to be achieved *"in line with the London Plan targets through energy efficient design and effective use of low and zero carbon technologies."* Further, the policy states that *"where the required reduction from on-site renewable energy is not feasible within major developments, contributions off-site will be sought."* Finally, the policy states that *"all developments should be designed to make the most efficient use of natural resources whilst safeguarding historic assets, their settings and local amenity and include sustainable design and construction techniques to increase the re-use and recycling of construction, demolition and excavation waste and reduce the amount disposed to landfill;"*

7.2.36 Policy EM1: Climate Change Adaptation and Mitigation notes that *"The Council will ensure that climate change mitigation is addressed at every stage of the development process by:* [inter-alia]

- *Prioritising higher density development in urban and town centres that are well served by sustainable forms of transport.*
- *Promoting a modal shift away from private car use and requiring new development to include innovative initiatives to reduce car dependency.*
- *Ensuring development meets the highest possible design standards whilst still retaining competitiveness within the market.*
- *Working with developers of major schemes to identify the opportunities to help provide efficiency initiatives that can benefit the existing building stock.*
- *Promoting the use of decentralised energy within large scale development whilst improving local air quality levels.*
- *Targeting areas with high carbon emissions for additional reductions through low carbon strategies. These strategies will also have an objective to minimise other*

[28] London Borough of Hillingdon (2024): Local Plan and Review. [Online]. Available at: https://www.hillingdon.gov.uk/local-plan-and-review, accessed 11/03/2025.

pollutants that impact on local air quality. Targeting areas of poor air quality for additional emissions reductions.

- *Encouraging sustainable techniques to land remediation to reduce the need to transport waste to landfill. In particular developers should consider bioremediation as part of their proposals.*
- *Encouraging the installation of renewable energy for all new development in meeting the carbon reduction targets savings set out in the London Plan. Identify opportunities for new sources of electricity generation including anaerobic digestion, hydroelectricity and a greater use of waste as a resource […]*

Local Plan: Part 2, Development Management Policies

7.2.37 Policy DMEI2: Reducing Carbon Emissions states that:

- *"All developments are required to make the fullest contribution to minimising carbon dioxide emissions in accordance with London Plan targets.*
- *All major development proposals must be accompanied by an energy assessment showing how these reductions will be achieved.*
- *Proposals that fail to take reasonable steps to achieve the required savings will be resisted. However, where it is clearly demonstrated that the targets for carbon emissions cannot be met onsite, the Council may approve the application and seek an off-site contribution to make up for the shortfall.*

Predicting effects

7.2.38 In overview, GHG emissions have been estimated by applying published emissions factors and/or whole-life carbon assessment (WLCA) data to activities required for the Proposed Development. The emissions factors relate to a given level of activity, a physical or chemical process, or amount of fuel, energy or materials used to the mass of GHGs released as a consequence.

7.2.39 Further detail of the approach, data inputs, assumptions and boundaries of the calculations is given in Appendix 7.1: GHG Emission Calculations.

7.2.40 The GHGs considered in this assessment are those in the 'Kyoto basket'[29] of global warming gases expressed as their CO_2-equivalent global warming potential (GWP). This is denoted by CO_2e units in emissions factors and calculation results. GWPs used are typically the 100-year factors in the Intergovernmental Panel on Climate Change Sixth Assessment Report[30] or as otherwise defined for national reporting under the United Nations Framework Convention on Climate Change (UNFCCC).

7.2.41 The main emissions sources within the boundary of the assessment comprise:

[29] The 'Kyoto Basket' encompasses the following greenhouse gases: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), nitrogen trifluoride (NF_3), hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride (SF_6).
[30] Table 7.15 in IPCC (2021): Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 2391 pp.

- the 'embodied carbon' of materials used in construction;
- the 'embodied carbon' of materials used during fit-out by tenants;
- transport of materials to site and use of construction plant;
- operational energy consumption;
- operational transport;
- operational emissions of standby generators; and
- operational emissions of refrigerant gases.

Receptor Sensitivity

7.2.42 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 atmospheric mass of the relevant GHGs and consequent warming potential, expressed in tCO_2e, has therefore been treated as a single receptor of **high** sensitivity. It is considered to be of high sensitivity given the importance of the global climate as a receptor, the limited and decreasing capacity to absorb further GHG emissions without severe climate change resulting, and the cumulative contribution of GHG emission sources.

Impact Magnitude

7.2.43 As GHG emissions can be quantified directly and expressed based on their GWP, the magnitude of impact is reported numerically as tCO_2e rather than requiring a descriptive scale.

Effect Significance

7.2.44 The IEMA assessment guidance for GHG emissions describes five levels of significance for emissions resulting from a development, each based on whether the GHG emission impact of the development will support or undermine a science-based 1.5°C-compatible trajectory towards net zero.

7.2.45 To aid in considering whether effects are significant, the guidance recommends that GHG emissions should be contextualised against pre-determined carbon budgets, or applicable existing and emerging policy and performance standards where a budget is not available or not meaningfully applicable at the scale of development assessed. It is a matter of professional judgement to integrate these sources of evidence and evaluate them in the context of significance.

7.2.46 Taking the guidance into account, the following have been considered in contextualising the Proposed Development's GHG emissions:

- the magnitude of GHG emissions as a percentage of local authority carbon budgets;
- the GHG emissions intensity of the Proposed Development relative to benchmarks and recommended performance standards for comparable development; and,
- whether the Proposed Development contributes to, and is in line with, the applicable UK policy for GHG emissions reductions, where this policy is consistent with science-based commitments to limit global climate change to an internationally-agreed level (as determined by the UK's current Nationally Determined Contribution under the Paris Agreement).

7.2.47 Effects from GHG emissions are described in this chapter as adverse, negligible or beneficial based on the following definitions, which closely follow the examples in Box 3 of the IEMA guidance.

- **Major Adverse:** the Proposed Development's GHG impacts would not be compatible with the UK's net zero trajectory. Its GHG impacts would not be mitigated, or would be compliant only with do-minimum standards set through regulation. The Proposed Development would not provide further emissions 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 Proposed Development's GHG impacts would not be fully compatible with the UK's net zero trajectory. Its GHG impacts would be partially mitigated and may partially meet the applicable existing and emerging policy requirements, but it 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 Proposed Development's GHG impacts would be compatible with the UK's 1.5°C trajectory and would be fully consistent with up-to-date or emerging policy and good practice emissions reduction measures. A project with minor adverse effects is fully in line with measures necessary to achieve the UK's trajectory towards net zero.
- **Negligible:** the Proposed Development would achieve emissions mitigation that goes well beyond existing and emerging policy compatible with the 1.5°C trajectory, such that radical decarbonisation or net zero is achieved well before 2050. A project with negligible effects provides GHG performance that is well 'ahead of the curve' for the trajectory towards net zero and has minimal residual emissions.
- **Beneficial:** the Proposed Development would result in emissions reductions from the atmosphere, whether directly or indirectly, compared to the without-project baseline. As such, the net GHG emissions would be below zero. A project with beneficial effects substantially exceeds net zero requirements with a positive climate impact.

7.2.48 **Major** and **moderate adverse** effects and **beneficial** effects are considered to be **significant**.

7.2.49 **Minor adverse** and **negligible** effects are considered to be **not significant**.

Geographical Scope

7.2.50 The scope of GHG emission sources and processes assessed has been defined in paragraph 7.2.41 above.

7.2.51 GHG emissions have a global effect rather than directly affecting any specific local receptor. The impact of GHG emissions occurring due to the Proposed Development on the global atmospheric concentration of the relevant GHGs, expressed in CO_2e, is therefore considered within this assessment. As GHG impacts are global and cumulative with all other sources, no specific geographical study area is defined for the identification of receptors or assessment of effects.

7.2.52 However, GHG emissions caused by an activity are often categorised into 'scope 1', 'scope 2' or 'scope 3' emissions, following the guidance of the WRI and the WBCSD Greenhouse Gas Protocol[31] suite of guidance documents.

- Scope 1 emissions: released directly by the entity being assessed, e.g., from combustion of fuel at a facility or refrigerant gas losses;
- Scope 2 emissions: caused indirectly by consumption of imported energy, e.g., emissions from generating electricity supplied through the national grid to a facility; and
- Scope 3 emissions: caused indirectly in the wider supply chain, e.g., in the upstream business activities supplying goods or services or the downstream use of products or disposal of waste from a facility.

7.2.53 This assessment has sought to include emissions from all three scopes, where this is material and reasonably possible from the information and emissions factors available, to capture the impacts attributable to the Proposed Development.

