YOUR LONDON AIRPORT
Gatwick

CLIMATE CHANGE ADAPTATION PROGRESS REPORT

April 2016

Report submitted to the Department for Environment, Food and Rural Affairs (DEFRA) at:

Climate Change Adaptation Defra
Nobel House, London SW1P 2JR

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April 2016

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1. About this report

This report provides an update to Gatwick Airport Limited's Climate Change Adaptation report published in July 2011[1].

Our 2011 report was prepared in response to the Government's direction, under the Climate Change Act 2008, to major infrastructure operators in the energy, transport and water sectors to report publicly on their climate change adaptation strategy and actions. Our 2011 report outlined Gatwick's approach to climate change risk assessment and prioritisation, and our adaptation actions and forward plans.

In 2015 the Government invited first round reporters, including Gatwick, to submit an update to their 2011 reports. In line with Defra's guidance[2], our update report provides a summary of developments since 2011 in our approach to climate change adaptation. This includes insights from our experience with adaptation to date; the implementation status of the adaptation action plan set out in our 2011 report, and new measures introduced since our 2011 report; and how we are incorporating climate adaptation into our operations and longer term planning.

2. About Gatwick

Gatwick is the world's busiest single runway airport and the UK's second busiest airport in terms of passenger throughput. Gatwick competes directly with Heathrow, Stansted, Luton and London City as well as with European airports in one of the busiest air transport markets in the world.

Gatwick is also an important public transport hub, with frequent rail services to London, and direct or connecting rail or coach services to many towns in South East England and nationally.

Gatwick is owned by a group of global investment funds led by Global Infrastructure Partners (GIP), which has committed to a long-term investment with a focus on improving facilities and service levels.

Gatwick's ambition is to compete to grow and become London's airport of choice. We have identified a clear path to achieving 45 million passengers per annum with the existing single runway and two terminals operation. Our current Master Plan[3], published in 2012, describes how Gatwick will develop sustainably in moving towards this level of growth. This requires an integrated and balanced approach to deliver economic and social benefits from growth while minimising environmental impact. To ensure this, our Master Plan incorporates our Decade of Change sustainability strategy as well as our approach to climate-related adaptation and resilience issues such as flood risk to protect operations and local communities.

2.1. Gatwick's growth

Gatwick has experienced significant growth since our first round Climate Change Adaptation report was published, from 31.3 million passengers in 2010 to 40.3 million in 2015. Our airlines fly to over 200 destinations in 90 countries, and in 2015 almost 44% of passengers traveled to Gatwick by public transport.

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[1] Gatwick Airport's 2011 Climate Change Adaptation report is available to download at http://webarchive.nationalarchives.gov.uk/20130123162956/http:/www.defra.gov.uk/environment/climate/sectors/reporting-authorities/reporting-authorities-reports/

[2] In preparing this report we have used Defra's guidelines for voluntary second round reporting: *Climate Change Adaptation Reporting Power – how to report your progress in planning for climate change*, Defra, December 2013.

[3] Gatwick Airport's Master Plan is available to download at http://www.gatwickairport.com/business-community/about-gatwick/developing-gatwick/published-plans/

Since new ownership in late 2009, Gatwick has invested over £1 billion in the first five years with a further £1 billion being invested in the next. Our investment is focused on improving the airport experience for our passengers, upgrading the fabric of the airport and increasing terminal and airfield capacity to meet forecast growth. These projects, which incorporate designed-in energy efficient systems, include:

- **North Terminal:** extension works, Pier 5 refurbishment, forecourt redesign and new car park construction;
- **South Terminal:** refurbishment and entrance/forecourt redevelopment, creation of a new centralised security screening position, baggage system upgrade, replacement of Pier 1 and reconfiguration of Pier 2;
- **Airfield:** construction of new airfield operations building, runway resurfacing and implementation of airfield LED lighting systems on the runway, aprons and stands.

Gatwick has also contributed to two major infrastructure projects managed by other organisations:

- **Rail station improvements:** Gatwick has contributed £7.9m to Network Rail's £53m project to extend the station concourse, construct a seventh platform and improve vertical circulation between platforms and the concourse.
- **Upper Mole Flood Alleviation Scheme (UMFAS):** Gatwick has contributed £4.01m to the Environment Agency's £15m flood prevention scheme which benefits both the airport and the surrounding area.

2.2 Airports Commission

Gatwick is participating in the Government's consideration of additional UK airport capacity. The Airports Commission was established by Government in September 2012 to identify the scale and timing of any requirement for additional airport capacity. The Airports Commission was also asked to recommend to the Government options for delivering additional UK airport capacity in the short, medium and long term.

