Homes England

The Housing and Regeneration Agency

West of Ifield, Crawley
Environmental Statement: Volume 1: Main Report

CHAPTER 9: CLIMATE CHANGE
Version 1 - Planning submission

July 2025

9 CLIMATE CHANGE

9.1 Introduction

9.1.1 This chapter of the ES reports on the identification and assessment of likely significant climate change effects to arise from the demolition and construction stage and operational stage of the Proposed Development.

9.1.2 The chapter describes the climate change legislation, policy and guidance framework; the methods used to assess the potential impacts and likely effects; the baseline conditions at the Site and within the study area; the likely climate change effects and the setting out of proposed mitigation measures, where feasible, in respect of any identified likely significant effects; proposed additional mitigation and any enhancement measures where applicable; the significance of residual effects; and inter-project cumulative effects.

9.2 Legislation, Policy and Guidance Context

9.2.1 The assessment has been informed by the following legislation, policies and published guidance:

- International Legislation:
  - The Paris Agreement (2015)[1];
  - Kyoto Protocol (1998)[2];
- National Legislation and Policy:
  - The UK's Nationally Determined Contribution (NDC)[3] , to the United Nations Framework Convention on Climate Change (UNFCCC) (2022)[4];
  - Climate Change Act (2050 Target Amendment) Order (2019)[5], including UK Carbon Budgets[6] [7];
  - National Planning Policy Framework (NPPF) (2024)[8] in particular the following sections:
    - 'Chapter 2 – Achieving sustainable development';
    - 'Chapter 8 – Promoting healthy and safe communities';
    - 'Chapter 9 – Promoting sustainable transport';
    - 'Chapter 12 – Achieving well-designed places';
    - 'Chapter 14 – Meeting the challenge of climate change, flooding and coastal change';
  - UK Climate Change Risk Assessment: Government Report (2022)[9];
  - Building Regulations Approved Document F: Ventilation (2021)[10];

[1] United Nations Framework Convention on Climate Change (UNFCCC), 2015. Paris Agreement. 21st Conference of the Parties. Paris. United Nations.

[2] UNFCCC, 1998. Kyoto Protocol. 11th Conference of the Parties. Montreal. United Nations.

[3] UNFCCC, 2016. Nationally Determined Contribution User Guide. Available at: https://unfccc.int/files/focus/indc_portal/application/pdf/ndc_parties_userguide_version_1__may_2016_(2).pdf. Accessed 15/04/2025.

[4] Department for Business, Energy and Industrial Strategy, 2022. The UK's Nationally Determined Contribution communication to the UNFCCC. Available at: https://www.gov.uk/government/publications/the-uks-nationally-determined-contribution-communication-to-the-unfccc. Accessed 15/04/2025.

[5] Secretary of State, 2019. Climate Change Act 2008 (2050 Target Amendment) Order 2019.

[6] House of Commons Library, 2019. UK Carbon Budgets. House of Commons Library.

[7] Climate Change Committee, 2025. The Seventh Carbon Budget. Available at: https://www.theccc.org.uk/wp-content/uploads/2025/02/The-Seventh-Carbon-Budget.pdf. Accessed 20/05/2025.

[8] Ministry of Housing, Communities and Local Government, 2024, with a minor update in February 2025. The National Planning Policy Framework. Available at: https://assets.publishing.service.gov.uk/media/67aafe8f3b41f783cca46251/NPPF_December_2024.pdf. Accessed 15/04/2025.

[9] UK Government, 2022. UK Climate Change Risk Assessment 2022 (Policy Paper). Presented to Parliament pursuant to Section 56 of the Climate Change Act 2008. Available at: https://www.gov.uk/government/publications/uk-climate-change-risk-assessment-2022. Accessed 15/04/2025.

[10] Ministry of Housing, Communities and Local Government, 2021. The Building Regulations, 2010. Approved Document F: Ventilation. HMSO.

  - Building Regulations Approved Document G: Sanitation, hot water safety and water efficiency (2015)[11];
  - Building Regulations Approved Document H: Drainage and waste disposal (2015)[12];
  - Building Regulations Approved Document L: Conservation of fuel and power (2021)[13];
  - Committee on Climate Change, UK Housing Fit: for the Future? (2019)[14]; and
  - The Future Homes Standard: changes to Part L and Part F of the Building Regulations for new dwellings (2019)[15].
- Regional Policy:
- Local Policy:
  - Horsham District Planning Framework (2015)[16], in particular policies:
    - 'Policy 35 - Strategic Policy: Climate Change';
    - 'Policy 36 - Strategic Policy: Appropriate Energy Use';
    - 'Policy 37 - Sustainable Construction';
  - Horsham District's Climate Action Strategy (2024)[17];
  - Horsham Local Cycling and Walking Infrastructure Plan (LCWIP)[18] (2020);
  - Crawley Local Cycling and Walking Infrastructure Plan LCWIP[19] (2020);
  - Rusper Neighbourhood Plan (2021)[20], in particular Policy RUS3: Design;
- National guidance and industry standards:
  - Planning Practice Guidance – Climate Change (2019)[21];
  - Royal Institution of Chartered Surveyors (RICS) Whole Life Carbon Assessment (WLCA) Guidance (2024)[22];
  - Institute of Environmental Management and Assessment's (IEMA) Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance (2022)[23];
  - IEMA Guide to: Climate Change Resilience and Adaptation (2020)[24];
  - Publicly Available Standard (PAS) 2080:2023 Carbon Management in Infrastructure and Built Environment (2023)[25];

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11 Ministry of Housing, Communities and Local Government, 2015. The Building Regulations, 2010. Approved Document G: Sanitation, hot water safety and water efficiency. HMSO.

12 Ministry of Housing, Communities and Local Government, 2015. The Building Regulations, 2010. Approved Document H: Drainage and waste disposal. HMSO.

13 Ministry of Housing, Communities and Local Government, 2021. The Building Regulations, 2010. Approved Document L: Conservation of fuel and power. HMSO.

14 Climate Change Committee, 2019. UK housing: Fit for the future?

15 Ministry of Housing, Communities and Local Government, 2019. The Future Homes Standard 2019 Consultation on changes to Part L (conservation of fuel and power) and Part F (ventilation) of the Building Regulations for new dwellings. HMSO.

16 Horsham District Council, 2015. Horsham District Planning Framework. Available at: https://www.horsham.gov.uk/__data/assets/pdf_file/0016/60190/Horsham-District-Planning-Framework-November-2015.pdf. Accessed 19/05/2025.

17 Horsham District Council, 2024. Horsham District's Climate Action Strategy. Available at: https://www.horsham.gov.uk/__data/assets/pdf_file/0018/132615/View-the-Climate-Action-Strategy.pdf. Accessed 19/05/2025.

18 Horsham District Council, 2020. Horsham Local Cycling and Walking Infrastructure Plan (LCWIP). Available at: https://www.horsham.gov.uk/__data/assets/pdf_file/0017/113165/Horsham-District-Local-Cycling-and-Walking-Infrastructure-Plan.pdf. Accessed 19/05/2025.

19 Crawley Borough Council, 2020. Horsham Local Cycling and Walking Infrastructure Plan (LCWIP). Available at: https://crawley.gov.uk/sites/default/files/2020-07/Crawley%20LCWIP%20Full%20report_0.pdf. Accessed 03/07/2025.

20 Rusper Neighbourhood Plan 2018-2031. Available at: https://www.horsham.gov.uk/__data/assets/pdf_file/0011/108488/Rusper_Neighbourhood_Plan_2020_Final-1.pdf. Accessed 11/06/2025.

21 Department for Levelling Up, Housing and Communities. 2024. Planning Practice Guidance. Available at: https://www.gov.uk/government/collections/planning-practice-guidance. Accessed 15/04/2025.

22 RICS, 2024. Whole Life Carbon Assessment for the Built Environment, 2nd edition. Available at: https://www.rics.org/content/dam/ricsglobal/documents/standards/Whole_life_carbon_assessment_PS_Sept23.pdf. Accessed 15/04/2025.

23 IEMA, 2022. IEMA Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance, 2nd Edition. Available at: https://s3.eu-west-2.amazonaws.com/iema.net/documents/knowledge/policy/impact-assessment/J35958_IEMA_Greenhouse_Gas_Guidance-1.pdf. Accessed 15/04/2025.

24 IEMA, 2020. IEMA EIA Guide to: Climate Change Resilience and Adaptation. Available at: https://www.iema.net/resources/reading-room/2020/06/26/iema-eia-guide-to-climate-change-resilience-and-adaptation-2020. Accessed 15/04/2025.

25 British Standards Institution (BSI), 2023. PAS2080 Carbon management in Buildings and Infrastructure. Available at: https://www.bsigroup.com/en-GB/insights-and-media/insights/brochures/pas-2080-carbon-management-in-infrastructure-and-built-environment/. Accessed 15/04/2025.

- Tyndall Centre, Setting Climate Commitments for Horsham (2025)[26];
- West Sussex County Council, Carbon Management Plan (no date)[27];
- West Sussex County Council, Climate Change Strategy 2020–2030 (2020)[28];
- West Sussex, Climate Action and Adaptation Plan, Our priorities for 2024-2027 (2024)[29];
- West Sussex County Council, Our Council Plan 2021-2026 (2021)[30];and
- Bath Inventory of Carbon and Energy (ICE) V4.0[31];

9.3 Consultation

9.3.1 A first formal Scoping Opinion was provided by HDC in November 2020 (HDC ref: EIA/20/0004) however this opinion was based on the Applicant submitting an outline planning application for the Site. However, the Applicant decided to pursue a hybrid application, it became necessary to review and reassess the scope of the ES for the revised Proposed Development, as outlined in the ES Scoping Opinion Request Report dated 17th October 2023. Consequently, a new Scoping Opinion was requested and subsequently issued in November 2023 (HDC ref: EIA/23/0007). Since November 2023, the design of the Proposed Development has altered slightly with the addition of proposed groundwater abstraction wells, and therefore it was considered necessary to reassess the scope of the ES once again. An additional Scoping Opinion regarding the revised hybrid planning application was adopted on the 15th July 2024. For the purpose of the evolution of this chapter, all relevant scoping responses have been considered, including those received from Crawley Borough Council (CBC).Pre-application discussions have been held, jointly, over a number of years with Horsham District Council, Crawley Borough Council and West Sussex County Council.

9.3.2 Table 9.1 summarises the key ES Scoping Opinion responses and separate consultations that have been undertaken with respect to the climate change assessment.

Table 9.1: Summary of Consultation

Consultee and Form/ Date of Consultation	Summary of Comments	Where in this Chapter Comments are addressed
HDC EIA Scoping Opinion 30/11/2020	Reference should be made here for the requirement of this potential strategic Site to be carbon neutral. Draft policies on climate change under the Local Plan Review outline HDC's approach. In the event this site is allocated for development in the Local Plan Review the site will be required to demonstrate the delivery of carbon neutrality or negativity within the development, including demonstrating a fabric first approach to the construction of built development, and	The design of the Proposed Development has been explored in ES Volume 1, Chapter 4: Proposed Development Description. Mitigation measures regarding greenhouse gas (GHG) emissions and climate change have been set out within this chapter and would be set out in more detail at the reserved matters stage. Carbon emissions associated with the demolition and construction and stage of the Proposed Development have been assessed within this chapter.

[26] Tyndall Centre, 2025. Setting Climate Commitments for Horsham. Available at: https://carbonbudget.manchester.ac.uk/reports/E07000227/. Accessed 15/04/2025.

[27] West Sussex County Council, (no date). Carbon Management Plan. Available at: https://www.westsussex.gov.uk/media/17322/carbon_management_plan.pdf. Accessed 08/05/2024.

[28] West Sussex County Council, 2020. Climate Change Strategy 2020–2030. Available at: https://www.westsussex.gov.uk/media/17325/climate_change_strategy_2020-2030.pdf. Accessed 19/05/2025.

[29] West Sussex County Council, 2024. Climate Action and Adaptation Plan, Our priorities for 2024-2027. Accessed 19/05/2025.

[30] West Sussex County Council, 2021. Our Council Plan 2021-2026. Available at: https://www.westsussex.gov.uk/media/nlefrggc/our_council_plan.pdf. Accessed 19/05/2025.

[31] *ICE database available to download at:* Circular Ecology, 2024. Embodied Carbon – The ICE Database. Available at: https://circularecology.com/embodied-carbon-footprint-database.html. Accessed on 08/04/2025.

Table 9.1: Summary of Consultation		
	maximum use of onsite renewable energy technologies.	As detailed in the Site-Wide Design Code (WOI-HPA-DOC-SWDC-01), the Proposed Development would be designed to emphasise efficiency and maximise the use of low carbon and renewable energy sources, supported by a whole Site net zero carbon trajectory to 2050. The design would be based on a whole life value approach and contribute to carbon offsets if needed. An Energy Statement (WOI-HPA-DOC-ENE-01) has also been prepared for the Proposed Development and will be submitted as part of the hybrid planning application. This includes mitigation measures. This presents carbon savings and meets the planning policy requirements for Horsham District Council.
CBC comments in relation to 2020 Scoping Opinion - received 27 October 2020	Table 4.2 of the Scoping Report proposes to exclude 'waste and resource management' from the scope of the ES on the basis that these would be considered within standalone document appended to the ES. Given that waste and resource management have potential impacts associated with climate change, these should form part of the ES in relation to climate change.	The climate assessment presents an estimation of the GHG emissions associated with the Proposed Development's waste and materials as included in the scope within Table 9.2. In addition, an Outline Operational Waste Management Strategy (WOI-HPA-OOWMS-01) and Outline Site Waste Management Plan (WOI-HPA-DOC-OSWMP-01) have been submitted with the hybrid planning application.
	The following policies and legislation should be included in the ES: • Building Regulations Approved Documents F, G, H and L (as updated) • The UK's Industrial Strategy (2017) • Industrial Strategy: The Grand Challenges (2017, as updated) • Spring Statement 2019: Written Ministerial Statement (includes commitment to introduction of Future Homes Standard and mandating end of fossil-fuel heating in new-builds from 2025) • The Future Homes Standard: changes to Part L and Part F of the Building Regulations for new dwellings (2019)	Policies and legislation relevant to the chapter are stated in Section 9.2 and are considered appropriate for the assessment.

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	• Planning for the Future: White Paper August 2020 • Committee on Climate Change (CCC), UK Housing Fit for the Future (Feb 2019)	
	In terms of methodologies the following are relevant: • The Government's Standard Assessment Procedure for the Energy Rating of Dwellings (SAP) (2012) • The Government's Standard Assessment Procedure for the Energy Rating of Dwellings (SAP) 10.1 (draft) (2019)	Guidance and methodologies specific to energy are used and referenced within the Energy Statement (WOI-HPA-DOC-ENE-01).
	It is considered that the following documents should be added to the account of Local Policies which are relevant to the ES for the development (relevant to Surface Water Resources and Flood Risk and Transport as well as Climate Change): • Crawley 2030: Crawley Borough Local Plan 2015-2030 (2015) • Emerging Crawley Borough Local Plan 2021-36 (Regulation 19 draft) • Planning and Climate Change Supplementary Planning Document (Crawley Borough Council, 2016) • Climate Emergency Declaration (Crawley Borough Council, 2019) • New Directions for Crawley: Draft Transport Strategy (2020) • Crawley Draft Local Cycling and Walking Infrastructure Plan (2020)	Section 9.2 of this ES chapter contains the relevant Local Policies.
	CBC consider that the methodology used in the Environmental Statement for the GHG Assessment must be transparent and capable of being followed on the basis of information in the public domain. It is also noted that the PAS 2080: 2016 document is subtitled 'Carbon management in infrastructure', whereas the Proposed Development mainly primarily of housing. CBC therefore questions whether this document is an appropriate framework for consideration of the emissions of the Proposed Development. It is	The chapter has been undertaken in line with the principles set out in the IEMA Guidance[23] and the updated '*PAS 2080:2023'*[25]. These guidance documents are considered to be industry best practice and are freely available within the public domain. These documents include principles relating to management of GHG emissions within the context of buildings and infrastructure projects and include consideration of demolition and construction and completed development stages.

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	therefore considered that any reference made to this document as a basis for the approach taken in the EIA must include justification as to its relevance in respect of the Proposed Development.	
	CBC consider that the assessments of climate change resilience and in-combination climate change impact should seek to establish a quantitative basis as far as possible, and include reference to recognised quantitative benchmarks or concepts, so that the assessment can easily be compared with other similar assessments. It is also noted that IEMA guidance is not freely accessible, and in these circumstances it is not considered acceptable merely to cite this source as justification for a proposed approach without setting out the underlying justification.	IEMA's Guidance[24] is considered to be industry best practice guidance for the effective consideration of climate change resilience and adaptation in the EIA process in line with the UK Town and Country Planning (EIA) Regulations (2017) The approach for the assessment of climate resilience and in-combination climate impacts, presented within Section 9.6 of this Chapter, have used a combination of quantitative and qualitative methodologies as appropriate to the topic, e.g. the approach to assessing climate change allowances for flood risk would be quantitative and take account of Environment Agency guidance. With respect to overheating, the 2024 Scoping Opinion Request Report outlined that a detailed quantitative overheating study would not be included in this chapter or the hybrid planning submission due to it being unfeasible without detailed and fixed development layouts (to be determined at Reserved Matters stage). However, this chapter has included details of how this can be secured by further assessment at the reserved matters stage. Therefore, overheating has been considered on a qualitative basis within this chapter as part of the reasonable worse case consideration of the Proposed Development parameters.
	CBC questioned the proposed approach to the definition of potential significant effect in respect of GHG emissions. CBC notes that compliance with the overall carbon budgets requires that emissions from new builds to be brought down to net zero as quickly as possible, and that the forthcoming UK carbon budgets realistically available for new build residential developments is only a	In line with IEMA Guidance[23], it should be noted that the crux of significance for the GHG assessment is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050. Contextualisation of the carbon

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	tiny fraction of the overall budgets. Moreover, the carbon budgets identified only extend to 2032, whereas the ES purports to assess the impact of the development over a 60 year period following construction, i.e. into the 2080s. This extends well beyond the point at which UK emissions are required to reach net zero. The threshold for identifying potential significant impact should accordingly be proportionately reduced over the lifetime of the development to reflect this reality.	footprint of a scheme determines whether or not it supports or undermines the trajectory towards net zero. Therefore, the total GHG emissions associated with the Proposed Development have been compared to the carbon budgets for the UK and HDC and the building sector up to 2042. The HDC carbon budget has been calculated by the Tyndall Centre by allocating a proportion of the UK carbon budget. The total GHG emissions from the Proposed Development over a 60-year design life has been presented in the assessment. The GHG emissions from the operational energy of the Proposed Development has taken into account the decarbonisation of the grid and the GHG emissions from the operational traffic of the Proposed Development has taken into account the uptake of electric cars.
	The inclusion of transport emissions, including emissions from traffic arising from the development during its operational phase, as part of the assessment of GHG emissions is strongly supported. The ES should seek to model these emissions for the whole lifetime of the development, while making clear what assumptions have been made and what difficulties have been encountered. The treatment of this issue in the ES, and the discussion of mitigation measures should cross-refer to the transport section of the ES.	The modelled transportation emissions have been incorporated into the GHG emissions assessment and the discussion of mitigation measures has been cross-referenced to ES Volume 1 Chapter 15: Transport when necessary.
	CBC requested that the ES should include further details in terms of the types and range of climate change impacts which are to be considered in the assessment of climate change resilience. Specifically, the 'examples of weather events' and associated effects should be more comprehensive in the ES, and further clarity should be added on the range of impacts which do not appear to be directly relevant to climate change resilience.	Examples of weather events provided within the 2024 Scoping Opinion Request Report were not intended to be comprehensive in this regard. A climate resilience workshop was held on 21st April 2023, with key members of the Design Team to ascertain the pertinent climate change resilience impacts, which have been considered within the assessment and presented within 'Assessment of Effects' section of this ES Chapter.
	Policy ENV9 in the current CBLP	The climate change resilience

