

Birmingham Airport Climate Change Adaptation Progress Report 2024

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**Birmingham
Airport**





Contents

1	Foreword	3
2	Progress in adapting to climate change	4
2.1	Overview	4
2.2	Reviewing our assessment of climate change risk	5
2.3	Progress against previously identified actions	7
3	Interdependencies	11
4	Monitoring and Review	13
5	Appendix A - Climate change risk register	15

01 - Foreword

Welcome to our Climate Change Adaptation progress report for 2024.

On a global and local level our climate is changing and will continue to do so as a result of greenhouse gas emissions. Although efforts are being made to reduce these greenhouse gas emissions through climate change mitigation, the effects of climate change will have a lasting impact.

Climate change has the potential to impact the operation of Birmingham Airport and we must ensure we are prepared to adapt to the prospect of hotter, drier summers, and warmer, wetter winters, as well as the potential for increasingly frequent extreme weather events.

Climate change can pose potential risks to energy security, water security, market stability and infrastructure capacity. Planning for the future – and not just reacting to emergency situations – will reduce the risks posed by the effects of climate change and make the Airport more resilient and sustainable. Building this level of preparedness and resilience to climate change is an essential way to protect the business and our operations.

Our Aim, as set out in our Sustainability Strategy, is to ensure that the Airport remains resilient to a changing climate and in a position to benefit from any potential opportunities.

In 2011 we produced our first Climate Change Adaptation Report. This was completed under direction from the Department for Environment, Food and Rural Affairs (Defra) under the Adaptation Reporting Power, as a regulatory requirement of the Climate Change Act 2008. The 2011 report identified the risks posed to our Airport from a changing climate in order to assist the business with preparing for climate change and also contributed to the Government's first round of National Adaptation Reporting (ARP1). We subsequently produced Climate Change Adaptation Progress Reports in 2016 and 2021, forming part of five-year cycles and the second and third rounds of National Adaptation Reporting (ARP2 & ARP3).

This 2024 report is our fourth update and outlines the progress made in adapting to the predicted effects of current and future climate change on our organisation since our previous 2021 Climate Change Adaptation Progress Report. It also reviews our Climate Change Risk Register and will form part of the fourth round of National Adaptation Reporting (ARP4), being used to inform the UK Governments Climate Change Risk Assessment (CCRA), which is required to be carried out every 5-years.

We have assessed our climate change adaptation risks against information from the latest UK Climate Projections available (UKCP18), produced by the Met Office Hadley Centre.

In addition to our work on climate change adaptation, we are also engaged in climate change mitigation with a commitment to become a Net Zero Carbon Airport by 2033, prioritising zero carbon Airport operations and minimising carbon offsets. Whilst this progress report focuses exclusively on climate change adaptation, information regarding our climate change mitigation activities can be found within both our [Sustainability Strategy](#) and subsequent [Annual Progress Reports](#).

Since publishing our 2021 Climate Change Adaptation Progress Report, we have also developed and published our [Net Zero Carbon Plan](#), a clear strategy in support of achieving our Net Zero commitment, setting out our next phase of investment to deliver on-site renewable energy generation and energy efficient operations.

By integrating climate change adaptation into the core operations of our Airport, we aim to build a resilient, sustainable, and more adaptable Airport infrastructure—one that not only minimises potential disruptions but also contributes to our part in limiting the Earth's temperature increase to well below 2°C, in line with the United Nations' ambition, and mitigating the broader impacts of climate change.

The development of this progress report has been guided by a thorough assessment of climate projections, risk factors, and stakeholder input, reflecting our collective recognition that climate resilience is not merely a reactive response to immediate threats, but an essential component of responsible planning and stewardship for future generations.

As we implement the actions outlined, we will remain committed to transparency, collaboration, and innovation, working closely with our partners, stakeholders, and the communities we serve. This is an ongoing journey, and we recognise that the challenges we face will continue to evolve. But with a robust and adaptive framework in place, we are confident that we will be able to meet these challenges head-on, ensuring that our Airport remains a vital, resilient part of the global transportation network for generations to come.

As always I welcome your thoughts, comments and queries at sustainability@birminghamairport.co.uk



Nick Barton
CEO

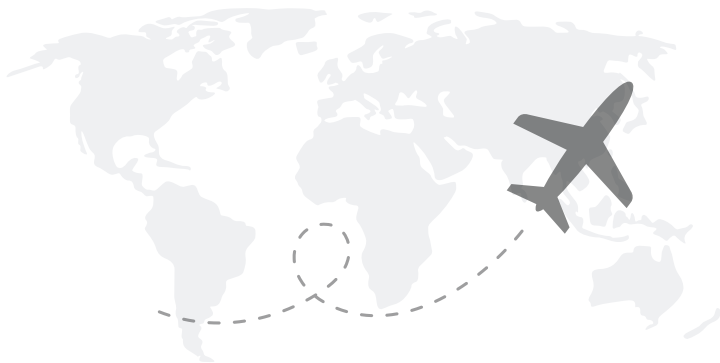
02 - Progress in adapting to climate change

2.1 Overview

We recognise that the UK's climate is changing and that recent decades have been warmer, wetter and hotter compared to the 20th century, with the MET Office's recent [State of the UK Climate Report](#) showing that 2023 was the second warmest year in the UK since records began, the seventh wettest with heavier rainfall becoming ever more frequent, and having record high sea levels at several UK locations.

The concept of climate change is embedded within all areas of the business and our 2011 climate change adaptation progress report identified a number of actions required in order to prepare the business for the likely impacts of climate change. We have made significant progress against these actions over several years, and this is detailed at section 2.3.

During this round of reporting, we have reviewed and updated our climate change risk register. As part of this review, a number of climate change risk workshops have been held to engage both internal and external stakeholders. Our climate change risk register has been updated to reflect the progress that has been made against previous actions, and the input of changes in technology and development.



02 - Progress in adapting to climate change

2.2 Reviewing our assessment of climate change risk

During 2024 we have reviewed our climate change risk register with all applicable stakeholders. This included representatives from a range of internal company departments, in addition to sharing with our Airport Consultative Committee (ACC). The ACC, representing the interests of local authorities, resident groups, industry bodies and Airport users, plays a vital role as a communication channel between the Airport and its many stakeholders.

We have re-evaluated the identified climate change risks against information from the latest UK Climate Projections (UKCP18), produced by the Met Office Hadley Centre. There are various different emissions scenarios that can be used when generating data;

- Representative Concentration Pathway (RCP) 2.6 (low emissions scenario)
- RCP4.5 and RCP 6.0 (medium emissions scenario)
- RCP 8.5 (high emissions scenario)
- SRES A1B (medium emissions scenario used in previous climate predictions - CP09)

In 2011 and 2016 the Airport Company chose two of the key timelines to discuss: 2020 and 2050. In 2021 and within this current round of reporting climate change issues, three timelines have been considered within our climate change risk register: 2025, 2050 and 2080.

