

Environmental Information Consultation Document (EICD)

Chapter 18: Climate resilience
and adaptation

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18. Climate resilience and adaptation

18.1 Introduction

- 18.1.1 As indicated within **Chapter 1: Setting the scene for consultation – environmental information**, ‘climate resilience and adaptation’ is an environmental aspect for which information is presented for consultation.
- 18.1.2 This chapter summarises the potential effects of climate change on the Project as presented for the 2026 Public Consultation. It also summarises how future climate conditions, such as increased temperature and extreme weather events, may be managed through design, construction and operation measures. In line with the Airports National Policy Statement (ANPS) and wider UK Government commitments to managing climate risks and achieving net zero emissions, it focuses on how the Project could be impacted by climate change and the measures employed to reduce these climate impacts, rather than the Project’s contribution to climate change, which is considered separately in **Chapter 12: Carbon and Other Greenhouse Gases. Emissions** are also considered in the environmentally managed growth topic paper; however, this relates to emissions management rather than the effects of climate change.
- 18.1.3 The content of this chapter is underpinned by a technical assessment of climate change resilience and adaptation, using a standard methodological approach for development applications, which is summarised here for consultation. The technical assessment of climate resilience and adaptation will be presented in full as part of the Environmental Statement (ES).
- 18.1.4 **Chapter 3: Approach to environmental assessment** explains the overarching environmental assessment approach undertaken in this Environmental Information Consultation Document (EICD). This explains the typical assessment approach which will determine how the Project will affect a particular environmental aspect, such as biodiversity or air quality. This chapter on climate resilience and adaptation is different, as it focuses on how the environment may affect the Project, and on the measures embedded into its design and operation, rather than on the potential effects themselves.
- 18.1.5 This chapter should also be read in conjunction with **Chapter 2: Description of the project**, which describes the Project components, construction activities and operation of the expanded airport considered in the climate resilience and adaptation assessment.

18.2 What do we mean by ‘climate resilience and adaptation’?

- 18.2.1 Climate change, meaning the long-term shifts in average weather patterns observed over extended periods, is already affecting the UK and is expected to continue to do so over the coming decades.
- 18.2.2 Changes in climate conditions, such as high temperatures, seasonal precipitation, average wind speed and the frequency and intensity of extreme weather events, have the potential to cause disruption and damage.
- 18.2.3 In this context, climate change resilience (CCR) refers to the ability of the Project to continue to operate safely and effectively under current and future climate conditions. This includes its capacity to withstand, adapt to, and recover from climate hazards such as heatwaves, heavy rainfall, flooding, droughts or strong winds.
- 18.2.4 The potential for climate change to worsen or improve effects identified within other environmental aspects of the Project is known as in-combination climate change impact (ICCI). For example, new landscape planting may not cope well with rising temperatures and more frequent droughts, placing additional stress on survival if future temperatures and rainfall are not considered when selecting species. Similarly, heavier rainfall could potentially lead to localised flooding if not considered when determining drainage and storage capacities.
- 18.2.5 Climate adaptation describes the measures taken to respond to these changing climate conditions. Adaptation measures can incorporate existing design elements, construction practices and operational and regulatory processes (known as embedded environmental measures) which reduce the Project’s vulnerability to climate-related effects, or the impact of those effects.

18.3 How climate change could influence the Project

- 18.3.1 Climate change may influence the Project in several ways. This depends on what is being impacted, such as buildings, runways, roads, the environment, employees, or neighbouring communities. These are known as receptors.
- 18.3.2 During construction, effects from climate change may arise from increased variability and severity of weather conditions. More frequent or intense rainfall events have the potential to disrupt construction activities, affect temporary drainage arrangements, and increase the risk of surface water flooding or the movement of sediments and pollutants. Prolonged dry or hot periods may increase dust, place additional stress on water resources, and affect the health and safety of construction workers. Storms and high wind speeds may affect lifting operations and temporary structures required to conduct construction activities, impacting the delivery programme.
- 18.3.3 During operation, longer term changes in climate may influence how the Project performs over time, unless appropriate measures are embedded into its design.