Table 9.1: Summary of Consultation		
	specifically highlights the issue of water stress, and associated impacts of drought/water storage and that the Borough is in an area of serious water stress. Impacts associated with water stress (both on the study area itself, and on the wider area) will need to be considered as part of the assessment of climate change resilience, and as part of the assessment of impacts linked to Surface Water Management and Flood Risk and must be scoped into the ES.	assessment, presented within 'Assessment of Effects' of this ES Chapter, has considered the impact of drought on sensitive receptors. Within the submitted Scoping Opinion Request Report in 2024, construction and operational stage effects were scoped out for groundwater as the Hydrogeological Risk Assessment (HyRA) (WSP-WATER-REPORT-INT-0002) found no significant impacts on groundwater (or groundwater dependent) receptors based on their sensitivity and likely magnitude of change and incorporated embedded mitigation (which includes appropriate permits/licenses as well as best practice and pollution prevention controls). Therefore, no potentially significant effects to groundwater were identified and groundwater effects were scoped out of the ES for both construction and operation. A Water Neutrality Statement (WOI-HPA-DOC-WNS-01) has also been prepared which has been submitted with the planning application. This statement includes comment on the proposed provision of alternative water sources as part of the delivery of a private potable water supply and if required, SNOWS credits (offset).
	GHG emissions of the study area. Various UK wide statistics on emissions and construction activity are cited, but it is not clear what relevance these have to the current proposal. A rough baseline position could be established based on the buildings and activities within the study area and their operational requirements.	Data on energy demand and water usage of the existing buildings has been provided by the Applicant (where available) and has been utilised to estimate the baseline GHG emissions. Data provided is considered sufficient for estimation of GHG emissions.
2023 EIA Scoping Opinion – HDC comments - received 27 November 2023	HDC has agreed targets which includes indirect emissions to be carbon neutral by 2050. A key opportunity for the Council to address climate change will be to ensure that new developments are built to high sustainability standards, to reduce the demand for energy and reduce emission of greenhouse gases.	As detailed in the Site-Wide Design Code (WOI-HPA-DOC-SWDC-01), the Proposed Development would be designed to emphasise efficiency and maximise the use of low carbon and renewable energy sources, supported by a whole Site net zero carbon trajectory to 2050. The design would be based on a whole life value approach and contribute to carbon

Table 9.1: Summary of Consultation

		offsets if needed. An Energy Statement (WOI-HPA-DOC-ENE-01) has also been prepared for the Proposed Development at outline planning application stage which includes mitigation measures. This presents carbon savings and meet the planning policy requirements for HDC. It states that the Proposed Development has sustainability at its core and zero carbon is the target for both buildings and transport.
	Reduction in the demand for transport should also be incorporated wherever possible to reduce the impacts of traffic on climate change. Development needs to be designed to reduce reliance on carbon-based heat and electricity sources to reach these targets. These include renewable technologies such as heat pumps, district heating schemes or solar energy.	The modelled transportation emissions have been incorporated into the GHG emissions assessment and the discussion of mitigation measures has been cross-referenced to ES Volume 1 Chapter 15: Transport when necessary. GHG emissions associated with the energy usage of the Proposed Development, based on energy modelling, have been incorporated into the GHG emissions assessment. Operational energy scenarios are referenced within the Energy Statement (WOI-HPA-DOC-ENE-01).
Natural England Scoping Consultation received 8 November 2023	The ES should identify how the development affects the ability of the natural environment (including habitats, species, and natural processes) to adapt to climate change, including its ability to provide adaptation for people. This should include impacts on the vulnerability or resilience of a natural feature (i.e. what's already there and affected) as well as impacts on how the environment can accommodate change for both nature and people, for example whether the development affects species ability to move and adapt. Nature-based solutions, such as providing green infrastructure on-site and in the surrounding area (e.g. to adapt to flooding, drought and heatwave events), habitat creation and peatland restoration, should be considered. The ES should set out the measures that will be adopted to address impacts. Further information is available from	Environmental receptors identified as sensitive to the Proposed Development, and which have been 'scoped-in' to the assessment are summarised in Table 9.16. A climate change resilience assessment has been undertaken for the demolition and construction stage and the completed development stage, presented in Table 9.17 and Table 9.20.

Table 9.1: Summary of Consultation		
	the Committee on Climate Change's (CCC) Independent Assessment of UK Climate Risk, the National Adaptation Programme (NAP), the Climate Change Impacts Report Cards (biodiversity, infrastructure, water etc.) and the UKCP18 climate projections. The Natural England and RSPB Climate Change Adaptation Manual (2020) provides extensive information on climate change impacts and adaptation for the natural environment and adaptation focussed nature-based solutions for people. It includes the Landscape Scale Climate Change Assessment Method that can help assess impacts and vulnerabilities on natural environment features and identify adaptation actions. Natural England's Nature Networks Evidence Handbook (2020) also provides extensive information on planning and delivering nature networks for people and biodiversity. The ES should also identify how the development impacts the natural environment's ability to store and sequester greenhouse gases, in relation to climate change mitigation and the natural environment's contribution to achieving net zero by 2050. Natural England's Carbon Storage and Sequestration by Habitat report (2021) and the British Ecological Society's nature-based solutions report (2021) provide further information.	
2024 HDC ES Scoping Opinion (ES Volume 2 Technical Appendix 2.2) received 15 July 2024	HDC has agreed targets which includes indirect emissions to be carbon neutral by 2050. A key opportunity for the Council to address climate change will be to ensure that new developments are built to high sustainability standards, to reduce the demand for energy and reduce emission of greenhouse gases.	As detailed in the Site-Wide Design Code (WOI-HPA-DOC-SWDC-01), the Proposed Development would be designed to emphasise efficiency and maximise the use of low carbon and renewable energy sources, supported by a whole Site net zero carbon trajectory to 2050. The design would be based on a whole life value approach and contribute to carbon offsets if needed. An Energy Statement (WOI-HPA-DOC-ENE-01) has been prepared for the Proposed Development at outline

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		planning application stage which includes mitigation measures. This presents carbon savings and meet the planning policy requirements for HDC. It states that the Proposed Development has sustainability at its core and zero carbon is the target for both buildings and transport.
	Reduction in the demand for transport should also be incorporated wherever possible to reduce the impacts of traffic on climate change. Development needs to be designed to reduce reliance on carbon-based heat and electricity sources to reach these targets. These include renewable technologies such as heat pumps, district heating schemes or solar energy.	The modelled transportation emissions have been incorporated into the GHG emissions assessment and the discussion of mitigation measures has been cross-referenced to ES Volume 1 Chapter 15: Transport when necessary. GHG emissions associated with the energy usage of the Proposed Development based on energy modelling have been incorporated into the GHG emissions assessment. Operational energy scenarios are referenced within the Energy Statement (WOI-HPA-DOC-ENE-01).
	Chapter 5 of the HDLP outlines the Council's updated approach to climate change. In line with the Horsham District Council Climate Action Strategy, the Council's expectation is that new development that takes place is as a minimum designed to be net zero carbon in construction and operation. To deliver this, new development in Horsham District should maximise the smart use of renewable energy, enable the decarbonisation of our energy supply, use renewable or low carbon heat sources and be highly energy efficient to minimise energy demand and heat losses.	An Energy Statement (WOI-HPA-DOC-ENE-01) has been prepared for the Proposed Development which includes mitigation measures. This presents carbon savings and meets the planning policy requirements for HDC.
	Advised to adhere to the policies outlined under Chapter 5 of the HDLP. All measures must be outlined in an Energy Statement to be submitted with any application.	Policies specific to energy are used and referenced within the Energy Statement (WOI-HPA-DOC-ENE-01).
Natural England Scoping Consultation received 4 July 2024	Comment received as per Scoping Consultation received 8 November 2023.	As per previous scoping consultation response.

9.4 Assessment Scope

9.4.1 The assessment has been undertaken in accordance with IEMA's Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance, IEMA's Guide to Climate Change Resilience and Adaptation (hereafter referred to as 'IEMA Guidance') and all other applicable legislation, national, regional, and local policy and guidance, as well as the 2024 EIA Scoping Opinion (ES Volume 2 Technical Appendix 2.2). Professional judgement has been used to determine the significance of likely effects.

9.4.2 The assessment has been based on information presented in ES Volume 1 Chapter 3: Alternatives and Design Evolution, ES Volume 1 Chapter 4: Proposed Development Description, and ES Volume 1 Chapter 5: Demolition and Construction Description.

Technical Scope

9.4.3 The EIA Regulations require an assessment of the likely significant effects of a project on the climate and *vice versa*. Therefore, the climate change assessment in the context of the ES, has comprised three separate assessments:

- Climate Change Resilience (CCR) Assessment – considers the vulnerability of the Proposed Development to extreme weather and projected climate change during the demolition and construction stage and completed development stage;
- In-Combination Climate Impacts (ICCI) Assessment – considers how extreme weather and projected climate change could have an additive effect on impacts identified by other technical disciplines as a result of the Proposed Development during the demolition and construction stage and completed development stage; and
- GHG Emissions Assessment – considers the potential for significant effects to arise from the Proposed Development in terms of GHG emissions during the demolition and construction stage and completed development stage.

9.4.4 Consideration of the resilience of the Proposed Development is important to ensure that the development is fit-for-purpose when the impacts of climate change are taken into account. For example, key climate issues that may be associated with the Proposed Development include uncomfortable living and working conditions from extreme high temperatures; increased risk of flooding due to extreme precipitation; or/and increased dust pollution from drier conditions.

9.4.5 Design standards and other assessments for planning often consider these climate parameters. However, some additional consideration may need to be made as not all design standards take account of future climate projections.

9.4.6 The GHG emissions assessment has considered how the demolition and construction and the completed development stages of the Proposed Development would impact on climate change as a result of its global warming potential. The GHG emissions assessment has included the following in line with the IEMA Guidance[23]:

- A review of current and future GHG emissions trends;
- A proportionate estimation of GHG emissions associated with the demolition and construction stage in line with PAS 2080:2023 requirements. PAS 2080 provides a framework setting out how to manage whole life carbon when delivering infrastructure and buildings assets and programmes of work. It considers GHG emissions associated with raw material extraction, processing and manufacturing of building materials used in construction (embodied carbon), the transportation of materials to and from Site and demolition and construction activities;
- A proportionate estimation of GHG emissions associated with the completed development stage of the Proposed Development in line with PAS2080:2023 requirements. PAS 2080 considers GHG emissions associated with land use change,

regulated and unregulated energy demand, water use and transport use by the users of the Proposed Development; and

- A proportionate estimation of GHG emissions associated with the end of life stage of the Proposed Development in line with PAS2080:2023 requirements. PAS 2080 considers GHG emissions associated with deconstruction and demolition, transport of materials and waste processing and disposal.

9.4.7 The following two scenarios have been included within the GHG assessment, in line with the IEMA Guidance[23]:

- 'Do minimum', i.e., existing activities on the Site remain in operation; and
- 'Do something', i.e., existing activities on the Site are no longer in operation and the Proposed Development is constructed and operational.

9.4.8 Existing operational buildings on the Site that have been included within the "do minimum" scenario are limited to those associated with the Ifield Golf Club. Minor elements, which would not contribute substantially to the overall estimation of GHG emissions associated with the operation of the existing Site uses (e.g. Thrifts Yard, Lower Farm Barn and buildings south-west of Rusper Road), have not been included within the existing development GHG emissions estimates.

9.4.9 A proportionate estimation of the net GHG emissions has been undertaken, comparing the "do minimum" and "do something" scenarios. This includes:

- A comparison of the Proposed Development's net GHG emissions against the UK, Tyndall commitments for HDC only, and UK building sector carbon budgets; and
- A summary of the design and proposed mitigation measures for the Proposed Development.

Spatial Scope

9.4.10 Due to the nature of each assessment (CCR, ICCI and GHG emissions), separate study areas for each of the assessments have been described in the following sections.

Climate Change Resilience

9.4.11 The study area for the CCR assessment does not extend beyond the boundary of the Site. This approach aligns with IEMA guidance, which recommends focusing on the resilience of the Proposed Development to projected climate hazards. It is considered appropriate for identifying potential vulnerabilities and adaptive capacity within the Proposed Development footprint.

In-Combination Climate Impacts

9.4.12 The study area for the ICCI assessment has matched that of the relevant technical disciplines (e.g. air quality, noise and vibration, transport, flood risk, etc.). This is to take account of the fact the ICCI assessment considers the additive effect of climate change on the other technical assessments cumulatively.

Greenhouse Gas Emissions

9.4.13 The study area for the GHG emissions assessment is not restricted by geographical scope but instead includes any increase or decrease in GHG emissions associated with the demolition and construction stage and completed development stage of the Proposed Development over a 60-year period. The scope of GHG emissions includes the following:

- Demolition and construction stage: GHG emissions which are likely to result from the Proposed Development's carbon footprint but is also related to the transport of materials to and from the Site, transport of fuel to the site and workers commute (this may be distant from the Site);

- **Completed development stage**: GHG emissions which are likely to result from the operation and the use of the Proposed Development and emissions associated with the study area assessed within ES Volume 1 Chapter 15: Transport. Such emissions include those associated to the traffic generated by road users travelling to the Proposed Development; and
- **End of life Stage**: GHG emissions which are likely to result from stripping out, disassembly and deconstruction and demolition works, as well as from transport, processing and disposal of materials at the end of the Proposed Development's life.

Temporal Scope

9.4.14 Due to the nature of each assessment (CCR, ICCI and GHG emissions), separate temporal scopes for each of the assessments have been described in the following sections.

Climate Change Resilience

9.4.15 The CCR assessment has considered the impacts of climate change during the demolition and construction stage, comprising a phased delivery over approximately 15 years, with construction anticipated to commence in 2027. Over 10 years is considered to be long-term in duration; however, the individual impacts and effects would occur over a medium-term duration (5-10 years). This is because works would vary in nature and duration, and Site conditions would continuously change as completed phases of development are delivered during the demolition and construction stage.

9.4.16 The completed development stage is anticipated to start in 2028 with the initial occupation of the secondary school. The Proposed Development is then expected to be fully complete and operational by 2041. For the purposes of the CCR assessment, a 60-year design life has been assumed in line with the RICS WLCA Guidance[22]. The design life has been assumed to be until 2087 as the completed development stage becomes operational from 2028.

In-Combination Climate Impacts

9.4.17 The temporal scope for the ICCI assessment matches that of the relevant technical assessments considered. This is to take account of the fact that the ICCI assessment considers the additive effect of climate change on the other technical assessments. The assessment has been undertaken against the future baseline based on the future climate change projections.

Greenhouse Gas Emissions

9.4.18 The GHG assessment has considered impacts arising during the demolition and construction stage and completed development stage.

9.4.19 For the purposes of the GHG assessment, an indicative construction programme has been included in ES Volume 1 Chapter 5 Demolition and Construction, and confirmed by Turner and Townsend (T&T). This has been utilised for the GHG assessment. The programme is anticipated to be carried out in 5 indicative phases, which are listed along with the indicative start and end year:

- Phase 1 (2027 – 2029);
- Phase 2 (2029 – 2036);
- Phase 3 (2033 – 2038);
- Phase 4 (2036 – 2041); and
- Phase 5 (2040 – 2041).

9.4.20 A design life of 60 years has been assumed for the purpose of this assessment, based on principles outlined in the RICS WLCA Guidance and the design life considered within the

WLCA. The design life has been assumed to be until 2087 as the completed development stage would begin to become operational from 2028.

9.4.21 In respect of the end of life stage emissions, these would arise in 2087 which is outside of the carbon budget periods presented in Table 9.5; the UK Government has set five-yearly carbon budgets which currently run until 2042 only. Accordingly, an assessment cannot be undertaken, considering the assessment methodology adopted. The end of life stage emissions have therefore only been provided for information purposes as required by RICS WLCA Guidance[22] and PAS 2080 Guidance[25].

9.5 Baseline Characterisation Method

Desk Study

Climate Change Resilience and In-Combination Climate Impacts

9.5.1 In order to establish the existing and future baseline conditions for climate in the study area (the Site), relevant data was reviewed and assessed. Data was obtained from the following sources:

- Met Office UK Climate Averages – Charlwood Climate Station[32], the nearest Met Office Weather Station to the Site, located approximately 1.3 km north, and considered representative of Site conditions; and
- United Kingdom Climate Projections (UKCP18)[33]

Greenhouse Gas Emissions

9.5.2 In order to establish the existing baseline GHG emissions in the study area, relevant data was reviewed and assessed. Data was obtained from the following sources:

- Local Planning Authority (HDC) and national carbon dioxide emissions statistics[34];
- UK Carbon Budgets[6 7];
- Tyndall Centre's Setting Climate Commitments for Horsham[26]; and
- Energy Performance certificates (EPCs) from the existing buildings on the Site, provided by the Applicant.

9.5.3 Input data provided by the wider Design Team, or reasonable assumptions made using professional judgement, have been used in calculations, along with carbon emissions factors to estimate the GHG emissions associated with the existing Site uses. Further information on the limitations and assumptions of the assessment have been provided in Section 9.8 .

Field Study

9.5.4 Field study/data collection was not required at the Site as the data provided by other sources was deemed to be adequate and representative of the Site conditions.

9.6 Assessment Method

Methodology

9.6.1 Due to the nature of each assessment (CCR, ICCI and GHG emissions), a separate methodology for each assessment has been defined to ensure proportionate identification of effects and the potential significance of these.

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32 Met Office, 2020. UK climate averages: Charlwood. Available at: https://www.metoffice.gov.uk/research/climate/maps-and-data/location-specific-long-term-averages/gcpffy3zr. Accessed 22/04/2025.

33 Met Office, 2018. UKCP data. Available at: https://www.metoffice.gov.uk/research/approach/collaboration/ukcp/data/index. Accessed 22/04/2025.

34 UK Government, 2024. UK local authority and regional carbon dioxide emissions national statistics 2005-2022. Available at https://www.gov.uk/government/statistics/uk-local-authority-and-regional-greenhouse-gas-emissions-statistics-2005-to-2022. Accessed 19/06/2025.

Demolition and Construction Stage

Climate Change Resilience

9.6.2 The CCR assessment has considered how current and future climate trends in the study area could affect the Proposed Development during the demolition and construction stage. The CCR assessment has comprised the following:

- Identification of sensitive receptors;
- Review of the current climate in the study area and future medium-term trends using data from the Charlwood Climate Station[32] and UKCP18[33], and assessment of projected changes on climate variables;
- Completion of a qualitative assessment, based on professional judgement and the IEMA Guidance[24], of extreme weather impacts that could affect the Proposed Development during the demolition and construction stage, completed development stage and end of life stage;
- Summary of design and mitigation measures to improve resilience to extreme weather; and
- Identification of any residual effects.

9.6.3 The CCR assessment has provided a judgement on whether any projected climate change impacts and associated effects are likely to be significant.

In-Combination Climate Change Impact

9.6.4 Climate change may have an additive effect in respect of the individual environmental effects reported for other technical assessments undertaken as part of the ES. These effects may individually be insignificant, but when combined or added, could result in significant effects requiring additional design and/or mitigation measures.

9.6.5 All technical assessment chapters (ES Volume 1 Chapters 6-15) included as part of this ES have been considered. The ICCI assessment has been completed as a high-level overview providing the following:

- Review of current climate trends and projected changes in climate variables in the study area using data from the Charlwood Climate Station[32]and UKCP18[33;]
- Review of potential effects associated with the Proposed Development which could be exacerbated by the impacts of climate change;
- Review of embedded design and mitigation measures, as well as additional mitigation that have been identified;
- Qualitative assessment, based on professional judgement, of the implications of extreme weather and potential future climate change on additional mitigation measures identified by the other technical assessments during the demolition and construction and completed development stages;
- Further mitigation that may be required to address the effects of climate change; and
- Identification of any residual effects taking account of climate change.

9.6.6 The ICCI assessment has provided a qualitative judgement on whether climate change is likely to alter the significance of any of the effects identified in the impact assessment. To ensure the assessment is proportionate, individual negligible effects have not been considered in this assessment.

Greenhouse Gas Emissions

9.6.7 The sources of GHG emissions associated with the demolition and construction stage of the Proposed Development are summarised in Table 9.2. GHG emissions associated with the detailed infrastructure elements (Phase 1 Detailed Component), have been estimated

separately to the GHG emissions associated to the outline components. The emissions factors and method used for both the detailed and outline components are presented in Table 9.2.

9.6.8 GHG emissions are measured in carbon dioxide equivalent (CO_2e). This is a measure used to compare the emissions from various GHG emissions based upon their global warming potential.

9.6.9 The calculations for each of the PAS 2080:2023 modules presented within Table 9.2, used data provided by the Design Team, or where necessary, reasonable assumptions made using professional judgement.

