



A Second Runway for Gatwick

Updated Scheme Design Submission

SD3

Engineering Plans

YOUR LONDON AIRPORT
Gatwick

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AC Module 5	Noise
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Executive Summary

This report describes Gatwick's R2 Engineering Plans, comprising information on energy and other utility requirements, geo-environmental issues, surface development plans and costs.

Our internal team has been supported by Turner and Townsend principally in relation to cost and programme management. Turner and Townsend who are a leading global programme management and construction consultancy that supports organisations that invest in, own and operate assets. They operate from 83 offices in 33 countries. They have a very considerable amount of knowledge and experience of major airport projects.

Bechtel has peer reviewed much of Turner and Townsend's work and advised on all aspects of the project. Bechtel is a leading global company with core expertise in construction and project management, employing 53,000 people in 40 different countries.

This deliberate approach of setting internal challenge and review of our analysis is one which has given us added confidence with regard to the conclusions we have drawn at this stage of the project process, with regard to cost, programme and risk management.

Gatwick is in a much better location to accommodate another runway compared to Heathrow. Gatwick's expansion can be built much more quickly, cost effectively and with much less environmental impact than either of the Heathrow options.

The Airports Commission has rightly indicated that it is important to understand how expeditiously the shortlisted options can be delivered. Points that we draw to the Commission's attention are:

- Speed and certainty of delivery are major factors in considering the most beneficial outcome for the UK economy. Gatwick estimates that between 2025 and 2050, a second runway at Gatwick (2+2) will result in an average of 6.5m additional passengers per year versus a third runway at Heathrow (3+1). Over 25 years, this gives a cumulative total of circa 170m additional passengers;
- The Commission recognises that there are inherent risks of delay in the planning and construction process and requests evidence that capacity can be delivered as expeditiously as practicable within the required timescale. Gatwick can deliver airport capacity, with an additional runway which could be operational by 2025, with construction commencing before the end of the next parliament (i.e. May 2020);
- Realistically, a third runway at Heathrow is unlikely to be available before 2030. This is due to the greater difficulty of establishing and maintaining policy support, the greater complexity of the planning and environmental issues raised and the challenges of adding infrastructure to an already congested and built up locality. This includes going beyond existing boundaries, major construction around and over the M25 as well as having to address historic landfill and re-provide other key infrastructure that would be lost. Gatwick's R2 development in contrast will be built predominantly on safeguarded land and therefore fits well within the current Planning Context.

The location of Heathrow's proposed third runway brings with it major disadvantages in terms of adverse impacts on other existing infrastructure and the massive impact on the local area for an extensive period of time during construction including:

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- Tunnelling of the most well used section of Europe's busiest motorway and the associated congestion this would impose on the strategic and local road network;
- Closure and presumably diversion of the A4 and the associated congestion and delays, along with the likely need to re-provide lost commercial property on sites that have not so far been identified by Heathrow;
- The complexity and expense of maintaining access to Terminal 5 during construction of Terminal 6;
- Impact of construction in terms of traffic, pollution, noise and replacement of rail access for construction;
- A longer construction period than at Gatwick with the associated construction effects therefore being experienced for a much longer period of time;
- Reliance on third parties who have no statutory duty to cooperate regarding the need to replace their facilities (for example, in relation to existing landfill and waste to energy sites which must be re-provided before construction can take place).

The Gatwick option provides greater value for money during construction (i.e. beyond being a less expensive scheme to begin with) as a result of:

- Being a simpler project to manage than a third runway at Heathrow;
- Lesser risk of delay and cost escalation due to the above risk factors;
- Implementation of highly effective Project Management;
- Leading edge procurement; and
- Showcasing British innovation in engineering design and construction management.

Factors to be considered

These factors and the supporting documents demonstrate that Gatwick's Engineering Plans are simple, low risk, flexible, innovative, sustainable, affordable, and protect Quality of Life.

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FIGURE 1: GATWICK'S ENGINEERING PLANS



These outcomes are achievable because construction will take place on a largely greenfield, level site which can be easily segregated from the ongoing airport operations and with minimal disruption to local roads, services or businesses. There is no need to modify extant major infrastructure and there would be limited impact to local communities.