7.2.54 The majority of GHG emissions are likely to occur within the territorial boundary of the UK and hence within the scope of the UK's national carbon budgets. However, in recognition of the climate change effect of GHG emissions (wherever occurring) and the need, as identified in national policy, to avoid 'carbon leakage' overseas when reducing UK emissions, potential scope 3 GHG emissions that may physically occur outside the UK have been considered where relevant.

Temporal Scope

7.2.55 GHG impacts from the construction and operational phases of the Proposed Development have been assessed.

7.2.56 As the application is not for a time-limited planning permission, and there is no end of life stage defined, decommissioning effects have not been assessed. Demolition of existing structures on the Site is also excluded, as this work has already been undertaken and was subject to a Pre-Demolition audit to identify materials for re-use. The approach to setting the temporal scope of the EIA is discussed in Chapter 5 of the ES.

7.2.57 The varying atmospheric residence time of GHGs once emitted, and their differing climate impact, has been considered through the use of 100-year GWPs to express these in a common CO_2e metric, as discussed above.

7.2.58 The timing of GHG emission impacts and mitigation (reductions) is also a part of evaluating the significance of effects, due to the cumulative heating effect of changing GHG concentrations in the atmosphere. For example, achieving net zero or reduced emissions by 2035 instead of 2045 would avoid a decade of cumulative heating, with consequences in the long term for the likelihood of remaining with a global 1.5°C or 2°C average temperature change.

[31] WRI and WBCSD (2004): The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard. Revised edition, Washington and Geneva: WRI and WBCSD.

Consultation

7.2.59 Formal EIA scoping under Regulation 15 of the EIA Regulations 2017 has not been undertaken but the scope has been discussed and agreed through pre-application engagement with LB Hillingdon.

7.2.60 A Climate Change EIA Scoping Briefing Note (November 2024) was written to inform discussion with LB Hillingdon concerning the appropriate scope of assessment for climate change impacts, and the methodological approach that will be taken for the assessment.

7.2.61 The note set out the proposed scope of the Climate Change ES Chapter, noting that the assessment of GHG emission impacts was proposed to be scoped in as it is considered that there is potential for significant effects. Proposed to be scoped out was the assessment of climatic risks to the Proposed Development, as an initial review of types of risk based on site-specific climate change projections has shown that these would already be effectively managed through the planning system, with no significant environmental effects being likely.

7.2.62 Likewise, the assessment of inter-related effects due to climate change in the future baseline was also proposed to be scoped out, because the ES only includes one other impact pathway assessment (air quality) and so there is no additional inter-relationship between effects to consider.

7.2.63 Table 7.2 summarises the scope of assessment that was proposed.

Table 7.2 Summary of scope agreed through consultation

Impact pathway	Scoped in or out?	Justification
Construction		
Embodied carbon of construction materials, transport, and construction activity on site	**In**	These construction-stage GHG emissions are likely to make a material contribution to whole-life impacts
Embodied carbon of fit-out, i.e. initial installation of tenants' IT equipment	**In**	
Land use change	**Out**	There are no significant baseline GHG-emitting activities nor soil or vegetation carbon stocks vulnerable to disturbance. Landscape planting or habitat creation would not be of a scale to have significant carbon sequestration.
Climate risks	**Out**	The limited climate change expected in the near term (construction period) can be managed through good practice for construction and workforce health and wellbeing, secured by a CEMP, such that no significant risks are likely
Inter-related effects	**Out**	No additional pathways for inter-related effects are identified that would not already be considered in the air quality assessment. No other impact pathways are proposed to be scoped in to the EIA.
Operation		

Impact pathway	Scoped in or out?	Justification
GHG emissions from occupants' regulated and unregulated energy use	In	These operational-stage GHG emissions are likely to make a material contribution to whole-life impacts
Embodied carbon of tenants' datacentre equipment (refreshes)	In	These operational-stage GHG emissions have the potential to make a material contribution to whole-life impacts, to be determined through further assessment
GHG emissions from maintenance and refurbishment of building(s)	In	These operational-stage GHG emissions have the potential to make a material contribution to whole-life impacts, to be determined through further assessment
GHG emissions from staff transport	In	Although datacentres do not typically generate significant traffic from staff commuting etc, this is provisionally scoped in, with the materiality of emissions to be determined through further assessment when traffic data is available
Fugitive refrigerant gas emissions	In	Potential for this to be a material source of scope 1 emissions, on the basis of existing operational evidence from other data centres operated by the Applicant
GHG emissions from occupants' water, wastewater and waste management	Out	These are considered to be *de minimis* as water cooling is not proposed and the proposed development will have a small operational workforce
Land use change	Out	There are no significant baseline GHG-emitting activities nor soil or vegetation carbon stocks vulnerable to disturbance
Climate risks	Out	The climate risks of potential significance are considered to be flooding and overheating. Flood risk, with climate change allowance, is managed through the planning system. The cooling strategy for the proposed development is a key part of the design and its energy use will already be considered in the assessment. The resilience and sustainability of water supplies, with respect to the demand and the utility's duties, will be referenced in the project description. No further assessment in the EIA is therefore required.
Inter-related effects	Out	No additional pathways for inter-related effects are identified that would not already be considered in the air quality assessment. No other impact pathways are proposed to be scoped in to the EIA.
Decommissioning		
Deconstruction and waste disposal, recycling or re-use	Out	Decommissioning-stage GHG emissions are not likely to make a material contribution to whole-life impacts. Nevertheless, the WLCA will inform

Impact pathway	Scoped in or out?	Justification
		mitigation by design (i.e. design for re-use and recycling on circular economy principles).
Land use change	**Out**	There are no significant baseline GHG-emitting activities nor soil or vegetation carbon stocks vulnerable to disturbance
Climate risks	**Out**	The climate risks of potential significance are considered to be flooding, structural instability in extreme weather, and health/wellbeing risks to an outdoor workforce (e.g. heatwave conditions). These are managed through the planning system and through health and safety at work legislation such that significant effects are unlikely and further mitigation cannot meaningfully be determined through EIA.
Inter-related effects	**Out**	No additional pathways for inter-related effects are identified that would not already be considered in the air quality assessment. No other impact pathways are proposed to be scoped in to the EIA.

7.2.64 The Climate Change EIA Scoping Briefing Note was discussed in a workshop with LB Hillingdon on 11 November 2024.

7.2.65 The scope was generally agreed, although LB Hillingdon commented that embodied carbon was controlled through the London Plan WLCA process and would not necessarily be an appropriate area to condition any further control or mitigation via the planning permission. Nevertheless, under the EIA Regulations, it is an indirect impact that is likely to have a significant effect, so is included in the assessment.

Assumptions and Limitations

7.2.66 There are three main limitations to the assessment. Firstly, the Proposed Development is at a relatively early stage of design. This means that materials quantities, energy consumption and the reduction targets for these are necessarily estimates subject to uncertainty. These are made following London Plan guidance, which has a limited set of building typologies that are not closely applicable to a datacentre (with office buildings being the closest).

7.2.67 Secondly, design and operational information available at this stage concerns the building envelope including the fixed mechanical and electrical plant within the Applicant's control. The specific datacentre IT equipment that will be installed in the Proposed Development is not known at this stage. It would depend on tenants' needs for particular computing workloads. The embodied carbon of data centre IT equipment is a developing area of knowledge and there is large uncertainty apparent from an initial review of existing literature, discussed in Appendix 7.1.

7.2.68 Thirdly, the GHG impacts of the Proposed Development over its life could change depending on adaptation or mitigation at a national level, e.g. decarbonisation of energy supplies and transport. Present-day and projected future emission factors in Building Regulations, Defra and DESNZ guidance have been considered. The factor for assessments under Part L of the Building Regulations 2021 has been used in the initial assessment of impacts prior to further

mitigation, consistent with the Energy and Overheating Statement. This is a reasonably conservative position given the expected continued decarbonisation of electricity generation in the UK over time, as the factor is lower than present-day grid-average electricity supply (to be more representative of the opening year of the Proposed Development) but does not make the assumption of the UK grid-average electricity supplies being zero-carbon by the early 2030s.

7.2.69 The applicant's existing and proposed further mitigation measures to reduce the carbon intensity of the electricity supply are discussed in Section 7.4 and Section 7.6 respectively.

7.3 Baseline Conditions

7.3.1 The Site comprises brownfield land, formerly a building used as a private hire taxi garage / repair centre that has been demolished, and currently in use as a construction compound for the other adjacent data centre developments.