Whilst UKCP18 remains the most widely referenced set of climate projections, we have also considered any ongoing updates and supplementary reports provided by the UK Met Office, including the UKCP Local Projections, shared in 2020 and designed to provide more high-resolution data for specific regions of the UK and providing us with a better understanding of regional variations in temperature, rainfall and other climate extremes. UKCP18 climate variables for the West Midlands region are summarised in Tables 1, 2 and 3.

The UK Government also publishes a [Climate Change Risk Assessment \(CCRA\)](#) every five years, with their latest report, published in 2022, presenting a review of the latest climate projections and assessing how the climate risks facing the UK have evolved since UKCP18 projections. This includes assessing risks like flooding, water shortages, and infrastructure challenges in more detail, considering the latest understanding from UKCP18 projections as well as updated scientific evidence. Our 2024 progress report has been brought forward by two-years to better align with this Government reporting and uses the latest CCRA to inform our own risk assessment.

Climate Variable	2050s RCP2.6	2050s RCP6.0	2080s RCP2.6	2080s RCP6.0
Mean Annual Temperature	+1.2°C	+1.2°C	+1.3°C	+2.4°C
Mean Winter Temperature	+1.1°C	+1.1°C	+1.2°C	+2.0°C
Mean Summer Temperature	+1.7°C	+1.5°C	+1.9°C	+3.2°C
Mean Summer Precipitation	-15%	-15%	-19%	-26%
Mean Winter Precipitation	+6%	+5%	+9%	+14%

Table 1. UKCP18 Climate Projections for temperature and rainfall for the West Midlands region, for low (RCP2.6) and medium (RCP6.0) emission scenarios. These figures are relative to a 1981-2000 baseline.

Climate Variable	Baseline (1981-2000)	2025's	2050's	2080's
Temperature: number of frost days (days with a temperature equal or lower than 0°C)	36	22	17	9
Temperature: number of hot days (days with a maximum temperature higher than 25°C)	20	32	52	70
Precipitation: number of dry spells (10 days+ with no precipitation)	9	9	9	11
Precipitation: winter mean (mm/day)	1.75mm	1.8mm	2.0mm	2.09mm

Table 2. UKCP18 Climate Projections for temperature (frost and hot days) and rainfall (dry spells and winter daily rainfall) for the West Midlands region, for medium (RCP6.0) emission scenario relative to a 1981-2000 baseline.

Climate Variable	Long-term climate projection to 2080
Storms	An increase in frequency and severity
Wind-speed	A general calming of surface wind speeds (<10%) is projected for all seasons.
Fog	Spring: >35% decrease in fog events Summer: >65% decrease in fog events Autumn: 10 - 30% decrease in fog events Winter: 20% increase in fog events
Lightning	Winter: Similar Spring: increase to 6-10 days from 4-5 days Summer: increase to 8-13 days from 8-9 days Autumn: increase to 5-9 days from 2-3 days
Snow	Days of snowfall: Autumn/spring: 80% less Winter: 70% less Heavy snow events: Spring: 80% reduction Winter: 60% reduction

Table 3. High level overview of other climate parameters considered and their long-term climate projections out to 2080.

02 - Progress in adapting to climate change

Our risk assessment process considers impact and likelihood on a scale of 1 to 5. The impact and likelihood scores are multiplied to calculate the risk score, with the maximum risk rating for any risk being 25. The risk matrix used is shown in Table 4 to the right. This method aligns with other Airports through Airports UK (previously the Airport Operators Association), providing input on a sectoral climate change risk register template which has been developed in conjunction with Defra. This template is being used across reporting Airports in order to increase the consistency of reporting and allows identified climate risks to be assessed and quantified in the same way across the sector. Our 2024 climate change risk register can be found in Appendix A.

Actions arising from identified climate risks have been assigned to one of three categories:

1. Watching brief; to be maintained in the short-term using the latest climate projections.
2. Investigate; risk to be investigated in order to be fully understood before determining if action is needed.
3. Action; identified as needed in order to adapt to a climate change risk.

		Climate Change Risk Matrix				
		Likelihood				
		Improbable (1) Event may occur in exceptional circumstances. Should virtually never occur.	Unlikely (2) Remote. Event could occur at some time. Possible but not likely.	Less than likely (3) Occasional. Event should occur at some time. Possible to occur.	More than likely (4) Event will probably occur in most circumstances. Likely to happen. Can be anticipated.	Highly probable (5) Frequent. Event is expected to occur in most circumstances. Almost certain.
Impact	Minimal (1) Noticeable event but manageable or absorbed through normal activity.	1	2	3	4	5
	Minor (2) An event which can be managed via existing processes. Minor adverse consequences.	2	4	6	8	10
	Moderate (3) A significant event which requires prompt action to prevent escalation. Can usually be managed under normal circumstances.	3	6	9	12	15
	Major (4) A large event that requires a high-level of engagement, special arrangements and effective management. Crisis Management Teams activated.	4	8	12	16	20
	Catastrophic (5) A critical event with extremely devastating consequences. Potential or actual disaster for the business. Loss of Life.	5	10	15	20	25

Table 4. 2024 Climate Change Risk Matrix.

02 - Progress in adapting to climate change

2.3 Progress against previously identified actions

The progress made against actions identified or remaining open from our previous round of climate change adaptation reporting are detailed below. Due to the long-term nature of the timeframes considered in our climate change risk assessment, specific completion dates have not been set.



Number: CCAA03

Action: Incorporate an analysis of climate change resilience into all capital investment appraisals for future infrastructure and building developments.

Progress: All infrastructure projects that require a capital investment appraisal are required to be evaluated to ensure sustainability criteria are met as a minimum and prioritised wherever possible in order to ensure alignment with Sustainability Strategy and Net Zero Carbon commitments. This action will remain open for continual review of sustainability criteria within the capital expenditure process.

Current Status: Action open.

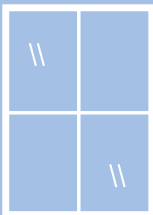


Number: CCAA06

Investigate: Consider the need for equipment and/or data that will provide improved real time information on wind, wind shear and monitoring for storms.