This is in stark contrast to the very considerable engineering and construction challenges inherent in plans for a third runway at Heathrow airport. These are far more complex, much higher cost and are likely to result in significant environmental impacts and extensive disruption to local communities and the strategic road network.

Significant economic benefits will result from the development of the second runway at Gatwick and because of the inherent simplicity of design and deliverability, enabling operation by 2025, these benefits will be delivered to the local and regional economy earlier than a Heathrow development. The benefits are fully described in the Strategic Argument and Development Strategies reports but in summary, an additional runway at Gatwick will support employment and economic growth in the local and surrounding areas through both direct employment at an expanded airport, and through further catalytic effects throughout the Gatwick Diamond and Coast to Capital Local Enterprise Partnership (LEP). It is estimated an additional 22,000 airport related jobs will be created generating an additional GVA of £1.73bn per annum to the local economy by 2050.

We are including a number of technical reports which support this submission. These include reports on: Energy, Waste, Water and Flood, Geo Environmental as well as other supporting documents such as Biodiversity, Carbon, Local Economy, Place, Quality of Life, Construction Delivery and Financial Case including costs.

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In addition, we bring together Gatwick's response to a number of the Objectives which are listed in Appendix B of the Airport Commission's Appraisal Framework.

On the following pages we review the seven key attributes of our approach:

Simple

- The majority of the land we intend to use has been safeguarded. There are no previous landfill sites and very little contamination. In contrast, we believe the Heathrow (NW Option) site contains 39 landfill sites.
- Much of the safeguarded land is greenfield land and the number of buildings requiring demolition is relatively low in comparison to Heathrow, therefore minimising impact on local communities.
- Because the existing terminals are all on the north side of the airfield away from the second runway development site, the new infrastructure can be largely segregated from the existing operation whilst construction takes place.
- There is no need for major alterations to key infrastructure close to Gatwick, which is very different from the situation at Heathrow.
- Due to Gatwick's excellent performance in reducing water demand in recent years, our modelling confirms that there is spare capacity in the water infrastructure to accommodate a second runway development.
- Equally our modelling confirms that we do not need any major additional utilities infrastructure beyond what is already planned in respect of water supply, electrical supply or aircraft fuel supply. These can all either be accommodated with existing capacity, or where additional capacity may be required (e.g. sewage treatment) within land safeguarded as part of the Master Plan.
- Whilst we already have a high degree of confidence in our cost and programme forecasts, the inherent simplicity of the project will enable us to relatively quickly further increase our levels of confidence.

Low risk

Across all aspects of the delivery of a second runway, Gatwick offers a much lower risk option compared to the options at Heathrow.

Risk is considered to be low in terms of the delivery programme required to achieve equivalent overall capacity of one new operational runway by 2030 as suggested by the Airports Commission. In fact, we believe we can have a fully operational runway delivered by 2025.

Heathrow faces much greater risk of failing to obtain (and maintain) planning policy support. It suffers from greater risk through the planning system, difficulty in maintaining policy support and is subject to much greater risk due to construction complexity and the cost of compulsory acquisition - which translates into much greater risk to cost and programme. In our view, it is unlikely that a third runway at Heathrow could be delivered before 2030. Gatwick benefits from the following:

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- Our second runway will be built on land that has been safeguarded via the planning system, is predominantly greenfield land and with relatively fewer impacts on existing homes, buildings, infrastructure and heritage sites than the Heathrow proposals;
- Gatwick has established good stakeholder relationships with its key Local Authorities and we have shown how well Gatwick fits within the overall planning context. We believe we can therefore commence construction prior to the end of the next parliament (May 2020) ;
- We propose a phased delivery of demand-sensitive elements such as terminal building capacity, aircraft parking stands and taxiways;
- Risk to investors is accordingly significantly reduced;
- The majority of airfield and terminal infrastructure would be developed independently of existing operations on a landside site; and`
- Much less third party delivery risk - a major concern for investors; while this is limited in the case of Gatwick, we believe this risk will be a major cause for concern at Heathrow especially where these third parties have no statutory obligation to cooperate.

Operational risk at Gatwick is also minimised because:

- We have increased significantly the resilience of key utility infrastructure and minimised flood risk through the engineering design coupled with key mitigation measures;
- We have developed our plans for utilities with our key stakeholders, and ensured we have aligned our future plans to mitigate any risk either to our development or to local businesses and communities. This will also achieve further embedded resilience in our utilities supplies.