Increasing summer temperatures and more frequent heatwaves may increase the risk of overheating in buildings and affect the performance and durability of infrastructure assets, including runways, taxiways and mechanical and electrical systems. Drier conditions can increase the risk of fire and result in damage or delays. Periods of heavy or prolonged rainfall may result in swelling, heaving and erosion leading to destabilisation of ground conditions.

- 18.3.4 Climate change also has the potential to exacerbate the Project's effects on the surrounding environment and communities. For example, increased rainfall could worsen potential Project-related effects on surface and groundwater, while drought could reduce the resilience of species and ecosystems in habitats that have been fragmented by the Project. Higher temperatures may increase the Project's effects on thermal comfort and human health.
- 18.3.5 However, the level of climate change that the Project will experience is uncertain and dependent on global efforts to transition to a low-carbon economy. As such, this assessment considers an unlikely, but plausible, range of future climate conditions.

18.4 Legislation, policy and guidance

- 18.4.1 In the UK, there is a wide variety of legislation, policy and guidance in place related to climate resilience and adaptation, as summarised in this chapter.
- 18.4.2 The legislation which sets targets for reducing the UK's impacts on climate change and establishes the need to prepare for managing climate risks is the UK Climate Change Act 2008 [1]. As required by the Act, the Third National Adaptation Programme (NAP3) [2] sets out the actions that government and others will take to adapt to the challenges of climate change in the UK for the five-year period between 2023 and 2028. Heathrow's Fourth Adaptation Progress Report [3] details the airport's activities in responding to the risks associated with climate change as required by the Act.
- 18.4.3 The Airports National Policy Statement (ANPS) [4] sets out how the effects of climate change must be considered in development consent applications and is a primary planning policy for the Project. The ANPS advises that new airport infrastructure will typically be a long-term investment which will need to remain operational over many decades in the face of a changing climate. As such, key components for assessment include the consideration of the latest climate projections, to understand potential risks, and the demonstration of resilience within a range of future climate scenarios for critical infrastructure. This reflects a risk-based approach to climate resilience, recognising the uncertainty inherent in climate projections and the potential for changes in the frequency and severity of extreme weather events over the lifetime of the infrastructure.
- 18.4.4 The National Planning Policy Framework [5] sets out the Government's Planning Policies for England. Policies related to improving resilience are set out in **Section 14: Meeting the Challenge of Climate Change**, Flooding and Coastal Change.
- 18.4.5 The Climate Adaptation Strategy for Transport 2025 [6] sets out the Department for Transport's vision for a climate-resilient transport system that underpins growth,

keeps people and goods moving, and supports every part of the UK economy. This strategy has been considered as part of the wider policy context for the assessment.

- 18.4.6 Climate Change Adaptation: Policy Information 2022 [7] emphasises the role of climate adaptation to reduce negative consequences of climate change in the UK. It also gives a description of the initiatives by the UK government for building preparedness and improving resilience to climate change impacts. This guidance is relevant to this assessment as it sets out the UK policy context for climate change adaptation and resilience.
- 18.4.7 Local and regional planning authorities also have strategies to manage climate change adaptation and resilience within their administrative areas, for example the Strategic Climate Action Plan [8] which sets the Borough of Hillingdon's overarching plan to respond to climate change. These local plans and strategies have been used to support the determination of scope, hazards, vulnerability, potential impact and embedded environmental measures within the assessment.
- 18.4.8 Relevant industry best practice and guidance used to establish the methodology, determine impacts, establish embedded environmental mitigation and assess risks include:
- the Institute of Sustainability and Environmental Professionals' Environmental Impact Assessment (EIA) Guide to Climate Change Resilience and Adaptation [9];
 - ISO 14090: Adaptation to climate change – Principles, requirements and guidelines [10];
 - ISO 14091 Adaptation to climate change – Guidelines on vulnerability, impacts and risk assessment [11]
 - ISO 14092 Climate change adaptation – Requirements and guidance on adaptation planning for local governments and communities [12]; and
 - Planning Practice Guidance 2021 [13].
- 18.4.9 In addition, we are actively managing climate risks to the airport through our Climate Adaptation Strategy 2026 [4]. The strategy summarises headline findings from Heathrow's climate risk assessment and considers its current and future climate risks. From these findings, goals have been established that are underpinned by a set of actions and targets to modify the airport and inform its long-term planning. These include actions such as embedding climate risk assessment and management in business processes and procedures, updating engineering standards, and advancing modelling and research.