In December 2013, Gatwick's proposal, for a new runway spaced sufficiently south of the existing runway to permit full independent operation, was one of three proposals shortlisted by the Airports Commission. Following shortlisting Gatwick carried out a public consultation during April and May 2014. A Report of Consultation was published in July 2014 which confirmed Gatwick's preference for a wide spaced runway of the type preferred by the Airports Commission.

In May 2014 the proposers of the shortlisted schemes submitted scheme designs. Gatwick's proposed scheme design incorporates a comprehensive Sustainability Case covering all economic, environmental and social issues, including Carbon and Climate Change Adaptation and Resilience, Water and Flood Risk, Air Quality, Noise, Biodiversity, Surface Access, National and Local Economy, Place, Quality of Life and Community. An independent Sustainability Assessment of our Sustainability Case has also been prepared.[4]

The Airports Commission undertook its own analysis of the shortlisted options and on 11 November 2014 launched a 12 week consultation on its analysis. The consultation ran for twelve weeks to 3 February 2015. In July 2015 the Airports Commission published its Final Report setting out its recommendations to Government for expanding aviation capacity in the UK.

In December 2015 the Government indicated that it has not yet reached a decision on the location of new runway capacity and that further analysis is required on environmental impacts, including air quality, noise and carbon. Gatwick is participating fully in this process.

[4] These documents are available at http://www.gatwickairport.com/business-community/new-runway/Documents-library/

3. Sustainability and climate change

3.1 Our Decade of Change strategy

For Gatwick, sustainability means delivering a world class passenger experience and supporting economic growth whilst being a responsible operator, working closely with our stakeholders and being a good neighbour to our local communities. Gatwick's Decade of Change strategy[5], launched in 2010, outlines our sustainability objectives and 2020 goals on ten issues: air quality, biodiversity, carbon, community, energy, local economy, noise, surface access, waste, and water.

Our Decade of Change 2020 goal on carbon is to reduce our Scope 1 and 2 greenhouse gas emissions (i.e. fuel and energy used to run the airport) to 50% of the 1990 reconstructed baseline of known emissions (82,843 tCO_2eq). To date, we have reduced these emissions by 33% below 1990 baseline in absolute terms and 66% below 1990 baseline on a per passenger basis.[6]

Other elements of our Carbon action plan include energy and water efficient building design standards, purchase of renewable electricity, and encouraging our airlines to continue developing single engine taxiing to reduce fuel burn as part of Airport-Collaborative Decision Making. We are also developing a timetable for deployment of low/zero emission airfield vehicles.

At an industry level, Gatwick Airport is a member of Sustainable Aviation. As a member of this organisation, we are able to participate in industry discussions on climate change adaptation and risk management. Sustainable Aviation provides a forum for members and signatories to share their learnings and discuss best practice.

3.2 Regulatory context

Our Decade of Change sustainability strategy also helps to ensures that we are aligned with, while going further than, applicable environmental regulations at local, national and European level. In the case of climate change, which requires action at all three levels and also globally, we welcome the Paris Agreement reached in December 2015 which for the first time brings all UN Member countries into a shared framework of actions to keep a global temperature rise this century well below 2 degrees Celsius and strengthen local and international capabilities to deal with the impacts of climate change.

Local agreements

In 2015 our Section 106 Legal Agreement with West Sussex Country Council and Crawley Borough Council, signed in 2008, was extended until the end of 2018. The agreement sets legally binding obligations on air quality, local community, noise, surface access, and land use and development. It also includes specific reporting obligations on climate change, energy use, waste collection and recovery, and discharged water quality. Our annual reports on our Section 106 performance are independently audited.[7]

UK Carbon Reduction Targets

At the national level, the UK's 2008 Climate Change Act established the world's first legally binding climate change target. The UK set itself the aim of reducing the UK's greenhouse gas emissions by at least 80% (from

[5] For more information on Gatwick's Decade of Change sustainability strategy please visit http://www.gatwickairport.com/business-community/corporate-responsibility/sustainability-strategy/

[6] For more information on our sustainability performance please visit http://www.gatwickairport.com/business-community/corporate-responsibility/sustainability-strategy/corporate-responsibility-reporting/

[7] Gatwick Airport's S106 Annual Monitoring Reports are available at http://www.gatwickairport.com/business-community/corporate-responsibility/sustainability-strategy/s106-action-plans/

1990 baseline by 2050). Our commitment to a low carbon Gatwick reflects the Government's target of continually reducing the UK's carbon emissions. Our goal by 2020 is to reduce our emissions by 50% compared to 1990 and we are presently on track to meet this goal. The implementation and communication of our low carbon strategy sees us working with airlines, business partners and key stakeholders so that we have an aligned approach to carbon management and reduction.