Progress: Increased wind gusts and potential changes in direction are expected as a result of climate change, but exact likelihood is unknown. Extreme weather events are continually monitored on the airfield. Details are still uncertain on future predicted extreme weather events as a result of climate change. The Airport has responded adequately to extreme events that have occurred and is capable of accepting aircraft divers due to weather events at other airports. This will form part of the NATS technology and innovation roadmap, as the Airports Air Traffic Navigation Services provider from 2025.

Current Status: Investigation open.



Number: CCAA07

Action: Carry out an enhanced review of heavily glazed building areas temperature control requirements e.g. terminal buildings.

Progress: Heavily glazed areas in buildings can pose significant challenges when it comes to temperature control, including higher heat gain in the summer months and higher heat loss in the winter months. These challenges can affect energy efficiency and temperature control, reducing the effectiveness of our Heating, Ventilation and Cooling (HVAC) System.

We use a comprehensive Building Management System (BMS) to control, monitor and optimise our HVAC infrastructure throughout our buildings, allowing improvements in efficiency even in difficult to manage areas, such as those that are heavily glazed. Our 40-million pound investment to develop our Next-Generation Security system has enabled better use of our existing space, with the discontinued use of our original security area and lanes, which were situated in heavily-glazed area, resulting in improvements for our customers and staff and reducing time spent in heavily glazed areas to a minimum. Significant investment in metering has also taken place over 2023-24, connecting 66 electricity sub-meters to our BMS and allowing us to have more informed temperature control and visibility.

Current Status: Action open.



02 - Progress in adapting to climate change



Number: CCAA08

Investigate: Carry out a full review of HVAC system and building performance standards.

Progress: Current Airport infrastructure capability is managed through our asset management programme. We recognise that climate change presents a high risk to the resilience of our Heating, Ventilation and Cooling (HVAC) System. and as such are in the process of updating a comprehensive HVAC strategy. Our HVAC is a complex system made up of many asset elements including Air Handling Units, chilled water plant, boilers, cooling towers and the associated pipe, duct and pump infrastructure and the HVAC strategy will allow us to implement the prioritisation of HVAC projects as required. The Airport also remains compliant with the Energy Performance of Buildings (England and Wales) Regulations 2012, obtaining and displaying valid Energy Performance Certificates (EPC's).

Current Status: Investigation open.

Number: CCAA09

Investigate: Look at future aircraft types and their refuelling requirements.

Progress: We have entered into a long-term partnership with ZeroAvia aiming for zero-emission, hydrogen-powered air travel, making on-airfield hydrogen refuelling and regular domestic passenger flights of zero-emission aircraft a reality in the coming years.

ZeroAvia is currently working on bringing to market a zero-emission system capable of flying 20-seat aircraft 300 nautical miles by 2025. This opens up the possibility of green air travel from Birmingham to destinations like Glasgow, Aberdeen, Belfast and Dublin by the middle of this decade. In a move that would make zero-emission travel to Mediterranean holiday destinations a reality, ZeroAvia is aiming to get an emissions-free 80-seat aircraft flying up to 1,000 nautical miles by 2027. We plan to use an area near to our disused Elmdon terminal building as a potential location for hydrogen refuelling infrastructure, testing and operations.

We are also in the process of developing a future fuels strategy, working with consultants Atkins Réalis to inform and develop this so as to fully understand the Airport infrastructure required to best support the transition to lower emission alternative fuels.

We are aligned with and have provided input into Sustainable Aviation's [Net Zero Carbon Roadmap](#) and subsequent [progress report](#), supporting the UK Governments SAF mandate target of 10% SAF by 2030. We are also committed to working with our airline partners to support their transition to cleaner, more fuel-efficient, lower emissions aircraft, increasing the percentage of next-generation aircraft operating at the Airport to 18% of all movements in 2023, the highest percentage we have seen yet. Next-generation aircraft offer emissions, noise and carbon reductions and the transition to increased use of these is essential to our future operations.

Current Status: Investigation open.



02 - Progress in adapting to climate change

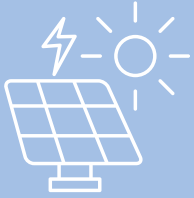
Number: CCAA10

Action: Reduce reliance on grid and increase security of energy supply through on-site renewable energy generation electricity generation (Solar PV).

Progress: The security of electricity supply from the grid could be adversely impacted by future predicted extreme weather events caused by climate change. Increased summer temperatures will increase energy requirements for cooling across the UK and an increase in lightning strikes could cause a reduction in grid reliability.

Significant progress has been made, with the investment and installation of 12,000 solar PV panels on the airfield providing at least 20% of our on-site electrical power requirements, reducing our reliance on the power grid and reducing our carbon emissions by 19%. Please see the below case-study for further information. We are continuing to explore options for additional projects to further reduce our reliance on the grid and achieve our Net Zero Carbon goal.

Current Status: Action open.



Number: CCAA11

Investigate: Carry out an assessment of drainage system capacity, maintenance and upgrade requirements.

Progress: Our Flood & Pollution Control System is made up of 10 polluted water holding tanks with a combined capacity of over 20 million litres, the equivalent of 8 Olympic swimming pools. Although vast in quantity, in the event of these holding tanks reaching full capacity, we have permits in place with the Environment Agency which allow discharge of this overflow to our on-site brooks. This can be observed via our automated Supervisory Control and Data Acquisition (SCADA) system, which is monitored 24/7. Current Airport infrastructure capability is managed through our asset management programme, this includes our Flood & Pollution Control System, which has a specific asset management plan to consider distinct upgrade requirement projects as and when needed. Our ongoing drainage system maintenance requirements are managed through a pre-planned schedule and are implemented and recorded through our Airfield Infrastructure department.

We also use weather forecasting systems to understand the real-time level of risk, alongside daily rainfall monitoring, allowing for more timely warnings and operational decisions to be made. We reviewed and updated our Airport Emergency Plan in 2023, with this piece of work led by our Fire & Emergency Planning department and engaging with a multitude of internal and external stakeholders.

Current Status: Investigation open.



02 - Progress in adapting to climate change



Number: CCAA12

Investigate: Carry out de-silting and bank stabilisation works at on-site brooks to increase channel capacity.

Progress: We are working in conjunction with the Environment Agency to facilitate our plans to carry out de-silting and bank stabilisation works at the Hatchford Brook inflow to aid brook flow and increase channel capacity, alongside work also planned at the Low Brook in early 2025.

Current Status: Investigation open.



Number: CCAA13

Investigate: Carry out building fabric survey to determine areas where more immediate roofing work is required.