18.5 Assessment summary

- 18.5.1 This section summarises the approach taken in the technical assessment of climate resilience and adaptation and how conclusions have been drawn in this chapter.

More details on the assessment approach of environmental aspects can be found in **Chapter 3**.

Climate baseline

- 18.5.2 The following current climate conditions for Heathrow are derived from historic Met Office data: [15, 16, 17]
- Observed climate conditions in West London are characterised by a clear seasonal pattern.
 - Temperatures are typically highest in mid-summer and lowest in mid-winter. Extreme high and low temperatures have occurred with some of the highest UK temperatures recorded at Heathrow.
 - Rainfall is generally greater during the autumn and winter months, with comparatively drier conditions through late winter, spring and summer. Extreme downpours have resulted in flooding.
 - Significant snowfall and icy conditions are infrequent but can occur.
 - Wind conditions are typically moderate, although stronger winds are more likely during the winter period. Disruptive high wind speeds and gusts have been experienced during storm events.
 - Humidity remains relatively high throughout the year, with higher levels in winter and slightly lower levels in summer.
- 18.5.3 Future climate projections were determined using the latest UK Climate Projections (UKCP18) [18], in line with the requirements of the Airports National Policy Statement (ANPS). The projection data indicate how the climate could change in the short-, medium- and long-term future. These climate projections indicate that the Project location could experience:
- Consistent warming with average temperatures increasing throughout the years.
 - Very hot temperatures and heatwaves increasing in frequency and duration.
 - Shifting rainfall patterns, with drier summers and wetter winters, and more intense downpours.
 - A reduction in snowfall and days below freezing.
 - An increased frequency and intensity of storms and high winds.
 - Lower humidity during summer months.
- 18.5.4 In line with best practice and standards, the climate projections were determined under a high emissions scenario considering modelling outputs at the 10th, 50th and 90th percentile. While these changes are considered unlikely, they are plausible and are important for stress-testing critical infrastructure. However, extreme events beyond these modelled conditions are possible. More extreme changes will be considered for safety critical infrastructure.

Assessment approach

- 18.5.5 The assessment considers how future weather and climate conditions could affect the Project over time. It draws on climate projections and the considerations built into the Project's design and operational processes to help mitigate the impacts of climate change.
- 18.5.6 The technical assessment that underpins the summary presented in this chapter follows a standardised methodology for development consent applications.
- 18.5.7 The methodology structures the identification of specific receptors (e.g., buildings, taxiways, roads, employees and IT infrastructure), assessment of vulnerability and impacts related to climate hazards, determination and assessment of relevant embedded environmental measures, and assessment of risk to determine whether any potential impacts linked to future climate conditions could influence the Project or its surroundings using the concept of 'significance'. We have considered these factors qualitatively using professional judgement informed by relevant guidance, literature, available data, observations and experience of comparable projects. We also recognise the interdependencies between receptors and the wider systems within which the Project is situated, and how these may influence the interaction and overall risk profile of climate hazards.
- 18.5.8 Significance is established by evaluating the severity of climate-related impacts to the Project. An effect is considered significant where, in the context of baseline conditions and future climate scenarios, it would result in a noticeable or meaningful change to the Project.
- 18.5.9 The first step to assess climate resilience is to determine the likelihood of climate hazards occurring, rated on a 5-point scale, using the historic and climate projection data. Next, the vulnerability of receptors is determined using a 5-point scale of criticality. Vulnerability is determined using a matrix of these scores on a scale from 'very low' to 'very high'. Receptors rated 'moderate' or higher in a matrix of climate hazard and criticality are considered vulnerable and scoped into the risk assessment.
- 18.5.10 Then, potential impacts on vulnerable receptors from the climate hazards are identified. For the in-combination climate change impact (ICCI), due to the uncertainties involved, an assessment of 'likely' or 'unlikely' is applied to determine the climate impact. A rating of 'unlikely' was given if the climate impact was not expected to occur and/or there was a weak link between the climate and the effect on a receptor. Anything rated 'unlikely' is not scoped into the risk assessment.
- 18.5.11 To assess risk, likelihood and consequence of the identified impacts are assessed on five-point scales. Consequences are assessed using defined criteria covering safety, cost, passenger journey times, and public perception. Risk is determined using a matrix of these scores on a scale from 'very low' to 'very high'.
- 18.5.12 Significance is then assigned using the results of the risk matrix, where risks rated as 'medium', 'high' or 'very high' are considered to result in significant effects.
- 18.5.13 Any significant effects are addressed through embedded environmental mitigation to reduce the risks. If risk ranking is reduced to 'very low' or 'low', then the risk is