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Sustainable

- Our Engineering Plans demonstrate best practice in sustainability and draw on Gatwick's industry leading performance in this area, as set out in our Sustainability Construction Strategy and Second Runway Sustainability Strategy.
- Gatwick's plans demonstrate an Integrated Resource Management System for waste, water and energy delivered through both construction and operational phases with investment in stimulating ongoing innovation in these areas.
- Our Engineering Plans show Gatwick's commitment to a highly efficient, sustainable and ultimately, carbon neutral operation through measures such as CHP Energy Centre fuelled by woodchip biomass and biogas from anaerobic digestion of airport waste and sewage sludge.
- As part of our Energy Centre development, we believe there could be merit in a joint study with local councils and operators on joint waste disposal measures and in working in partnership with local councils and operators to explore the feasibility of exporting excess power to local community/district heating initiatives.
- Our water related schemes are part of an efficient sustainable system with acknowledgement of the potential inter dependencies of supply, sewage disposal, recycling and bio diversity.
- We will build upon our Gatwick's award winning biodiversity management and partnership work through Gatwick Biodiversity and the development of the linear park providing integrated habitat management and greenspace alongside the diverted River Mole.
- Our buildings will be designed to BREEAM (Building Research Establishment Environmental Assessment Methodology) Excellent or comparable building standards with inherent energy efficient performance incorporating renewable energy technologies.
- Whilst not included in the Appraisal Framework as an objective, we show that our ground noise mitigation measures are integral to our Engineering Plans, with industry leading noise management, provision of noise bunds, a noise wall and landscaping corridors. We are committed to working with our local stakeholders to explore all opportunities for mitigating noise exposure, for example, through a potential ground run pen for engine testing.

Protecting Quality of Life

- Our innovative design requires less land take, and therefore involves significantly less disruption to and compulsory acquisition from local communities, than Heathrow. To further protect quality of life, we are working in partnership with local stakeholders to provide support for the relocation of community assets, where this may be required, including the re-provision of the local rugby club.
- Our Sustainable Construction Strategy and best practice construction standards and Code of Construction Practice will also serve to minimise impacts to local communities during construction phases and our construction impact would be far less than Heathrow's and for a considerably shorter period of time.

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- We will work, in partnership with local stakeholders to develop our ‘Community Asset’ initiative, utilising designated airport buildings for community events and initiatives, in line with our commitment to being part of, and integral to, sustainable community development. This will further support the work of the Gatwick Community Trust and Foundation, investing in local communities to enhance quality of life.
- We will work with local stakeholders to introduce a Community Flood Risk Forum, to provide ongoing communication and dialogue with our local communities, and will implement an up to £30 million investment programme to provide best in practice flood resilience measures throughout Gatwick’s operations which will protect Gatwick and our local communities downstream of the airport.
- We will undertake locally targeted recruitment events in places which particularly need economic growth (e.g. Croydon, other parts of the Wandle Valley) and more widely, along any of the train routes with good rail connections to support additional employment in more deprived areas.
- Gatwick’s assessment and approach to protecting the Quality of Life for local communities is described in the Quality of Life Appendix.

Flexible

- The flexibility of our Master Plan design means that our engineering requirements can also be as flexible and can be developed to align with demand.
- The new runway and midfield apron is located within the safeguarded area on land with minimal development, which means that there are few existing constraints. This allows the midfield Apron to be designed from the outset to be flexible and adaptable. This freedom is considerably different from the constraints around the proposed Terminal 6 site and the constraints that construction over the M25 would place on the Heathrow (NW Option) proposal.

Affordable

The simplicity of our engineering design means that it is affordable, primarily because it:

- requires predominantly the acquisition of land within existing safeguarded areas, and which is predominantly a countryside / greenfield site;
- employs tried and trusted technical designs and engineering solutions;
- can readily accommodate future innovation and technological developments;
- requires limited physical changes to the local natural and built environment;
- has no substantive interface challenges with road, rail or utility networks and a low level of dependence on third parties (unlike Heathrow); and
- can be developed largely in “landside” areas, independent of existing “airside” operations.