7.3.2 The current land use does not comprise substantial GHG-generating activities, nor does it comprise significant soil or vegetation carbon stocks that are vulnerable to disturbance from the proposed development. Existing structures of the former 'Addison Lee' building, where not removed already for the construction compound, may offer opportunities for re-use and recycling in a 'circular economy' approach to development. A pre-demolition audit has been undertaken.

7.4 Inherent Design Mitigation

Construction

7.4.1 Inherent mitigation has been considered to reduce the construction-stage embodied carbon impacts and is presented within the WLCA report accompanying this planning application. The inherent mitigation measures include:

- selecting a prefabricated structure over a non-prefabricated structure; and
- selecting a composite deck over reinforced concrete.

7.4.2 Together, the implementation of the two inherent mitigation measures outlined above are predicted to result in a 24.43 $kgCO_2e/m^2$ reduction in embodied carbon compared to the business-as-usual reference design. This is a reduction of ~2%.

7.4.3 Further, the Outline Construction Environmental Management Plan (CEMP) includes measures that will help to reduce the GHG impacts of construction activity on-site, through use of well-maintained plant, optimisation of construction methods and material use, retaining excavated material within the development area, and implementing best practice waste management.

7.4.4 There is no specific embedded design mitigation for climate risks in the construction phase. However, it is typical for reputable construction contractors to provide effective management of workforce health and safety related to weather conditions, and project programme and construction methods adapted to weather risks (such as waterlogged ground conditions in winter). For construction workers' welfare, good-practice measures drawn from HSE guidance[32] have been recommended for incorporation into the full CEMP.

[32] HSE, undated: Outdoor Working. https://www.hse.gov.uk/temperature/employer/outdoor-working.htm

Operation

7.4.5 The Proposed Development is intended to incorporate a range of mitigation measures to reduce operational GHG emissions from energy use and transport emissions. These are described in the Energy and Overheating Statement, the WLCA Report, the Sustainability Statement and the Transport Assessment which accompany this planning application.

7.4.6 For the purpose of this assessment, it has been assumed that identified feasible measures will be secured by planning condition as appropriate and therefore constitute committed mitigation.

7.4.7 For operational energy use, the intended feasible measures set out in the Energy and Overheating Statement comprise:

- high-performance insulated fabric and low air permeability, including the use of glazing with a low thermal transfer parameter (U-value);
- optimised glazing g-value and external vertical fins to limit unwanted excess summer solar gain, targeting high glazing light transmittance to optimise the use of natural daylight;
- a low Power Use Effectiveness (PUE) is being targeted for the scheme (a measure of a data centre's energy usage efficiency);
- cooling to the data halls will be provided by highly efficient evaporative coolers with supplementary chiller cooling;
- cooling to the office will be provided by electric air source heat pumps;
- heating will be provided through electric air source heat pumps and electric radiators in the limited areas that require them;
- lamps/luminaries to be specified with high efficacy of at least 120 lm/cW in the data halls and 100-120 lm/cW in all other spaces;
- lighting will incorporate efficient lighting controls (e.g. occupancy sensors) where applicable;
- heat recovery on mechanical ventilation;
- 'metering' and 'out-of-range error' reporting is included to enhance the Energy Management System;
- on-site energy generation by solar photovoltaic arrays;
- the use of rainwater harvesting; and,
- a carbon offset payment of the shortfall in regulated emissions, as per the London Plan.

7.4.8 The solar PV panels included in the Proposed Development design are expected to meet around 0.04% of the annual energy demand, which is an equivalent percentage reduction in operational carbon emissions from energy use, as it reduces the consumption of grid-supplied electricity. The embodied carbon of the solar PV panels is included in the WLCA total.

7.4.9 The Applicant has a policy reported in its corporate Carbon Reduction Plan[33] to procure REGO-backed 'green' electricity, having applied this since 2017, and will continue to do so in future.

[33] https://arkdatacentres.co.uk/policies/Ark_Carbon_Reduction_Plan.pdf, accessed December 2024

Under market-based GHG accounting, this can be reported as having zero carbon emissions. However, other than in private wire situations (not applicable to the Proposed Development), location-based GHG accounting to reflect the actual carbon intensity of electricity supplied from the grid should be stated[34]. This is the approach applied in the EIA to assess GHG emission impacts from electricity use prior to potential further mitigation. The Applicant considers that further mitigation through specific half-hourly matched Power Purchase Agreements (PPAs) is likely to be possible in future, which is discussed as additional mitigation in Section 7.6.

7.4.10 The Applicant targets a low Power Use Effectiveness (PUE) ratio. PUE is the ratio of total power demand to IT equipment demand, i.e. measuring the efficiency of the building's non-IT systems, particularly cooling, so a lower ratio is better. For developments that commence construction in 2026, a PUE of no greater than 1.2 is recommended by the UKGBC. The Applicant considers that a PUE of 1.2 will be achievable for the Proposed Development based on the typical operating temperatures for IT equipment that must be maintained in its existing facilities, which is around 28–32°C. The temperature at which IT equipment must be maintained affects the efficiency of the cooling system, which can reject heat to external air or water more efficiently the greater the differential is between target IT equipment temperature and ambient temperature.

7.4.11 However, if tenant IT equipment cooling needs were to change, for example requiring an operating temperature in the range of around 20–24°C as was common in the past, then the Applicant considers that a PUE of <1.2 may not be achievable.

7.4.12 While a PUE of <1.2 therefore cannot necessarily be guaranteed, it has been treated as embedded mitigation because it does represent the intended design case and is considered feasible by the Applicant based on its experience with existing tenants' IT equipment cooling needs. As it cannot be inherently guaranteed through the design, an appropriately worded planning condition reflecting the nuance of tenants' IT cooling needs would be required to secure this mitigation.

7.4.13 The Applicant intends to use biofuel (hydrogenated vegetable oil) as a fuel source for the standby generators, subject to there being sufficient sustainable supply available. HVO emits over 80% less CO_2e relative to 100% mineral diesel on a lifecycle basis. While the Air Quality ES chapter has assessed diesel use as the worst-case for air pollutant emissions, this is a conservative approach for maximum hourly concentration impacts. For assessing annual GHG emission impacts, treating HVO as embedded mitigation is reasonable as this is in line with the Applicant's corporate carbon policy and existing practice for datacentres.

7.4.14 GHG emissions from standby generation recorded across the Applicant's sites in 2019-2023 (reported in the Applicant's corporate Carbon Reduction Plan[35]) have ranged from 5 tCO_2e to 192 tCO_2e and the Applicant has a target of 16 tCO_2e/annum across all its sites by 2030.

7.4.15 Using HVO cannot be guaranteed in all circumstances, because in a widespread emergency power situation, HVO supplies might be limited and some diesel use could be required. However, this would not represent normal operation for standby generator testing and occasional use. As such, providing it is secured by an appropriately worded planning condition, this has been considered to be embedded mitigation.

[34] In the GHG Protocol guidance, cited above, used in this assessment; and under the UK Government's Environmental Reporting Guidelines: https://assets.publishing.service.gov.uk/media/67161e8696def6d27a4c9ab3/environmental-reporting-guidance-secr-march-2019.pdf, accessed 14/03/25
[35] https://arkdatacentres.co.uk/policies/Ark_Carbon_Reduction_Plan.pdf, accessed December 2024

7.4.16 The choice of evaporative cooling system for the Proposed Development means that a relatively small refrigerant charge is required for the HVAC system compared to the Applicant's other datacentres, which mitigates the potential impact of refrigerant gas leakage. However, like PUE, this will be subject to the expected operating temperatures, as described in para 7.4.11.

Commented [PS1]: This only holds true if higher operating temperatures are maintained. If operating temperatures of 20-24oC are required, we will need more FGas to meet the higher cooling demand, hence the additional sentence added

7.4.17 As noted in the Transport Assessment, the Proposed Development will result in a net decrease in trip generation against the previous use. Further, a recent consented scheme for Blocks 1-3 of Union Park, which is immediately adjacent to the site, will introduce widenings to provide a standard footway width for pedestrians to access the nearest bus stop and the existing canal link has been removed and replaced with a new pedestrian cycle link on the east side of North Hyde Garden bridge, which will allow direct access to the railway station, thus maintaining this route. A Travel Plan is also to be implemented for the Proposed Development to encourage modes of transport other than private car use.

7.5 Potential Effects Prior to Additional Mitigation

Construction Phase

Impact Magnitude

Building Envelope GHG Emissions

7.5.1 Construction of the Proposed Development will cause direct and indirect GHG emissions from the fuel and energy used by construction plant and in the 'embodied carbon' of materials used. The embodied carbon refers to the indirect emissions in the supply chain for those materials; extracting and transporting the raw materials, manufacturing them into products, and delivery of those products to site.