Europe's Emissions Trading System (EU ETS)

The EU ETS, launched in 2005, covers the EU's largest emitters through a cap and trade arrangement. Countries with commitments under the Kyoto Protocol to limit or reduce greenhouse gas emissions must meet their targets primarily through national measures. As an additional means of meeting these targets, the Kyoto Protocol introduced market-based mechanisms in order to offer significant additional emission reductions, such as the Europe's Emissions Trading System (EU ETS).

The EU ETS applies to a small element of Gatwick Airport's operations, i.e. gas oil usage and qualifying combustion plant exceeding 20MWth. Our EU ETS data and reporting is audited and independently verified on an annual basis.

As our 2011 Climate Change Adaptation report stated, we are supportive of aviation being included into the EU ETS and welcomed its inclusion from 2012 in EU ETS phase three. At present the EU has limited the scheme's scope to carbon emissions from flights within Europe. This exemption for non-EU flights is in place until 2016 while the International Civil Aviation Organization (ICAO) conducts negotiations on a global market-based mechanism to address international aviation emissions by 2016 for application by 2020.

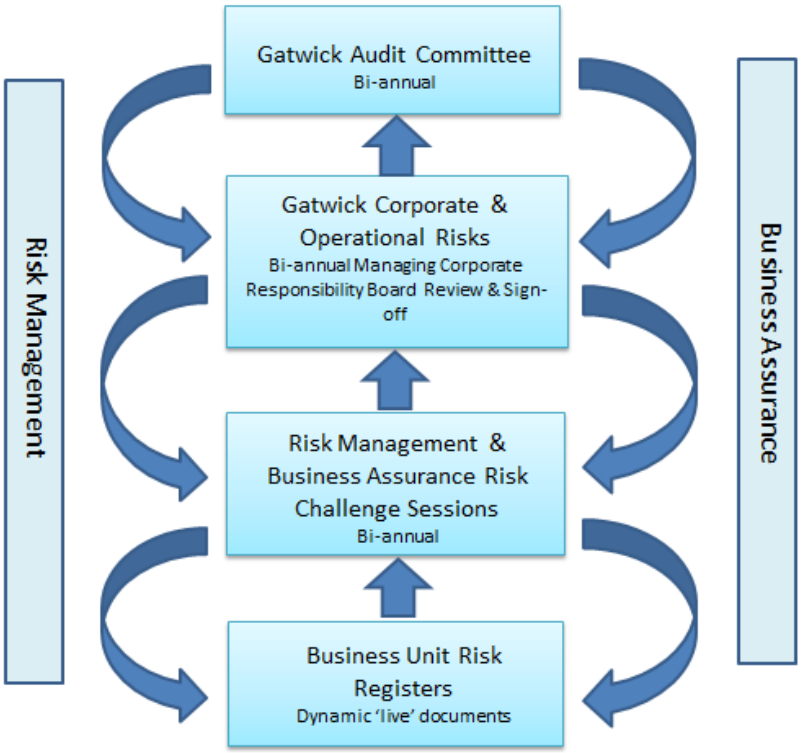
4. Update to our climate risk and adaptation assessment

4.1 Strategic and operational risk management

As outlined in detail in our first round report, the risk assessment is embedded in everything we do from day to day operation to long term development strategy; and environmental risk is a key part of all of our risk assessment processes.

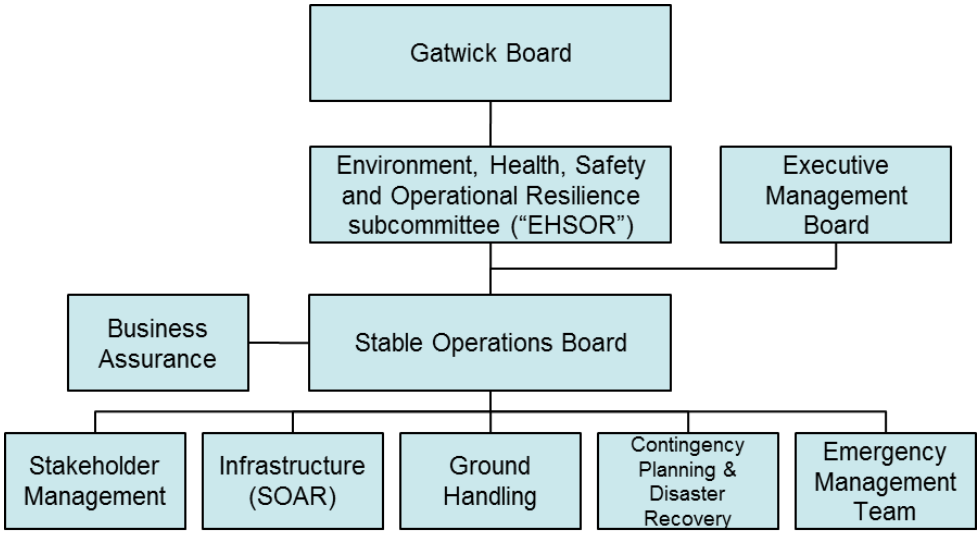
Each business unit across the airport has its own risk register outlining all risks associated with its operation. These registers are updated regularly and aligned with others across the business, to form the operational and strategic risk registers. Our strategic framework for corporate risk management is summarised in Figure 1.