Accordingly, not only does this result in a lower cost expansion in UK runway capacity, the programme is inherently low risk and all estimates and assessments can be made with a higher degree of confidence than for the considerably more complex project at Heathrow.

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Innovative

Under its new ownership Gatwick has already demonstrated the benefits of competition by being innovative and creative in the way it has gone about improving customer service, delivering capital programmes and working with airlines and other stakeholders.

We are committed to ensuring we develop and integrate best practice and innovation and our Master Plan preserves the flexibility to accommodate future advancements in technology, operational practice and regulatory environment e.g.:

- Gatwick's' record to date of innovation is already demonstrated throughout the whole airport, from Passenger Security to water treatment;
- Innovative approach to the new terminal and pier infrastructure permitting fully flexible passenger flow, ranging from full self-service to fully staffed check-in;
- Flexible and simple baggage operations permitting fast Minimum Connection Times for transfer passengers;
- Flexible stand and gate room designs capable of flexing to suit a range of airline operational models;
- Innovative apron design tailored for very fast LCC turnaround times;
- We are working with stakeholders to develop a Second Runway Construction Design Awards Scheme which will showcase British innovation in engineering and design;
- We have set out how we will set exemplar standards for enhancing the sustainability of our construction and operation, including key aspects such as energy, waste and water;
- Flexible allocation of space in the Master Plan for development of replacement commercial and employment land, and potential to relocate those businesses affected by the development to an enhanced location directly accessible from M23 / A23 and Gatwick Gateway;
- Innovative 'Community Asset' initiative which maximises the benefit which the airport can generate to local communities from providing amenity space for events to award winning habitat management and biodiversity enhancement.

1.Introduction

SD3 Engineering Plans is one of a suite of documents that form Gatwick's updated scheme design submission to the Commission.

In this report we have drawn together key aspects of the Engineering Plans for Gatwick's second runway development including information on costs, energy and utilities requirements, geo - environmental issues and surface development plans. The full scope of the proposed R2 project is detailed in the Master Plan report.

Gatwick is in the best location to accommodate a new runway. Compared to Heathrow, Gatwick is in the right place as it can be built much more quickly, cost effectively and at the same time with much less environmental impact. In our view, Heathrow is in the wrong place due to the impact a third runway would have on other existing infrastructure, the impact on the local area for an extensive period of time during construction and during ongoing operations following construction. Dispersing airport capacity by providing a second runway at Gatwick will avoid a concentration of air routes in one part of the South East's airspace as well as avoiding a significant growth in flights over densely populated central London and congestion on busy road networks.

Our internal team has been supported by Turner and Townsend who is a leading global programme management and construction consultancy that supports organisations that invest in, own and operate assets. They operate from 83 offices in 33 countries. They have a very considerable amount of knowledge and experience of major airport projects.

Bechtel has peer reviewed much of Turner and Townsend's work and advised on all aspects of the project. Bechtel is a leading global company with core expertise in construction and project management, employing 53,000 people in 40 different countries

This deliberate approach of setting internal challenge and review of our analysis is one which has given us added confidence with regard to the conclusions we have drawn at this stage of the project process, with regard to cost, programme and risk management.

The specific areas in which we sought the additional support of Bechtel were:

- A review of the constructability assessment;
- Preparation of an Airport Operational Readiness / Transition Plan;
- A review of the approach to cost estimates;
- A review of the approach to the various elements of contingency / risk; and
- A review of our Master Plan.

We propose to continue to work with Turner and Townsend and Bechtel to develop further our approach to managing the second runway project and to gain further confidence still with regard to cost and programme management.

We will also use this to review how the business might need to broaden to some degree the skills and expertise that may be necessary to deliver the second runway while at the same time ensuring that we continue to innovate and deliver excellent service to our passengers, airlines and other users. A formal review will be undertaken by the Board in due course drawing on the experience of the shareholders in delivering major projects whilst maintaining an efficient and effective operation.

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This report provides an overview of the scheme and we reference many technical documents which demonstrate the robust assessment and analysis that underpin our plans.