Progress: A roof infrastructure survey and inventory was carried out in 2017 and has been used to inform our current asset management programme. In 2023-24 extensive roofing work was carried out, including the replacement of a proportion of the North Terminal roof as part of the multi-million pound Next-Generation Security project. Fault reporting, including that of roofing issues and leaks is carried out through our Construction Maintenance Management System (CMMS) in order to highlight trends and determine prioritisation of any immediate roofing work requirements.

Current Status: Investigation open.



Number: CCAA14

Action: Review and assess adequacy of lightning protection system Airport wide.

Progress: Our lightning protection system is a specialised set of safety measures designed to protect our infrastructure, equipment, personnel and passengers from the hazards associated with lightning strikes. Airports can be higher risk areas due to the open, flat nature of operations and the presence of tall structures which can act as lightning attractors. As such, the system is made up of several lightning rods, down conductors, grounding systems and surge protectors and is inspected and tested on a regular, pre-determined schedule, with this managed by the Terminal Infrastructure team. Our lightning protection system will continue to be reviewed periodically to ensure continued effectiveness.

Current Status: Investigation open.



Number: CCAA15

Investigate: Review FOD procedure during storms.

Progress: FOD (foreign object debris) procedures are managed primarily through the Airfield Operations team, with FOD inspections carried out on a daily basis and actions to minimise FOD risk raised and implemented as needed. Any heightened FOD risk is highlighted and mitigated as part of project risk assessments and Hazard/Risk Analysis Review Planning (HARP) procedures. Weather and storm information is received via our Air Traffic Control and Control Centre, with procedures in place to send out real-time weather warnings via our weather warning group, ensuring all relevant stakeholders are aware and enabling risk to infrastructure and equipment to be minimised through appropriate action. FOD procedures will continue to be reviewed periodically to ensure their effectiveness.

Current Status: Investigation open.

03 - Interdependencies

The Airport does not operate in isolation and works in partnership with a variety of internal and external stakeholders on a collaborative approach to Climate Change Adaptation.

Our previous three rounds of reporting identified and considered a number of key stakeholders and interdependencies, as summarised in the below table. These include the Airport community - those residents, small businesses, landowners and occupiers living close to the Airport and those tenants, concessions and staff who work here. We also work with national and local government, with Parish and Town Councils and with Government funded organisations and large businesses across the region.

At an industry level we work extensively with Sustainable Aviation, a collaboration of UK airlines, Airports, air navigation service providers and major aerospace manufacturers which sets a long-term strategy for collective action to tackle the challenge of ensuring a cleaner, quieter, smarter future for our industry.

We also work closely with Airports UK (previously the Airport Operators Association), allowing us to collaborate with other UK Airports on climate change adaptation.

At a local level, the Airport Consultative Committee (ACC) represents the interests of local authorities, resident groups, industry bodies and Airport users, playing a vital role as a communication channel between the Airport and its many stakeholders. It is our responsibility to ensure anyone who might be affected has an opportunity to comment on and shape our decisions. We understand that clarity and transparency are the keys to maintaining a positive dialogue with our community stakeholders. We are therefore committed to fully engaging with the ACC, recognising its role as a 'critical friend' and the primary channel for the formal expression of community views and concerns.

All interdependencies have been considered as part of the climate change risk register at Appendix A, and we continue to monitor these and engage wherever necessary.

 <p>Industry</p>	 <p>Airport Community</p>	 <p>Local Community</p>	 <p>Business Community</p>	 <p>Government/ Regulators</p>
<ul style="list-style-type: none"> • Sustainable Aviation • Airlines • NATS • Airports UK (previously Airport Operators Association) • Airport Sustainability Forum 	<ul style="list-style-type: none"> • Employees • Tenants • Concessions • Handling Agents • Aircraft fuel providers 	<ul style="list-style-type: none"> • Residents • Parish/Town Councils • Airport Consultative Committee 	<ul style="list-style-type: none"> • Small Businesses • Landowners • Regional Business Community • Chambers of Commerce 	<ul style="list-style-type: none"> • Local Authorities • Department for Transport • Department for Environment, Food and Rural Affairs • Department for Energy Security and Net Zero • Civil Aviation Authority • Environment Agency • West Midlands Fire Service

03 - Interdependencies

Surface Access

Birmingham Airport relies on other modes of transport for surface access, to allow passengers and staff to access the Airport. Stakeholders involved include Highways England, Network Rail, Solihull Metropolitan Borough Council, Birmingham City Council, Warwickshire County Council, Train Operating Companies and Bus and Coach operators. These functions are important to the success of the Airport's [Surface Access Strategy](#) which was updated and published in 2023, and we continue to work closely with surface access stakeholders to understand how they are adapting to climate impacts.

We continue to work with bus operators to encourage the use of low or zero emission vehicles. Most of our bus services are operated by National Express West Midlands who have committed to a fully zero carbon fleet by 2030, with their current fleet meeting the Euro 6 standard – the highest emissions standard available. This reduces nitrogen oxide (NOx), carbon monoxide (CO), hydrocarbons (THC and NMHC) and particulate matter (PM10 and PM2.5). In addition to improving local air quality, the emissions standard also allows for lower CO2 emissions and an improved fuel economy.

West Midlands Railway, in partnership with Transport for West Midlands, is operating a new fleet of electric trains from Birmingham International Station. These electric trains contribute significantly to reducing emissions, by eliminating the use of diesel engines, decreasing levels of nitrogen oxide (NOx) and particulate matter (PM10 and PM2.5) emitted into the environment.

Communications

Both land and wireless communication feature heavily in Birmingham Airport's interdependencies, particularly in the operational field of Air Traffic Control. Our tower design has many features to mitigate against future climate change, including a heating and cooling system designed to cope with more extreme hot and cold weather conditions, external shutters to limit solar gain, internal blinds to allow for optimum temperature control and stabilising technology to limit movement during stormy weather.

The Airport has recently appointed NATS as its air traffic control provider from 2025, helping to develop a technology and innovation roadmap to ensure the air traffic service can deliver the increase in capacity safely and efficiently and enable the Airport's growth into the next decade, ensuring we encounter for climate risks as part of this process.

Andrew Holl, Birmingham Airport Airfield Operations Director said: "Our industry is evolving at an unprecedented pace, driven by rising traffic, advancing digitisation, and a heightened focus on sustainability. In this dynamic landscape, our partnership with NATS marks a key step forward for Birmingham Airport, opening up opportunities for modernising our services and accelerating our commitment to enhanced connectivity, innovation, and a greener future. We're very excited to shape the future of aviation at BHX together with NATS."