9.6.10 Further information on the limitation and assumptions of the assessment is provided in Section 9.8.

Table 9.2: Demolition and Construction Stage GHG Assessment Scope

PAS 2080 Module	Description	Included in Scope?	Emissions Factors
A1-A3: Product stage	GHG emissions which are emitted during the extraction and manufacture of materials used in the construction works of the Proposed Development.	ü	OneClick LCA Carbon Designer (LCA)[35] (buildings) ICE[36] (infrastructure)
A4: Transport to site	GHG emissions associated with vehicles transporting resources to and from the Site.	ü	OneClick LCA Carbon Designer (buildings) UK Government 2025 Conversion factors (infrastructure)
A5: Construction – Installation process	GHG emissions from the direct on-Site demolition and construction works	ü	RICS WLCA Guidance[22] (buildings and infrastructure)
	GHG emissions from waste management and disposal	ü	OneClick LCA Carbon Designer (buildings) UK Government 2025 Conversion factors (infrastructure)

Completed Development Stage

Climate Change Resilience and In-Combination Climate Change Impact

9.6.11 The CCR and ICCI assessments for the completed development stage have been carried out following the same methodology as described for the demolition and construction stage.

Greenhouse Gas Emissions

9.6.12 The sources of GHG emissions associated with the completed development stage of the Proposed Development have been summarised in Table 9.3. GHG emissions associated with the detailed infrastructure elements, (Phase 1 Detailed Component), have been estimated separately to the GHG emissions associated to the outline components. The GHG estimations for each of the PAS 2080:2023 modules presented within Table 9.3 used data provided by the Design Team, or where necessary, reasonable assumptions made using professional judgement.

9.6.13 Further information on the limitation and assumptions of the assessment have been provided in Section 9.8.

Table 9.3: Completed Development Stage GHG Assessment Scope

Module	Description	Included in Scope?	Emissions Factors

[35] OneClickLCA, 2025. Available at: https://oneclicklca.com/. Accessed 22/04/25.

[36] Department for Energy Security and Net Zero, 2024. UK Government GHG Conversion Factors for Company Reporting.

Table 9.3: Completed Development Stage GHG Assessment Scope			
B1: Use of Proposed Development (land use change)	GHG emissions associated with the change of land use as a result of the Proposed Development	ü	National Highways Environment and Wellbeing Fund tool[37] (buildings and infrastructure)
B2-B5: Maintenance, repair, replacement and refurbishment of materials	GHG emissions associated with the maintenance, repair and replacement of materials	ü	OneClick LCA Carbon Designer (buildings) RICS WLCA guidance[22] (infrastructure)
B6: Energy consumption	GHG emissions from regulated energy consumption of the Proposed Development	ü	UK Government 2025 Conversion factors (buildings and infrastructure)
B7: Water consumption	GHG emissions associated with water consumption.	ü	UK Government 2025 Conversion factors (buildings and infrastructure).
B8: User utilisation	GHG emissions associated with vehicles travelling to and from the Proposed Development.	ü	UK Emissions Factors Toolkit (EFT) V13.1[38] (buildings and infrastructure)

9.6.14 In addition, Table 9.4 presents the end of life assessment scope.

Table 9.4: End of Life Stage GHG Assessment Scope			
Module	**Description**	**Included in Scope?**	**Emissions Factors**
C1-C4: End of life stage – deconstruction; transport; waste processing for recovery; disposal	The electricity, fuel and water used in the deconstruction process.	ü	OneClick LCA Carbon Designer(buildings) RICS WLCA guidance[22] (infrastructure)

Carbon Budgets

9.6.15 The UK Government has set five-yearly carbon budgets which currently run until 2042. The UK national GHG emission fourth, fifth, sixth and seventh carbon budgets covers the demolition and construction stage of the Proposed Development (2027 to 2041). The Proposed Development is expected to be operational between 2028-2087.

9.6.16 The first three carbon budgets were set in 2009, with the fourth, fifth and sixth following in 2011, 2016 and 2021 respectively. The seventh carbon budget was published by the Committee on Climate Change on 26 February 2025; the Government must now propose a level for the seventh carbon budget and Parliament must either approve or reject this by 30 June 2026[7]. The seventh carbon budget was published by the Committee on Climate Change on 26 February 2025; the Government must now propose a level for the seventh carbon budget and Parliament must either approve or reject this by 30 June 2026[39].

9.6.17 The third, fourth and fifth carbon budgets, as set out in the Carbon Budgets Order 2009, the Carbon Budget Order 2011 and the Carbon Budget Order 2016, are based on an 80% reduction as legislated by the Climate Change Act 2008. The sixth carbon budget, as set out in the Carbon Budget Order 2021 (SI2021/750), and the seventh carbon budget, which is yet to be set, are based

[37] National Highways, 2020. Designated Funds: Environment and wellbeing. Available at: https://nationalhighways.co.uk/our-work/designated-funds/. *Tool available as Excel spreadsheet*. Accessed: 09/05/2025.

[38] UK Department for Environment, Food and Rural Affairs, 2025, Emissions Factor Toolkit, via: https://laqm.defra.gov.uk/air-quality/air-quality-assessment/emissions-factors-toolkit/.

[39] Committee on Change, 2025. The Seventh Carbon Budget. Available at: https://www.theccc.org.uk/publication/the-seventh-carbon-budget/. Accessed on 0/05/2025

on the target for 100% reduction in emissions by 2050. Projected carbon budgets for the building sector have been estimated to contextualise the GHG emissions of the Proposed Development.

9.6.18 Additionally, GHG emissions associated with the Proposed Development have been compared to the HDC Tyndall carbon budget, which have estimated carbon budgets for local authorities based on the national carbon budgets and commitments in the United Nations Paris Agreement.

9.6.19 The GHG assessment provides a professional judgement on whether GHG emissions associated with the Proposed Development are likely to be significant in the context of the UK and HDC carbon budgets. As HDC does not have their own carbon budget at this time, the budgets have been calculated by the Tyndall Centre by allocating a proportion of the UK carbon budget.

9.6.20 The HDC local carbon budget only consider operational energy consumption and therefore only the operational energy demand of the Proposed Development (B6) has been compared to the HDC carbon budget. A summary of all carbon budgets used in the assessment is presented in Table 9.5.

Table 9.5: Operational Carbon Budgets Summary

Carbon budget	Fourth: 2023-2027 ($MtCO_2e$)	Fifth: 2028-2032 ($MtCO_2e$)	Sixth: 2033-2037 ($MtCO_2e$)	Seventh: 2038-2042 ($MtCO_2e$)
UK	1,950	1,725	965	535*
Buildings Sector	419	334	237	103
HDC	1.5	0.7	0.3	0.2
*Proposed				

Cumulative Stage

Climate Change Resilience

9.6.21 The CCR effects resulting from the demolition and construction and completed development stages would be limited in their spatial extent to the Site boundary and the Proposed Development in isolation. Therefore, cumulative CCR effects with other schemes are not applicable.

In-Combination Climate Change Impact

9.6.22 The climate change ES chapter has considered potential in-combination cumulative climate impacts affecting environmental receptors identified by other technical assessments undertaken as part of this ES. It has included consideration of existing potential impacts on environmental receptors that could be intensified by climate change, as well as environmental impacts that could potentially emerge in the future.

9.6.23 The ICCI's resulting from the demolition and construction and completed development stages would be limited in their spatial extent to the relevant technical assessments in the ES for the Proposed Development. Therefore, cumulative effects have been considered for the full scope of technical assessments undertaken as part of this ES (intra cumulative) as opposed to in-combination with other cumulative schemes (inter cumulative).

Greenhouse Gas Emissions

9.6.24 In accordance with best practice, including the IEMA guidance on assessing GHG emissions in EIA, the GHG emissions assessment for the Proposed Development will not include a separate cumulative assessment of other developments. GHG emissions are inherently cumulative and global in nature. The assessment therefore considers the Proposed Development's emissions in the context of national and regional carbon budgets, which already reflect the aggregated emissions from all sectors and activities. This approach ensures that the assessment will focus on whether the Proposed Development would materially affect the UK's ability to meet its

legally binding carbon reduction targets. As a result, individual consideration of other planned or approved schemes have not been included in the GHG assessment, as this would not change the conclusions regarding significance nor add meaningful value beyond what is captured through carbon budget analysis.

9.7 Assessment Criteria

9.7.1 The criteria used to assess if an effect is significant or not, is set out in the following sub-sections. This has been informed by the IEMA Guidance, which differs slightly from that used in other assessments within the ES, as outlined in ES Volume 1 Chapter 2: EIA Process and Methodology.

9.7.2 Significance criteria has been determined by consideration of the sensitivity of the receptor, magnitude of impact and scale of the effect. In considering the significance of an effect, consideration has been given to the duration of the effect, the geographical extent of the effect and the application of professional judgement.

Receptor Sensitivity/Value Criteria

Climate Change Resilience

9.7.3 In line with IEMA Guidance, the sensitivity of receptors to potential climate change impacts has been considered, informed by the following factors:

- Susceptibility of the receptor (e.g. ability to be affected by a change); and
- Vulnerability of the receptor (e.g. potential exposure to a change).

9.7.4 The susceptibility of a receptor has been determined as high, medium or low in accordance with the criteria presented in Table 9.6.

Table 9.6: Receptor Susceptibility Criteria

Susceptibility	Criteria
Low	Receptor has the ability to withstand/not be altered much by the projected changes to the existing/prevailing climatic factors (e.g. retain much of its original function and form).
Medium	Receptor has some limited ability to withstand/not be altered by the projected changes to the existing/prevailing climatic conditions (e.g. retain elements of its original function and form).
High	Receptor has no ability to withstand/not be substantially altered by the projected changes to the existing/prevailing climatic factors (e.g. lose much of its original function and form).

9.7.5 The vulnerability of a receptor has been classified as presented in Table 9.7.

Table 9.7: Receptor Vulnerability Criteria

Vulnerability	Criteria
Low	Climatic factors have little influence on the receptors.
Medium	Receptor is dependent on some climatic factors but able to tolerate a range of conditions (e.g. a species which has a wide geographic range across the entire UK).
High	Receptor is directly dependent on existing/prevailing climatic factors and reliant on these specific existing climate conditions continuing in future (e.g. river flows and groundwater level) or only able to tolerate a very limited variation in climate conditions.

9.7.6 To ensure a proportionate response, professional judgement has been used in determining receptor sensitivity in line with IEMA guidance. The assessment focusses on receptors considered to be of high sensitivity to projected climate hazards, ensuring that resources are directed toward areas of greatest potential vulnerability and significance.

In-Combination Climate Change Impact

9.7.7 The ICCI assessment has focused on the potential for climate change to exacerbate the effects on receptors identified by the other technical disciplines. For this reason, the sensitivity of the

receptors has been considered the same as that which have been determined in the individual technical assessments in the ES.

Greenhouse Gas Emissions

9.7.8 GHG emissions associated with the Proposed Development would be released to the global atmosphere. Therefore, the global atmosphere is considered to be the receptor and is considered to be of high sensitivity. In line with standard practice, the sensitivity of human and natural receptors is not considered within the GHG assessment.

Impact Magnitude Criteria

Climate Change Resilience

9.7.9 The magnitude of impact has been assessed using professional judgement as a combination of both the probability (likelihood) of the impact and the impact consequence.

Probability of Impact

9.7.10 In line with IEMA Guidance, the probability of the impact refers to the likelihood of a climate impact occurring and having an impact on the Proposed Development, over its lifespan. This includes consideration of existing and embedded mitigation measures within the design of the Proposed Development. The probability of the impact criteria is presented in Table 9.8.

Table 9.8: CCR Likelihood (Probability) of Impact Criteria

Likelihood	Criteria
Unlikely	The climate impact is not anticipated to occur during the lifetime of the Proposed Development (60 years)
Possible (as likely as not)	The climate impact may occur a limited number of times during the lifetime of the Proposed Development (60 years)
Likely	The climate impact may occur multiple times during the lifetime of the Proposed Development (60 years)

Consequence of Climate Impact

9.7.11 In line with IEMA Guidance, consequence of impact considers the geographical extent of the effect, or the number of receptors affected (e.g., scale), the complexity of the effect, the degree of harm to those affected and the duration, frequency and reversibility of effect. The consequence of impact criteria is presented in Table 9.9.

Table 9.9: CCR Consequence of Impact Criteria

Consequence of Impact	Description
Very low	Disruption to an isolated section of the Site less than one day and affecting no receptors. Not required to reverse the effect.
Low	Disruption to an isolated section of the Site less than one day and affecting a single receptor. Manageable to reverse the effect.
Medium	Site-wide disruption lasting more than one day but less than one week and affecting a single receptor. Difficult to reverse the effect.
High	Site-wide disruption lasting more than one day but less than one week and affecting multiple receptors. High difficulty to reverse the effect.
Very high	Site-wide disruption (or greater) lasting more than one week and affecting multiple receptors. Very high difficulty to reverse the effect.

9.7.12 CCR impacts have been assessed on the basis of the likelihood of impact and consequence as presented in the matrix presented in Table 9.10.

Table 9.10: CCR Magnitude Matrix

Consequence of Impact Level	Likelihood of Impact Level		
	Unlikely	Possible	Likely
Very low	Low	Low	Medium
Low	Low	Low	Medium
Medium	Low	Medium	High
High	Medium	High	High
Very High	Medium	High	High

In-Combination Climate Change Impacts

9.7.13 In line with the IEMA Guidance, the ICCI assessment has been completed based on the likely environmental effects as identified and defined by the individual environmental assessments in the ES. Additional mitigation has been identified to address the potential for climate change to exacerbate these environmental effects.

Greenhouse Gas Emissions

9.7.14 In line with IEMA Guidance, it should be noted that the crux of significance for the GHG assessment is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050. Contextualisation of the carbon footprint of a development determines whether or not it supports or undermines the trajectory towards net zero. Therefore, the GHG emissions associated with the Proposed Development have been compared to UK, Buildings Sector and HDC carbon budgets, which is presented in Section 9.6.

Scale of Effect Criteria

Climate Change Resilience

9.7.15 As stated within IEMA Guidance, there is no legislative definition of 'significance'. The significance of a reported effect has therefore been determined using professional judgement on the basis of the sensitivity of receptors against the impact magnitude criteria using the matrix presented in Table 9.11. If receptors are considered to be of medium sensitivity, any impacts that are of high magnitude have been considered 'significant' in EIA terms. Similarly, receptors of high sensitivity, with impacts of medium or high magnitude have also been considered 'significant'. Reported effects that are considered 'significant' have been 'greyed out' in Table 9.11.

Table 9.11: CCR Scale of Effect Criteria

Magnitude of Impact	Sensitivity of Receptors		
	Low	Medium	High
Low	Not significant	Not significant	Not significant
Medium	Not significant	Not significant	Significant
High	Not significant	Significant	Significant

9.7.16 Additional mitigation has been identified for those climate resilience affects which have been considered significant.

In-Combination Climate Change Impact

9.7.17 As stated within IEMA Guidance, there is no legislative definition of 'significance'. The ICCI assessment describes each potential climate impact and uses professional judgement to determine whether there is potential for climate change to increase the significance of reported topic specific residual effects.

Greenhouse Gas Emissions

9.7.18 In line with IEMA Guidance, the scale of adverse effects for the GHG assessment has been described as either major, moderate or minor, as presented in Table 9.12. In line with IEMA Guidance, major adverse and moderate adverse have been considered as significant.

Table 9.12: GHG Emissions Scale of Adverse Effect Criteria

Scale	Criteria
Minor	The Proposed Development's GHG emissions effects would be fully consistent with applicable existing and emerging policy requirements and good practice design standards for projects of this type. The Proposed Development is fully in line with measures necessary to achieve the UK's trajectory towards net zero.
Moderate	The Proposed Development's GHG emissions effects are partially mitigated and may partially meet the applicable existing and emerging policy requirements but would not fully contribute to decarbonisation in line with HDC and UK's policy goals for projects of this type. The Proposed Development falls short of fully contributing to the UK's trajectory towards net zero.
Major	The Proposed Development's GHG emissions effects are not mitigated or are only compliant with do minimum standards set through regulation and do not provide further reductions required by existing HDC and UK's policy for projects of this type. The Proposed Development is locking in emissions and does not make a meaningful contribution to the UK's trajectory towards net zero.

Nature of Effect Criteria

Climate Change Resilience and In-Combination Climate Change Impact

9.7.19 The nature of the effect is in accordance with ES Volume 1 Chapter 2: EIA Process and Methodology and has been described as either adverse, neutral, or beneficial, as follows:

- **Adverse** – A detrimental or negative effect to a receptor;
- **Neutral** – An effect that on balance, is neither beneficial nor adverse to a receptor OR an effect that is equally beneficial and adverse to a receptor; and
- **Beneficial** – An advantageous or positive effect to a receptor.

Greenhouse Gas Emissions

9.7.20 The nature of the effect for the GHG emissions has been presented in Table 9.13.

Table 9.13: GHG Emissions Nature of Effect Criteria

Nature	Criteria
Adverse	The Proposed Development's GHG emissions effects would not be reduced through measures that go well beyond existing and emerging policy and design standards for projects of this type,and therefore would not achieve radical decarbonisation or net zero well before 2050.
Neutral	The Proposed Development's GHG emissions effects would be reduced through measures that go well beyond existing and emerging policy and design standards for projects of this type, enabling radical decarbonisation or the achievement of net zero well before 2050. The Proposed Development demonstrates GHG emissions performance that is well 'ahead of the curve' for the trajectory towards net zero and has minimal residual emissions.

Table 9.13: GHG Emissions Nature of Effect Criteria	
Beneficial	The Proposed Development's net GHG emissions effects are below zero and it causes a reduction in atmospheric GHG concentration, whether directly or indirectly, compared to the without- Proposed Development baseline. The Proposed Development substantially exceeds net zero requirements with a positive climate impact.

9.8 Assumptions and Limitations

Climate Change Resilience

9.8.1 The assessment has relied on data provided by the Met Office[32] and UKCP18[33]. It has been assumed that these data sets have been reported correctly.

9.8.2 Climate projections can be used to determine likely future trends in climate conditions in the study area of the Proposed Development through its lifetime. The climate trends included in this assessment are based on a range of GHG emissions scenarios which are subject to a degree of uncertainty. How the climate would react to different levels of emissions is also uncertain. There are three key sources of uncertainty within climate projections:

- Natural climate variability: either from natural external influences on climate (e.g. change in atmospheric particulates due to volcanic activity), or changes in the energy received from the sun;
- Incomplete understanding of earth system processes and their imperfect representation in climate models (modelling uncertainty); and
- Uncertainty in future man-made emissions of GHGs and other pollutants.

9.8.3 The CCR assessment has relied on the embedded mitigation measures and professional judgement of other technical chapters within the ES.

In-Combination Climate Impacts

9.8.4 The ICCI assessment has relied on the data and professional judgement of other technical assessments within the ES.

Greenhouse Gas Emissions

General

9.8.5 The GHG emissions assessment presented in this chapter considers GHG emissions associated with the demolition and construction and completed development stages.

9.8.6 For the purposes of the GHG assessment, the construction programme provided within ES Volume 1 Chapter 5: Demolition and Construction Description has been utilised. A design life of 60 years has been assumed for the purpose of this assessment, based on principles outlined in the RICS WLCA Guidance[22]. The design life has been assumed to be until 2087 as the completed development stage would begin to become operational would begin from 2028 (initial occupation of the secondary school).

9.8.7 A 15% contingency has been applied for all outline elements and a 6% contingency has been applied for all detailed elements within the GHG assessment, in line with the RICS WLCA guidance [22].

Existing development

9.8.8 EPCs were provided by the Applicant for buildings associated with Ifield Golf Club. No other energy consumption data was available for the Site, however all other existing activities are not considered to contribute substantially to the overall existing operational energy usage.

9.8.9 Annual water consumption was provided by WSP within the Water Neutrality Statement (WOI-HPA-DOC-WNS-01), for irrigation of the Ifield Golf Club.

9.8.10 Estimated GHG emissions associated with maintenance of the existing Site was based on the key performance indicator (KPI (10 $kgCO_2e/m^2$) presented within the RICS WLCA Guidance[22].

Demolition and Construction

A1-A3: Product Stage

Outline Element – (GHG Assumptions and Limitations)

9.8.11 At this outline planning stage, a preliminary set of data on proposed material quantities required to estimate the GHG emissions associated to the outline element was not available. Therefore, GHG emissions were estimated using the Carbon Designer function within the OneClickLCA tool in compliance with the RICS WLCA guidance[22]. This tool utilised input data in the form of the anticipated gross external area (GEA), as provided by the Applicant. The tool also used the number of above ground floors to estimate GHG emissions. In the absence of GEA or number of floors, reasonable assumptions were made using professional judgement. The GHG emissions assessment for construction of the outline element of the Proposed Development should therefore be considered as an estimate based on outline parameters at this stage of planning.