The report also describes how these Engineering Plans respond to a number of the objectives defined in Appendix B of The Commission's framework:

- To promote employment and economic growth in the local area and surrounding region;
- To protect and maintain natural habitats and bio diversity;
- To minimise carbon emissions in airport construction and operation;
- To protect the quality of surface and ground waters, use water resources efficiently and minimise flood risk;
- To minimise impacts on existing landscape character and heritage assets;
- To maintain and where possible improve the quality of life for local residents and wider population;
- To manage and reduce the effects of housing loss on local communities;
- To be affordable and financeable, including any public expenditure that may be required and taking account of the needs of airport users;
- To have the equivalent overall capacity of one new runway operational by 2030;
- To build flexibility into schemes design;
- To meet present industry safety and security systems;
- To maintain and where possible enhance current safety performance with a view to future changes and potential improvements in standards.

In addition, the report responds to the noise objective:

- To minimise and where possible reduce noise impact.

This document demonstrates that Gatwick's Engineering requirements are simple, low risk, flexible, innovative, sustainable and affordable, and that, as we set out in document SD4 Mitigation Strategies, any remaining adverse impacts can be mitigated.

Gatwick has also demonstrated that there is significant local, regional and national economic benefit as a result of the development of R2.

2. Energy and Utilities

In preparing the Engineering Plans, Gatwick has established the capacity constraints of existing systems and services, the additional utility provision that would be required to serve Gatwick's R2 proposals, and the constraints and infrastructure needed to support the provision of new utility services infrastructure. Full details of the assessment are contained within the Energy Appendix.

Within the report estimates of future energy use for the airport site in 2030 and 2050 have been made to inform the development of an energy strategy to deliver the energy demand.

The process has involved the analysis of current energy use across the airport to produce a baseline and then to extrapolate from this baseline using the Master Plan proposals and development schedule setting out areas of airport facilities and buildings. These plans together with assumptions around energy efficiency measures that are expected to be in place in the future, have informed the forecast energy demands.

Energy estimates have been made for the following:

Existing Facilities:

The existing terminals, airside and specific landside facilities.

Proposed Facilities:

The proposed terminals, airside and specific landside facilities – LGW R2 development.

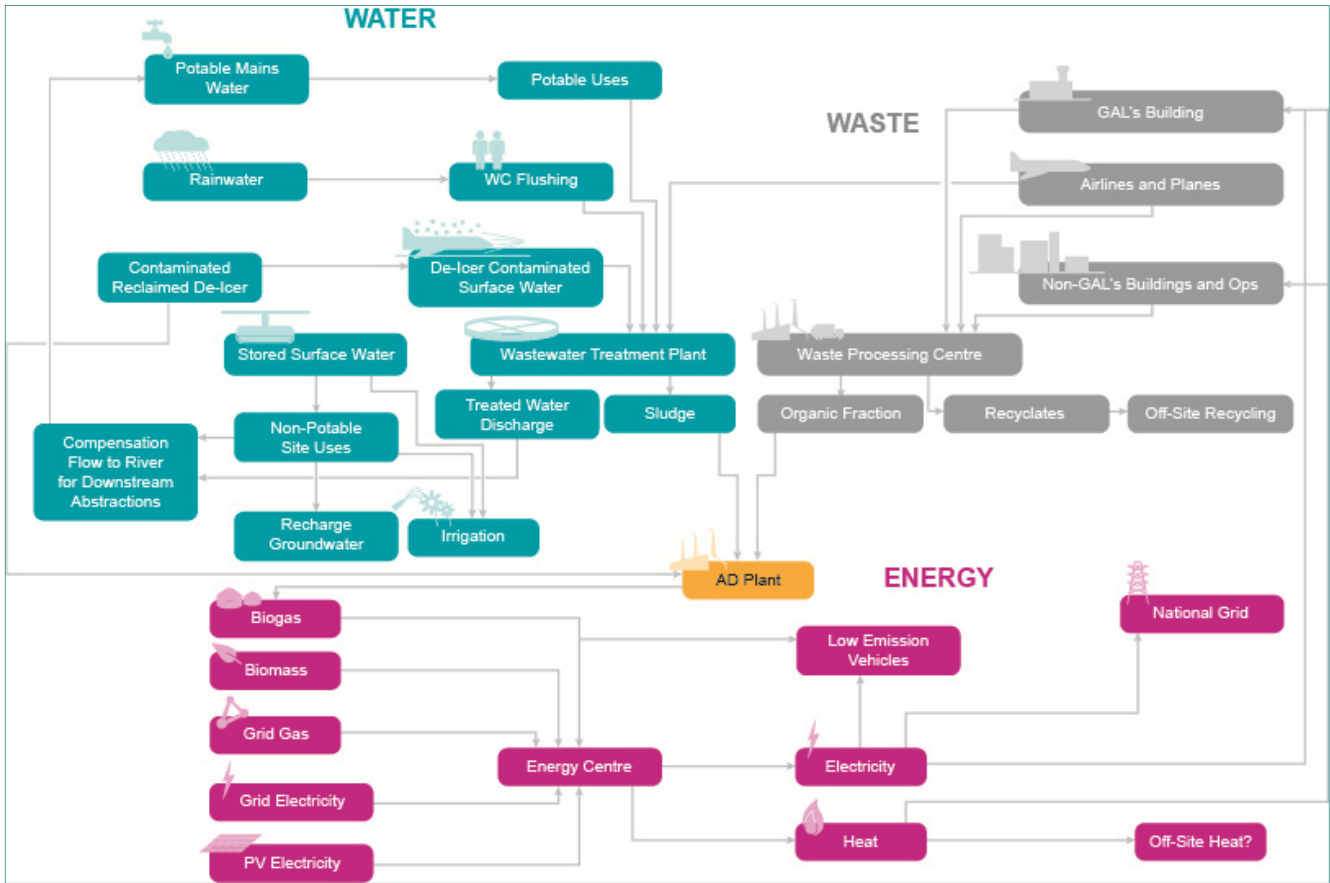
Energy, Water and Waste Strategies have been prepared setting out how Gatwick intends to service the additional utility requirements of the development, manage resources efficiently and ensure resilient systems. The strategies build upon Gatwick's 'Decade of Change' Sustainability Strategy which was launched in 2010 and which set targets across key sustainability indicators including water use, energy, climate change and waste management to be delivered by 2020.