considered not significant. If the risk remains significant, additional adaptations are recommended.

18.5.14 The assessment of climate resilience and adaptation focuses on two distinct aspects:

- A climate change resilience (CCR) assessment, which considers the resilience of the Project to future climate conditions over its lifetime.
- An ICCI assessment, which considers how projected changes in climate may influence or exacerbate the effects of the Project on other environmental aspects.

18.5.15 The work undertaken to date provides a robust basis for, and confidence in, the conclusions reached by this assessment. As would be expected for a topic of this importance, the assessment will continue to be reviewed and enhanced as the Project develops, with further work undertaken to refine and reinforce these conclusions where appropriate.

18.6 Assessment results

18.6.1 This section details the results of the climate change resilience (CCR) and in-combination climate change impact (ICCI) assessments related to (a) construction activities and (b) operation.

Construction

CCR Results

18.6.2 The CCR assessment for construction is primarily focused on risks associated with construction activities, machinery, equipment and temporary assets such as drainage.

18.6.3 The earlier years of the development programme is when most of the infrastructure (for example, the Northwest Runway, associated taxiways and M25 realignment) would be built. The construction approach, programme, Construction Support Sites and principal construction activities are described in **Section 2.4 of Chapter 2: Description of the project.**

18.6.4 The assessment identifies increased vulnerability to short term weather variability during this timeframe, reflecting the exposure of construction activities, temporary drainage arrangements and construction site access routes.

18.6.5 Climate risks and mitigation during construction include the following:

- Delays and damage due to increased frequency and severity of extreme weather events. Following standard processes and procedures, a specific risk assessment of severe weather impacts on the construction process, equipment and workers will be produced by the main contractor to inform mitigations. The main contractors' Environmental Management System (EMS) should consider all measures deemed necessary and appropriate to manage severe weather events and should as a minimum cover training of personnel and prevention and

monitoring arrangements. As appropriate, construction method statements should also consider severe weather events where risks have been identified.

- Increased frequency and intensity of heavy rainfall events which have the potential to disrupt construction activities, affect temporary drainage systems and increase the risk of surface water flooding on site and on local access routes. Embedded environmental measures to reduce this risk include using short-to-medium-range weather forecasting services from the Met Office to inform programme management, environmental control and impact mitigation measures. This will support proactive delivery by maximising good weather windows and providing opportunity to mitigate the impact of bad weather in advance. Additionally, contractors will register with the Environment Agency's flood warning service in areas of flood risk to help monitor risk levels.
- High wind events may affect construction plant, lifting operations and temporary structures leading to damage to machinery and delay in programme. Embedded environmental measures to reduce this risk include the use of monitoring and forecasting of weather trends to proactively identify high wind events, incorporation of wind loading and exposure into construction method statements, and establishment of processes and plans to restrict certain operations, cease working at height and secure materials during high wind and storm events.

18.6.6 Good practice design is employed across the Project as standard. With the application of embedded environmental measures, including construction management practices and health and safety controls, the effects from climate change during construction are deemed not significant.

ICCI Results

18.6.7 During construction, the ICCI assessment has considered whether projected changes in climate could exacerbate or otherwise influence the effects associated with construction activities, as identified within specific environmental aspects.

18.6.8 The ICCI identified that certain construction phase effects have the potential to interact with climate hazards, particularly in relation to increased rainfall intensity, periods of hot and dry weather, and more variable weather conditions impacting aspects such as health, air quality and water. For example, periods of prolonged hot or dry weather may influence worker welfare, increase dust generation and place additional pressure on water resources.