9.8.12 The indicative strategic phasing plan detailed in Figure 5.1 to 5.6 of ES Volume 1 Chapter 5: Demolition and Construction Description was used to infer buildings included in the outline element of the Proposed Development. For the purpose of the GHG emissions assessment, the maximum GEA was provided by P+P and confirmed by T&T. A summary of the assumed GEA per phase, has been provided in Table 9.14 below.

Table 9.14: Assumed Phasing for GHG Emissions Assessment

Assumed GEA for GHG Emissions Assessment (m^2)	Phase					
	1	2	3	4	5	Total
Class E Commercial Business & Service	-	21,477	11,396	7,257	-	40,130
Class F2 – Local Community	-	1,200	-	-	-	1,200
Class C1 Hotels	-	4,400	-	-	-	4,400 (80 beds)
Class B2 General Industrial	-	-	5,200	-	-	5,200
Class B8 Storage & Distribution	-	-	7,200	-	-	7,200
Class C2 / C3 Residential - Flat	0	29,763*	16,991*	18,206*	6,529*	71,489
Class C2 / C3 Residential - House	0	84,496*	48,235*	51,685*	18,536*	202,952
Sui – Generis Gypsy & Traveller	-	-	9,465	-	-	9,465
Class F1 Learning and non-residential institutions	92,900	24,600	-	-	-	117,500

*Residential areas provided in Gross Internal Area (GIA) have been subject to a 10% uplift to convert to GEA. Area of flat/house per phase has been assumed based on the total proposed ratio of flat/house floor space.

Detailed Element – (GHG Assumptions and Limitations)

9.8.13 Material quantities required for the construction of the detailed elements of the Proposed Development have been provided by Arcadis[40]. These include materials for temporary works, earthworks, Phase 1 on-Site highway works, drainage (including sustainable drainage systems (SuDs)), utilities and construction of the noise bund.

A4: Transport to Site

Outline Element – (GHG Assumptions and Limitations)

9.8.14 GHG emissions were estimated using the Carbon Designer function within the OneClickLCA tool in compliance with the RICS WLCA guidance[22].

Detailed Element – (GHG Assumptions and Limitations)

9.8.15 In the absence of specific material transport distances, the RICS WLCA guidance[22] has been used. For unladen journeys, an empty running factor of 43% of the tonnage transported during the loaded journey has been applied. The following assumptions have been applied:

- Bulk Materials, earthworks and road pavements would be locally sourced (50 km by road).
- Fencing, barriers, road restraint systems, civils structures and retaining walls would be nationally sourced (120 km).
- Drainage, street furniture and electrical equipment would be sourced from Europe (1500 km).

A5: Construction Installation Process

9.8.16 Pre-construction demolition (A5.1)

9.8.17 The gross external area (GEA) of existing buildings, provided by the Applicant, was used to estimate GHG emissions associated with the demolition of existing structures, along with the KPI (35 $kgCO_2e/m^2$ GIA), presented within the RICS WLCA Guidance[22]. In the absence of detailed demolition phasing information, a reasonable worst-case scenario has been adopted whereby all demolition is assumed to occur in the first year of the demolition and construction phase. This assumption implies that associated emissions are released immediately, rather than gradually over time. In contrast, under the 'do nothing' scenario, carbon would have continued to be sequestered through existing land cover, resulting in a net carbon offset.

9.8.18 Construction Activities (A5.2)

Outline & Detailed Element – (GHG Assumptions and Limitations)

9.8.19 GHG emissions associated with energy and fuel use used for construction plant and equipment have been estimated using the OneClickLCA tool, based on indicative Proposed Development's costs provided by T&T and in line with RICS WLCA guidance22.

9.8.20 Waste and waste management (A5.3)

Outline Element – (GHG Assumptions and Limitations)

9.8.21 GHG emissions were estimated using the Carbon Designer function within the OneClickLCA tool in compliance with the RICS WLCA guidance[22].

[40] Arcadis, 2024. West of Ifield phase 1A and 1B estimate May 2024. Bill of Quantities.

Detailed Element – (GHG Assumptions and Limitations)

9.8.22 The following assumptions have been applied:

- Wastage rates from the RICS WLCA guidance[22] were applied to the Proposed Development's quantities of materials.
- The proportion of each waste material that would be recycled, incinerated or landfilled has been based on default end of life routes within the RICS WLCA guidance[22].
- Carbon emission factors for landfill, incineration and recycling have been based on the UK Government conversion factors 2025.
- A 50 km transport distance from the Site to the landfill / incineration / recycling facilities has been assumed to estimate the carbon emissions associated to the transport of waste during the construction and end of life phases. This is in line with the RICS WLCA guidance[22].
- A5 emissions associated to the workers' commute have not been accounted for within the carbon baseline in line with RICS guidance, which states that impacts associated with these activities are not attributable to the Proposed Development but to the individual employees.

Completed Development – (GHG Assumptions and Limitations)

B1: Use of Proposed Development

9.8.23 GHG emissions associated with land use change were calculated using National Highways Environment and Wellbeing Fund tool. GHG emissions associated with land use change (B1) have been based on areas in hectares (ha) prior and post the Proposed Development. This information has been informed by the Biodiversity Net Gain (BNG) assessment (WOI-HPA-DOC-BNG-01) that accompanies this planning application. In line with standard methodology, emissions from land use change are typically offset or released gradually over time through vegetation regrowth or similar mechanisms. However, due to the lack of detailed phasing on land use type change data, a conservative worst-case approach has been applied. It is assumed that the net land use change, and associated carbon release, occurs from the start of the demolition and construction stage, rather than being balanced during the operational phase. Consequently, the development ('do something') scenario results in a carbon release, whereas the 'do nothing' scenario would have continued to offset emissions.

B2-B5: Maintenance, repair and replacement and refurbishment of materials

Outline Element – (GHG Assumptions and Limitations)

9.8.24 GHG emissions were estimated using the Carbon Designer function within the OneClickLCA tool in compliance with the RICS WLCA guidance[22].

Detailed Element – (GHG Assumptions and Limitations)

9.8.25 In the absence of information on the maintenance schedule, GHG emissions associated with maintenance (B2) were estimated in line with RICS WLCA guidance[22] recommendations, at 1% of the emissions associated with A1-A5.

9.8.26 Due to the absence of information on the repair schedule when developing the baseline, carbon emissions associated with repair (B3) have been estimated based on RICSWLCA guidance[22] recommendations, at 25% of the emissions associated with B2.

9.8.27 Replacement emissions have been based on the service life of materials (in line with RICS WLCA guidance[22]) and the expected number of times the material groups would be replaced within the 60-year design life of the Proposed Development. Where replacement of a material group would be required, the associated carbon emissions have been based on the A1-A3 and

A4 carbon emissions of that material. The service life of material groups used to estimate the B4 carbon emissions have been presented below:

- Earthworks would have a 0-year service life.
- Street furniture and electrical equipment would have a 15-year service life.
- Fencing, barriers and road restraint systems would have a 30-year service life.
- Road pavements would have a 35-year service life.
- Bulk materials, drainage, civils structures and retaining walls would have a 60-year service life.

9.8.28 Refurbishment emissions (B5) have not been included in this assessment as it is anticipated that refurbishment would not occur within the Proposed Development's design life. Their exclusion is considered to contribute to a reasonable worst-case scenario for the overall assessment.

B6: Energy Consumption

Outline Element – (GHG Assumptions and Limitations)

9.8.29 GHG emissions associated with the energy usage of the Proposed Development have been based on energy modelling as provided by Ramboll. To ensure a worst-case scenario, it has been assumed that operational energy requirements for the Proposed Development would align with the ones presented within Scenario 1 of the Energy Statement (WOI-HPA-DOC-ENE-01), which comprises direct electric heating, with on-Site Solar Photovoltaic (PV) delivering 10% of the energy demand. Decarbonisation of the UK electricity grid has been accounted for within the GHG emissions up until 2050.

Detailed Element – (GHG Assumptions and Limitations)

9.8.30 To estimate energy consumption, the number, type and power consumption (kW) of lighting columns were identified from the Outdoor Lighting Report prepared by Arcadis for Phase 1 (Detailed element) (10051123-ARC-130-1B-TC-LE-00001). Within the report, it was assumed that lights would be in operation for an average of 12 hours a day across the year (4380 hours in operation per year).

B7: Water consumption – (GHG Assumptions and Limitations)

9.8.31 GHG emissions associated with the water usage of the Proposed Development, have been calculated using the estimated water consumption of the Proposed Development as provided by WSP within the Water Neutrality Statement (WOI-HPA-DOC-WNS-01).

B8: User utilisation– (GHG Assumptions and Limitations)

9.8.32 GHG emissions associated to the vehicle movements during the completed development stage of the Proposed Development have been estimated using the Emissions Factors Toolkit (EFT) v13.1 published by Defra. The EFT allows users to estimate road vehicle pollutant emission rates for nitrogen oxides (NO_x), particulate matter $(PM)_{10}$, $PM_{2.5}$ and CO_2 for a specified year, road type, vehicle speed and vehicle fleet composition for all years up to 2030 for air quality assessments. EFT v13.1, allows users to estimate emissions for years between 2030-2050 in support of climate assessments and appraisals only. The EFT v13.1 utilises CO_2 emission factors published by the Department for Transport (DfT). The traffic data was entered into the EFT, along with speed data and link length. The EFT also utilises basic vehicle split composition information and projections for England provided by DfT/National Highways for roads up to 2050.

9.8.33 The completed development stage traffic flows have been provided by the Applicant's Transport Consultant, Steer.

C1-C4: End of life stage - deconstruction; transport; waste processing for recovery; disposal

Outline Element – (GHG Assumptions and Limitations)

9.8.34 GHG emissions were estimated using the Carbon Designer function within the OneClickLCA tool in compliance with the RICS WLCA guidance[22].

Detailed Element – (GHG Assumptions and Limitations)

9.8.35 The following assumptions have been applied:

- Activities for deconstruction [C1] have been assumed to be 25% of the A5.2 construction activities carbon emissions, in line with RICS WLCA Guidance[22].
- Carbon emissions associated with transport [C2] of deconstruction arisings to an appropriate disposal site in the UK have been assumed to be equivalent to those estimated for A4.

9.9 Baseline Conditions

Existing Baseline

Climate Change Resilience and In-Combination Climate Impacts

9.9.1 This section contains information about average monthly climate data for Charlwood Climate Station, which is the nearest Met Office Weather Station, located approximately 1.3 km from the Site, and considered representative of Site conditions. Information for the period 1991-2020[32] is summarised in Table 9.15.

Table 9.15: Average Monthly Climate Data for Charlwood Climate Station

Month	Maximum temperature (°C)	Minimum temperature (°C)	Days of air frost (days)	Sunshine (hours)	Rainfall (mm)	Days of rainfall ≥1 mm (days)
January	7.83	1.52	10.89	53.42	90.34	13.1
February	8.49	1.44	10.47	75.42	64.46	10.86
March	11.2	2.79	7.35	119.36	53.65	9.44
April	14.5	4.24	3.87	171.48	52.49	9.73
May	17.74	7.11	0.6	206.31	54.83	8.9
June	20.8	9.92	0.03	209.7	50.67	8.79
July	23.14	11.99	0	215.95	54.73	8.45
August	22.7	11.86	0	199.09	60.42	9.29
September	19.55	9.51	0.07	156.01	64.71	9.15
October	15.35	7.1	1.66	110.62	94.33	12.51
November	11.11	3.91	6.09	65.21	97.11	13.17
December	8.25	1.74	11.89	45.87	95.95	12.82
Annual	15.09	6.12	52.92	1628.44	833.69	126.21

9.9.2 Climate data available for Charlwood shows annual maximum and minimum temperatures both being higher than the UK average of 12.79 °C and 5.53 °C respectively, but more days of air frost experienced annually (an average of 52.92 annual air frost days in comparison to the UK annual average of 45.14 days). The average annual rainfall for Charlwood is 833.69 mm, compared to an average for England of 869.59 mm.

Greenhouse Gas Emissions

9.9.3 As noted in ES Volume 1 Chapter 1: Introduction, the Site comprises an irregular shaped parcel of land, covering a total area of approximately 171 hectares (ha). The Site is predominantly occupied by a mixture of arable and pastoral fields and includes the Ifield Golf Course and Country Club in its far southern portion. Existing buildings throughout the Site include Thrifts Yard, Lower Farm Barn and buildings south-west of Rusper Road.

9.9.4 The operational GHG emissions of the existing Site uses have been referred to as the 'do minimum' scenario and have been presented within this ES Chapter. The existing Site GHG emissions are approximately 98.4 tCO_2e per year as a result of the maintenance, energy and water usage of the occupied buildings currently situated on the Site and 164.3 tCO_2e per year carbon sequestration due to the vegetation currently existing on the Site.

9.9.5 National carbon dioxide emissions statistics are published by the UK Government[34] and contain historic emissions data covering 2005-2022 for all Local Authorities and Councils.

9.9.6 In 2022 HDC emitted 623 $ktCO_2e$. This figure can be broken into the following sectors:

- 234 $ktCO_2e$ from transport;
- 202 $ktCO_2e$ from domestic sources;
- 13 $ktCO_2e$ from the public sector;
- 48 $ktCO_2e$ from commercial and;
- 76 $ktCO_2e$ from industry.

Future Baseline

Climate Change Resilience and In-Combination Climate Impacts

9.9.7 Future climate projections are published by the Met Office through the UK Climate Projections website[33]. Climate projections can be used to determine the likely future climate conditions in the study area of the Proposed Development through its operational life.

9.9.8 Climate projections take into account uncertainty due to natural variability and an incomplete understanding of the climate system and its imperfect representation in models. The projections do this by giving the probabilities of a range of possible outcomes, as estimated by scientific methodology. Good practice in the UK uses UKCP18 projections[33] and published literature such as UK Climate Change Risk Assessment[29]. UCKP18 includes projections of a range of climate variables for different time slices until the end of the century.

9.9.9 The probabilistic projections in the UKCP18 provide local low, central and high changes across the UK, corresponding to various probability levels (e. g. 10 %, 50 % and 90 %). There are also a number of Representative Concentrations Pathways (RCPs) available for UKCP18, with each pathway resulting in a different range of global mean temperature increases over the 21st century. IEMA Guidance recommends the use of RCP 8.5 at the 50 % percentile, for the 2080 timeline to ensure a suitably conservative approach has been applied for this assessment.

9.9.10 The general climate trends for the UK are summarised within the UKCP18 projections[41] and have been provided. The trends show that at 2°C of global mean warming:

- The largest warming in the UK will be in the South-East where summer temperatures may increase another 3 to 4°C relative to present day;
- Median warming will be at least 1 to 2 °C throughout the year across the whole of the UK;

[41] Met Office. 2019. UKCP18 Factsheet: Derived projections. Available at: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-fact-sheet-derived-projections.pdf. Accessed 22/04/2025.

- Winter cool days will warm by 1 to 1.5 °C across the UK, whilst temperatures on warmer winter days increase by less than 1 °C; and
- In summer both hot and cool days warm by 1.5 to 2 °C across England.

9.9.11 The trends show that at 4°C of global mean warming:

- Hot summer days warm by 4.5 to 5°C compared to present day (1981-2000), across much of Southern England, possibly exceeding 5°C in some locations;
- Cooler summer days warm by 4 to 4.5°C across England and up to 5°C in the South-East; and
- Cool winter days warm by 2.5 to 3°C across the country.

Precipitation:

- Changes are uncertain, but suggest slightly wetter winters and drier summers, with summer drying more in the south (2°C global warming);
- Median winter precipitation increases by up to 20% across the country (4°C global warming); and
- Median summer precipitation decreases most in the south with median reductions of up to 20 to 30% across much of the England and Wales (4°C global warming).

Wind:

- Wind speed is not available for the UKCP18 probabilistic projections as it did not pass the credibility checks; however, global, regional and derived projections are available. UKCP18 depicts a wide spread of future changes in mean surface wind speed, however, there is large uncertainty in projected changes in circulation over the UK and natural climate variability contributes much of this uncertainty. It is therefore difficult to represent regional wind extreme winds and gusts within regional climate models.

Humidity:

- Humidity is a measurement of the amount of water vapour in the air. UKCP18 projections predicts that climate change would lead to an increase in humidity.

9.9.12 The projections updated within a 2022 UKCP18 factsheet[42] also show the following by 2070 under a high emissions scenario:

- Temperature of hot summer days show increases of 3.8 °C to 6.8 °C;
- Frequency of hot spells to increase from an 0.20 occurrences per year at present to 4.1 by 2070;
- By 2070, in the high emission scenario, precipitation is predicted to change by -45% to +5% in summer, and -3% to +39% in winter (where a negative change indicates less precipitation, and a positive change indicates more precipitation);
- Rainfall associated with an event that occurs typically once every 2 years increases by 29% (central estimate); and
- A decrease in soil moisture during summers in the future, consistent with the reduction in summer rainfall.

9.9.13 In terms of HDC and the south-east of England, UKCP18 projections for climate change over land[43] indicate increased likelihood of milder, wetter winters and warmer, drier summers for the future assessment period in comparison to the UKCP18 baseline, respectively.

[42] Met Office. 2022. UK Climate Projections: Headline Findings. Available at: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18_headline_findings_v4_aug22.pdf. Accessed 22/05/2025.

[43] Met Office, (no date). Climate change projections over land. Available at: https://www.metoffice.gov.uk/research/approach/collaboration/ukcp/summaries/climate-change-projections-over-land. Accessed 22/05/2025.

Greenhouse Gas Emissions

9.9.14 In the absence of the Proposed Development, the GHG emissions from the Site would be the same as estimated for the do minimum scenario.

9.9.15 Local and national GHG emissions have been reducing over recent years, primarily due to increasing generation of electricity from sources that produce less GHG emissions. This trend is expected to continue especially given the recent UK commitment to reduce domestic emissions to net zero by 2050. It is expected that emissions/carbon intensity would continue to decline in the region due to a combination of the following factors:

- National Government carbon budget;
- Local carbon reduction targets;
- Low carbon building design; and
- Decarbonisation of industry, energy supply and transportation.

9.9.16 As noted within their Climate Change Action Strategy[17], HDC has a target for the whole district to be carbon neutral by 2050.

Sensitive Receptors

Climate Change Resilience

9.9.17 The receptors identified as sensitive to the Proposed Development, and which have been 'scoped-in' to the assessment are summarised in Table 9.16.

Table 9.16: Summary of Sensitive Receptors

Receptor	Susceptibility	Vulnerability	Sensitivity
Buildings and infrastructure (including equipment, materials and building operations)	High	High	High
Human health (e. g. construction workers, occupants and Site users)	High	High	High
Environmental (e. g. integrity of landscape features, habitats and species)	High	High	High

9.9.18 To ensure a proportionate response, professional judgement has been used in determining sensitivity. The assessment focusses on receptors that are of high sensitivity. For example, human receptors are of high sensitivity because of the importance of their safety and welfare, whilst the Proposed Development itself is of high sensitivity because of the importance of the integrity of the building structures and fabric.

In-Combination Climate Impacts

9.9.19 The ICCI assessment is based on the receptors identified by the other technical disciplines included within this ES.

Greenhouse Gas Emissions

9.9.20 GHG emissions associated with the Proposed Development would be released to the global atmosphere. Therefore, this is the receptor and is of high sensitivity. In line with standard practice, the sensitivity of human and natural receptors is not considered within the GHG assessment.

9.10 Assessment of Effects

Demolition and Construction Effects

Climate Change Resilience

9.10.1 In line with IEMA Guidance, mitigation measures (including existing design measures) have been considered within this assessment and a summary of the significance of the likely effect has been provided. The assessment is based on professional judgement and is presented in Table 9.17.