Figure 1. Gatwick strategic framework for risk management



In early 2014, we introduced the concept of Stable Operations as a discipline to further improve our operational resilience. The Stable Operations team works closely with our Business Assurance team to ensure that their actions are fully integrated with the broader management and measurement of risk across the airport.

Figure 2. Governance of Stable Operations



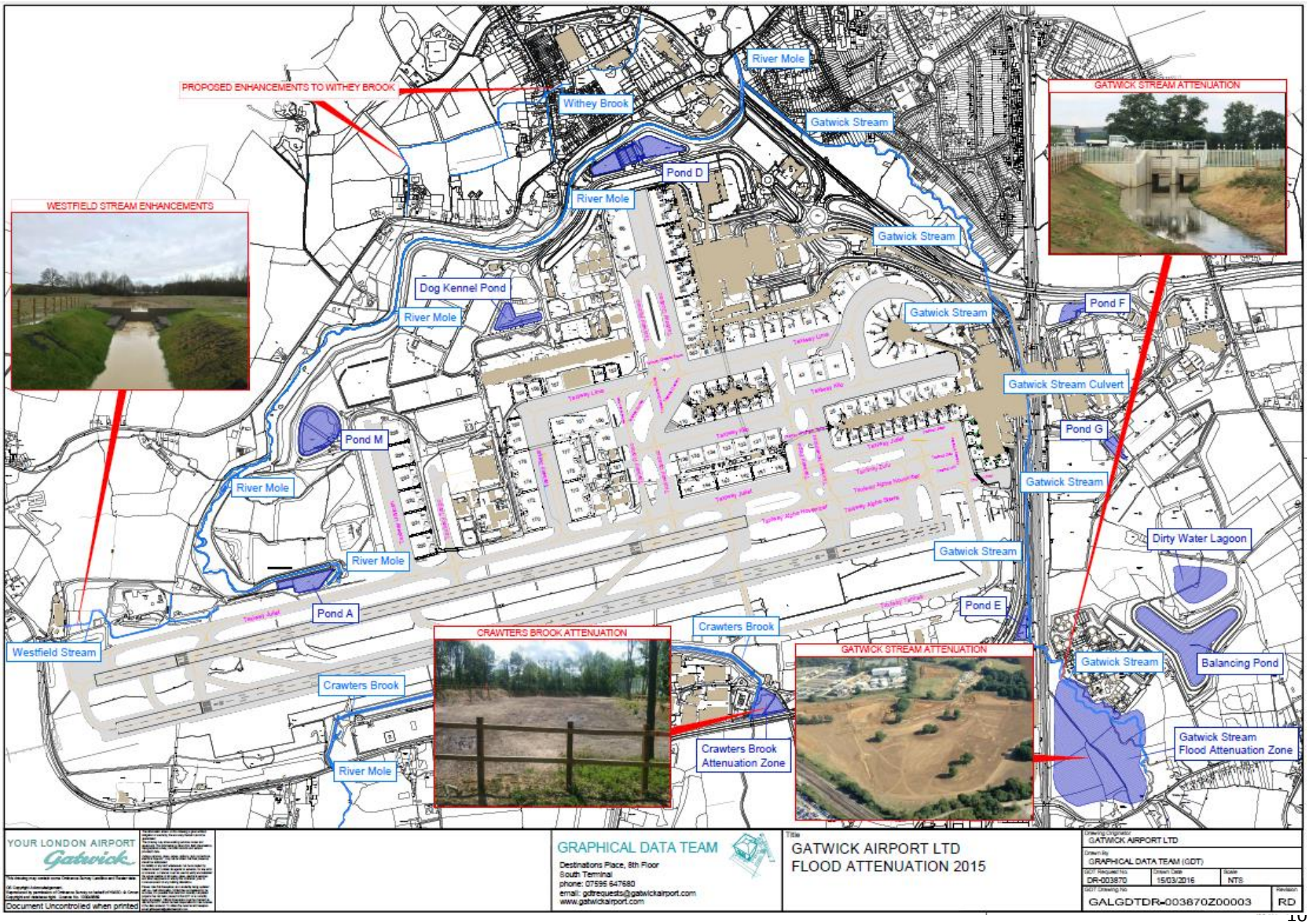
4.2 Climate risk assessment

In undertaking our climate change risk assessments, we start with our risk registers and follow the same risk assessment process for consistency and clarity. To inform our assessment of climate change risks to our facilities, operations and the people who use them, we use the worst case scenarios for UK climate change projections (UKCP09) up to 2050. We believe that scenarios presented beyond that timeframe are too far in advance of airport planning, aviation sector innovations trends or policy development for us to be confident in assessing the risks effectively.

Figure 3. Illustrative data from UKCP09 for the UK's South East region

Year	Temperature change (°C)		Precipitation mm change (%)	
	Winter average	Summer average	Winter average	Summer average
Low emissions scenario, change at 90% probability				
2020s	+ 2.1 °C	+ 2.8 °C	+ 19 %	+ 13%
2050s	+ 3.1 °C	+ 4.3 °C	+ 30 %	+ 9%
Medium emissions scenario, change at 90% probability				
2020s	+ 2.2 °C	+ 2.7 °C	+ 19 %	+ 14 %
2050s	+ 3.4 °C	+ 4.6 °C	+ 30%	+7 %
High emissions scenario, change at 90% probability				
2020s	+ 2.2 °C	+ 2.7 °C	+ 20 %	+ 18 %
2050s	+ 3.8 °C	+ 5.2 °C	+ 40 %	+ 9 %

Given Gatwick's location at the confluence of several waterways in the upper reaches of the River Mole catchment, our 2011 climate risk assessment identified increased risk of pluvial and fluvial flooding as our principal year-round risk. Our 2011 adaptation report outlined our £20 million programme to increase the Airport's protection levels against 1:50 and 1:100 year flood events; and our £9 million investment in ice/snow equipment and contingency training.


PROPOSED ENHANCEMENTS TO WITHEY BROOK
WESTFIELD STREAM ENHANCEMENTS
GATWICK STREAM ATTENUATION
CRAWTERS BROOK ATTENUATION
GATWICK STREAM ATTENUATION
Withey Brook
River Mole
Gatwick Stream
Pond D
Dog Kennel Pond