7.5.2 Construction-phase GHG emissions have been calculated by HDR, the project engineers, in their WLCA, the results of which are presented in a WLCA report and the Greater London Authority (GLA) WLCA template submitted alongside the planning application. The WLCA has calculated GHG emissions for lifecycle modules A1-A5 for the entire building envelope to shell and core stage, excluding the fit-out of the data centre, i.e. excluding emissions resulting from the installation of tenants' IT equipment. Details of the WLCA and GHG emission calculations are given in Appendix 7.1: GHG Emission Calculations.

7.5.3 The WLCA calculates that GHG emissions could be in the order of 41,044 tCO_2e. This equates to an embodied carbon intensity of 1,217 $kgCO_2e/m^2$.

'Fit-out' GHG Emissions

7.5.4 The embodied carbon of IT equipment within the datacentre has been excluded from the scope of the WLCA. An estimation of the materiality of excluded items to the total carbon impact is not provided. For the purpose of EIA it is necessary to include direct and indirect impacts insofar as these are material and it is proportionately possible to do so from available information, whether quantitatively or qualitatively. Fit-out of the datacentre with IT equipment (and refreshes of that equipment during its operating lifetime) is an indirect impact of the development from the embodied carbon of the equipment, i.e. causing GHG emissions from its manufacture, primarily overseas.

7.5.5 The specific IT equipment that will be installed in the Proposed Development is not known at this stage. It would depend on tenants' needs for particular computing workloads. An estimate has therefore been made based on review of open-access studies. Measuring the embodied carbon of high-performance computing equipment in datacentres is an emerging area of research, with relatively high uncertainty that is compounded by scaling published study

conclusions to the Proposed Development. The estimates are discussed in Appendix 7.1, but vary over two orders of magnitude: from tens of thousands of tonnes of CO_2, to hundreds of thousands, to possibly over one million tonnes using the results from one study.

7.5.6 Two qualitative conclusions are therefore drawn. Firstly, it is clear that the embodied carbon of IT equipment is likely to make a material contribution to the whole-life carbon impact and hence contribute to the significance of effect. The best estimate is that it is likely at the minimum to be comparable to the embodied carbon of the buildings to shell & core stage, or to the emissions from at least a year's electricity use in operation. It could, possibly, be very substantially greater. This is particularly the case when considering the likelihood of it being regularly replaced or upgraded in use, meaning the in-use replacement impacts (module B4 in LCA terminology) could come to outweigh the initial embodied carbon (modules A1-A5).

7.5.7 Secondly, while total direct and indirect GHG emissions caused by the Proposed Development are a matter for the significance of effect under the EIA Regulations, and hence a factor in the planning balance, it is difficult to see how the embodied carbon of IT equipment can be mitigated by the Applicant. This depends on the choice of equipment and supplier by tenants of the datacentre in due course. However, there is an opportunity for tenants to be aware of this impact and to engage with suppliers to request Environmental Product Declarations (EPDs) to inform their purchasing choice. This is likely to be of interest to tenants who will have both voluntary CSR and mandatory corporate carbon disclosure duties.

Construction Traffic

7.5.8 The Construction Management and Logistics Plan (CMLP) accompanying the planning application summarises the average daily trip generation figures for construction related HGV journeys for the demolition and construction period which have been calculated based on volumes of demolition material/excavated waste material, together with imported concrete, piling and cladding, as well as for the fit-out period. These have been multiplied up to annual figures based on the delivery times established for the Proposed Development, outlined within the CMLP (Monday-Friday only). This amounts to 252 days of annual construction i.e. representing a 5-day workweek and excludes bank holidays as is a requirement in London Borough of Hillingdon[36].

7.5.9 The CMLP does not indicate a typical HGV haulage distance and so an assumed 1-way distance of 25 km has been used for the purposes of this assessment. Emission factors for transport have been taken from the Defra and DESNZ company reporting factors including scope 3 upstream emissions[37]. Large rigid non-refrigerated HGVs of >33t GVW have been assumed. A nominal 50% lading factor is assumed, to account for differing fuel economy with laden and unladen inbound and outbound trips.

7.5.10 Construction-phase transport emissions are estimated to be 143 tCO_2e/annum.

Significance of Effect

Building Envelope GHG Emissions

7.5.11 Paragraph 7.2.46 defined three ways in which GHG impact magnitude could be contextualised to aid in determining significance of effects: as a percentage of local carbon budgets; by

[36] LB Hillingdon (2023): Noise nuisance. [Online] Available at: https://www.hillingdon.gov.uk/article/5157/Commercial-industrial-and-construction-noise, accessed 11/03/2025
[37] DESNZ (2024): Greenhouse gas reporting: conversion factors 2024. [Online]. Available at: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2024, accessed 11/03/2025

comparison to benchmarked emissions intensity; and with reference to whether the impact is in line with national net zero- and Paris Agreement-compatible policy goals for carbon reduction.

7.5.12 The existing total GHG emissions baseline in 2022 in Hillingdon (see Appendix 7.1) is 1,510,457 tCO_2e/annum, or 1,201,813 tCO_2/annum if excluding sources considered to be outside the authority's influence. The construction-stage embodied GHG emissions of 41,044 tCO_2e (divided over 2 years from 2026-2028) would be equivalent to 1.36% of the present-day baseline annual emissions in the local authority area, or 1.72% if excluding sources considered to be outside the authority's influence.

7.5.13 The recommended future carbon budget for Hillingdon (see Appendix 7.1) is approximately 1,090,000 tCO_2 in total for the 2026-2028 construction period. The construction-stage embodied GHG emissions would be equivalent to 3.78% of this budget.

7.5.14 While the UK national carbon budgets do not provide a useful scale of context for individual development emissions, the trajectory of GHG reductions towards the UK's net zero goal that they define is relevant: the Fourth Carbon Budget (2023-27) and Fifth Carbon Budget (2028-32) require a 23% and 32% national reduction respectively compared to the baseline period of the Third Carbon Budget (2018-22). On the assumption of a business-as-usual approach, the Proposed Development may not include measures to reduce its construction-stage impacts in line with this trajectory, with the committed mitigation being a ~2% reduction.

7.5.15 National and local policy and expert guidance, referenced in at the start of this chapter, requires *"radical reductions in GHG emissions"* in the UK economy and built environment. Advice from the Climate Change Committee is that that buildings remain the UK's second-highest emitting sector and there is a need for a significant increase in the pace of emission reductions and on-the-ground delivery of policy measures to achieve the UK's net zero emissions. With an assumed business-as-usual approach, absent further mitigation, this would not be achieved by the Proposed Development during its construction phase.

7.5.16 The London Plan Guidance: Whole Life-Cycle Carbon Assessments notes that all developments are expected to compare their WLC baseline against the most relevant benchmark of those listed in Appendix 2 of the guidance. Benchmarks are provided for the following building types:

- offices;
- residential;
- schools, universities etc.; and
- retail.

7.5.17 The WLCA undertaken for the Proposed Development assesses the emissions against the offices benchmark because datacentres are not covered by the GLA benchmarks. The Proposed Development's embodied carbon intensity of 1,217 $kgCO_2e/m^2$ (see paragraph 7.5.3) is greater than the LPG WLCA benchmark for offices of <950 $kgCO_2e/m^2$ and than the aspirational benchmark of <600 $kgCO_2e/m^2$. It is larger than the RIBA 2025 and 2030 targets of <970 $kgCO_2e/m^2$ and <750 $kgCO_2e/m^2$ for offices, and much larger than the LETI 2020 and 2030 good performance targets of <500 $kgCO_2e/m^2$ and <300 $kgCO_2e/m^2$ for offices.

7.5.18 Notwithstanding the GLA's guidance and the WLCA's consequent approach, offices buildings are not necessarily an appropriate embodied carbon benchmark for datacentre buildings. The UKGBC Net Zero Carbon Building Standard has an embodied carbon target specific to datacentres, which for developments with works commencing on site in 2026, is

≤705 kgCO_2e/m^2. Again, the Proposed Development's embodied carbon intensity is substantially greater than this.

7.5.19 Taking all of these contextual factors into consideration, and in line with the significance of effect definitions set out in paragraph 7.2.47 and the high sensitivity of the receptor, it is judged that the Proposed Development could have a **major adverse** construction-stage effect that is **significant**, prior to further mitigation.