18.6.9 Climate risks and mitigations during construction include:

- Increased high temperatures and heatwaves could impact worker health through heat stress and result in disruptions to the construction programme. Embedded environmental mitigations include establishing processes and plans to increase breaks and alter delivery schedules and increase the provision of water and shading where appropriate. Worker wellbeing will be supported through the provision of tools and trainings that include sun-awareness and signs of heatstroke before and during hot weather events. Regular briefings and team communications on hydration and heat management will also be held.

- Extended dry periods could increase dust generation and impact air quality. Embedded environmental mitigations include using standard construction practices and HSE guidance for minimising dust generation, as far as reasonably practicable, including deploying water suppression systems, using covering and containment barriers, and regularly cleaning roads and hard standing; and
- During dry periods, water resources can become stressed and the resulting limited or lack of water availability could lead to delays in the construction programme. Embedded environmental mitigations include employing practices to reduce demand, increase efficiency, reuse, recycle and manage discharge. The main contractors' Environmental Management System (EMS) should consider all measures deemed necessary and appropriate to manage water as a resource and minimise delays to the programme.

18.6.10 These interactions were considered in the context of the effects reported by each environmental aspect and the embedded environmental measures incorporated into the Project design and construction practices.

18.6.11 Following the ICCI assessment, it was determined that climate change does not materially alter the nature or significance of construction effects identified within other aspect chapters. Embedded environmental measures and established construction management practices are considered sufficient to manage potential climate impacts.

18.6.12 Thus, ICCI are deemed **not significant** for construction.

Operation

CCR Results

18.6.13 During operation, the focus of the CCR assessment shifts to the performance of permanent operational assets over their design life. The assessment of operation considers the resilience of the expanded airport infrastructure to longer term changes in climate.

18.6.14 Climate risks and mitigations during operation include:

- Increasing summer temperatures and more frequent heatwave conditions could impact built infrastructure and operations, causing damage and delay. For buildings and air infrastructure, such as terminals, runways and taxiways, baggage handling systems and IT infrastructure, high temperatures can trigger faults, alter the integrity of material and reduce operational performance. Embedded environmental measures to reduce this risk include designing airfield assets for the change in climate conditions projected at the end of their operational lifetime, considering materials used, cooling loads and requirement for ambient design temperatures. Operational and asset management processes and procedures, such as monitoring surface conditions on extreme temperature days, resurfacing and renewal plans, and using back-up energy generation, can proactively minimise disruption.

- Wetter winters and more intense rainfall events may result in greater need for drainage capacity, water attenuation flood risk management and protection of critical infrastructure to reduce damage, delay and pollution incidents caused by flooding. Embedded environmental measures to reduce this risk include using detailed flood and drainage modelling to inform design, including overlaying flood model outputs with critical assets to identify potential risks, alongside the application of Environment Agency climate change allowances for increases in rainfall intensity in the design of drainage and flood retention infrastructure. Additionally, an allowance for climate change has been incorporated into the water treatment element and pollution capture assets of the airfield drainage strategy.
- Changes in groundwater levels and soil moisture may affect earthworks, buried infrastructure and foundations resulting in damage and disruption. Embedded environmental measures to reduce this risk include designing earthworks and built assets in accordance with the relevant standards.
- Extreme weather events, including storms and high winds, may disrupt operations and result in damage, disruption and increasing maintenance requirements. Embedded environmental measures to reduce this risk include incorporating operational resilience measures and back-up infrastructure within the Project design, such as the establishment of multiple surface access points and back-up power generation for critical infrastructure.

18.6.15 The CCR assessment is conducted with the understanding that good practice design is employed in the Project as standard.

18.6.16 It is also noted that in newly operational infrastructure, where system performance, maintenance regimes and monitoring processes are still being established, a greater degree of uncertainty can be introduced into the assessment. However, considerations of our current processes and procedures have aided in the understanding of impacts, assessment of risks and identification of embedded mitigation.

18.6.17 As time progresses and operations are more established, it is assumed that risks are addressed in the context of fully operational infrastructure supported by mature inspection, maintenance and adaptation regimes. While climate change effects may be more pronounced during this period, the assessment indicates that the risks remain 'low' or 'very low' due to the embedded environmental measures considered within design, asset management and operational processes, allowing climate-related effects to be identified and mitigated, such as through Heathrow's Adaptation Strategy [14].