Pond F
Gatwick Stream Culvert
Pond G
Pond M
Dirty Water Lagoon
Pond A
Pond E
Westfield Stream
Crawters Brook
Crawters Brook Attenuation Zone
Balancing Pond
Gatwick Stream Flood Attenuation Zone
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NTS
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4.3 Evolution in our approach since 2011

Our latest risk assessment confirms that flooding and ice/snow continue to be our key climate-related risk and resilience priorities; and recognises that these risks and the potential impacts are increasingly interconnected:

- Increased incidence of heavy rainfall leading to pluvial and/ or fluvial flooding at the Airport, and/or upstream of the Airport
- Increased stress from heavy rainfall or extreme temperature events on the Airport's surface water infrastructure, utilities or critical equipment; and/ or on critical infrastructure beyond the Airport on which our operations are dependant
- Increased risk of snow/ice requiring increased use of de-icer with potential risk of surface water contamination
- Increased incidence of severe weather-related traffic delays, congestion or accidents in the vicinity of the airport.

Accordingly, our approach to climate adaptation has evolved to incorporate an expanded flood resilience action plan, alongside an overarching focus on power resilience across our operations, and an upgraded Adverse Weather Plan – all of which are anchored into our Stable Operations strategy. This reflects practical experience since 2011 with severe weather events and with resilience action planning and implementation.

One of the key drivers of this shift in approach was the severe weather event of December 2013 when Airport operations and service levels were badly affected for 36 hours. This tested our existing flood and power resilience programmes as well as the effectiveness of existing flood risk modelling.

Severe weather event, December 2013

The severe weather experienced on 23-24 December 2013 arose from a combination of high winds and very heavy rainfall leading to fluvial (river) and pluvial (surface water) flooding. According to the Met Office, the winter of 2013/14 saw the highest rainfall levels for almost 250 years in the South East of England. In the 18 hours prior to 24 December, over 66mm of rain fell.