The Energy and Water Strategies have been developed in discussion with the relevant network and utility supply companies and operators.

Figure 2 shows conceptually how the Engineering Plans for Energy, Water and Waste are being designed in an integrated way to support efficient and sustainable use of resources. This integration forms an important element of the plans to achieve effective use of these resources and offer wider environmental and sustainability benefits, as well as increased resilience of supply.

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FIGURE 2: SUSTAINABLE RESOURCE MANAGEMENT STRATEGY FOR GATWICK



The following sections consider current demand and available capacity and, with reference to supporting technical documents, whether additional infrastructure may be required to meet forecast growth.

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2.1 Electricity and Gas

Demand requirements are detailed in the Energy Appendix.

Future demand predictions for R2 have been based on the continued deployment of the highest standards of energy efficiency in the design, construction and operation of new buildings and facilities.

Gatwick's Engineering Plans include a carefully considered Energy Strategy that will secure low - carbon supply of energy to meet these requirements and serve the operational energy requirements of the R2 infrastructure.

The energy strategy is based on the hierarchy of:

- **Energy efficiency** - in design, construction and operation through highly efficient building envelopes, passive design to reduce heat gains and losses, widespread use of LED lighting, heat recovery, efficient plant and systems, energy management systems, staff training and efficiency programme;
- **Efficiency of energy supply** – through on-site generation and use of power and heat for R2, with low - carbon heat exported to other users, including the potential for community district heating initiatives and the use of smart technology in the electricity and heat networks to support demand management and the matching of supply to demand;
- **Renewable energy** – generated from locally imported biomass (CHP), biogas from on-site waste and photo-voltaic systems integrated into the design of the new terminal and other facilities.

In addition:

- We intend to undertake a case study with local councils and operators on joint waste disposal measures to supply the Energy Centre and maximise our energy from waste generation;
- Augment our low-carbon energy provision with the objective of ultimately being a carbon neutral airport. We are also exploring potential to off-set Scope 1 and Scope 2 emissions through operations.

The energy strategy for both 2030 and 2050 scenarios is based on the provision, as shown in the Operational Efficiency - Master Plan Appendix, of a new Energy Centre to support the R2 developments.