7.5.20 Recommended further mitigation to potentially reduce the magnitude of impact and significance of effect is discussed in Section 7.6, below.

'Fit-out' GHG Emissions

7.5.21 Considering also the embodied carbon of IT equipment installed in the datacentre in due course, this is likely to be at least as much as the embodied carbon of the buildings to shell & core stage, and potentially very much greater, although this is subject to high uncertainty. As such, and prior to further mitigation, it would contribute to the **major adverse**, **significant** effect.

7.5.22 Recommended further mitigation to potentially reduce the magnitude of impact and significance of effect is discussed in Section 7.6, below.

Construction Traffic

7.5.23 The existing total GHG emissions baseline in 2022 in Hillingdon (see Appendix 7.1) the transport sector is 591,716 tCO_2e/annum.

7.5.24 As noted earlier, construction transport GHG emissions are estimated to be 143 tCO_2e/annum. This is equivalent to 0.02% of the present-day baseline annual local authority emissions in the transport sector. The construction transport GHG emissions area also equivalent to less than 0.001% of Hillingdon's recommended future emissions budget in the assumed years of construction (2026-2028).

7.5.25 It is not possible from the information available to benchmark this as a carbon intensity or to estimate a transport emissions reduction at the Proposed Development compared to a business-as-usual approach.

7.5.26 The construction traffic at 143 tCO_2e/annum would contribute to the adverse effect of the construction phase overall, but is making a very small contribution relative to the embodied carbon so its significance has not been separately evaluated.

7.5.27 Recommended further mitigation to potentially reduce the magnitude of impact and significance of effect is discussed in Section 7.6, below.

Operational Phase

Impact Magnitude

7.5.28 The main emission sources in the operational phase would be from generating and supplying energy used in the buildings by tenants (other than that provided on-site by the PV panels), from fuel and electricity used in vehicles for workforce access, from standby generators, which are required to meet the electrical demand for the data centre in the event of an emergency power outage and during testing, and from leakage of refrigerant gases used within the chillers of the data centre's HVAC system.

7.5.29 Supply of potable water, treatment of wastewater and treatment of commercial waste from tenants are all also associated with indirect GHG emissions. However, the carbon intensity of

water supply and wastewater management is low relative to energy and transport, so this has been considered *de minimis* and excluded from further assessment (see Appendix 7.1). Waste generation rates are very uncertain to estimate before tenants are known, but data centre-type uses generating card and plastic waste would have largely recyclable waste streams. This is judged unlikely to be a material source of emissions relative to energy and transport, and has not been assessed further.

7.5.30 Finally, there would also be embodied carbon from maintenance and refurbishment work during the buildings' lifetime, captured within the B1-4 stages in the terminology used to describe WLCA undertaken for the building envelope. The embodied carbon emissions from maintenance and refurbishment work would be dependent on tenant choices and is difficult to estimate at this planning stage. The WLCA estimates this as a 1.25% uplift on the construction-stage (A1-A5) impacts, which would be *de minimis*. Given the UK trajectory of decarbonisation to 2050, future refurbishment of the building envelope (excluding IT equipment) is likely to have substantially lower carbon intensity than the initial construction stage, so has not been separately estimated in this assessment.

7.5.31 As discussed above, it is clear that the embodied carbon of IT equipment installed by tenants is likely to make a material contribution to the operational carbon impact considering the likelihood of it being regularly replaced or upgraded in use, meaning the B4 stage impacts could come to outweigh the initial A1-A5 embodied carbon. This was discussed above through analysis of the three life-cycle studies referenced and is not assessed separately.

7.5.32 Details of GHG emission calculations are given in Appendix 7.1: GHG Emission Calculations.

7.5.33 Consistent with the Energy and Overheating Statement submitted alongside this planning application, the total operational electricity consumption emissions, incorporating fabric measures and renewable energy technology as described in the Energy and Overheating Statement, could equate to **41,043 tCO_2e/annum.** The operational phase GHG emissions of 41,043 tCO_2e/annum equates to a whole-site energy use intensity of **17,283 kW/m²/annum** and a carbon intensity of **2.35 tCO_2/m^2/annum**.

7.5.34 This is calculated using the carbon intensity of grid electricity supply specified by Building Regulations Part L 2021, which is 0.136 $kgCO_2e$/kWh. As discussed in Appendix 7.1, the Part L emissions factor is about half the actual present-day grid-average carbon intensity of electricity supply, which is 0.275 $kgCO_2$/kWh including supply chain and transmission & distribution losses, as specified by DESNZ for company reporting in the UK in 2024 (latest year available). As such, use of the Part L factor is considered to be reasonably representative of the likely future decarbonisation of grid-supplied electricity by the Proposed Development's opening year, as opposed to using a more worst-case assessment based on a present-day emission factor.

7.5.35 The carbon intensity of electricity supply from the grid is likely to become lower over the Proposed Development's lifetime as national measures to reduce this continue to take effect. The Applicant is intending to use half-hourly matched low/zero carbon PPAs for the Proposed Development to influence that, procuring a low-carbon electricity supply, which is discussed further in the potential additional mitigation in in Section 7.6, below.

7.5.36 The Transport Assessment accompanying the planning application provides daily trip generation figures for the Proposed Development. These have been multiplied up to annual figures on a conservative (maximum-case) basis assuming 252 days of annual vehicle trips (i.e. weekdays, excluding bank holidays). Operational transport emissions are estimated to be **38 tCO_2e/annum**. This is based conservatively on present-day emissions factors (including

current electric vehicle use), and may become lower over the Proposed Development's lifetime, particularly with the expected phase-out of new petrol and diesel light vehicle sales in the 2030s.

7.5.37 The assessment of GHG emissions from standby generators used data from Chapter 6: Air Quality, which notes that fourteen 8.01 MW_{th} Rolls Royce MTU DS4000 20V4000 G94LF standby generators are proposed. The GHG emissions associated with the supply and combustion of hydrogenated vegetable oil (HVO) by the 14 standby generators for an estimated 31.7 hours per year (see Appendix 7.1 for details) would equate to **222 tCO_2e/annum.**

7.5.38 Finally, the assessment of GHG emissions associated with leakage of refrigerant gas (F-gas) from the HVAC systems of the Proposed Development have been assessed using data presented in the WLCA report. The WLCA report assumes that the R410a F-gas will be used for all systems, which has a Global Warming Potential (GWP) of 2088 with the AR4[38] GWPs used by the WLCA. The WLCA predicts an annual leakage rate of 1%. The GHG emissions associated with F-gas leakage could therefore equate to **15 tCO_2e/annum.** A 1% leakage assumption is in line with the Applicant's corporate Carbon Reduction Plan, which targets achieving this leakage rate for all sites by 2030.

Significance of Effect

7.5.39 Paragraph 7.2.46 defined three ways in which GHG impact magnitude could be contextualised to aid in determining significance of effects: as a percentage of local carbon budgets; by comparison to benchmarked emissions intensity; and with reference to whether the impact is in line with national net zero- and Paris Agreement-compatible policy goals for carbon reduction.

7.5.40 The existing total GHG emissions baseline in 2022 in Hillingdon (see Appendix 7.1) for the commercial sector is estimated to be 307,495 tCO_2e/annum. The total local authority area emissions are greater at 1,510,457 tCO_2e/annum, or 1,201,813 tCO_2e/annum if excluding sources considered to be outside the authority's influence.

7.5.41 As discussed above, the estimated GHG emissions from energy use in operation for the Proposed Development are 41,043 tCO_2e/annum using the Building Regulations Part L grid carbon intensity figure. This is equivalent to 13.35% of the present-day baseline annual local authority emissions in the commercial sector.

7.5.42 The UK's national carbon budgets are broken down into devolved administration targets but not further to a regional or local authority level. However, the Tyndall Centre for Climate Change Research[39] has recommended local authority-specific carbon budgets up to 2100 that, in its research, are considered to be an equitable distribution and compatible with a 1.5°C-aligned trajectory for the UK. The Tyndall Centre carbon budgets sum to being more stringent than the UK national budgets: the carbon budget for Hillingdon would result in achieving zero or near zero carbon by 2043 at a carbon reduction rate of -12.5% per year from a 2020 baseline[40].