During this period, three airfield sub-stations were flooded, primarily by overflow from the River Mole and Cawter's Brook, and the North Terminal switch rooms were flooded by surface water. This caused flooding and failure of lighting systems on the airfield, and failure of North Terminal electrical systems. There was also major disruption to local road and rail networks.

McMillan Report

The McMillan Report,[8] commissioned by Gatwick Airport Limited to independently review this major incident, found that the airport's investment of £20 million on flood prevention since the change of ownership in 2009 (i.e. the programme set out in our 2011 Climate Adaptation report) paid dividends in that the South Terminal – seen as at greatest risk of flooding – did not in fact flood. At the same time, the McMillan Report concluded that the flooding which actually occurred was significantly more severe than expected based on existing flood modelling and resilience plans.

Accordingly, the Report recommended that the flood modelling work should be redone urgently; existing flood alleviation plans should be accelerated, new remedial work should be undertaken and new procedures for managing major weather-related incidents put in place. The McMillan Report recommendations were adopted in full by the Board of Gatwick Airport Limited in February 2014 and were implemented in full by March 2015. A summary of the Actions taken in this regard is included at section 6.2 of this report.

[8] *Disruption at Gatwick Airport, Christmas Eve 2013, Report by David McMillan to the Board of Gatwick Airport Limited*, is available to download at http://www.gatwickairport.com/globalassets/publicationfiles/business_and_community/all_public_publications/2014/mcmillan_report_feb14.pdf

5. Climate adaptation actions

5.1 Flood risk re-modelling

As noted above, the quality and utility of flood risk modelling is a vital component in strengthening climate adaptation and resilience assessment and action. Accordingly, the work undertaken since December 2013 to update the flood model for the River Mole represents a significant investment in improving the evidence and knowledge base for climate-related risk evaluation and action planning.

Defra/Environment Agency guidance on climate change impacts have been used in our updated pluvial and fluvial modelling. The updated flood model for the Upper Mole has been developed in partnership with the Environment Agency, and the Environment Agency's largest supplier of modelling services, CH2M, has been used to build, calibrate, validate and document the model. This ensures that best practice techniques have been used to quantify the climate change risk.

A significant uncertainty continues to be the impact of changing 'storminess' on surface water flood risk. To overcome this uncertainty we have proposed a probabilistic approach to better quantify the risk across a range of pluvial events, and are undertaking a critical asset resilience assessment to provide the most cost beneficial standard of protection for our most critical assets.

5.2 Flood resilience

Our 2011 report summarised the Airport's £20 million programme of adaptation and mitigation measures to increase the airport's protection levels against 1:50 and 1:100 year flood events. This programme was a direct response to the 2007 Pitt Report on UK flood resilience, and was based on 2003 Environment Agency modelling supplemented by further modelling undertaken in 2009 and funded by Gatwick. The works included the Environment Agency's Upper Mole Flood Alleviation Scheme (UMFAS) to which Gatwick contributed substantial funding, and the Gatwick Stream flood alleviation scheme. Implementation of these works is largely completed – see section 6.1 for implementation summary.

In addition to this existing flood resilience programme, we have taken further action to strengthen the Airport's flood resilience and to ensure that this also contributes to local communities' flood resilience. This includes expediting the existing flood prevention and alleviation works; revising the Upper Mole flood modelling in partnership with the Environment Agency; and developing additional flood alleviation schemes with the Environment Agency as a result of this re-modelling. See section 6.2 for implementation summary.

5.3 Power resilience

The McMillan review of the Airport's response to the severe weather at Christmas 2013 identified power resilience as a key issue. Specific recommendations on switch rooms, alternate/ back up power sources and monitoring systems have been implemented -- see section 6.2 for implementation summary.

In addition, we are developing a long-term strategic approach to power resilience which focuses on the customer journey and in doing so views the Airport as a whole, made up independent yet interconnected systems, all of which must function and be resilient within the context of stable operations.

Through surveys of the Airport's electrical systems we have been able to classify power resilience at each stage of the customer journey using a 'traffic light' system. We found that the airfield has high levels of power resilience; and other parts of the customer journey have some resilience requiring investment to maintain stable operations in the event of serious power disruption. We are presently finalising the power resilience strategy, key projects and implementation road map to sustain and maintain power resilience at the Airport.