Energy Suppliers

Birmingham Airport currently remains dependent on an energy supply from external energy suppliers, as do other businesses which operate at the Airport, including our partner airlines and concessions. Action CCAA09 aims to reduce reliance on the grid and increase security of energy supply through on-site renewable electricity generation in the form of Solar PV, with significant advancements seen since 2021. The below case study outlines how we have reduced our reliance on the grid and how this will continue to be implemented through our [Net Zero Carbon Plan](#).



04 - Monitoring and Review

The concept of climate change risk and opportunities and the need to adapt to a changing climate is integrated throughout the business, with our overarching aim being to ensure that the Airport remains resilient to a changing climate and is in a position to benefit from any potential opportunities. This is outlined within our [Sustainability Strategy](#) which is publicly available via our website.

We are committed to ensuring the Airport is prepared to adapt to a changing climate and this message is communicated to all employees, partners and contractors through our [Sustainability Statement of Intent](#), which represents the views of our Board and is available to the public via our website.

Risks, opportunities and actions identified as part of our Climate Change Risk Register (Appendix A) contribute to the Airport Company's Corporate Risk Register and are documented, reviewed and progressed through our Environmental Management System to ensure continuity. The actions will be reviewed annually through the Airports Environmental Management Review Group to ensure they are still relevant to the business and that progress is continuing. All risks/opportunities identified within the Climate Change Risk Register have been assigned a risk owner, with progress monitored through BAL's internal governance structure.

Climate change adaptation is embedded into key organisational processes, including our asset management register, procurement, development and operational processes which include Airport Instructions and Local Operating Procedures.

Case Study: Reducing our Reliance on the Grid

Installation of onsite renewable generation is a key component in both our climate change adaptation and mitigation journeys. In 2024 year construction started on a configuration made up of 12,000 solar PV panels on the 1.5km-long embankment know as the 'Alpha Bund', which provides residents of Marston Green with protection from ground noise on the airfield.

This solar farm is able to provide at least 20% of our on-site electrical power requirements, reducing our reliance on the power grid and reducing our carbon emissions by 19%, moving us closer to our goal of becoming a Net Zero Carbon Airport by 2033.

Evo Energy worked closely with us on the design and build plans, with works commencing on the solar panel site last year at a cost of £9.7m. With full plant usage today, these panels, at peak, will supply 6.8MW of power back to the Airport, and it is anticipated that this will save 1,285 tonnes of CO2 per year.

Aviation, Maritime and Security Minister, Mike Kane got to see the expanse of the solar panel site first hand whilst on a tour of the Airport in October 2024, saying: "It's fantastic to see Birmingham Airport embrace their 2033 net zero mission. Their new solar farm, built with millions of pounds of investment, will produce almost a quarter of the electricity the Airport needs over the coming years. It's this sort of innovation and drive that will help the UK become a Clean Energy Superpower, and we will continue to support industry to achieve that goal."

Nick Barton, Chief Executive Officer commenting on the visit said: "We are delighted to be the first Airport the Aviation Minister has visited since his appointment. He saw first-hand the significant investments we are making at the Airport and the progress we are making in sustainability and skills development. Our solar panels will ensure that at certain times of the year, during sunnier and warmer days, we will have no reliance on incoming power sources, key to our net zero target."



04 - Monitoring and Review



Case Study: Flood & Pollution Control System

We operate a dedicated Flood & Pollution Control System across the site which is made up of four Total Organic Carbon (TOC) monitors and 10 polluted water holding tanks. In 2019 we replaced all the TOC monitors in the system at a cost of over £60,000. The system is designed to prevent surface water contaminated with substances such as de-icing fluid from entering on-site watercourses.

Warmer, wetter conditions and more intense rainfall give rise to impacts out on our airfield, where we have seen an increase in flooding events and higher levels of damage and expansion to several of our slot drains. Flooding remains an extremely prominent risk on site and monitoring of watercourse levels is undertaken continually. Action CCAA10 remains in place to assess drainage system capacity, maintenance and upgrade requirements, allowing us to determine if there are any further flood prevention measures that are necessary to protect key infrastructure and assets. In addition to this are our plans to carry out de-silting and bank stabilisation works at the Hatchford Brook inflow to increase channel capacity, with further work also planned at the Low Brook in 2025.

The Airfield Operations team continue to work hard to reduce the amount of de-icer used over the winter de-icing period, by focussing de-icing operations only on those areas where they are operationally required. Continuing this more targeted approach will help in reducing future use of de-icing fluids to the minimum required for aircraft safety, though absolute reductions are very much dependent on weather conditions throughout the winter period. Through this combination of targeted use and a milder winter period, we saw a 29% decrease in de-icer usage in the 2023/24 de-icing season vs 2022/23, the equivalent of over 250,000 litres of de-icing fluid.

We have mapped areas of the Airport which pose a potential risk of contamination for the watercourses, most notably those areas where fuels, oils and other chemicals are stored. We have worked with internal and external stakeholders to carry out an in-depth review of our spillage and emergency response procedures and have renewed our emergency spillage contract to ensure we are minimising and mitigating our spillage risk.

We continue to work with industry forums, internal and external stakeholders and the UK Government to share best practice and future climate change adaptation planning, of which increased rainfall and the associated flood risk remains a critical topic. Over 2023, we have worked with the Met Office, the Department for Transport via their Aviation Resilience Forum on Climate Change and Transport Adaptation Policy workshops for Aviation, in addition to Defra through their Adaptation Reporting Forum. We also remain engaged with the Environment Agency's Flood Warning Expansion Programme, facilitating the continued use of a solar powered rainfall gauge on the Airport site which is used to collect data on localised rainfall trends and make this publicly available.