18.6.18 Overall, no significant adverse effects from climate change are anticipated during operation. Climate risks are therefore deemed not significant.

ICCI Results

18.6.19 During operation, the ICCI assessment has focused on whether projected changes in climate could exacerbate the operational effects of the Project on environmental receptors, as reported within other environmental aspects.

18.6.20 Aspects with potential climate impacts that have been considered within the ICCI include:

- **Chapter 8: Noise and vibration**
- **Chapter 9: Air quality and odour**
- **Chapter 11: Health**
- **Chapter 13: Water environment**
- **Chapter 14: Historic environment**
- **Chapter 15: Landscape and visual**
- **Chapter 16: Land quality**
- **Chapter 17: Waste and materials**

18.6.21 The ICCI assessment identified that climate change has the potential to influence the context in which certain operational effects occur.

18.6.22 Example climate risks and mitigations from other environment aspects include:

- Climate change could exacerbate the effect the Project has on surrounding biodiversity, landscape and visual receptors as changes in average conditions and more frequent severe weather could reduce habitat health and bring about biodiversity loss. Embedded environmental measures include landscape planting that will consider climate change when selecting appropriate species for planting, adequate monitoring post-planting, and recognising the role Blue and Green Infrastructure (B&GI) has in increasing resilience to climate change within the landscape design. B&GI could include sustainable water systems, permeable surfacing, shading (of rivers, spaces and buildings) and/or maintenance of connectivity for species.
- Climate change could exacerbate the effect the Project has on health and the wider community as average temperature increase and heatwaves become more frequent. Embedded environmental measures include the use of appropriate landscaping, planting and building design, including planting large areas of the new airfield with grassland to mitigate the potential for Urban Heat Island effects. We will also manage overheating in replacement buildings by following the appropriate standards.
- Future changes in the precipitation regime can lead to changes in the groundwater level, which could result in potential damage to archaeological or paleoenvironmental remains. Embedded environmental measures include avoiding or minimising changes to groundwater flows and avoiding dewatering as far as practicable.

18.6.23 While climate change will impact other environmental aspects, the impacts and interactions do not result in new significant effects, nor do they materially increase the significance of effects identified within the aspect assessments.

18.6.24 On this basis, ICCI are deemed not significant for operation.

18.7 Summary of likely significant climate resilience and adaptation effects

- 18.7.1 Through the technical assessment, which forms the basis of this chapter, no risks were rated as 'medium', 'high' or 'very high' in relation to climate change resilience and adaptation for the Project as presented for Consultation, and, as such, no significant effects were identified in the climate change resilience (CCR) or in-combination climate change impact ICCI assessment results during construction or operation. This conclusion reflects the incorporation of embedded environmental measures across the Project and the requirement to consider climate change within relevant processes and standards.
- 18.7.2 The assessment therefore indicates that effects from climate change to the construction and operation of the Project result in no noticeable or meaningful change to the Project.

18.8 Next steps and preparation of the Environmental Statement (ES)

- 18.8.1 The climate change resilience (CCR) and in-combination climate change impact (ICCI) assessment will be refined using further design detail, baseline information, supplementary survey data such as biodiversity, and updated modelling outputs such as flood risk.
- 18.8.2 The Environmental Statement (ES) will demonstrate how good design would help reduce adverse climate effects and how embedded environmental measures would be assessed and secured. A full technical assessment of the climate resilience and adaptation environment aspect will also be included.

18.9 Glossary of terms

Term / Acronym	Definition
Climate adaptation	The measures taken to respond to changing climate conditions.
Climate change resilience	The capacity of systems and its component to anticipate and cope with a climate risk.
Climate hazard	The potential occurrence of a physical weather or climate event or trend that may cause negative impacts.
Climate impact	The effects on receptors from extreme weather, climate events and of climate change.
Significance	The severity of climate-related impacts to the Project and whether it is sufficiently material that it must be taken into account.
Vulnerability	Propensity or predisposition of a receptor to be adversely affected by a climate hazard.

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