The electricity loads required for the operation of the second runway development would require the construction of a new 33kV primary sub-station. This would supplement the current electricity supply to the airport from two existing 33kV primary sub stations that serve North and South Terminals. A site has been safeguarded in the Master Plan for its provision and under existing commercial arrangements this new infrastructure would be funded by UKPNS.

UKPNS have confirmed that there is no reason to expect that the provision of additional electricity supplies would present any difficulties for Gatwick, or affect the resilience of supplies to other users in the network.

The resilience of electricity supply within Gatwick would also be enhanced through the improvement of the 11kV connections between the new sub-station and existing sub-stations. A further opportunity is being explored with UKPNS for an independent 33kV supply to the new substation which would further enhance the resilience of electricity supplies at Gatwick.

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Discussions with our gas supplier have also been positive and Scotia have advised that there are no major constraints to additional gas required or any adverse impacts on the resilience of supplies to other users in the network.

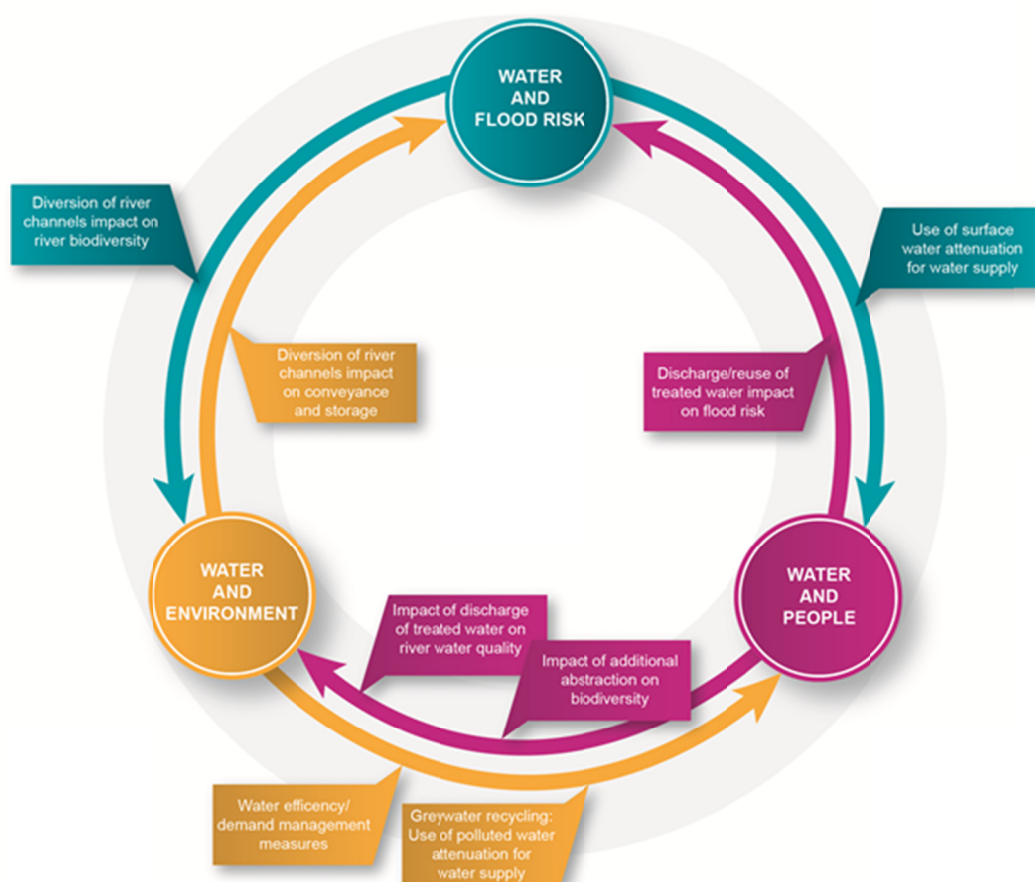
Increased resilience in terms of gas supplies would arise as the airport will generate biogas locally from digesting its waste and wastewater sludge for use in boilers as well as (potentially) within its vehicle fleets.

2.2 Water

Flood risk, water quality, biodiversity, water resources, and waste water treatment and recycling are heavily interrelated as shown in the diagram below (Figure 3). Our overall aims are to:

- reduce flood risk to the airport and surrounding areas;
- protect and improve water quality and the water environment;
- enhance biodiversity;
- use water resources efficiently.