Appendix A - Climate Change Risk Register

Risk Identification					Business Context				Risk Scoring									Control & Action	
Risk No	Climate Variable	Risk/ Opportunity (including indirect and interdependency risks/opportunities)	Decision threshold, process or trigger point for action on the risk	Potential Consequences (Functions, Services, Assets affected)	Interdependencies	Location/ Business Area	Risk Owner	Previously Identified Risk	Risk Score (2025)			Risk Score (2050's)			Risk Score (2080's)			Existing Controls	Further Actions (if required)
									Impact (I)	Likelihood (L)	Risk Score (bL)	Impact (I)	Likelihood (L)	Risk Score (bL)	Impact (I)	Likelihood (L)	Risk Score (bL)		
CCR01	Increased Summer Temperature	Thermal expansion of building infrastructure, such as concrete and steel, reducing longevity.	No specific decision threshold	Operational disruption Airport closures Financial cost to repair/ replace affected infrastructure	No interdependencies identified	All buildings	Head of Development Asset Owners	Yes	3	2	6	3	2	6	3	3	9	Maintenance programme Conformance with building regulations Consideration of climate change for all future builds as part of design works	Watching Brief
CCR02	Increased Summer Temperature	Airfield surface and sub-surface structural damage to runway and aprons caused by temperatures exceeding design standards i.e. melting, cracking.	UK tarmac standards (roads, aprons) begin to lose integrity once temperatures in the shade exceed 32°C. Tarmac itself is black, absorbs heat and can hit 80°C at such temperatures. Runway surfaces design standards withstand far higher temperatures to be able to cope with aircraft braking.	Operational disruption Airport closures Financial costs to repair damage Reputational damage Consequential damage	No interdependencies identified	Airfield	Airfield Operations Director	Yes	3	2	6	3	3	9	3	3	9	Runway, taxiway and apron maintenance programme Visual inspections	Watching Brief
CCR03	Increased Summer Temperature	Landside surface and sub-surface structural damage to bitumous surfaces, such as car parks, landside roads caused by extreme heat.	UK tarmac standards (roads, aprons) begin to lose integrity once temperatures in the shade exceed 32°C. Tarmac itself is black, absorbs heat and can hit 80°C at such temperatures.	Operational disruption Financial costs to repair damage Reputational damage	No interdependencies identified	Landside - all bitumous surfaces (car parks, on-site roads)	Head of Commercial (car parks) Head of Development	Yes	2	2	4	2	3	6	2	3	6	Maintenance programme	Watching Brief
CCR04	Increased Summer Temperature	Increased accumulation of rubber on runway	Requirement to maintain appropriate friction requirements in line with runway friction assessments	Operational disruption due to runway closure Runway excursion Health & Safety incident	No interdependencies identified	Airfield	Airfield Operations Director	Yes	2	2	4	2	2	4	2	3	6	Runway inspection regime including runway frictions assessment Rubber removal contractor retained and works carried out to schedule	Watching Brief

Appendix A - Climate Change Risk Register

CCR05	Increased Summer Temperature	Decrease in passenger comfort within Airport buildings caused by inadequate cooling systems and inability of air handling units (AHU's) to 'dump' hot air from internal to external due to high external temperature	28oC - 30oC	Decline in revenue and passenger numbers Negative impact on passenger wellbeing Reputational damage Increase in Health & Safety incidents/accidents	No interdependencies identified	All buildings	Head of Terminal Infrastructure	No	2	4	8	2	4	8	3	5	15	Building Management System to manage hot days Existing heating, ventilation and air conditioning system efficiency in newer buildings e.g. ATC tower Maintenance regime of chilling infrastructure Conformance to BREEAM standards	Investigate CCAA07 - Carry out an enhanced review of heavily glazed building areas temperature control requirements e.g. terminal buildings Investigate CCAA08 - Carry out a full review of HVAC system and building performance standards
CCR06	Increased Summer Temperature	Decrease in staff/ contractor comfort within Airport buildings caused by inadequate cooling systems and inability of air handling units (AHU's) to 'dump' hot air from internal to external due to high external temperature	28oC - 30oC	Increased staff absence Negative impact on staff wellbeing Reputational damage Increase in Health & Safety incidents/accidents	No interdependencies identified	All buildings	Head of Terminal Infrastructure	No	3	4	12	3	4	12	3	5	15	Building Management System to manage hot days Existing heating, ventilation and air conditioning system efficiency in newer buildings e.g. ATC tower Maintenance regime of chilling infrastructure Conformance to BREEAM standards	Investigate CCAA07 - Carry out an enhanced review of heavily glazed building areas temperature control requirements e.g. terminal buildings Investigate CCAA08 - Carry out a full review of HVAC system and building performance standards
CCR07	Increased Summer Temperature	More residents' windows open, particularly at night, leading to greater disturbance from aircraft operations	No specific decision threshold	Requirement for additional noise mitigation Operational restrictions imposed Reputational damage	No interdependencies identified	Airport noise footprint	Head of Sustainability	Yes	2	2	4	2	2	4	2	2	4	Noise Action Plan Sound Insulation Scheme Noise Complaints Procedures Introduction of newer quieter aircraft	Watching Brief
CCR08	Increased Summer Temperature	Flashpoint of aviation fuel exceeded on hot days causing a potential fire hazard.	Aviation fuel flash point is 38°C	Financial costs for damage caused Operational disruption Health & Safety Incident	Aircraft fuel providers	Airfield	Airfield Operations Director	Yes	4	2	8	4	2	8	4	3	12	Spillage reporting and clean up procedures. Refuelling procedures	Investigate CCAA09 – Look at future aircraft types and their refuelling requirements
CCR09	Increased Summer Temperature	Increase in local air quality pollutants such as ozone	No specific decision threshold	Environmental damage due to increase in pollutants Restrictions on future planning and development activity	No interdependencies identified	Local air quality	Head of Sustainability	Yes	1	3	3	2	3	6	3	3	9	Air quality monitoring for a range of pollutants in place	Watching Brief

Appendix A - Climate Change Risk Register

CCR10	Increased Summer Temperature	Reduced lift for departing aircraft due to 'thin air' and reduced engine efficiency in very hot weather	No specific decision threshold	Requirement for additional noise mitigation Operational restrictions imposed	No interdependencies identified	Airport noise footprint	Head of Sustainability	Yes	3	1	3	3	2	6	3	2	6	Potential to change load factors Existing noise footprint monitoring and mitigation	Watching Brief
CCR11	Increased Summer Temperature	Increased expansion and contraction of pipework damaging pipes	No specific decision threshold	Injury and damage to assets Financial cost of maintenance and repair	No interdependencies identified	All buildings	Head of Airfield Infrastructure Head of Terminal Infrastructure	No	3	2	6	3	3	9	3	3	9	Maintenance and replacement regime	Watching Brief
CCR12	Increased Summer Temperature	Reduced cabin comfort on-board aircraft during turnaround	No specific decision threshold	Reputational damage Passenger distress	Airlines	Aircraft	Head of Customer Experience	Yes	3	2	6	3	3	9	3	3	9	Air conditioning on board aircraft during turnaround	Watching Brief
CCR13	Increased Summer Temperature Increased Intense Periods of Rainfall	Hardening of natural surfaces with reduced natural drainage function resulting in increased run-off and risk of flooding	No specific decision threshold	Operational disruption due to excess surface water	No interdependencies identified	Airfield - stands, taxiways & access roads)	Airfield Operations Director	No	3	2	6	3	3	9	3	3	9	Grounds Maintenance ensure ground inspections take place	Watching Brief
CCR14	Increased Summer Temperature Increased Intense Periods of Rainfall	Increased ground movement, leading to: - instability of surrounding objects/buildings/ structures - damage to underground infrastructure (drainage and utility pipes, cables and chambers) - changes to tree stability	No specific decision threshold	Operational disruption Airport closure Financial costs to repair damage/ replace affected asset Health & Safety incident Reputational damage	No interdependencies identified	All buildings and underground infrastructure	Asset Owners	Yes	3	2	6	3	2	6	3	2	6	Monitoring and maintenance programme Completion of Civil Aviation Authority 'CAP 232' annual airside survey	Watching Brief
CCR15	Increased Summer Temperature Lightning	Increased fire risk due to hotter dryer summers and increased incidence of lightning in summer. Grass/ vegetation fires could cause poor visibility due to smoke, with possible fire damage to outlying structures. Risk of fires off site impacting aircraft operations to/from the Airport. Risk of fire resulting from use of bird scaring flares.	No specific decision threshold	Financial costs for damage caused Operational disruption Health & Safety Incident	West Midlands Fire Service	Sitewide + off site within smoke range/ at destinations	Head of Health, Safety & Fire Head of Fire & Emergency Planning	Yes	4	1	4	4	2	8	4	2	8	On-site Fire & Rescue Department Procedures for use of flares	Watching Brief