Table 9.17: Demolition and Construction Stage Climate Change Resilience Effects

Climate Change Trend	Climate (Change) Impact on Receptor	Embedded Design and Mitigation Measures	Significance of Effect	Additional Mitigation Required
Increased frequency and intensity of extreme weather events: Intense rainfall events	**Receptor**: Buildings and infrastructure Extreme rainfall events could result in the erosion of stockpiles and resultant silting of drainage assets. This could result in secondary impacts such as localised flooding.	An Outline Site Waste Management Plan (SWMP) (WOI-HPA-DOC-OSWMP-01) has been prepared for the Proposed Development and accompanies the hybrid planning application. As committed to in the Outline SWMP and ES Volume 1 Chapter 5: Demolition and Construction Description, a detailed SWMP would be submitted for review and approval by HDC prior to commencement of works on-Site. The Detailed SWMP would be based upon the Outline SWMP. The Detailed SWMP would be expected to include measures such as: • Ordering the quantity of materials required for the job, thus reducing over-ordering; • Determining when and where materials are required and requesting 'just in time' deliveries where possible; • Where possible and appropriate to do so, using prefabrication off-Site; and • Having appropriate storage areas ready - these should be covered to protect against rain and ideally have a hard-standing surface. An Outline Construction Environmental Management Plan (OCEMP) has been prepared for the hybrid planning application (ES Volume 2 Technical Appendix 5.1). An OCEMP has also been prepared by Arcadis specifically for the detailed element (Phase 1) of the Proposed Development (the "Phase 1 OCEMP) (10051123-ARC-XXX-ZZ-TR-CM-00001). A Detailed CEMP would be prepared by the Principal Contractor, prior to demolition and construction works commencing on-Site to manage and control demolition and construction impacts in more detail. The Detailed CEMP would be based upon and comply with requirements in the Outline CEMPs. The Detailed CEMP would include appropriate storage, handling and management of demolition and construction wastes and materials to minimise damage by weather and reduce erosion, with due regard to the potential for mobilisation into surface drainage.	Temporal Scope: Temporary, medium term Likelihood Level: Unlikely Consequence Level: Medium Receptor Sensitivity: High Impact Magnitude: Low Nature of Effect: Adverse Significance of Effect: **Not Significant**	Additional mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.

Table 9.17: Demolition and Construction Stage Climate Change Resilience Effects

Climate Change Trend	Climate (Change) Impact on Receptor	Embedded Design and Mitigation Measures	Significance of Effect	Additional Mitigation Required
		In addition, as committed to in ES Volume 1 Chapter 5: Demolition and Construction Description, the construction drainage system for the Proposed Development would be designed and managed to comply with BS 6031:2009[44], which details methods that should be considered for the general control of drainage on construction sites.		
	Receptor: Buildings and infrastructure Extreme rainfall events could affect the ability to undertake certain demolition / construction activities leading to programme delays (e.g. pouring of concrete and asphalt).	Works would be undertaken in accordance with the provisions of the Construction (Design and Management) (CDM) Regulations 2015[45]. As stated in ES Volume 1 Chapter 5: Demolition and Construction Description, demolition and construction work would be weather dependent. In line with best practice construction measures, more vulnerable activities such as the demolition works and earthworks would take place in appropriate weather conditions where possible (taking into account programme timescale constraints). This would reduce the likelihood of weather delays to these activities and would be implemented via the Detailed CEMP. In addition, the construction drainage system for the Proposed Development would be designed and managed to comply with BS 6031:2009[44], which details methods that should be considered for the general control of drainage on construction sites, reducing the likelihood of flooding during demolition and construction.	Temporal Scope: Temporary, medium term Likelihood Level: Possible (as likely as not) Consequence Level: Low Receptor Sensitivity: High Impact Magnitude: Low Nature of Effect: Adverse Significance of Effect: **Not Significant**	Additional mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.
	Receptor: Human health and environment Extreme rainfall events could spread contaminated soil (if present) during	Details of the management measures associated with contaminated land are included in the OCEMP (ES Appendix 5.1). Specific measures within the OCEMP to avoid and minimise the potential for contamination impacts are as follows: • All construction personnel would be required to wear appropriate Personal Protective Equipment (PPE) and to only undertake work following a Health and Safety risk assessment and a Health and Safety	Temporal Scope: Temporary, medium term Likelihood Level: Unlikely Consequence Level: Medium Receptor Sensitivity: High Impact Magnitude: Low	Additional mitigation not required. Existing design and mitigation measures are appropriate to

[44] British Standard Institution. 2009. BS6031:2009 British Standard Code of Practice for Earthworks.
[45] Secretary of State, 2015. The Construction (Design and Management) Regulations 2015

Table 9.17: Demolition and Construction Stage Climate Change Resilience Effects

Climate Change Trend	Climate (Change) Impact on Receptor	Embedded Design and Mitigation Measures	Significance of Effect	Additional Mitigation Required
	ground excavations to nearby environmental receptors, which could affect local soil and water quality. Secondary impacts could include harm to Site personnel and future on-site occupants.	Induction. Hygiene and welfare facilities would need to be provided for use by construction personnel during the works; • Chemicals, including fuel, would be stored in bunded containers; • Spill trays would be used when refuelling; • Disposal of water removed from any excavations would be in accordance with Environment Agency (EA) requirements; • A temporary drainage network would be installed to prevent surface runoff (silts, muds) from leaving the Site or entering surface water drains; and • All Site works would be undertaken in accordance with the EA's Pollution Prevention Guidelines. • Regularly maintaining construction vehicles to reduce the risk of hydrocarbon contamination; • Storing, handling and managing construction materials with due regard to the sensitivity of the local aquatic environment and thus the risk of accidental spillage or release; • All liquids and solids of a potentially hazardous nature on surfaced areas should be stored, with bunding, in accordance with the EA's Pollution and Prevention Guidelines 2 (PPG2) preventing pollution from above ground storage tanks. Whilst the EA's PPGs are no longer valid, these represent good practice and would therefore be followed; • Not using any underground storage tanks; and • Contractors would control and bund any hazardous substances used on-Site (although at this stage none are anticipated), including oil drums or containers on-Site, in accordance with Control of Substances Hazardous to Health (COSHH) Regulations (as amended) and ensure that oil or other contaminants are not allowed to reach watercourses or groundwater sources including aquifers.	Nature of Effect: Adverse Significance of Effect: **Not Significant**	account for climate change/ extreme weather.

Table 9.17: Demolition and Construction Stage Climate Change Resilience Effects

Climate Change Trend	Climate (Change) Impact on Receptor	Embedded Design and Mitigation Measures	Significance of Effect	Additional Mitigation Required
		Furthermore, all Site works would be undertaken in accordance with the EA's Pollution Prevention Guidance Note 6 (PPG6)[46].		
Increased frequency and intensity of high temperatures: Heatwaves	**Receptor**: Human health Heatwaves and higher temperatures could impact on-Site personnel welfare, for example, causing heat stress and unsafe working conditions.	All works on-Site would be undertaken in accordance with the provisions of the CDM Regulations 2015. As detailed in ES Volume 1 Chapter 5: Demolition and Construction Description, all construction personnel would be required to only undertake work following a Health and Safety risk assessment and a Health and Safety Induction. The risk of heat stress to Site personnel working outdoors would be managed through this process, e.g. provision of necessary personal protective equipment (PPE) and toolbox talks to highlight risks of heatstroke.	Temporal Scope: Temporary, medium term Likelihood Level: Possible (as likely as not) Consequence Level: Low Receptor Sensitivity: High Impact Magnitude: Low Nature of Effect: Adverse Significance of Effect: **Not Significant**	Additional mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather, assuming the Health and Safety risk assessment and a Health and Safety Induction includes measures to mitigate risk of heat stress to Site personnel.
	Receptor: Human health Heatwaves, higher temperatures and drought conditions could increase dust generated during	Recommended dust mitigation measures for high-risk sites (provided by the Institute of Air Quality Management (IAQM) guidance) would be detailed within the Dust Management Plan (DMP), within the Detailed CEMP. This would be secured by means of an appropriately worded planning condition. Inspections during activities with a high potential to create dust would be increased in prolonged dry weather. The OCEMP (ES Volume 2 Technical Appendix 5.1) lists management measures for minimising potential air	Temporal Scope: Temporary, medium term Likelihood Level: Possible (as likely as not) Consequence Level: Low Receptor Sensitivity: High Impact Magnitude: Low	Additional mitigation not required. Existing design and mitigation measures are appropriate to

[46] Environment Agency, 2012. Pollution Prevention Guidelines 6 Working at Construction and Demolition Sites.

Table 9.17: Demolition and Construction Stage Climate Change Resilience Effects

Climate Change Trend	Climate (Change) Impact on Receptor	Embedded Design and Mitigation Measures	Significance of Effect	Additional Mitigation Required
	demolition and construction activities which could impact Site personnel and future on-Site occupants.	quality impacts from dust during the demolition and construction stage. These include: • Planning Site layout to locate dust generating activities as far as possible from receptors and planning Site operations to take into account prevailing wind patterns; • Using prefabrication off-Site, where possible; • Using solid screens around dusty activities and around stockpiles. Fully enclose the Site or specific operations where there is a high potential for dust production and the Site is active for an extensive period; • Keeping Site fencing barriers and scaffolding clean using wet methods and remove dusty materials from Site as soon as possible; • Minimising emissions from stockpiles by covering, seeding, fencing or damping down; • Using suitable dust suppression equipment or techniques for activities likely to generate dust; • Ensuring adequate water supply for effective dust and particulate matter suppression and ensuring suitable cleaning material is available at all times to clean up spills; • Using enclosed chutes, conveyors and covered skips and minimising drop heights of materials; • Soft stripping buildings before demolition; • Avoiding explosive blasting, using appropriate manual or mechanical alternatives; • Re-vegetating earthworks and exposed areas / soil stockpiles to stabilise surfaces as soon as practicable; • Avoiding concrete scabbling where possible; • Ensuring aggregates are stored in bunded areas and are not allowed to dry out and ensuring bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos. For smaller supplies	Nature of Effect: Adverse Significance of Effect: **Not Significant**	account for climate change/ extreme weather.

Table 9.17: Demolition and Construction Stage Climate Change Resilience Effects

Climate Change Trend	Climate (Change) Impact on Receptor	Embedded Design and Mitigation Measures	Significance of Effect	Additional Mitigation Required
		of fine powder materials, ensuring bags are sealed after use and stored appropriately to prevent dust; • Using water-assisted dust sweepers to clean access and local roads and avoid dry sweeping of large areas; • Ensuring vehicles entering and leaving the Site are appropriately covered; and • Installing hard surfaced haul routes, which are regularly damped down and inspected.		
	Receptor: Buildings and infrastructure Heatwaves and higher temperatures could affect the ability to undertake certain demolition and construction activities leading to programme delays.	All works on-Site would be undertaken in accordance with the provisions of the CDM Regulations 2015. As stated in ES Volume 1 Chapter 5: Demolition and Construction Description, demolition and construction work would be weather dependent. In line with best practice construction measures, more vulnerable activities such as the demolition works and earthworks would take place in appropriate weather conditions (taking into account programme timescale constraints). This would reduce the likelihood of weather delays to these activities and would be implemented via the Detailed CEMP.	Temporal Scope: Temporary, medium term Likelihood Level: Possible (as likely as not) Consequence Level: Low Receptor Sensitivity: High Impact Magnitude: Low Nature of Effect: Adverse Significance of Effect: **Not Significant**	Additional mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.
Increased frequency of extreme weather events: Windstorms and wind gusts	**Receptor**: Buildings and infrastructure Winds gusts could result in the damage of stockpiles, creating windblown debris and unsafe conditions for on-Site personnel and pedestrians within	All works on-Site would be undertaken in accordance with the provisions of the CDM Regulations 2015. As committed to in ES Volume 1 Chapter 5: Demolition and Construction Description, hoardings would be erected around the Site, limiting the wind flow through the Site. Where stockpiles exist on-Site, best practice measures for stockpile management would be utilised. In addition, as included in the OCEMP (ES Volume 2 Technical Appendix 5.1) the following measures would be implemented: • Using prefabrication off-Site, where possible;	Temporal Scope: Temporary, medium term Likelihood Level: Unlikely Consequence Level: Low Receptor Sensitivity: High Impact Magnitude: Low Nature of Effect: Adverse Significance of Effect: **Not Significant**	Additional mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.

Table 9.17: Demolition and Construction Stage Climate Change Resilience Effects				
Climate Change Trend	**Climate (Change) Impact on Receptor**	**Embedded Design and Mitigation Measures**	**Significance of Effect**	**Additional Mitigation Required**
	the vicinity of the Site.	• Where possible, incorporating 'just-in-time' deliveries to minimise stockpiling and prevention congestion of the Site; • Planning Site operations to take into account prevailing wind patterns and off-site receptors; • Use of solid screens around dusty activities and around stockpiles. • Fully enclose the Site or specific operations where there is a high potential for dust production and the Site is active for an extensive period; • Covering, seeding, fencing or damping down of stockpiles; • Re-vegetating earthworks and exposed areas / soil stockpiles to stabilise surfaces as soon as practicable; • Using water sprays and wind/dust fences where possible, particularly in dust sensitive locations i.e. during demolition works, water spraying and/or screening would be implemented; • Cleaning of fencing barriers and scaffolding clean using wet methods; • Removal of dusty materials from Site as soon as possible; • Undertaking monitoring, as appropriate, to ensure the effectiveness of dust control in accordance with the Institute of Air Quality Management guidance; and • Installation of wheel and vehicle body wash facilities.		
	Receptor: Human health Windstorms could cause wind gust conditions and create unsafe conditions for on-Site personnel and pedestrians	During the demolition and construction stage, health and safety measures would be implemented to ensure that the construction workers are adequately protected from wind conditions. For example, minimising stockpiling and positioning in a manner that reduces risk of dust arising through wind action and water spraying/ chemical stabilisation in windy conditions.	Temporal Scope: Temporary, medium term Likelihood Level: Unlikely Consequence Level: Low Receptor Sensitivity: High Impact Magnitude: Low Nature of Effect: Adverse Significance of Effect: **Not Significant**	Additional mitigation not required. Existing design and mitigation measures are appropriate to account for climate

Table 9.17: Demolition and Construction Stage Climate Change Resilience Effects				
Climate Change Trend	**Climate (Change) Impact on Receptor**	**Embedded Design and Mitigation Measures**	**Significance of Effect**	**Additional Mitigation Required**
	within the vicinity of the Site.			change/ extreme weather.
	Receptor: Buildings and infrastructure Windstorms could cause wind gust conditions and damage or disrupt on-Site crane operations.	The Detailed CEMP would include best practice and mitigation measures for operating tall cranes during high winds and the Principal Contractor would be required to implement all relevant conditions on operating procedures and other relevant commitments.	Temporal Scope: Temporary, medium term Likelihood Level: Unlikely Consequence Level: Medium Receptor Sensitivity: High Impact Magnitude: Low Nature of Effect: Adverse Significance of Effect: **Not Significant**	Additional mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.
	Receptor: Buildings and infrastructure Windstorms could cause wind gust conditions and result in damage to hoarding.	As committed to in the OCEMP (ES Volume 2 Technical Appendix 5.1), hoarding would be providing during the demolition and construction works. Regular inspections would be carried out to ensure that the integrity of the hoarding is maintained. Furthermore, the Principal Contractor would prepare a Detailed CEMP. This would ensure that hoardings would be erected and removed securely.	Temporal Scope: Temporary, medium term Likelihood Level: Unlikely Consequence Level: Low Receptor Sensitivity: High Impact Magnitude: Low Nature of Effect: Adverse Significance of Effect: **Not Significant**	Additional mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.

9.10.2 The CCR assessment for the Proposed Development has not identified any significant effects for the demolition and construction stage once embedded mitigation measures are taken into account. All impacts would be of low magnitude and therefore effects would be temporary, medium-term, adverse, direct and Not Significant.

In-Combination Climate Impacts

9.10.3 A summary of potential ICCI and effects during the demolition and construction stage is provided in Table 9.18. The assessment is based on professional judgment informed by a review of individual technical assessments within ES Volume 1.

Table 9.18: Demolition and Construction Stage In-Combination Climate Impacts and Effects

Effect of Proposed Development on Receptors	Embedded Design and Mitigation Measures	Climate Change Trend	Potential In-Combination Climate Impact on Individual Technical Effects or Embedded Mitigation	Is there a Significant In-Combination Climate Impact?	Additional Mitigation Required?
Soil and Agriculture Potential interactions of climate change with the identified effects are considered to be Negligible given embedded design mitigation measures, based on professional judgement and review of ES Volume 1 Chapter 6: Soil and Agriculture. The assessment has considered the impacts of climate change during the demolition and construction stage, comprising a phased delivery over approximately 15 years. Over 10 years is considered to be long-term in duration; however, the individual impacts and effects would occur over a medium-term duration (5 to 10 years). This is due to the temporary and localised nature of soil and agricultural impacts during the demolition and construction stage, which are unlikely to be significantly influenced by short-to medium-term climate change. Receptors such as soil and agricultural land use have limited sensitivity to climate variables over this timescale, particularly where effective mitigation (such as the Framework Soil Management Plan (ES Appendix 6.2), which aims to maintain, and improve, the quality and quantity of soil resources) would be in place. These measures have been designed to be resilient under a range of weather conditions and remain effective in projected future climates, supporting the conclusion of a negligible ICCI impact.					
N/A	N/A	N/A	Negligible	No significant In-Combination Climate Impact.	No additional mitigation required.
Air Quality					
Exposure of sensitive receptors to dust from demolition and construction activities, including earthworks, construction of building structures, materials handling, excavation, earthmovings, and hard and soft landscaping.	Adoption of best practice in compliance with the IAQM guidance to reduce impacts from high-risk sites would be undertaken. This includes preparation of a Dust Management Plan (DMP) for the Site as part of the Detailed CEMP. This would be secured by means of an appropriately worded planning condition. The DMP would include measures such as the implementation of dust suppression techniques. Control of dust would rely upon good Site management and mitigation techniques including several	Increased frequency and intensity of extreme weather events: Drought conditions.	Extended periods of drought could arise as a result of warmer summer months and limited precipitation. This may increase dust production and reduce deposition which has the potential to affect human health. Drought conditions may reduce the availability of water for dust suppression mitigation measures, which would	**Not Significant** due to the embedded mitigation measures committed to in the OCEMP (ES Volume 2 Technical Appendix 5.1) and Phase 1 OCEMP (10051123-ARC-XXX-ZZ-TR-CM-00001) (e.g. increase the frequency of inspections during activities with a high potential to create dust or in prolonged dry weather; development, implementation of a DMP,	No additional measures required. Temporary storage of water could be considered during the demolition and construction stage to be used for dust suppression in drought conditions.

Table 9.18: Demolition and Construction Stage In-Combination Climate Impacts and Effects

Effect of Proposed Development on Receptors	Embedded Design and Mitigation Measures	Climate Change Trend	Potential In-Combination Climate Impact on Individual Technical Effects or Embedded Mitigation	Is there a Significant In-Combination Climate Impact?	Additional Mitigation Required?
	that rely on water, such as the use of water-assisted dust sweepers, wheel washers, and hand-held spray systems.		reduce the effectiveness of embedded mitigation measures.	covering stockpiles and minimising stockpile size).	
Biodiversity					
Loss of and degradation of habitat, enhancement of existing habitats, and creation of new habitat.	Vegetation that is removed would be replaced on a phased basis following construction. Proposed enhancements to habitats on-Site include planting and green infrastructure within the Proposed Development, dominated by native plant species of benefit to wildlife wherever possible, and with non-native species of value to wildlife. This would include Sustainable Drainage Systems (SuDs), urban trees, biodiverse roofs, living walls, new native species-hedgerows and rain gardens, and replacement ponds, maximised for their biodiversity value via design, location and connectivity. In addition, a Landscape and Ecological Management Plan (LEMP) has been prepared for the Phase 1 element of the Proposed Development	Increased frequency and intensity of extreme weather events: Drought conditions.	Extended periods of drought could arise as a result of warmer summer months and limited precipitation which would reduce the effectiveness of embedded mitigation measures.	**Not significant** due to mitigation measures including selection of vegetation including a range of species rich planting (and avoidance of high-water demand species) and incorporation of rainwater harvesting systems to provide for irrigation.	None required; however, it is recommended that landscape maintenance requirements are specified within an additional and separate Habitat Management and Monitoring Plan (HMMP) for the wider Site which would accompany reserved matters applications. Mitigation (if required) would be secured through means of an appropriately worded planning condition.