[38] IPCC (2007): Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A. (eds.)]. IPCC, Geneva, Switzerland, 104 pp. [Online]. Available at: https://www.ipcc.ch/report/ar4/syr/, accessed 11/03/2025
[39] Kuriakose, J *et al* (2022): Setting Climate Commitments for Hillingdon: Quantifying the implications of the United Nations Paris Agreement. Tyndall Centre. [Online] Available https://carbonbudget.manchester.ac.uk/reports/E07000196/, accessed 11/03/2025
[40] The Tyndall Centre defines zero or near zero carbon as achieving CO_2 levels >96% lower than in the Paris Agreement reference year of 2015, excluding non-CO_2 GHGs and aviation and shipping emissions. The carbon budgets are for energy-related CO_2 emissions only.

7.5.43 Considering the recommended Hillingdon emissions budget in the opening year (320,000 tCO_2e/annum during the period 2028-2032), the GHG emissions impact of operational energy use would be equivalent to 12.83% of this.

7.5.44 The combined operational GHG emissions from energy use, standby generators, F-gas leakage and operational transport are estimated to be 42,272 tCO_2e/annum. This is equivalent to 13.43% of the present-day baseline annual local authority emissions in the commercial sector. It also equates to 12.91% of the opening-year recommended emissions budget for Hillingdon.

7.5.45 While UK national carbon budgets do not provide a useful scale of context for individual development emissions, the trajectory of GHG reductions towards the UK's net zero goal that they define is relevant: the Fourth Carbon Budget (2023-27) and Fifth Carbon Budget (2028-32) require a 23% and 32% national reduction respectively compared to the baseline period of the Third Carbon Budget (2018-22). The Proposed Development's embedded mitigation would not provide percentage reductions in its impact that are in line with this trajectory.

7.5.46 The GLA's guidance followed in the Energy and Overheating Statement requires the energy use intensity (EUI – kWh/m^2/annum) of the Proposed Development, 17,581 kWh/m^2/annum, to be compared to the target of 55 kWh/m^2/annum for an office building (consistent also with LETI and RIBA targets for this type of building). As noted in the Energy and Overheating Statement, comparing to EUI benchmarks or targets is not very meaningful for a datacentre because of the exceptionally high energy demand per m^2 from IT equipment, compared to other types of building.

7.5.47 The UKGBC Net Zero Carbon Buildings Standard recognises this difficulty and recommends instead a Power Use Effectiveness (PUE) target, which is the ratio of total power demand to IT equipment demand, i.e. measuring the efficiency of the building's non-IT systems, particularly cooling. For developments that commence construction in 2026, a PUE of 1.2 is recommended by the UKGBC. The Energy and Overheating Statement states that the Proposed Development is targeting a low PUE, but does not specify a committed or target figure. However, as discussed in the embedded mitigation (Section 7.4, above), the Applicant considers that the design would provide for a PUE of <1.2 provided that tenants' IT equipment operating temperatures are as expected, and this is intended to be secured through an appropriately worded planning condition.

7.5.48 GHG emissions from a proportion of residual regulated energy use for the Proposed Development are expected to be offset through an agreed payment to the council's offsetting fund as set out in the Energy and Overheating Statement. However, in line with the GLA guidance, this is benchmarked to a much lower energy use intensity than predicted for the Proposed Development and only includes regulated energy, so the carbon offset payment will only apply to circa 0.5% of the total energy use emissions.

7.5.49 A proportion of energy use will also be mitigated through generation by on-site solar PV panels. However, this will only mitigate around 0.04% of total energy use emissions, and will also have a payback period for the embodied carbon of the PV panels.

7.5.50 The total quantum of refrigerant gas stated to be required for the Proposed Development is small, and combined with a predicted leakage rate of 1% in line with the Applicant's corporate policy, this suggests minimal impact from fugitive F-gases.

7.5.51 The Proposed Development is in an urban location with good access to active travel and public transport services, which mitigates likely transport emissions, and these are predicted to form a very minor part of the total operational impact.

7.5.52 The purpose of a datacentre development is to provide the physical infrastructure – secure building space, energy supply and cooling – for high-performance computing, which by its nature is very energy intensive. The grid electricity supply connection and standby generators of the Proposed Development are sized to meet this high energy demand, which is not within the Applicant's control to mitigate, being dependent on datacentre tenants' computing needs.

7.5.53 It is not feasible within the Site to install low/zero carbon generation sources at a scale to meet a meaningful fraction of the energy demand. However, the PUE target, plan to procure half hourly matched low/zero carbon energy supplies, use of HVO, low refrigerant gas charge and sustainable location with respect to travel, do provide a degree of mitigation for operational GHG emissions.

7.5.54 Taking these contextual factors into consideration, and in line with the significance of effect definitions set out in paragraph 7.2.47 and the high sensitivity of the receptor, it is judged that the Proposed Development would have a **moderate adverse** effect from operational GHG emissions that is **significant**.

7.5.55 Recommended further mitigation to potentially reduce the magnitude of impact and significance of effect is discussed in Section 7.6, below.

7.6 Additional Mitigation

7.6.1 The preceding sections have set out the scientific and policy context requiring new development to mitigate GHG emissions. As explained in Section 7.5, prior to additional mitigation, both the construction and operation of the Proposed Development would result in adverse climate change effects that are significant. Embedded mitigation measures that can be quantified from information in the WLCA and the Energy and Overheating Statement would amount to less than a 2% reduction for the construction phase and around a 1% reduction for the operational phase compared to the business-as-usual design, although the PUE target also contributes to mitigating operational phase energy emissions which would be higher if the PUE were greater.

7.6.2 Accordingly, further good-practice mitigation measures are recommended for the construction stage of the Proposed Development where potentially significant adverse effects were identified, for incorporation within the detailed design and construction plan. These measures are intended to secure the embedded mitigation assumed and where necessary go further to enable the development to effectively mitigate GHG emissions.

7.6.3 Further good-practice mitigation measures are also recommended for the operational stage of the Proposed Development where potentially significant adverse effects were identified from operational energy use and where there is an opportunity to further reduce F-gas leakage impacts.

7.6.4 This would be in line the Local Plan policies listed in Section 7.2 to mitigate GHG emissions. It would also be in line with the NPPF objectives to shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience to climate change.

Construction Phase

GHG Emissions Mitigation Approach

7.6.5 A significant adverse effect from construction has been predicted prior to further mitigation.

7.6.6 To mitigate embodied carbon impacts, a recognised framework should be used to set an appropriate emissions intensity target, to guide design, procurement and construction decisions

accordingly, and to monitor and report on its achievement. This would go further than the GLA's planning-stage WLC requirement which, being benchmarked to office developments, does not apply well to the Proposed Development. It would be in line with the Local Plan policy EM11 "*The Council will ensure that climate change mitigation is addressed at every stage of the development process by: … – Ensuring development meets the highest possible design standards whilst still retaining competitiveness within the market…"*

7.6.7 The UKGBC published a framework definition for net zero buildings[41] to define a target for substantially reduced or net zero emissions from construction, including use of offsetting for residual emissions if necessary. The pilot version of the full UK Net Zero Carbon Buildings Standard has now been published in September 2024[42], which builds on the UKGBC framework by setting recommended embodied carbon limits and performance standards, starting with 2025 as a baseline and ratcheting down the emissions performance in line with a sector-specific trajectory to net zero (compatible with the UK's national commitments), including for data centres.

7.6.8 This is a suitable standard to follow in order to achieve effective mitigation of construction-stage impacts for the Proposed Development's construction in 2026-2028. Its approach is consistent with the methodology for measuring and reducing whole-life carbon in the RICS, LETI and RIBA guidance referenced within the London Plan Guidance: Whole Life-Cycle Assessments and includes a good-practice embodied carbon target tailored to datacentre developments.

7.6.9 The UKGBC Net Zero Carbon Building Standard embodied carbon target for datacentres with works commencing on site in 2026 is to achieve ≤705 $kgCO_2e/m^2$.

7.6.10 To identify the specific means of making further embodied carbon reductions for this target, an update to the whole life carbon assessment (WLCA) for the Proposed Development should be undertaken prior to RIBA Stage 4 – Technical Design, when more detailed information is available regarding the materials to be used within the construction of the Proposed Development. It should be informed by the carbon hotspots and potential reduction opportunities identified in the current WLCA report. This assessment should follow the Net Zero Carbon Buildings Standard and RICS guidance *'Whole Life Carbon Assessment (WLCA) 2nd Edition'*[43] (or any update prevailing at the time).

7.6.11 The embodied carbon of tenants' IT equipment has also been estimated as likely to contribute materially to the significant adverse effect predicted, but with a high uncertainty range and being dependent on the choice of equipment and supplier by tenants of the datacentre in due course. There is an opportunity for tenants to be aware of this impact and to engage with suppliers to request Environmental Product Declarations (EPDs) to inform their purchasing choice.