5.4 Snow and ice

Our 2011 climate adaptation report summarised the Airport's process changes and investments to strengthen snow and ice resilience following the change of ownership at the end of 2009. This included investment in upgrading the airport's snow clearing equipment and de-icer storage facilities; and working with airlines and airport partners to develop and agree enhanced snow contingency plans, following benchmarking visits to Scandinavian airports in Oslo, Helsinki and Stockholm Arlanda. In winter 2010, we invested a further £8 million to double the size of Gatwick's snow fleet from 47 to 95 vehicles, putting our snow clearing capability on a par with that of Oslo Airport in Norway.

It should be recognised however that although we are well prepared for heavy snow fall and significant ice formation, there may be occasions in the future when some disruption is experienced to normal operation.

5.5 Gatwick's Adverse Weather Plan

Updated during 2014 and reviewed annually, the purpose of the Gatwick Adverse Weather Plan is to provide information relating to procedures to keep the Airport open for operations as far as is reasonably practical. The goal of the plan is to support teams in achieving stable operations in the first instance or to minimise disruption where possible. The plan is adopted by the Aerodrome co-ordinator / Airside Operations Manager ("AOM") in consultation with relevant commanders and Business Continuity teams.

Whilst the Incident and Crisis Management ("ICM") Manual details how Gatwick Airport personnel are to manage all Incidents, Major Incidents or Crisis, the Adverse Weather Plan details the approach that the operational teams take to ICM including the Command and Control structure, roles and responsibilities, procedures and processes and supporting tools within Adverse Weather.

The Plan covers all Airside areas including runways, taxiways, aprons, roads, passenger walkways, grass areas and stands. Additionally, the Plan includes the responses required from the Terminals and Surface Transport team. The weather states that are covered within the Adverse Weather plan are: snow; flood; wind; heat; low visibility; and volcanic ash.

The current edition of the Adverse Weather Plan has been effective from September 2015. This plan is reviewed annually in conjunction with the Snow plan which is effective from 31st November to the 1st March and issued with the agreement of all affected parties.

In collaborative decision making - consideration will be given to the following factors:

- Severity of weather conditions / forecast weather conditions;
- Time of day/night/year;
- Traffic movements expected;
- Staff and equipment resource; and
- Staff and passenger welfare.

6. Adaptation actions – implementation status

6.1 Actions listed in 2011 climate adaptation report

The actions listed in our 2011 climate adaptation report (pages 33-36) focused on flood risk alleviation and resilience. The following provides a summary update on implementation of these actions.

Actions	Implementation
Contribute funding for the Environment Agency's Upper Mole Flood Alleviation Scheme (UMFAS) to improve flood risk protection from 1:20 year events to 1:50 year events.	As flooding presents a major business risk to the airport, GAL entered into a legal agreement with the Environment Agency (EA) in 2010 to contribute £4.018m towards four of five capital schemes promoted by the EA, which together comprise a £15m off airport Flood Alleviation Scheme (FAS) for Upper Mole. These capital contributions are tied to the completion of elements of works. The works are comprised of the following projects: Tilgate Lake Scheme, Clays Lake Scheme and Worth Farm & Gratton's Park Scheme. The contribution split and implementation status is as follows: 1. Tilgate Lake Scheme - £1.5m - COMPLETE 2. Clays Lake Scheme - £1.3m – Due to be COMPLETED 2017 3. Worth Farm and Gratton's Park Scheme - £1.218m - COMPLETE
With the EA, explore further measures to reduce flood risk from the Gatwick Stream in 1:50 year flood events and to protect the airport from 1:100 year flood events.	Gatwick and its specialist consultants explored various options and the decision was made to proceed with Gatwick Stream Flood Alleviation (GSFA) in its present format. The GSFA was completed in November 2014. The £12m project provides 186,000m3 of flood attenuation storage and protects the airport from flooding at the South Terminal culvert.
Evaluation of options to extend the operational life of Pond D, the airport's main surface water attenuation pond which was 20 years old in 2011; and planning of further improvements to Pond E.	Major refurbishment of the infrastructure at D Pond was completed in 2014. The project included the addition of a new pollution lagoon which significantly increases our resilience.
Regular reviews of flood protection measures and improvements for airport users and critical facilities.	Implemented as part of McMillan Report recommendations – see section 6.2 below.

6.2. New actions since 2011

McMillan Report recommendations on flood prevention and alleviation planning (published February 2014, implemented in 2014 and 2015)

The McMillan Report, produced in February 2014, was commissioned by the Board of Gatwick Airport Limited following the flood event at Gatwick on 24 December 2013. David McMillan, GAL non-executive director, led the review and production of the Report. The Report contains 27 recommendations on Gatwick Airport's flood prevention and alleviation planning, contingency and resilience planning, passenger welfare and safety issues. The report was accepted in full by the GAL Board.