Table 9.18: Demolition and Construction Stage In-Combination Climate Impacts and Effects

Effect of Proposed Development on Receptors	Embedded Design and Mitigation Measures	Climate Change Trend	Potential In-Combination Climate Impact on Individual Technical Effects or Embedded Mitigation	Is there a Significant In-Combination Climate Impact?	Additional Mitigation Required?
	(10051123-ARC-300-1A-TR-LA-00001). This includes a programme of maintenance and management operations, with a dynamic review period at 5 years. This will consider the rate of establishment of the new planting, results from the monitoring of habitat conditions against the set targets, impacts of climate change and future stewardship requirements.				
Cultural Heritage Potential interactions of climate change with the identified effects are considered to be Negligible given embedded design mitigation measures, based on professional judgement and review of ES Volume 1 Chapter 10: Cultural Heritage. The assessment has considered the impacts of climate change during the demolition and construction stage, comprising a phased delivery over approximately 15 years. Over 10 years is considered to be long-term in duration; however, the individual impacts and effects would occur over a medium-term duration (5 to 10 years). This reflects the fact that cultural heritage assets identified within the assessment are not expected to be significantly affected by climate change during the demolition and construction stage. The impacts on these assets are primarily physical and localised, relating to factors such as setting, vibration, or ground disturbance, which are not materially influenced by climatic variables. Embedded mitigation, including a staged programme of archaeological work, Archaeological Mitigation Strategy, careful Site planning, and protective measures during construction, would ensure resilience to a range of environmental conditions. Therefore, climate change is unlikely to intensify or alter the nature or significance of these effects, supporting a negligible ICCI impact.					
N/A	N/A	N/A	Negligible	No significant In-Combination Climate Impact.	No additional mitigation required.
Landscape and Visual Potential interactions of climate change with the identified effects are considered to be Negligible given embedded design mitigation measures, based on professional judgement and review of ES Volume 1 Chapter 11: Landscape and Visual. The assessment has considered the impacts of climate change during the demolition and construction stage, comprising a phased delivery over approximately 15 years. Over 10 years is considered to be long-term in duration; however, the individual impacts and effects would occur over a medium-term duration (5 to 10 years). This is because the predicted effects on landscape and visual receptors during demolition and construction are					

Table 9.18: Demolition and Construction Stage In-Combination Climate Impacts and Effects

Effect of Proposed Development on Receptors	Embedded Design and Mitigation Measures	Climate Change Trend	Potential In-Combination Climate Impact on Individual Technical Effects or Embedded Mitigation	Is there a Significant In-Combination Climate Impact?	Additional Mitigation Required?
temporary and localised, and are primarily related to physical changes such as vegetation removal, Site compound locations, and construction activities. These effects would be unlikely to be significantly influenced or worsened by climate change over the medium-term construction period. Embedded mitigation measures, including Habitat Management and Monitoring Plan (HMMP), habitat creation to reflect existing surroundings and aesthetically appropriate Site hoardings, would be designed to be effective under a range of environmental conditions, including anticipated climate variability. As a result, climate change is not expected to materially affect the magnitude or duration of landscape or visual effects, supporting a negligible ICCI impact.					
N/A	N/A	N/A	Negligible	No significant In-Combination Climate Impact.	No additional mitigation required.
Noise and Vibration Potential interactions of climate change with the identified effects are considered to be Negligible given embedded design mitigation measures, based on professional judgement and review of ES Volume 1 Chapter 12: Noise and Vibration. The assessment has considered the impacts of climate change during the demolition and construction stage, comprising a phased delivery over approximately 15 years. Over 10 years is considered to be long-term in duration; however, the individual impacts and effects would occur over a medium-term duration (5 to 10 years). This conclusion is supported by the fact that noise and vibration effects during demolition and construction are primarily related to equipment operation and construction activities, which would not be directly influenced by climate variables over the medium-term. Embedded mitigation measures such as positioning of hoarding to minimise noise, restricted working hours, and use of noise attenuated plant would be designed to control and minimise impacts regardless of weather or climatic conditions. Consequently, the predicted noise and vibration effects would be unlikely to be materially altered by climate change, supporting a negligible ICCI impact.					
N/A	N/A	N/A	Negligible	No significant In-Combination Climate Impact.	No additional mitigation required.
Socioeconomics Potential interactions of climate change with the identified effects are considered to be Negligible given embedded design mitigation measures, based on professional judgement and review of ES Volume 1 Chapter 13: Socioeconomics and Health. The assessment has considered the impacts of climate change during the demolition and construction stage, comprising a phased delivery over approximately 15 years. Over 10 years is considered to be long-term in duration; however, the individual impacts and effects would occur over a medium-term duration (5 to 10 years). This is because the socioeconomics and health effects during demolition and construction are predominantly related to temporary changes such as employment, local business activity, and community disruption, which would not be expected to be significantly influenced by climate change over the medium-term project period. Embedded mitigation measures, including management strategies, community engagement, and construction traffic					

Table 9.18: Demolition and Construction Stage In-Combination Climate Impacts and Effects

Effect of Proposed Development on Receptors	Embedded Design and Mitigation Measures	Climate Change Trend	Potential In-Combination Climate Impact on Individual Technical Effects or Embedded Mitigation	Is there a Significant In-Combination Climate Impact?	Additional Mitigation Required?
management, would be designed to be effective regardless of weather or climatic variations. Therefore, climate change is unlikely to materially alter the scale or significance of socioeconomics and health impacts, supporting a negligible ICCI impact.					
N/A	N/A	N/A	Negligible	No significant In-Combination Climate Impact.	No additional mitigation required.
Water and Flood					
Contamination of Surface Water	Demolition and construction works would be undertaken in compliance with the OCEMP (ES Volume 2 Technical Appendix 5.1) and Phase 1 OCEMP (10051123-ARC-XXX-ZZ-TR-CM-00001) which include measures to avoid and minimise potential contamination impacts including: storing, handling and managing construction materials with due regard to the potential for mobilisation; selection of appropriate piling and excavation techniques.	Increased frequency and intensity of extreme weather events: Intense rainfall events	Increased frequency of heavy rainfall events could increase mobilisation of contaminants and surface water run-off from the Site, potentially spreading contamination to controlled waters.	Not Significant due to mitigation measures specified in the OCEMP (ES Volume 2 Technical Appendix 5.1) and Phase 1 OCEMP (10051123-ARC-XXX-ZZ-TR-CM-00001) including storing, handling and managing construction materials with due regard to the potential for mobilisation. Significance of Effect: **Not Significant**	No additional measures required.
Flood risk, fluvial, pluvial and groundwater flooding	Where applicable for works near a main river, a flood risk activity permit would be sought from the EA and works would be carried out in accordance with EA requirements, to ensure that there are no effects on demolition and construction workers as a result of flooding.	Increased frequency and intensity of flooding	Increased precipitation could lead to an increased frequency and intensity of flooding.	**Not Significant** due to the embedded mitigation measures committed to in the OCEMP (ES Volume 2 Technical Appendix 5.1) and Phase 1 OCEMP (10051123-ARC-XXX-ZZ-TR-CM-00001) (e.g. preparation of a construction	No additional mitigation would be required.

Table 9.18: Demolition and Construction Stage In-Combination Climate Impacts and Effects

Effect of Proposed Development on Receptors	Embedded Design and Mitigation Measures	Climate Change Trend	Potential In-Combination Climate Impact on Individual Technical Effects or Embedded Mitigation	Is there a Significant In-Combination Climate Impact?	Additional Mitigation Required?
				phase surface water management plan, with consent required, where applicable, by the EA and Lead Local Flood Authority (LLFA), a flood risk activity permit flood and mitigation features).	
Transport Potential interactions of climate change with the identified effects are considered to be Negligible given embedded design mitigation measures, based on professional judgement and review of Chapter 15: Transport. The assessment has considered the impacts of climate change during the demolition and construction stage, comprising a phased delivery over approximately 15 years. Over 10 years is considered to be long-term in duration; however, the individual impacts and effects would occur over a medium-term duration (5 to 10 years). This reflects that the transport-related effects during demolition and construction are mainly associated with changes in traffic flow, congestion, and vehicle movements, which would not be expected to be significantly influenced by climate change over the medium-term. Embedded mitigation measures such as traffic management plans, scheduling of deliveries, and route optimisation would be designed to ensure resilience under various weather conditions and would be unlikely to be compromised by anticipated climate variability. As a result, climate change is not expected to materially affect the nature or significance of transport impacts, supporting a negligible ICCI impact.					
N/A	N/A	N/A	Negligible	No significant In-Combination Climate Impact.	No additional mitigation required.

9.10.4 The ICCI assessment for the Proposed Development has identified no significant effects as a result of climate change during the demolition and construction stage given embedded design mitigation measures. Accordingly, in-combination climate effects would not be significant.

Greenhouse Gas Emissions

9.10.5 Information on demolition and construction embedded mitigation measures is presented in ES Volume 1 Chapter 5: Demolition and Construction Description. Embedded mitigation relevant to the GHG assessment includes, but is not limited to, the following:

- The Detailed CEMP would include a SWMP which would implement the waste hierarchy to reuse and recycle waste material.
- A strategy for minimising carbon emissions would be used when selecting materials. The Detailed CEMP would outline the approach for a range of resources efficiency principles including locally sources materials and services, auditing materials to demonstrate environmental performance and options for reuse of supplies and materials. It would be carried out alongside a carbon footprinting procedure that would minimise carbon demands of the Proposed Development, identify the use renewable energy resources and incorporate efficient energy supply and low carbon technologies.
- Construction materials are likely to be selected following the Building Research Establishment (BRE) 'Green Guide to Specification'. These include:
  - Minimising embodied energy content (the energy used in manufacture);
  - Using recyclable materials where they have high embodied energy; and
  - Maximising the recycled content of the material, ease of maintenance, appropriate sourcing of materials and totally excluding deleterious and hazardous materials.
- The 'sustainability' of raw materials would be considered during the procurement process.

9.10.6 In accordance with the Design Code, a Whole Life Carbon Assessment (WLCA) is to be submitted as part of each subsequent reserved matters application. This would inform the detailed design with a view to reducing embodied and operational carbon, identify feasible carbon reduction measures and demonstrate how construction and operational emissions have been reduced as much as possible using the carbon reduction hierarchy (e.g. as set out in PAS2080).

9.10.7 As noted within Arcadis' Earthworks strategy[47], it is proposed that following completion of demolition surveys and where suitable, an estimated quantity of approximately 1,058 m^3 of materials would be crushed and reused as engineered fill for Phase 1 of the Proposed Development. The proposed waste management strategy (i.e. anticipated proportion available for reuse on-Site, sent off-Site for recycling, or proportion disposed at landfill) for the demolition waste for the entire Site has not been finalised. This will be confirmed by the Principal Contractor once appointed.

9.10.8 The extent of Site won material that may be reused on the Site for Phase 1 has been informed by the findings of previous ground investigation for the wider Site[48]. All material except made ground is deemed suitable for reuse on Site for Phase 1, and a working estimate of the expected volume of made ground in the arisings has been made based on the assumption that 10% of Site won material for Phase 1 is unsuitable for re-use.

[47] Arcadis, 2023. Earthworks Strategy for Phase 1. 10051123-ARC-060-ZZ-TR-CE-00001

[48] Ground Investigation by Geosphere Environmental (Ref: 6071,SI,GROUND,GF,SG,JD,22-04-22,V2, dated 22/04/2022) and Ground Investigation and Geotechnical Design by Arcadis (10051123-ARC-010-1A-TR-GE-00001)

9.10.9 A high-level breakdown of the estimated demolition and construction stage GHG emissions for the Proposed Development are presented in Table 9.19. The GHG emissions have been broken down into life cycle stages as specified in PAS2080.

Table 9.19: Demolition and Construction Stage Greenhouse Gas Assessment Summary

PAS2080 modules	Estimated GHG Emissions (tCO_2e)	% of Total Emissions
Product stage; including raw material supply, transport, and manufacture (A1-A3)	182,035	84%
Transport to/from works site (A4)	18,274	8%
Construction/installation processes (A5)	17,298	8%
Total	**217,607**	**100%**

9.10.10 Of the total GHG emissions associated with the demolition and construction stage, the detailed component accounts for 9% whilst the outline component accounts for 91%.

9.10.11 When comparing the "do something" scenario associated to the demolition and construction stage against the "do minimum scenario", i.e. the operational emissions of the existing on-Site buildings, the net GHG emissions contribution of the Proposed Development to the carbon budgets are expected to be:

- 0.001 % to the UK's fourth carbon budget (2023-2027);
- 0.005 % to the UK's fifth carbon budget (2028-2032);
- 0.009 % to the UK's sixth carbon budget (2033-2037); and
- 0.007 % to the UK's seventh carbon budget (2038-2042).

9.10.12 Furthermore, it is expected to contribute:

- 0.005 % to the projected buildings sector carbon budget for 2023-2027;
- 0.024 % to the projected buildings sector carbon budget for 2028-2032;
- 0.035 % to the project buildings sector carbon budget for 2033-2037; and
- 0.035 % to the project buildings sector carbon budget for 2038-2042.

9.10.13 The net GHG emissions associated to the demolition and construction stage have not been compared to the Tyndall Centre recommended HDC energy only Carbon Budget, as this is only applicable to the building energy demand during the completed development stage.

9.10.14 Due to the low percentage of GHG emissions in comparison to the UK and projected buildings sector carbon budgets, and the embedded mitigation measures currently in place, including the proposed WLCA to be undertaken at reserved matters application and secured by planning condition, the demolition and construction stage of the Proposed Development is assessed as compatible with the budgeted, science-based 1.5°C trajectory in terms of rate of GHG emissions reduction. Therefore, the scale of effect of the Proposed Development on the likelihood of avoiding severe climate change, partially aligns with a science-based 1.5 °C compatible trajectory and achieving net zero by 2050. Accordingly, demolition and construction stage GHG effects are considered to be temporary, medium-term, adverse, direct and **Minor Adverse** (not significant).

Completed Development Effects

9.10.15 A summary of potential CCR impacts during the completed development stage is provided in Table 9.20. In line with IEMA Guidance, mitigation measures (including existing design measures) have been considered within this assessment and a summary of the significance has been provided. The assessment has been based on professional judgment and has been informed by a review of mitigation measures included within individual technical assessments of the ES.

Table 9.20: Completed Development Stage Climate Change Resilience Assessment

Climate Change Trend	Climate (Change) Impact on Receptor	Embedded Design and Mitigation Measures	Significance of Effect	Additional Mitigation Required
Increased frequency and intensity of extreme weather events: Intense rainfall events	**Receptor**: Buildings, infrastructure and human health Wetter winters and increased frequency of intense rainfall events could result in the overwhelming of drainage assets. This could result in secondary impacts such as localised flooding or mobilisation of contamination.	A Flood Risk Assessment (FRA) (WOI-HPA-DOC-FRA-01) and an Outline Drainage Strategy (DS) (WOI-HPA-DOC-SWDS-01) have been prepared for the Proposed Development and considers the flood risk to the Proposed Development and downstream receptors. The Site-wide FRA has been informed by the Phase 1 FRA Addendum with Hydraulic Modelling Report (10051123-ARC-260-ZZ-TR-ZZ-002) which has been prepared by Arcadis for the detailed component of the Proposed Development. According to the Site-wide FRA, areas of fluvial; Flood Zone 2 and Flood Zone 3 are present in the northern and eastern boundaries and a limited section at the downstream (northern) limit of the Rusper Road Drain is shown to have a fluvial flood risk. Whilst three separate historical fluvial flooding events have affected land in the north-east of the Site, none of the proposed residential, employment, school areas, playing pitches and allotments are shown to have been affected during these events. Therefore, fluvial flood risk is not considered to affect the majority of the Proposed Development. Whilst updated Flood Maps for Planning show that a potential area of flooding related to the Rusper Road Drain, is now defined as a Flood Zone, this is associated with overland pluvial (surface water) flows and not a fluvial risk. When considered correctly as a pluvial flood risk, land in proximity to the Rusper Road Drain is reported by the EA of having a Very Low or Low chance of such water reaching 300mm. A detailed Surface Water Drainage Design Report (10051123-ARC-050-ZZ-TR-CE-00002) for the Phase 1 Highways and Infrastructure indicates that the majority of the detailed component is located within Flood Zone 1, therefore at Low Risk of flooding from rivers and seas. An area within Phase 1, along Rusper Road, is shown to be located within Flood Zones 2 and 3, however as stated in the Site-wide FRA, this is considered to be of a pluvial nature rather than fluvial. A small area of the Phase 1, along the River Mole and Ifield Brook shows regions within Flood Zones 2 and 3. A further small area of the proposed 'Phase 1' highway and corresponding drainage shown to be located within Flood Zone 2 and Flood Zone	Temporal Scope: Long term Likelihood Level: Unlikely Consequence Level: Medium Receptor Sensitivity: High Impact Magnitude: Low Nature of Effect: Adverse Significance of Effect: **Not Significant**	Additional mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.

Table 9.20: Completed Development Stage Climate Change Resilience Assessment

Climate Change Trend	Climate (Change) Impact on Receptor	Embedded Design and Mitigation Measures	Significance of Effect	Additional Mitigation Required
		3, where the proposed highway crosses the River Mole via a proposed new bridge. The Site-wide Drainage Strategy proposes to limit the surface water discharge rate to existing greenfield rates for all rainfall events up to and including the climate change-corrected 100-year storm + 40 % climate change (CC) fluvial event. This would be achieved through Sustainable Drainage Systems including detention basins, below ground tanks, MUGA attenuation, swales, filter trenches, blue/green roofs, rain gardens and oversized pipes. The Site wide drainage strategy would have a total attenuation requirement of 52,113 m^3, distributed between the Site-wide masterplan and individual plot catchments. Flood exceedance routes throughout the Proposed Development site have been considered should rainfall event exceeds the inlet capacity of the drainage network. The proposed hardstanding areas should seek to direct flows away from occupied residential blocks and primarily to the larger areas of low depressions, roads, ditches and other means of surface water storage/ conveyance. Design of the finished floor levels for the buildings will ensure that levels fall away from the building thresholds (to be secured by planning condition). The Design code states that new wet grassland detention basins must be provided as part of the Site wide SuDS and flood alleviation strategy. These must be designed so that any standing water drains away within 24 hours. These would be integrated within the Proposed Development parcels, access corridors and strategic open spaces. SuDs must be designed in accordance with industry standard guidance (e.g. CIRIA guidance), including for climate change allowances.		
	Receptor: Buildings and infrastructure Wetter winters and increased frequency of	The FRA (WOI-HPA-DOC-FRA-01) indicates that the Site is within an area at low risk of groundwater flooding, flooding and, although the Site is within an area shown to have a potential flood risk associated with reservoir failure, the likelihood of such a flood is considered to be low.	Temporal Scope: Long term Likelihood level: Unlikely	Additional mitigation not required. Existing design and

Table 9.20: Completed Development Stage Climate Change Resilience Assessment

Climate Change Trend	Climate (Change) Impact on Receptor	Embedded Design and Mitigation Measures	Significance of Effect	Additional Mitigation Required
	intense rainfall events could result in increased groundwater levels.		Consequence level: Medium Receptor Sensitivity: High Impact Magnitude: Low Nature of Effect: Adverse Significance of Effect: **Not Significant**	mitigation measures are appropriate to account for climate change/ extreme weather.
	Receptor: Buildings, infrastructure and human health Increased frequency of intense rainfall events could result in increased river levels leading to flooding within the vicinity of the Site.	A Flood Risk Assessment (FRA) (WOI-HPA-DOC-FRA-01) and an Outline Drainage Strategy (DS) (WOI-HPA-DOC-SWDS-01) have been prepared for the Proposed Development and considers the flood risk to the Proposed Development and downstream receptors. According to the FRA, areas of fluvial; Flood Zone 2 and Flood Zone 3 are present in the northern and eastern boundaries and a limited section at the downstream (northern) limit of the Rusper Road Drain is shown to have a fluvial flood risk. Whilst three separate historical fluvial flooding events have affected land in the north-east of the Site, none of the proposed residential, employment, school areas, playing pitches and allotments are shown to have been affected during these events. Therefore, fluvial flood risk is not considered to affect the majority of the Proposed Development. Whilst updated Flood Maps for Planning show that a potential area of flooding related to the Rusper Road Drain, is now defined as a Flood Zone, this is considered to be associated with overland pluvial (surface water) flows and not a fluvial risk. When considered correctly as a pluvial flood risk, land in proximity to the Rusper Road Drain is reported by the EA of having a Very Low or Low chance of such water reaching 300mm. A detailed Surface Water Drainage Design Report (10051123-ARC-050-ZZ-TR-CE-00002) for the Phase 1 Highways and Infrastructure indicates that the majority of the detailed component is located within Flood Zone 1, therefore at Low Risk of flooding from rivers and seas. An area within Phase 1, along Rusper Road, is	Temporal Scope: Long term Likelihood Level: Unlikely Consequence Level: Low Receptor Sensitivity: High Impact Magnitude: Low Nature of Effect: Adverse Significance of Effect: **Not Significant**	Additional mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.