7.6.12 It is therefore recommended that notice is given to tenants about the embodied carbon of IT equipment prior to occupation, explaining that this was estimated to be at least equivalent to that of the buildings and M&E systems or to a year's energy use. This is likely to be of interest to tenants who will have both voluntary CSR and mandatory corporate carbon disclosure duties and can prompt consideration of carbon reduction through IT procurement decisions.

[41] UKGBC (2019): Net Zero Carbon Buildings Framework (and subsequent implementation guidance and technical notes). [Online] Available at: https://ukgbc.org/resources/net-zero-carbon-buildings-framework/, accessed 13/03/2025
[42] UK Net Zero Carbon Buildings Standard (2024), https://www.nzcbuildings.co.uk/pilotversion, accessed 13/03/2025
[43] RICS (2023): Whole life carbon assessment for the built environment. 2nd edition. [Online] available at: https://www.rics.org/profession-standards/rics-standards-and-guidance/sector-standards/construction-standards/whole-life-carbon-assessment, accessed 13/03/2025

7.6.13 Finally, the Applicant has used electric cranes for work on the adjacent datacentre developments and considers that this could be feasible for the Proposed Development as well. A requirement to use electric construction plant, where this is available and suitable for the site, should therefore be included within the final CEMP for the Proposed Development.

Roles and Responsibilities

7.6.14 PAS2080 and associated guidance from the ICE[44] and the CLC[45] provide a helpful structure for roles and responsibilities at each project stage. While these standards are applicable to infrastructure developments, the structure of roles and responsibilities is considered to be useful and relevant to major developments of any type. In brief, the suggested structure of roles and responsibilities is likely to mean that at the current early design stage, the Applicant's responsibility as the project owner and initial designer is to:

- take account of whole-life carbon in decision-making and procurement;
- apply the carbon reduction hierarchy (avoid/switch/improve);
- set a clear carbon vision, leadership and initial carbon reduction target for the works; and
- not over-constrain the design specification too early, which may limit carbon reduction and innovation opportunities.

7.6.15 Carbon management should be set as a factor in the procurement decision for appointing a design and construction contractor or for managing an internal delivery team. This could be on the basis of a contractor's or internal team's own performance record, documented corporate strategy and targets for moving towards net zero, and/or specific carbon management and innovation questions at tendering stage.

7.6.16 At the further design and delivery stage, the lead responsibility for managing carbon and achieving reductions will typically transition to the appointed design and construction contractor or internal delivery team, with the project owner being in a monitoring role.

Climate Resilience and Adaptation

7.6.17 As noted in paragraph 7.4.4 above, construction industry working practices are considered to be adapted to weather extremes likely to be experienced in the 2026-2028 construction period and so no significant adverse effects were predicted, with good-practice health and wellbeing measures drawn from HSE guidance[46] being recommended for incorporation into the final CEMP. These are as follows and should be adopted into the final CEMP.

Cold Environments

- Ensure the personal protective equipment issued is appropriate
- Provide mobile facilities for warming up, and soup or hot drinks
- Introduce more frequent rest breaks

[44] ICE, 2023: Guidance Document for PAS2080. Available at https://www.ice.org.uk/media/vm0nwehp/2023-03-29-pas_2080_guidance_document_april_2023.pdf, accessed 06/02/24
[45] CLC, undated: Guidance Document for PAS2080. Available at https://www.constructionleadershipcouncil.co.uk/wp-content/uploads/2019/06/Guidance-Document-for-PAS2080_vFinal.pdf, accessed 06/02/24
[46] HSE, undated: Outdoor Working. https://www.hse.gov.uk/temperature/employer/outdoor-working.htm, accessed 31/03/25

- Consider delaying the work until warmer times of the year without compromising on safety
- Make sure workers can recognise the early symptoms of cold stress, such as a cough or body aches

Hot Environments

- Reschedule work to cooler times of the day where needed
- Provide more frequent rest breaks and introduce shading to rest areas
- Provide free access to cool drinking water
- Introduce shading in areas where people are working
- Encourage workers to remove personal protective equipment when resting to help encourage heat loss
- Make sure workers can recognise the early symptoms of heat stress

Operational Phase

Energy

7.6.18 A significant adverse effect due to energy use has been predicted prior to further mitigation.

7.6.19 As noted in the assessment section, the inherent purpose of a datacentre development is to host a very energy intensive activity. Much of the demand is not within the Applicant's control to mitigate, being dependent on datacentre tenants' computing needs. The <1.2 PUE target as committed mitigation specified in Section 7.4 would limit the amount of power used on cooling and other building services, which is partly within the Applicant's control through design, but also depends on the temperature to which tenants require their IT equipment to be cooled. It is not feasible within the Site to install low/zero carbon generation sources to meet a meaningful fraction of the energy demand, shown in the Energy and Overheating Statement.

7.6.20 As required by Policy SI2 of the London Plan, where it is clearly demonstrated that the zero-carbon target cannot be fully achieved on-site, i.e. through the inherent mitigation measures outlined within the Energy and Overheating Statement which accompanies this application, an offset payment to the local borough council's offset fund is required. A payment of £602,149 is proposed in the Energy and Overheating Statement to offset the shortfall in CO_2 emissions from regulated energy use in operation. However, this offset only applies to energy use constituting around 0.5% of the total predicted energy demand of the Proposed Development. Carbon offsetting is a recognised mitigation measure, but sits at the bottom of the IEMA mitigation hierarchy, meaning that it is preferable to explore means to avoid and reduce GHG emissions before offsetting is considered for residual emissions.

7.6.21 The Applicant has a corporate policy to procure REGO-backed 'green' electricity for its own operations. If such a policy were applied to the Proposed Development including the unregulated energy demand from tenants' equipment, this could be regarded as further mitigating a proportion of the electricity use emissions under market-based GHG accounting. It is possible that tenants may have such corporate policies themselves. While procuring a green electricity tariff is a part of many corporate sustainability strategies and sends a market signal encouraging investment in renewable energy in the UK, it does not directly affect the actual carbon intensity of electricity supplied from the grid to the Proposed Development nor offer clear additionality of investment in low/zero carbon generation that is attributable to the Proposed

Development. As a commercial matter it may also not be possible to secure via planning condition. As such, this has not been recommended here as a further EIA mitigation measure secured through the planning permission to reduce residual effects.

7.6.22 The Applicant has an aspiration to support investment in low/zero carbon electricity supply for its developments more directly by entering into half-hourly matched low/zero carbon Power Purchase Agreements (PPAs). As firm long-term contracts for a specific low-carbon energy supply, these can provide bankability to third party lenders for investment in developers' additional low/zero carbon generation projects. Unlike a private wire supply, the electricity under a PPA is still delivered into the grid, but the PPA provides clearer evidence of additionality of new low/zero carbon baseload generation with direct attribution of this to the Applicant. The Applicant has in mind supporting development of small modular nuclear reactor developments, among other potential sources.

7.6.23 This PPA route addresses the fact that it is typically not practical to provide significant low/zero-carbon electricity generation on or in the vicinity of an application site for a datacentre. Supporting additional investment in half-hourly matched off-site low/zero carbon generation sources via a bankable PPA offers a means to not only obtain 100% zero carbon energy 100% of the time for the facility but also to help reduce the carbon intensity of grid-supplied electricity to the benefit of the datacentre sector and a means to reduce the risk that additional demand from datacentres compromises the UK's policy goal to decarbonise grid electricity by the early 2030s.

7.6.24 Again, as a commercial matter and being dependent on third parties' activities in future, the mitigation potential of a PPA supporting small modular reactor (or other half hourly matched low/zero carbon generator) development may also not be possible to secure via planning condition. As such, this has not been recommended as a further EIA mitigation measure secured through the planning permission to reduce residual effects. However, the potential for it has been discussed in the residual effects at Section 7.7, below.

Transport

7.6.25 The embedded mitigation for operational transport, as set out in the Transport Assessment, is predicted to lead to minimise GHG emission effects from this source. On the assumption that the mitigation measures proposed through Transport Assessment are secured, no further specific mitigation measures are required.

Standby Generators

7.6.26 The embedded mitigation for GHG emissions from this source is use of HVO, which emits over 80% less CO_2e relative to the typical use of diesel on a lifecycle basis. On the assumption that this embedded mitigation measure is secured, no further specific mitigation measures are required.