The following provides a summary update on implementation of McMillan Report recommendations 1-10 on flood prevention and alleviation, power resilience and contingency planning. A further 17 recommendations focusing on the detail of contingency planning, safety and passenger welfare have also been implemented.

In addition to McMillan Report implementation, GAL has also undertaken Strategic Power Resilience planning the output of which will be finalised in mid-2016.

McMillan Report implementation status at end of 2015
1. The Airport's planned Review of its flood prevention and alleviation plans should be undertaken urgently.
• Revision of Upper Mole flood modelling (already agreed as part of a longer term work programme with the Environment Agency) was brought forward by two years. A Collaborative Agreement relating to Upper Mole Flood Risk and Scenario Modelling was signed in July 2014. GAL is funding 90% of the flood modelling work. • The model software and scenario testing was completed by March 2015. The modelling includes 1:100, 1:200 and 1:200 plus climate change events
2. Existing flood alleviation plans currently under construction should be prioritised and reviewed to assess whether they can be completed earlier than currently planned.
• The Gatwick Stream Flood Alleviation Scheme was completed and in full use by August 2014. • Three of the four UMFAS scheme components had been completed prior to the December 2013 flood event. Planning approval for the final part of the UMFAS, Clays Lake, was given after December 2013. The contract was awarded in July 2014 with an expected completion date of August 2017.
3. Consider bringing forward the Ifield element of UMFAS, with a contribution from GAL.
• We are working with the Environment Agency to devise relevant additional flood alleviation schemes based on the revised Upper Mole catchment flood modelling undertaken in 2014-15. This will include obtaining an independent review of the benefits to GAL of the Ifield Lakes project.
4. The review of Gatwick flood protection plans should include an assessment of potential impact of flooding at Gatwick on local communities upstream and downstream of the airport.
• We are using the revised Upper Mole flood risk modelling work to test a range of development and catchment change scenarios to assess the impact on areas both up and downstream of the Airport. Upon completion, the scenarios will be built into the Airport's forward plan for flood protection and alleviation.
5. Consider increasing the resilience and redundancy between switch rooms.
• The resilience of the two North Terminal Switch Rooms that failed in the Christmas Eve 2013 event has been improved by flood proofing, and upgraded back indication and pump monitoring on both the power and the pump systems. In addition, the Electrical Resilience Programme includes a resilience strategy for the Switch Rooms.
6. Consider providing alternative and back-up power switching for critical systems.
• An agreed list of critical systems has been drawn up and a standby generation system developed.
7. Enhance the electronic monitoring systems deployed in switch rooms and check all sensitive equipment regularly at periods of high risk.
• Switch Room monitoring systems have been enhanced (see items 5 and 6 above). • The Flood Monitoring Area Check List of critical assets was implemented from December 2014, and has been incorporated within the Gatwick Flood Contingency Plan.
8. Any sensitive equipment e.g. IT, currently located in basements or other areas susceptible to flooding should be moved urgently, or protected where relocation is not practical, and no future designs should locate sensitive equipment in areas susceptible to flooding.
• During 2014, resilience and relocation works were undertaken to all critical areas below the modelled datum. • Building standards have also been implemented to prevent any further building below the datum for a 1:100 year flood event plus allowance for climate change. • During the December 2013 flood event, critical IT infrastructure was impacted by extended loss of power caused by substation flooding. The flood protection works implemented in 2014 and UPS and generator installations will in combination significantly reduce the already low risk of a critical service outage occurring due to a flooding of a critical IT computer equipment room or power substation. • A further assessment of IT infrastructure that supports GAL's critical operations was conducted during 2014 with the findings incorporated into the network resilience programme.
9. GAL should consider securing water pumping capacity (assets and operatives) in addition to its own needs so as to assist in evacuating flooding on assets that belong to others that impact on the operation of the airport e.g. local authorities, Highways Agency.

• During 2014, two high volume pumps and eight smaller pumps have been acquired to enhance Airfield fluvial (river) and pluvial (surface water) pumping capacity; and the relevant contingency, training and maintenance procedures have been implemented.
10. The Airport's Contingency Plans should be reviewed, in close collaboration with airlines and ground handlers to ensure: these organisations are fully committed to the plans; the plans are fit for purpose; the plans secure the right participants from each organisation in times of disruption; the plans provide suggested actions for predictable events through having basic Standard Operating Procedures and check lists that all parties agree are relevant.
• The Contingency Plans review took place during 2014 and incorporated actions undertaken to implement other McMillan Report recommendations. The review included consultation with all relevant stakeholders and external review of specific elements e.g. the Adverse Weather Plan.