Table 9.20: Completed Development Stage Climate Change Resilience Assessment

Climate Change Trend	Climate (Change) Impact on Receptor	Embedded Design and Mitigation Measures	Significance of Effect	Additional Mitigation Required
		shown to be located within Flood Zones 2 and 3, however as stated in the Site-wide FRA, this is considered to be of a pluvial nature rather than fluvial. A small area of the Phase 1, along the River Mole and Ifield Brook shows regions within Flood Zones 2 and 3. A further small area of the proposed 'Phase 1' highway and corresponding drainage shown to be located within Flood Zone 2 and Flood Zone 3, where the proposed highway crosses the River Mole via a proposed new bridge. The Site-wide Drainage Strategy proposes to limit the surface water discharge rate to existing greenfield rates for all rainfall events up to and including the climate change-corrected 100-year storm + 40 % climate change (CC) fluvial event. This would be achieved through Sustainable Drainage Systems including detention basins, below ground tanks, MUGA attenuation, swales, filter trenches, blue/green roofs, rain gardens and oversized pipes. The Site wide drainage strategy would have a total attenuation requirement of 52,113 m^3, distributed between the Site-wide masterplan and individual plot catchments. Flood exceedance routes throughout the Proposed Development site have been considered should rainfall event exceeds the inlet capacity of the drainage network. The proposed hardstanding areas should seek to direct flows away from occupied residential blocks and primarily to the larger areas of low depressions, roads, ditches and other means of surface water storage/ conveyance. Design of the finished floor levels for the buildings will ensure that levels fall away from the building thresholds (to be secured via appropriate planning condition). The Design code states that new wet grassland detention basins must be provided as part of the Site wide SuDS and flood alleviation strategy. These must be designed so that any standing water drains away within 24 hours. These would be integrated within the Proposed Development parcels, access corridors		

Table 9.20: Completed Development Stage Climate Change Resilience Assessment

Climate Change Trend	Climate (Change) Impact on Receptor	Embedded Design and Mitigation Measures	Significance of Effect	Additional Mitigation Required
		and strategic open spaces. SuDs must be designed in accordance with industry standard guidance (e.g. CIRIA guidance), including for climate change allowances.		
Increased frequency and intensity of extreme weather events: Heatwaves	Receptor: Environmental Increased frequency and severity of extreme heat events (i.e. heat waves) could result in the landscape design being compromised (e.g. tree and shrubs die).	The following general principles have been committed to within the Design Code: • Climate change must be a foremost consideration when selecting trees and plants, with preference given to drought tolerant and semi-drought tolerant species. • New trees must be robust hardy species with a mix of predominantly native broadleaved species of UK provenance selected to provide resilience to pests and diseases and climate change effects. • Appropriate pit accessories such as aeration/irrigation pipes and drainage inspection pipes must be provided for all street trees to support successful establishment and to facilitate monitoring • Water supply arrangements for allotment plot holders, including use of stored rainwater and SuDS for watering crops.	Temporal Scope: Long term Likelihood Level: Unlikely Consequence Level: Low Receptor Sensitivity: High Impact Magnitude: Low Nature of Effect: Adverse Significance of Effect: **Not Significant**	Additional mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.
	Receptor: Buildings and infrastructure Increased frequency and severity of extreme heat events (i.e. heat waves) could result in overheating of mechanical and electrical equipment.	Overheating assessments have not been undertaken at this stage of outline design. It is expected that the overheating assessments would be undertaken for the detailed design stage. As stated in ES Volume 1 Chapter 4: Proposed Development Description, cooling of buildings including design measures such as use of ventilation and green infrastructure to help absorb heat would be considered at detailed design.	Temporal Scope: Long term Likelihood Level: Unlikely Consequence Level: Low Receptor Sensitivity: High Impact Magnitude: Low Nature of Effect: Adverse Significance of Effect: **Not Significant**	Additional mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.
	Receptor: Human health High temperatures and heatwaves could result in overheating and	As stated in ES Volume 1 Chapter 12: Noise and Vibration, it is expected that opening windows cannot be used as a strategy to mitigate against external noise break-in during overheating conditions, across all residential development plots. The noise level limits are expected to be exceeded across the proposed	Temporal Scope: Long term Likelihood Level: Unlikely	Additional mitigation not required. Existing design and

Table 9.20: Completed Development Stage Climate Change Resilience Assessment

Climate Change Trend	Climate (Change) Impact on Receptor	Embedded Design and Mitigation Measures	Significance of Effect	Additional Mitigation Required
	unsuitable conditions e.g. discomfort for building occupants of the Proposed Development.	residential development with windows open. Therefore, windows would be required to be closed, and alternate passive or active means of ventilation would be required, to be secured via planning condition. Overheating assessments have not been undertaken at this stage of outline design. It is expected that the overheating assessments would be undertaken for the detailed design stage. The following general principles are included in the Design Code and could potentially reduce the risk of overheating at detailed design: • Measures such as green roofs and SuDs would be implemented at detailed design. These would help absorb heat and therefore avoid overheating of buildings. • Native mixed species hedgerows must be planted along the boundary to provide shelter, enhance micro-climate and improve biodiversity. • Where applicable, use of permeable paving systems which would improve attenuation and trapping of moisture to assist natural cooling. Details on materials are expected to be secured via planning condition. In addition, green infrastructure could be designed in line with current best practice to keep spaces cool and usable during extreme weather.	Consequence Level: Medium Receptor Sensitivity: High Impact Magnitude: Low Nature of Effect: Adverse Significance of Effect: **Not Significant**	mitigation measures are appropriate to account for climate change/ extreme weather.
Increased frequency and intensity of high temperatures: Drought conditions.	**Receptor**: Buildings and infrastructure, human health Prolonged periods of drought could affect potable water availability.	A Water Neutrality Statement (WOI-HPA-WNS-01) has been prepared, which demonstrates how the Proposed Development would achieve water neutrality within the Sussex North Water Resource Zone (WRZ). The strategy is based on a combination of demand reduction, water reuse and offsetting measures. To minimise potable water use, the following water reduction and reuse measures will be incorporated: • Specification for an 85 litres per person per day per capita consumption for residential units. • Requirement for achieving 3 BREEAM credits or equivalent for commercial and educational premises.	Temporal Scope: Long term Likelihood Level: Unlikely Consequence Level: Medium Receptor Sensitivity: High Impact Magnitude: Low Nature of Effect: Adverse Significance of Effect: **Not Significant**	Additional mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.

Table 9.20: Completed Development Stage Climate Change Resilience Assessment

Climate Change Trend	Climate (Change) Impact on Receptor	Embedded Design and Mitigation Measures	Significance of Effect	Additional Mitigation Required
		• Implementation of rainwater harvesting systems for non-potable water demand.		
Increased frequency of extreme weather events: Windstorms and wind gusts	**Receptor**: Buildings and infrastructure Windstorm events could cause damage to the Proposed Development. This could include damage to roof sheeting and wall cladding. This could also create unsafe conditions for users.	Although the UKCP18 climate data identifies trends for near surface wind speeds for the second half of the 21st century (accompanied by an increase in frequency of winter storms over the UK) any increase would be modest compared to interannual variability for the PPE-15 (perturbed parameter ensemble). It has not been considered that climate change would impact the predicted wind microclimate conditions in and around the Proposed Development. It is expected that the structural design would account for appropriate wind loading at the detailed design stage.	Temporal Scope: Long term Likelihood Level: Unlikely Consequence Level: Medium Receptor Sensitivity: High Impact Magnitude: Low Nature of Effect: Adverse Significance of Effect: **Not Significant**	Additional mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.

9.10.16 The CCR assessment for the Proposed Development has not identified significant effects for the completed development stage taking into account embedded mitigation measures. All impacts would be of low magnitude and therefore effects would be permanent, long-term, adverse, direct, but **Not Significant**.

In-Combination Climate Impacts

9.10.17 A summary of potential ICCI and effects during the completed development stage is provided in Table 9.21. The assessment is based on professional judgment informed by a review of individual technical assessments within the ES. The ICCI assessment for the Proposed Development has not identified any significant effects for the operational phase once existing design mitigation measures are taken into account. All effects are therefore considered to be **Not Significant**.

Table 9.21: Completed Development Stage In-Combination Climate Impacts and Effects

Effect of Proposed Development on Receptors	Embedded Design and Mitigation Measures	Climate Change Trend	Potential In-Combination Climate Impact on Individual Technical Effects or Embedded Mitigation	Is there a Significant In-Combination Climate Impact?	Additional Mitigation Required?
Soil and Agriculture Potential interactions of climate change with the identified effects are considered to be Negligible, based on professional judgement and review of Chapter 6: Soil and Agriculture. During operation, soil and agricultural impacts are expected to be minimal due to the nature of ongoing land use and management practices. Embedded mitigation measures such as soil conservation, drainage management, and habitat restoration would be designed to be robust and adaptable to a range of future climatic conditions. These measures would be maintained and updated as necessary to address changing environmental factors. As a result, the effects on soil quality and agricultural land use are unlikely to be significantly influenced by climate change during the operational phase, supporting a negligible ICCI impact.					
N/A	N/A	N/A	Negligible	No significant In-Combination Climate Impact.	No additional mitigation required.
Air Quality Potential interactions of climate change with the identified effects are considered to be Negligible, based on professional judgement and review of Chapter 7: Air Quality. During operation, air quality effects are anticipated to be limited due to ongoing control measures and regulatory compliance. Embedded mitigation measures such as emissions controls, monitoring, and traffic management would be designed to remain effective under a range of future climatic conditions. These measures would be maintained and adapted as necessary to respond to evolving environmental factors. Therefore, the identified effects on air quality are unlikely to be materially influenced by climate change during the operational phase, supporting a negligible ICCI impact.					
N/A	N/A	N/A	Negligible	No significant In-Combination Climate Impact.	No additional mitigation required.
Biodiversity Potential interactions of climate change with the identified effects are considered to be Negligible, based on professional judgement and review of Chapter 8: Biodiversity. During operation, biodiversity effects are expected to be limited due to ongoing habitat management and monitoring. Embedded mitigation measures such as habitat enhancement, species protection, and adaptive management would be designed to be resilient to a range of future climate conditions. These measures would be maintained and updated as needed to address any emerging environmental changes. As a result, the impacts on biodiversity are unlikely to be significantly influenced by climate change during the operational phase, supporting a negligible ICCI impact.					
N/A	N/A	N/A	Negligible	No significant In-Combination Climate Impact.	No additional mitigation required.
Cultural Heritage Potential interactions of climate change with the identified effects are considered to be Negligible, based on professional judgement and review of Chapter 10: Cultural Heritage. During operation, effects on cultural heritage assets are expected to be minimal due to ongoing monitoring and maintenance. Embedded mitigation measures,					

Table 9.21: Completed Development Stage In-Combination Climate Impacts and Effects

Effect of Proposed Development on Receptors	Embedded Design and Mitigation Measures	Climate Change Trend	Potential In-Combination Climate Impact on Individual Technical Effects or Embedded Mitigation	Is there a Significant In-Combination Climate Impact?	Additional Mitigation Required?
including conservation protocols, protective measures, and Site management, would be designed to be resilient to a range of future climate conditions. These measures would be regularly reviewed and updated as necessary to respond to any changes in environmental factors. Therefore, climate change is unlikely to materially affect the condition or significance of cultural heritage assets during the operational phase, supporting a negligible ICCI impact.					
N/A	N/A	N/A	Negligible	No significant In-Combination Climate Impact.	No additional mitigation required.
Landscape and Visual Potential interactions of climate change with the identified effects are considered to be Negligible, based on professional judgement and review of Chapter 11: Landscape and Visual. During operation, effects on landscape and visual receptors are expected to be limited due to ongoing management and maintenance of landscaping and screening features. Embedded mitigation measures such as habitat management, planting schemes, and visual screening would be designed to be resilient to a range of future climatic conditions. These measures would be monitored and adapted as necessary to respond to environmental changes over time. As a result, climate change is unlikely to materially alter the nature or significance of landscape and visual effects during the operational phase, supporting a negligible ICCI impact.					
N/A	N/A	N/A	Negligible	No significant In-Combination Climate Impact.	No additional mitigation required.
Noise and Vibration					
Exposure of sensitive receptors to increased noise levels due to open windows.	The assessment has considered the potential for overheating in the site suitability assessment. Subject to the proposed glazing, ventilation and plant noise requirements being secured by planning conditions, the potential for overheating would be avoided.	Increased temperatures and heatwaves	Increased temperatures and heatwaves could lead to an increased frequency of internal noise exceeding thresholds as a result of opening windows in high temperatures.	Not Significant	No additional mitigation required.

Table 9.21: Completed Development Stage In-Combination Climate Impacts and Effects

Effect of Proposed Development on Receptors	Embedded Design and Mitigation Measures	Climate Change Trend	Potential In-Combination Climate Impact on Individual Technical Effects or Embedded Mitigation	Is there a Significant In-Combination Climate Impact?	Additional Mitigation Required?
Socioeconomics Potential interactions of climate change with the identified effects are considered to be Negligible, based on professional judgement and review of Chapter 13: Socioeconomics and Health. During operation, socioeconomics and health effects are expected to be managed through ongoing community engagement, health and safety protocols, and economic development initiatives. Embedded mitigation measures such as public health monitoring, traffic management, and local business support would be designed to remain effective under a range of future climate conditions. These measures would be regularly reviewed and adapted as necessary to address emerging challenges. Therefore, climate change is unlikely to materially alter the scale or significance of socioeconomics and health impacts during the operational phase, supporting a negligible ICCI impact.					
N/A	N/A	N/A	Negligible	No significant In-Combination Climate Impact.	No additional mitigation required.
Water and Flood					
Flood risk, fluvial, pluvial and groundwater flooding	The Drainage Strategy has made a climate change allowance of 40 % and would seek to deliver greenfield fun-off rates.	Increased frequency and intensity of flooding	Increased precipitation could lead to an increased frequency and intensity of flooding.	Not Significant	No additional mitigation required.
Transport Potential interactions of climate change with the identified effects are considered to be Negligible, based on professional judgement and review of ES Chapter 15: Transport. During operation, transport-related effects such as traffic flow, congestion, and vehicle movements are expected to be managed through ongoing operational controls and infrastructure maintenance. Embedded mitigation measures including traffic management systems, route optimisation, and infrastructure resilience planning would be designed to remain effective under a range of future climatic conditions. These measures would be regularly reviewed and adapted to respond to evolving climate projections and environmental challenges. Therefore, climate change is unlikely to materially alter the nature or significance of transport impacts during the operational phase, supporting a negligible ICCI impact.					
N/A	N/A	N/A	Negligible	No significant In-Combination Climate Impact.	No additional mitigation required.

Greenhouse Gas Emissions

9.10.18 Information on embedded mitigation measures is included in ES Volume 1 Chapter 4: Proposed Development Description, ES Volume 1 Chapter 5: Demolition and Construction Description, Outline Site Waste Management Plan (SWMP) (WOI-HPA-DOC-OWSMP-01) and the Site-Wide Design Code (WOI-HPA-DOC-SWDC-01):

- Preparation of an Outline Energy Statement (WOI-HPA-DOC-ENE-01). The Energy Statement follows the energy hierarchy, i.e.:
  - Be Lean: use less energy (reduce energy by design).
  - Be Clean: increase efficiency of energy supply.
  - Be Green: use energy from renewable and low carbon sources
  - The choice of scenario would be further assessed and confirmed at reserved matters stage and would further consider factors such as capital and operational cost, legalised cost of energy and net zero aspirations. At this stage, Scenario 3, which comprises individual Air Source Heat Pumps (ASHP) at building level with communal heating for flats, and 10% solar PV on-site generation, is preliminarily proposed for its ability to deliver heat efficiently without needing an Energy Centre.
- Preparation of a Water Neutrality Statement (WOI-HPA-DOC-WNS-01) which states the following water reduction and reuse measures:
  - Adoption of a water usage efficiency target for residential buildings of <85 litres per person per day;
  - Provision of water efficient fittings throughout the Proposed Development;
  - Requirement for the design of the commercial premises and schools to achieve to achieve BREEAM WAT01 three credits, which will reduce their water demand by 40%;
  - Rainwater harvesting systems to be incorporated at property level to provide for irrigation and other non-potable needs.
- Preparation of a Travel Plan[49] to encourage the occupants to travel by active modes, such as walking, cycling and public transport to minimise the impacts of the Proposed Development. Key initiatives include secure and accessible cycle parking for all users, provision of up to 20 car club spaces and the introduction of new 'Fastway' bus routes and strategically located bus stops to ensure accessibility throughout the Proposed Development.
- Where possible, materials must reduce the carbon footprint impact. These should be locally sourced and low carbon materials shall be used where these conform to the necessary standards and meet the necessary performance standards or specification.
- Maximising the recycled content of the material, ease of maintenance, appropriate sourcing of materials and totally excluding deleterious and hazardous materials.
- The 'sustainability' of raw materials would be considered during the procurement process. At the reserved matters application stage, delivery partners would be required to demonstrate how they meet the latest best practice standards
- Construction materials are likely to be selected following the Building Research Establishment (BRE) 'Green Guide to Specification'. These include:
  - Minimising embodied energy content (the energy used in manufacture);
  - Using recyclable materials where they have high embodied energy; and

[49] Steer, 2025. West of Ifield Travel Plan.

- Maximising the recycled content of the material, ease of maintenance, appropriate sourcing of materials and totally excluding deleterious and hazardous materials.

- Maximise the amount of plant-life, with preference given to drought tolerant and semi-drought tolerant species, where these are appropriate to character and context.
- Minimising transport distances to waste sorting and recycling facilities will reduce the carbon emissions associated with waste handling. Bulky materials such as crushed concrete which can be reused should not be transported by road over large distances; nearby sites for reuse should be identified.
- Designs should be in line with the waste hierarchy. Priority must be given to waste prevention, followed by reuse on-Site, efficient recycling, recovery and disposal as a last resort.
- The Detailed SWMP should take into account a wider sustainability agenda, considering energy/ fossil fuel consumption and the overall efficiency of recycling and recovery operations, including transport.
- Phase 1 infrastructure elements have been designed to minimise the frequency of future maintenance interventions through the incorporation of low maintenance materials, equipment and features[50].

9.10.19 Details on specific materials to be used will be secured via planning condition.

9.10.20 In accordance with the Design Code, a Whole Life Carbon Assessment (WLCA) is to be submitted as part of each subsequent reserved matters application, to be secured by planning condition. This would inform the detailed design with a view to reducing embodied and operational carbon, identify feasible carbon reduction measures and demonstrate how construction and operational emissions have been reduced as much as possible using the carbon reduction hierarchy (e.g. as set out in PAS2080).

9.10.21 A high-level breakdown of estimated GHG emissions associated with the completed development stage of the Proposed Development is presented in Table 9.22.

Table 9.22: Completed Development Stage Greenhouse Gas Assessment Summary

PAS2080 modules	Estimated GHG Emissions (tCO_2e)	% of Total Emissions
Use of Proposed Development (B1)	-9,674*	-1%
Maintenance, repair, replacement and re-furbishment of materials (B2 – B5)	62,972	9%
Operational energy use (B6)	10,867	2%
Operational water use (B7)	6,479	1%
User's utilisation (traffic) (B8)	633,646	90%
Total	**704,290**	**100%**
*Negative value for land use change indicate sequestration rather than emission of GHGs.		

9.10.22 Of the total GHG emissions associated with the completed development stage, the detailed component accounts for 1% whilst the outline component accounts for 99%.

9.10.23 When comparing the "do something" scenario against the "do minimum scenario", i.e. the operational emissions of the existing Site uses, the net contribution of the completed development stage of the Proposed Development is expected to contribute to:

- 0.005 % to the UK's fifth carbon budget (2028-2032);
- 0.008 % to the UK's sixth carbon budget (2033-2037); and

[50] Arcadis, 2024. West of Ifield Phase 1 Infrastructure, Supplementary Information. 10051123-ARC-XXX-ZZ-TR-ZM-00002

- 0.013 % to the UK's seventh carbon budget (2038-2042).

9.10.24 The completed development stage of the Proposed Development is expected to contribute to:

- 0.234 % to the Tyndall Centre recommended HDC fifth energy carbon budget (2028-2032);
- 0.790 % to the Tyndall Centre recommended HDC sixth energy carbon budget (2033-2037); and
- 0.565 % to the Tyndall Centre recommended HDC seventh energy carbon budget (2038-2042).

9.10.25 The completed development stage of the Proposed Development is expected to contribute:

- 0.027 % to the projected buildings sector fifth carbon budget (2028-2032);
- 0.034 % to the projected buildings sector sixth carbon budget (2033-2037); and
- 0.068 % to the projected buildings sector seventh carbon budget (2038-2042).