Refrigerant Gas Leakage

7.6.27 F-gas leakage in operation is predicted to make a small contribution to the significant adverse effect in operation from the Proposed Development with a 1% leakage rate. R410a, the F-gas assumed at this stage to be use in the HVAC systems of the Proposed Development, has a high GWP of 2088. F-gases with a lower GWP suitable for use in cooling systems of this type are available, such as R1234ze, which has a GWP of 7, i.e. its global warming effect is two orders of magnitude less than that of R410a. Hence, exploring the use of an appropriate F-gas with a lower GWP is recommended as additional mitigation; this also mitigates the risk should greater leakage occur in practice than has been predicted.

7.7 Residual Effects

Construction Phase

Building Envelope and Construction GHG Emissions

7.7.1 With full implementation of the additional mitigation described in Section 7.6 during detailed design, the Proposed Development's effects could be reduced to **minor adverse** and **not significant.**

'Fit-out' GHG Emissions

7.7.2 Even with the additional mitigation outlined above, 'fit-out' of the data centre with IT equipment specific to the needs of the tenants is considered likely still to result in at least a **moderate adverse** and **significant** effect. This conclusion is reached because the embodied carbon of the IT equipment in datacentres is an emerging area of research, with relatively high uncertainty, and mitigation would be dependent on tenants' choices that can be nudged but not controlled.

Operational Phase

Standby Generators

7.7.3 Subject to the embedded mitigation (use of HVO) being secured by appropriately worded planning condition, GHG emission effects from standby generator use would remain **minor adverse** and **not significant**.

Refrigerant Gas Leakage

7.7.4 With full implementation of the additional mitigation noted above, GHG emission effects from the operational leakage of F-gases could be further reduced from minor adverse (not significant) to **negligible** and **not significant**.

Energy

7.7.5 Subject to the embedded mitigation (<1.2 PUE target) being secured by appropriately worded planning condition, GHG emission effects from energy use would remain **moderate adverse** and **significant**.

7.7.6 No further feasible direct mitigation of operational energy use emissions could be proposed to reduce this to a non-significant level. This reflects the difficulty of providing low/zero-carbon electricity generation on or in the vicinity of an application site at a scale to meet a material proportion of the high energy demand inherent in a datacentre development.

7.7.7 However, the Applicant procures REGO-backed 'green' electricity and has an aspiration to more directly support investment in half-hourly matched low/zero carbon electricity supplies for its developments in future by entering into Power Purchase Agreements (PPAs) with low/zero carbon generator developers, such as for small modular nuclear reactors. Supporting additional investment in off-site half-hourly matched low/zero carbon generation sources via a bankable PPA offers a means to not only obtain 100% zero carbon energy 100% of the time for the facility but also to help reduce the carbon intensity of grid-supplied electricity to the benefit of the datacentre sector, and a means to reduce the risk that additional demand from datacentres compromises the UK's policy goal to decarbonise grid electricity by the early 2030s.

7.7.8 As a commercial matter and being dependent on third parties' activities this cannot necessarily form an EIA mitigation measure that can be secured through the planning permission and hence

be relied upon when determining the significance of residual effects. Nevertheless, it should be acknowledged that there is potential through this route for the carbon emissions arising from energy consumption by the Proposed Development to be significantly reduced or potentially nearly eliminated in future.

7.8 Implications of Climate Change

7.8.1 Climate change could cause inter-related effects, in which it exacerbates or ameliorates the effects of the Proposed Development on sensitive receptors (i.e. the inter-related effects of climate change with other environmental impact pathways).

7.8.2 Inter-related effects are effects that interact spatially and/or temporally, resulting in multiple effects, or effects of a greater significance, upon a single receptor. The inter-related effects of climate change can be considered in two categories:

- climate change altering the sensitivity of receptors or the baseline environment, thereby increasing the significance of effects; and,
- climate change modifying an impact pathway, i.e. by changing the magnitude or spatial extent or introducing new receptors.

7.8.3 These have been assessed within the only other technical chapter of the ES, as applicable, under this section heading (Implications of Climate Change).

7.8.4 The main area within the topics scoped in to the EIA where there is a potential for an inter-related effect relevant to the Proposed Development, subject to assessment by the technical lead, is considered to be:

- air pollutant dispersion: a change in prevailing weather patterns and localised changes in atmospheric chemistry could impact air pollutant dispersion, thereby affecting short-term and potentially annual-average concentrations.

7.8.5 The potential nature of inter-related effects is discussed further in Chapter 6: Air Quality.

7.8.6 In addition, clearly there are inter-related effects with flood risk and with overheating risk for the Proposed Development. On the basis that the flood risk assessment submitted with the planning application includes an appropriate allowance for increased rainfall with climate change, and the Proposed Development design includes cooling and shading specified with a view to future climatic conditions (as set out in the Energy and Overheating Statement), climate risk assessment was agreed to be scoped out of the EIA.

7.9 Cumulative Effects

7.9.1 All developments that emit GHGs have the potential to impact the atmospheric mass of GHGs as a receptor, and so may have a cumulative impact on climate change. Consequently, cumulative effects due to other specific local development projects are not predicted individually but are taken into account when considering the impact of the Proposed Development by defining the atmospheric mass of GHGs as a high sensitivity receptor.

7.10 Summary

7.10.1 A summary of the assessment is set out in Table 7.2 overleaf.

7.11 References

- List references used in the assessment

7.12 Assessor information

7.12.1

Chapter	Responsibility	Name	Qualifications	Assessor information
Climate Change	Savills	Miles Ryan-Cummings	BSc; PIEMA; REnvP	Miles has over two years' experience in climate change and greenhouse gas emissions assessments for projects of different scales, within different sectors. He is has Practitioner Membership with the Institute of Environmental Management and is a Registered Environmental Practitioner with the Society for the Environment.
Climate Change	Savills	Tom Dearing	MSc, MIEMA, CEnv	Tom has 15 years' experience of carbon and climate assessment. He is a Chartered Environmentalist, Full Member of IEMA, and co-author of the 2022 IEMA guidance used in this assessment.

Table 7.3 Summary of effects

Receptor	Receptor sensitivity	Description of potential impact	Proposed further mitigation	Residual effect	Significant / not significant
Construction Phase					
Atmospheric concentration of GHGs	High	Indirect GHG emissions from construction material use ('embodied carbon') and delivery, and direct emissions from on-site construction activity, related to the building envelope	Carbon management using UKGBC NZCB standard to achieve the recommended embodied carbon performance target (≤705 $kgCO_2e/m^2$ for development begun in 2026, or as may be updated) consistent with the UK's net zero trajectory, updated lifecycle analysis at the detailed design stage, and monitoring of as-built outcome. Use of electric plant such as cranes, where feasible, during construction.	Could be reduced to **minor adverse**	Could be reduced to **not significant**
Atmospheric concentration of GHGs	High	Indirect GHG emissions from embodied carbon of IT equipment	Notice should be given to tenants about the embodied carbon of IT equipment prior to occupation, explaining that this was estimated to be at least equivalent to that of the buildings and M&E systems or to a year's energy use.	Could be reduced but likely to remain **moderate adverse**	Likely to remain **significant**
Atmospheric concentration of GHGs	High	Direct and indirect GHG emissions from construction traffic	No further mitigation required.	**Minor adverse**	**Not significant**
Construction workforce	High	Health and wellbeing risk from outdoor work during high temperature events	Good practice measures from the HSE to be included in the final CEMP, to secure the embedded mitigation.	**Low risk**	**Not significant**
Operation Phase					

Receptor	Receptor sensitivity	Description of potential impact	Proposed further mitigation	Residual effect	Significant / not significant
Atmospheric concentration of GHGs	High	Indirect GHG emissions from energy consumption	No feasible further direct mitigation identified. However, the Applicant has an aspiration to support investment in half-hourly matched off-site low/zero carbon generation such as small modular nuclear reactors through half-hourly matched Power Purchase Agreements, which could, in time, offer mitigation of energy consumption impact.	**Moderate adverse** However, with the aspiration for this to be reduced in future	**Significant** However, with the aspiration for this to be reduced through the move to half-hourly matched low/zero carbon baseload energy PPAs
Atmospheric concentration of GHGs	High	Indirect GHG emissions from traffic generation	No further mitigation required.	**Minor adverse**	**Not significant**
Atmospheric concentration of GHGs	High	Direct and indirect GHG emissions from fuel combustion by standby generators	No further mitigation required.	**Minor adverse**	**Not significant**
Atmospheric concentration of GHGs	High	Direct GHG emissions from refrigerant gas leakage from the Proposed Development's HVAC systems	Explore feasibility of using a refrigerant gas with a lower GWP than R410a, such as R1234ze.	Could be further reduced to **negligible**	**Not significant**