Appendix A - Climate Change Risk Register

CCR16	Increased Summer Temperature	Effect of air temperature on the (increased) speed of aircraft landing	No specific decision threshold	Harder, faster landing affecting the structural integrity of the runway	Airlines	Airfield	Head of Air Navigation Services Airfield Operations Director	No	3	2	6	3	2	6	3	2	6	Runway, taxiway and apron maintenance programme Visual inspections Regular engagement with airlines through flight safety committee Review of landing procedures	Watching Brief
CCR17	Increased/ Decreased Summer/ Winter Temperature	Increased energy demand for cooling, ventilation and heating - increased reliance on energy suppliers being able to supply this demand	No specific decision threshold	Power outages - critical equipment failure Operational disruption Airport closures	Energy supplier	All buildings	Head of Sustainability	Yes	3	2	6	3	3	9	3	4	12	On-site diesel generators for back-up power for business critical operations	Action CCAA10 - Reduce reliance on grid and increase security of energy supply through on-site renewable energy generation electricity generation (Solar PV) - this will form part of the Net Zero roadmap (currently in development)
CCR18	Increased/ Decreased Summer/ Winter Temperature Increased/ Decreased Rainfall	Increased risk to the health and wellbeing of outside workers due to a failure to exercise appropriate duty of care for outside workers caused by changes in climate, including hotter working conditions, wetter working conditions, colder working conditions	No specific decision threshold	Health & Safety Incident Reputational Damage	No interdependencies identified	Outside workers	Head of Health, Safety & Fire	Yes	3	2	6	3	3	9	3	3	9	Occupational Health department on site Health & Safety Department on site Individual departmental risk assessments and wellbeing currently include provision for hot weather working	Watching Brief
CCR19	Increased/ Decreased Summer/ Winter Temperature Increased/ Decreased Rainfall	Increase in disease vectors at the Airport resulting from changes to their distribution, leading to tropical and other diseases	No specific decision threshold	Increased staff absence Operational disruption	No interdependencies identified	Sitewide	Head of Health, Safety & Fire	Yes	2	2	4	2	2	4	2	2	4	Occupational Health Department on site Regular liaison with port health Health & Safety Department on site	Watching Brief
CCR20	Increased/ Decreased Summer/ Winter Temperature Increased/ Decreased Rainfall	Changes to airfield habitats and bird populations impacting wildlife control and increasing risk of bird strike	No specific decision threshold	Additional management of wildlife required Health & Safety incident Reputational damage	No interdependencies identified	Airfield	Airfield Operations Director	Yes	3	2	6	3	2	6	3	2	6	Airfield wildlife management in place Habitat management regime in line with the Civil Aviation Authority 'CAP 772' requirements	Watching Brief

Appendix A - Climate Change Risk Register

CCR21	Increased Rainfall	Release of contaminated surface water to brooks as a result of polluted water holding tanks exceeding capacity	No specific decision threshold	Regulatory notification/ fines Reputational damage Restriction of future development	No interdependencies identified	Airfield brooks (Hatchford, Westley & Low brooks)	Head of Airfield Infrastructure Head of Terminal Infrastructure	Yes	3	3	9	3	3	9	3	3	9	Surface water drainage system feeding into 10 polluted water holding tanks - control mechanisms if holding tanks reach full capacity EA permits in place to manage polluted water, allowing discharge to brook in event of full capacity Monitoring of overflow to brook days	Investigate CCAA11 - Carry out an assessment of drainage system capacity, maintenance and upgrade requirements.
CCR22	Increased Rainfall	Inadequate site drainage system capacity leading to stand/ taxiway/ access road/ general site flooding	Flooding of stand/ taxiway/ access road of airfield	Operational disruption due to excess surface water Airport closures Financial cost to repair/ replace affected infrastructure	No interdependencies identified	Airfield - stands, taxiways & access roads)	Head of Airfield Infrastructure Head of Terminal Infrastructure	Yes	3	2	6	3	2	6	3	3	9	Drainage maintenance regime Monitoring of brook levels Flood & pollution control system in place.	Investigate CCAA11 - Carry out an assessment of drainage system capacity, maintenance and upgrade requirements.
CCR23	Increased Rainfall	Overflow of brooks (and culverts) leading to stand/ taxiway/ access road/ general site flooding	Flooding of stand/ taxiway/ access road of airfield	Operational disruption due to excess surface water Airport closures	No interdependencies identified	Airfield - stands, taxiways & access roads)	Head of Airfield Infrastructure Head of Terminal Infrastructure	Yes	3	2	6	3	2	6	3	3	9	Brook maintenance regime Monitoring of brook levels Flood & pollution control system in place.	Action CCAA12 - Carry out de-silting and bank stabilisation works at on-site brooks to increase channel capacity.
CCR24	Increased Rainfall	Intense rainfall and standing water affecting the accuracy of ILS readings	No specific decision threshold	Operational disruption due to excess surface water Airport closures	No interdependencies identified	Airfield - stands, taxiways & access roads)	Head of Airfield Infrastructure Head of Air Navigation Services	No	4	1	4	4	1	4	4	2	8	Improved drainage at ILS	Watching Brief
CCR25	Increased Rainfall	Torrential rain creates hazardous conditions for vehicles and aircraft i.e. airside and landside road vehicles, and taxiing and landing aircraft, due to: -reduced visibility -icy or wet conditions	No specific decision threshold	Financial costs to repair/replace equipment Operational disruption Reduced aircraft movements Aircraft/ vehicle collision Health & Safety incident Costs to meet additional de-icing volume requirements	No interdependencies identified	Sitewide	Airfield Operations Director	Yes	3	1	3	3	2	6	3	3	9	Winter operations plan and activities Airfield safety plan and activities	Watching Brief