9.10.26 Due to the low percentage of the GHG emissions in comparison to the UK, projected buildings sector and Tyndall Centre recommended HDC energy only carbon budgets and the embedded mitigation measures, the completed development stage of the Proposed Development is assessed as compatible with the budgeted, science-based 1.5 °C trajectory in terms of rate of GHG emissions reduction. Therefore, the scale of effect of the Proposed Development on the likelihood of avoiding severe climate change, is in alignment with a science-based 1.5°C compatible trajectory and achieving net-zero by 2050. Accordingly, the GHG effects are considered to be permanent, long-term, adverse, direct, **Minor Adverse** (Not Significant).

9.10.27 A summary of the GHG emissions associated with the demolition and construction stage, completed development stage and the end of life stages of the Proposed Development is shown in Table 9.23 below.

Table 9.23: Proposed Development Greenhouse Gas Assessment Summary

Item	Estimated GHG Emissions (tCO_2e)
End of life (C1-C4)	46,205

9.10.28 The total GHG emissions from the demolition and construction and completed development stages and end of life of the Proposed Development, based on a 60-year design life, 968,102 tCO_2e.

9.10.29 A summary of the GHG emissions associated with the existing development, Proposed Development and the net emissions (i.e. the Proposed Development emissions minus the existing development emissions), based on a 60-year design life, is shown in Table 9.24:

Table 9.24: Proposed Development Net Greenhouse Gas Assessment Summary

Item	Estimated GHG Emissions (tCO_2e)
TOTAL for proposed development	968,102
TOTAL for existing development	-3,951
TOTAL net emissions (Proposed Development – existing development)	972,053

Contextualisation of Proposed Development GHG Emissions Against Carbon Budgets

9.10.30 Table 9.25 presents a contextualisation of the results of the net GHG emissions assessment for all stages of the Proposed Development against the UK, HDC and building sector carbon budgets.

Table 9.25: Contextualisation of Proposed Development Estimated Net Greenhouse Gas Emissions Against UK, Tyndall Centre Recommended HDC and UK Building Sector Carbon Budgets

Carbon Budget ($MtCO_2e$)	Fourth (2023-2027)	Fifth (2028-2032)	Sixth (2033- 2037)	Seventh (Proposed) (2038- 2042)
Total estimated GHG emissions (tCO_2e)	20,925	169,079	161,858	105,265
UK Carbon Budget (tCO_2e)	1,950,000,000	1,725,000,000	965,000,000	535,000,000
Percentage of UK Carbon Budget (%)	0.001%	0.010%	0.017%	0.020%
Tyndall Centre recommended HDC energy only Carbon Budget (tCO_2e)	1,500,000	700,000	300,000	200,000
Percentage of Tyndall Centre recommended HDC energy only Carbon Budget	0.0%	0.2%	0.8%	0.6%
Buildings Sector Projected Budget (tCO_2e)	419,484,776	334,204,192	236,731,666	103,000,000
Percentage of Buildings Sector Projected Budget (%)	0.005%	0.051%	0.068%	0.102%

9.10.31 When comparing the "do something" scenario against the "do minimum" scenario, i.e. the operational development emissions of the existing development, the net contribution of the Proposed Development during demolition and construction and completed development stages is expected to contribute to:

- 0.010 % to the UK's fifth carbon budget (2028-2032);
- 0.017 % to the UK's sixth carbon budget – (2033-2037); and
- 0.020 % to the UK's seventh carbon budget (2038-2042).

9.10.32 The demolition and construction and completed development stages of the Proposed Development is expected to contribute to:

- 0.234 % to the Tyndall Centre recommended HDC fifth energy carbon budget (2028-2032);
- 0.790 % to the Tyndall Centre recommended HDC sixth energy carbon budget (2033-2037); and
- 0.565 % to the Tyndall Centre recommended HDC seventh energy carbon budget (2038-2042).

9.10.33 The demolition and construction and completed development stages of the Proposed Development is expected to contribute:

- 0.051 % of the buildings sector carbon budget for 2028 to 2032;
- 0.068 % of the buildings sector carbon budget for 2033 to 2037; and
- 0.102 % of the buildings sector carbon budget for 2038 to 2042.

9.11 Assessment of Residual Effects

Additional Mitigation

Demolition and Construction Stage

Climate Change Resilience

9.11.1 No significant effects are predicted, and consequently no additional mitigation is required.

In-Combination Climate Impacts

9.11.2 No significant in-combination climate effects are predicted, and consequently no additional mitigation is required.

Greenhouse Gas Emissions

9.11.3 No significant effects are predicted, and consequently no additional mitigation is required on the basis that a WLCA is conditioned at reserved matters stage.

9.11.4 Potential opportunities to further reduce GHG emissions during the demolition and construction stage are as follows:

- Materials must be durable and of the highest quality to minimise the need for maintenance and remain attractive throughout the building life.
- Where possible, products with a high recycled content must be specified and 'cradle-to-cradle' certified products considered.
- Where possible, concrete with increased cement replacement – e.g. fly ash or ground granulated blast-furnace slag (GGBS) – and reinforcement steel with 100 % recycled content for non-critical structural elements must be specified.
- The development must be designed with adaptability, disassembly and recyclability in mind:
  - Pursue modular design;
  - Incorporate soft spots or easily dismountable structures where possible; and
  - Ensure buildings can be adapted for future changes in use.
- A waste policy and diversion of waste from landfill target set.
- Designs should be in line with the waste hierarchy, by designing out waste, creating flexible spaces, and selecting materials for easy maintenance and end of life reuse and recycling. For example, the reuse of demolished and excavated materials on-site must be maximised.

Completed Development Stage

Climate Change Resilience

9.11.5 No significant effects are predicted, and consequently no additional mitigation is required.

In-Combination Climate Impacts

9.11.6 No significant in-combination climate effects are predicted, and consequently no additional mitigation is required.

Greenhouse Gas Emissions

9.11.7 No significant effects are predicted, and consequently no additional mitigation is required.

9.11.8 However, Scenario 2 or 3 of the Energy Statement should be considered as the design develops. Scenario 2 comprises individual ASHPs at property level whilst Scenario 3 comprises individual ASHPs installed at building level with communal heating for flats using a centralised ASHP, both with on-Site solar PV to deliver 10% of buildings' energy demand. Both scenarios provide a reduction of GHG emissions compared to Scenario 1.

9.11.9 Potential opportunities to reduce GHG emissions during the completed development stage at reserved matters applications include the following:

- Explore the use of open areas to accommodate PV panels;
- Specify equipment with low refrigerant global warming potential and leakage;

- Deliver high thermal efficiency;
- Design for adaptability, disassembly and recyclability:
- Pursue modular design;
- Incorporate soft spots or easily dismountable structures where possible; and
- Ensure buildings can be adapted for future changes in use.

9.11.10 Other considerations to further reduce whole life-cycle emissions at subsequent detailed design stage for the completed development stage include:

- Encouraging the use of electric fleet vehicles, and providing electric vehicle charging infrastructure in line with the WSCC guidance (as noted in the Framework Travel Plan (WOI-HPA-DOC-FTP-01));
- Applying measures to reduce operational waste, such as providing adequate provision for internal and external waste storage and setting waste recycling targets to reduce GHG emissions from the transportation of waste;
- Encouraging public transport use and active travel via the implementation of a Sustainable Travel Plan. A Framework Travel Plan has been prepared and will be submitted with the hybrid planning application (WOI-HPA-DOC-FTP-01). The Travel Plan encourages active travel and public transport use, as well as the best use of motorised vehicles;
- Provide internal and external lighting through high-efficient, low energy LED luminaires combined with photocell devices to detect daylight in the room and dim the light accordingly, lights that default to off when no occupants are present; and
- Install efficient plant and controls.

Enhancement Measures

9.11.11 No enhancement measures are proposed in respect of climate change.

Demolition and Construction Residual Effects

Climate Change Resilience

9.11.12 As no additional mitigation would be required, the residual demolition and construction effects remain not significant, as reported in the 'Assessment of Effects' section.

In-Combination Climate Impacts

9.11.13 As no additional mitigation would be required, the residual demolition and construction effects remain not significant, as reported in the 'Assessment of Effects' section.

Greenhouse Gas Emissions

9.11.14 As no additional mitigation would be required, the residual demolition and construction effects remain not significant, as reported in the 'Assessment of Effects' section.

Completed Development Residual Effects

Climate Change Resilience

9.11.15 As no additional mitigation would be required, the residual completed development effects remain not significant, as reported in the 'Assessment of Effects' section.

In-Combination Climate Impacts

9.11.16 As no additional mitigation would be required, the residual completed development effects remain not significant, as reported in the 'Assessment of Effects' section.

Greenhouse Gas Emissions

9.11.17 As no additional mitigation would be required, the residual completed development effects remain **Minor Adverse (Not Significant)** as reported in the 'Assessment of Effects' section.

9.11.18 It is however recommended that the Proposed Development considers Scenario 2 or 3 of the Energy Statement, which have lower energy demand compared with Scenario 1.

9.12 Summary of Residual Effects

9.12.1 Table 9.26: provides a tabulated summary of the outcomes of the climate change assessment of the Proposed Development.

Table 9.26: Summary of Residual Climate Change Effects

Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
				+ -	D I	P T	R IR	St Mt Lt
Demolition and Construction								
Climate Change Resilience								
Buildings and infrastructure	Heavy rainfall leading to stockpile erosion and siltation of drainage assets	None required	Not Significant	-	D	T	R	Mt
Buildings and infrastructure	Heavy rainfall leading to inability to undertake demolition and/or construction activity and programme delays	None required	Not Significant	-	D	T	R	Mt
Human health and environment	Heavy rainfall spreading contaminated soil (if present) during ground excavations	None required	Not Significant	-	D	T	R	Mt
Human health	Heatwaves and high temperatures affecting site personnel welfare	None required	Not Significant	-	D	T	R	Mt
Human health	Heatwaves and high temperatures leading to increased dust generation	None required	Not Significant	-	D	T	R	Mt
Buildings and infrastructure	Heatwaves and high temperatures leading to inability to undertake demolition / construction activity and programme delays	None required	Not Significant	-	D	T	R	Mt
Buildings and infrastructure	Strong winds leading to damage of stockpiles	None required	Not Significant	-	D	T	R	Mt
Human health	Strong winds leading to Site personnel and nearby pedestrian harm	None required	Not Significant	-	D	T	R	Mt
Human health	Strong winds affecting on-site crane operations	None required	Not Significant	-	D	T	R	Mt

Table 9.26: Summary of Residual Climate Change Effects								
Buildings and infrastructure	Strong winds leading to damage to Site hoardings	None required	Not Significant	-	D	T	R	Mt
In-Combination Climate Impacts								
Soil resources and agricultural land	Potential interactions of climate change with identified soil and agricultural land effects.	None required.	None	N/A	N/A	N/A	N/A	N/A
Air Quality	Extended period of drought could increase exposure of sensitive receptors to dust generated from demolition and construction activities.	None required.	Not significant	-	D	T	R	Mt
Biodiversity	Loss of and degradation of habitat, enhancement of existing habitats, creation of new habitat.	None required.	Not Significant	-	D	T	R	Mt
Cultural Heritage	Potential interactions of climate change with identified cultural heritage effects.	None required.	None	N/A	N/A	N/A	N/A	N/A
Landscape and visual	Potential interactions of climate change with identified landscape and visual effects.	None required.	None	N/A	N/A	N/A	N/A	N/A
Noise and Vibration	Potential interactions of climate change with identified noise and vibration effects.	None required.	None	N/A	N/A	N/A	N/A	N/A
Socio-Economics and Health	Potential interactions of climate change with the identified socio-economic effects.	None required.	None	N/A	N/A	N/A	N/A	N/A
Water and flood	Increased frequency of heavy rainfall events could increase mobilisation of contaminants.	None required.	Not significant	-	D	T	R	Mt
	Increased precipitation could lead to an increased frequency and intensity of flooding.	None required.	Not significant	-	D	T	R	Mt
Transport and Accessibility	Potential interactions of climate change with identified transport and accessibility effects.	None required.	None	N/A	N/A	N/A	N/A	N/A
Greenhouse Gas Emissions								
Global Climate	GHG Emissions	WLCA's have been proposed to be undertaken for early design stages of the Proposed	Minor Adverse (not significant)	-	D	P	IR	Mt

Table 9.26: Summary of Residual Climate Change Effects								
		Development, to be secured via condition, and throughout design development to allow the identification of high carbon materials and activities and recommend low carbon alternatives.						
Completed Development								
Climate Change Resilience								
Buildings, infrastructure and human health	Increased frequency of intense rainfall leading to overwhelming of drainage assets and potential flooding	None required	Not Significant	-	D	P	R	Lt
Buildings and infrastructure	Wetter winters and increased frequency of intense rainfall leading to elevated groundwater levels and potential flooding	None required	Not Significant	-	D	P	R	Lt
Buildings, infrastructure and human health	Increased frequency of intense rainfall events could result in increased river levels leading to flooding	None required	Not Significant	-	D	P	R	Lt
Environment	Increased frequency and severity of heat event could affect landscape design and planting	None required	Not Significant	-	D	P	R	Lt
Buildings and infrastructure	Increased mean temperatures and heatwaves leading to failure of M&E equipment	None required	Not Significant	-	D	P	R	Lt
Human health	Increased mean temperatures and heatwaves leading to overheating in residential dwellings	None required	Not Significant	-	D	P	R	Lt
Buildings, infrastructure and human health	Drought conditions affecting potable water availability	None required	Not Significant	-	D	P	R	Lt
Buildings and infrastructure	Increased frequency of windstorm events and extreme winds leading to damage to the Proposed Development	None required	Not Significant	+/-	D	P	R	Lt
In-Combination Climate Impacts								

Table 9.26: Summary of Residual Climate Change Effects								
Soil resources and agricultural land	Potential interactions of climate change with identified soil and agricultural land effects.	None required.	None	N/A	N/A	N/A	N/A	N/A
Air Quality	Potential interactions of climate change with identified air quality effects.	None required.	None	N/A	N/A	N/A	N/A	N/A
Biodiversity	Potential interactions of climate change with identified biodiversity effects.	None required.	None	N/A	N/A	N/A	N/A	N/A
Cultural Heritage	Potential interactions of climate change with identified cultural heritage effects.	None required.	None	N/A	N/A	N/A	N/A	N/A
Landscape and visual	Potential interactions of climate change with identified landscape and visual effects.	None required.	None	N/A	N/A	N/A	N/A	N/A
Noise and Vibration	Exposure of sensitive receptors to increased noise levels due to open windows.	None required	None	-	D	T	R	Lt
Socio-Economics and Health	Potential interactions of climate change with the identified socio-economic effects.	None required.	None	N/A	N/A	N/A	N/A	N/A
Water and flood	Increased precipitation could lead to an increased frequency and intensity of flooding.	None required	None	-	D	T	R	Lt
Transport and Accessibility	Potential interactions of climate change with identified transport and accessibility effects.	None required.	None	N/A	N/A	N/A	N/A	N/A
Greenhouse Gas Emissions								
Global Climate	GHG Emissions	It is recommended that the Proposed Development considers Scenario 2 or 3 of the Energy Statement.	Minor Adverse (not significant)	-	D	P	IR	Lt
Notes: * - = Adverse/ + = Beneficial/ +/- Neutral; D = Direct/ I = Indirect; P = Permanent/ T = Temporary; R=Reversible/ IR= Irreversible; St- Short term/ Mt –Medium term/ Lt –Long term. **Negligible/Minor/Moderate/Major								

9.13 Cumulative Effects

Intra-Project Effects

9.13.1 As explained in ES Volume 1 Chapter 2: EIA Process and ES Methodology, intra-project cumulative effects are discussed in ES Chapter 16: Cumulative Effects.

Inter-Project Effects

Climate Change Resilience

9.13.2 The climate resilience effects identified as a result of the demolition and construction and completed development stages are limited in their spatial extent to the Site boundary and the Proposed Development in isolation. Therefore, cumulative climate change resilience effects with other schemes have not been considered.

9.13.3 In-Combination Climate Impacts

9.13.4 The ICCI's resulting from the demolition and construction and completed development stages would be limited in their spatial extent to the relevant technical assessments in the ES for the Proposed Development. Therefore, ICCI cumulative effects have not been considered with other cumulative schemes.

Greenhouse Gas Emissions

9.13.5 As specified in Section 9.6, the effects of GHG emissions from specific cumulative schemes have not been individually assessed. However, GHG emissions, have been contextualised within the UK, HDC and the building sector-based carbon budgets.

9.14 Summary of Assessment

Background

9.14.1 This chapter has detailed the potential climate change effects due to the demolition and construction and completed development stages of the Proposed Development. The assessment of demolition and construction and completed development stages has been undertaken taking into account the relevant national and local guidance and regulations. An end of life stage has been considered in respect of greenhouse gas emissions for information purposes.

Demolition and Construction Effects

Climate Change Resilience

9.14.2 The CCR assessment has reviewed the potential vulnerability of the demolition and construction stage of the Proposed Development to extreme weather and projected climate change.

9.14.3 Taking into account the embedded mitigation measures, the effects are predicted to be of low magnitude. The construction of the Proposed Development would result in adverse effects, but these would not be significant in respect of identified receptors and climate change.

In-Combination Climate Impacts

9.14.4 The ICCI assessment has reviewed the potential for climate change to exacerbate the effects from other environmental disciplines on identified receptors. Taking into account the embedded mitigation measures, no significant effects have been identified.

Greenhouse Gas Emissions

9.14.5 The Proposed Development would produce GHG emissions during the demolition and construction stage from the raw materials required, transport, and demolition and construction processes. The provisional estimate of GHG emissions from the demolition and construction stage is approximately 217,607 tCO_2e.

9.14.6 Overall, it is considered that the demolition of the existing site and construction of the Proposed Development would result in a minor adverse effect on climate change and identified receptors; no significant effects in relation to climate change have been identified.

9.14.7 Whole Life Carbon Assessments have been proposed as additional mitigation to be undertaken for early design stages of the Proposed Development, and throughout design development, where further opportunities for reduction in GHG emissions would be identified and implemented.

Completed Development Effects

Climate Change Resilience

9.14.8 The CCR assessment has reviewed the potential vulnerability of the Proposed Development to extreme weather and projected climate change. Taking into account the embedded mitigation measures, the impacts are predicted to be of low magnitude.

9.14.9 While the completed development stage of the Proposed Development would result in adverse effects on identified receptors and climate change, the effects would not be significant.

In-Combination Climate Impacts

9.14.10 The ICCI assessment has reviewed the potential for climate change to exacerbate the effects from other environmental disciplines on identified receptors. Taking into account the embedded mitigation measures, no significant effects have been identified.

Greenhouse Gas Emissions

9.14.11 Once the Proposed Development is operational, GHG emissions would be generated primarily from the use of the Proposed Development and from its maintenance. The provisional estimate of emissions from the completed development stage of the Proposed Development over the 60-year design life (including end of life) is approximately 750,496 tCO_2e.

9.14.12 When comparing the Proposed Development GHG emissions against the existing Site condition, it is considered that the completed Proposed Development would result in a minor adverse effect on climate change and identified receptors; however, this effect would not be significant in relation to climate change.

9.14.13 It is however recommended that the Proposed Development considers Scenario 2 or 3 of the Energy Statement, which have lower energy demand compared with Scenario 1.

9.14.14 WLCAs have been proposed as additional mitigation to be undertaken for early design stages of the Proposed Development, and throughout design development, where further opportunities for reduction in GHG emissions would be identified and implemented.

Cumulative Effects

Climate Change Resilience

9.14.15 The CCR effects identified as a result of the demolition and construction and completed development stages would be limited in their spatial extent to the Site boundary and the Proposed Development in isolation. Therefore, cumulative CCR effects with other schemes are not applicable.

In-Combination Climate Change Impact

9.14.16 The climate change chapter has considered potential in-combination cumulative climate impacts affecting environmental receptors identified by other ES topic chapters. It includes consideration of existing potential impacts on environmental receptors that could be intensified by climate change as well as environmental impacts that could potentially emerge in the future.

9.14.17 The ICCI's resulting from the demolition and construction and completed development stages would be limited in their spatial extent to the relevant technical assessments in the ES for the proposed development. Therefore, ICCI cumulative effects other cumulative schemes are not applicable.

Greenhouse Gas Emissions

9.14.18 The atmospheric concentration of GHGs and resulting effect on climate change is affected by all sources and sinks globally, anthropogenic and otherwise. As GHG emission impacts and resulting effects are global rather than affecting one localised area, the approach to cumulative effects assessment for GHGs differs from that for many EIA topics where only projects within a geographically bounded study area of, for example, 1-2 km would be included.

9.14.19 Therefore, effects of GHG emissions from specific cumulative projects have not been individually assessed. However, GHG emissions, have been contextualised within the UK, HDC and building sector carbon budgets.