Appendix A - Climate Change Risk Register

CCR26	Increased Rainfall	Rain ingress in roof of certain Airport buildings increasing the occurrence of false fire alarm activation	No specific decision threshold	Increase in frequency of false fire alarm activation	No interdependencies identified	All buildings	Head of Health, Safety & Fire	No	2	3	6	2	3	6	2	3	6	Fault reporting system	Investigate CCAA13 - Carry out building fabric survey to determine areas where more immediate roofing work is required
CCR27	Increased Rainfall	Flood damage to aircraft navigation systems/buildings and instrument landing system (ILS), leading to equipment shut down due to water exposure and/or unavailability of critical navigational aid systems	No specific decision threshold	Financial costs to repair/replace equipment Operational disruption Reduced aircraft movements	No interdependencies identified	Aircraft Navigation Systems/LS	Head of Air Navigation Services	Yes	4	1	4	4	2	8	4	2	8	Regular equipment monitoring of known wet and boggy areas Daily checks Maintenance regime Equipment installed on higher ground to mitigate against water damage	Watching Brief
CCR28	Reduced Summer Rainfall	Pollution of local watercourses due to debris accumulated in pipework during longer dry spells then being washed out	No specific decision threshold	Regulatory notification/ fines Reputational damage	No interdependencies identified	Airfield brooks (Hatchford, Westley & Low brooks)	Head of Airfield Infrastructure	Yes	3	2	6	3	2	6	3	2	6	Water quality monitoring and review programme Maintenance of key parts of the flood & pollution control system equipment	Watching Brief
CCR29	Reduced Summer Rainfall	Dry areas of soil being picked up in high winds/storms and becoming foreign object debris (FOD)	No specific decision threshold	Operational disruption	No interdependencies identified	Airfield	Airfield Operations Director	No	2	1	2	2	1	2	2	2	4	Existing FOD arrangements	Watching Brief
CCR30	Fog	Seasonal changes to fog related disruption (increase in winter months, decrease for remainder of year).	Low Visibility Procedures take effect when the Instrument Runway Visual Range (IRVR) is less than 600m and/or the cloud ceiling is 200ft or less	Operational disruption caused by runway closure and low ground visibility Reduced aircraft movements Reputational damage	No interdependencies identified	Airfield	Airfield Operations Director	Yes	3	1	3	3	2	6	3	2	6	Low visibility operating and notification procedures in place	Watching Brief

Appendix A - Climate Change Risk Register

CCR31	Lightning	Increase in lightning events leading to: -refuelling suspension -changes to flight routing -asset damage due to strike/fire, including essential ATC and IT equipment -decrease in ground handling agent's operational performance	No specific decision threshold	Operational disruption caused by decrease in aircraft movements Increased insurance claims Reputational damage H&S incident	Aircraft fuel providers	All aircraft on airfield/ in airspace controlled by BAL ATC	Head of Air Navigation Services	Yes	4	2	8	4	2	8	4	2	8	All commercial aircraft are tested for resilience to lightning strike as part of their certification. Aircraft can withstand lightning strike in the air but during take-off and landing instrument loss would be critical Diversion procedures Lightning protection system Back-up generators for power loss to critical equipment	Investigate CCAA14 - Review and assess adequacy of lightning protection system Airport wide
CCR32	Snow and Ice Events	Snow events leading to schedule disruption, staff & PAX difficulties getting to/from the Airport site	No specific decision threshold	Operational disruption caused by runway closure Reduced aircraft movements Reputational damage	Surface Access: ground transport connections for PAX and staff travelling to/from site in snow conditions Handling agents Third parties	Airfield	Airfield Operations Director	Yes	4	3	12	4	2	8	4	1	4	Winter operations plan and activities Airfield safety plan and activities	Watching Brief
CCR33	Snow and Ice Events	Increase in aircraft de-icing needed	No specific decision threshold	Operational disruption Increased risk of pollution incident	Handling agents carrying out de-icing De-icer supply chain	Airfield	Airfield Operations Director	Yes	2	3	6	2	2	4	2	1	2	Winter operations plan and activities Flood & pollution control system processes	Watching Brief
CCR34	Storms	Rain, wind, snow affecting passengers during walk between carpark and terminal	No specific decision threshold	Reduced passenger experience	No interdependencies identified	Car park to terminal	Head of Planning and Transport	No	2	2	4	3	3	9	3	3	9	Covered walkway/ buses from car parks People mover from train station	Watching Brief
CCR35	Storms	Increased occurrence of 'force majeure' enabling contractors to cease work without contractual penalty	No specific decision threshold	Financial risk and delay in project completion	No interdependencies identified	Sitewide	Procurement	No	2	2	4	3	2	6	3	2	6	Current procurement processes	Watching Brief

Appendix A - Climate Change Risk Register

CCR36	Storms	Increased risk of schedule interruption from stormy conditions, including increased risk of foreign object debris (FOD) creation and cross-winds	No specific decision threshold	Reduced aircraft movements; operational disruption	Other Airports - divers	All aircraft on airfield/ in airspace controlled by BAL ATC	Head of Air Navigation Services	Yes	3	3	9	3	3	9	3	4	12	High wind procedures and cross wind procedures enacted at defined criteria (dependant on aircraft type)	Investigate CCAA06 - consider the need for equipment and/or data that will provide improved real time information on wind, wind shear and monitoring for storms. Investigate CCAA15 - Review FOD procedure during storms
CCR37	Storms	Increased building induced turbulence in high winds, exacerbated through emerging ICAO policy to reduce restrictions on development adjacent to runways.	No specific decision threshold	Operational disruption	Local Planning Authorities	Airfield	Airfield Operations Director	No	2	2	4	2	2	4	2	3	6	Assessed as part of any new building development	Watching Brief
CCR38	Wind	Increased longevity of wing tip vortex effect due to general becalming of surface wind speeds. Wing tip vortex is particularly problematic for small aircraft taking off/ arriving in quick succession after large aircraft.	No specific decision threshold	Damage to residential structure; H&S incident; financial cost to repair structures Reduced runway capacity, reduction in load for larger aircraft	No interdependencies identified	Controlled airspace Vortex protection scheme boundary	Head of Sustainability	Yes	1	2	2	2	2	4	3	2	6	Vortex protection scheme ATC procedures for vortex spacing (as per regulations)	Watching Brief

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