FIGURE 3: SCHEMATIC OF WATER ELEMENT INTERACTIONS



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Because of the strong inter-relationships between the impacts and embedded mitigations for different aspects of the water topic, it is not possible to evaluate each in isolation and, accordingly, an holistic review has been undertaken, which is detailed in the Water and Flood Risk Appendix.

We have undertaken a thorough review of all forms and sources of flooding to Gatwick and have also assessed the flood risks to airport and surrounding local communities. We have identified a range of feasible solutions to ensure the operation of a sustainable drainage solution for the airport.

Our baseline designs provide for a 1 in 100 year flood event plus 20% allowance for climate change. The run-off from the airport site itself will be attenuated to greenfield run-off rates, and the river diversions around the airport will contain the water courses during flood conditions.

Our overall strategy with respect to flooding is as follows:

- The river diversions as designed will prevent the River Mole and Crawter's Brook from flooding Gatwick Airport and posing a flood risk to communities upstream and downstream of Gatwick. They require no further mitigation for flood risk as the re-aligned river corridors are sized to both contain the river in the event of flood, and are designed to slow the rivers' flow during flood conditions;
- Gatwick has created a flood resilience fund of up to £30m. Projects already underway include installing new water storage chambers at critical points at the airport, enhancing resilience in the North Terminal basement to offer better protection to critical assets, and improving systems used to monitor pumping stations and river levels. Gatwick has committed to a contribution to the Ifield element of the Upper Mole Flood Alleviation Scheme should the Environment Agency proceed with this project. Gatwick are currently funding additional modelling work to determine requirements of this project;
- Flows discharged to the environment are at or are below current rates of discharge prior to any development. Runway pavements and runway strips have been designed so that surface water cannot collect on the surface;
- The site drainage design will ensure the airfield is protected from flooding;
- Surface water attenuation storage is designed to accommodate a 1 in 100 year probability event, plus an allowance for climate change to 2050;
- Our modelling indicates that there is sufficient capacity within the drainage and river corridors to significantly reduce effects to the existing airport for the 1 in 100 year event for large areas of the existing airport;
- We have further undertaken modelling for a 1 in 1000 year probability event which indicates that new airport facilities are also protected for this, at no increased risk to surrounding communities;
- Sizing of flood attenuation and surface water run-off ponds will depend on the overall water-use strategy as is discussed further below.

The Environment Agency have been consulted and concluded that the proposals should meet all statutory requirements, and provide for an improved river for biodiversity and flood risk, whilst run-off treatment should ensure that water quality standards are maintained.

We have identified a range of feasible options to provide for a sustainable drainage solution for the airport.

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Options have been developed based on the assumption that plans for handling surface water should be designed in line with existing best practice for airport sites with a 20% allowance for climate change. However, we will commit to deliver a development that aligns with future best practice should design criteria be revised through development of the scheme.

Details of how the Engineering Plans align with the best practice design criteria are provided in the Water and Flood Risk Appendix, including site drainage, surface water attenuation storage and proposals for treatment of discharge.

The Airport is supplied with potable water by Sutton and East Surrey Water (S&ES) from their Bough Beech reservoir.

We have developed models to assess the future annual demand, peak day and hourly peak demand for potable water that would be required as passenger numbers and operations grow.

We have discussed these requirements with S&ES who have confirmed that their own Water Resource Plans can more than accommodate the planned expansion of Gatwick Airport without impacting on other users.

In our mitigation and enhancement proposals, we have identified a range of measures to reduce water usage and manage and reuse water efficiently (Water and Flood Risk Appendix).

We have prepared a number of detailed technical documents and plans which together provide engineering specifications for the different elements of the water topic as described above. These include:

- construction specifications to reduce the use of water in construction works as part of our Sustainable Construction Strategy and best practice environmental management standards;
- specifications for surface water drainage, to protect water quality and provide for a functional drainage design which will attenuate flows, enable recycling, and protect water quality;
- functional specifications for a water pumping station;
- approximate design quantities for drainage types (filter, carrier, buried storage etc.);
- functional specifications for a stand-alone treatment plant and wetland treatment options.

Working with our Stakeholders

We have consulted extensively with the Environment Agency (rivers, flood risk and water quality), Sutton & East Surrey Water (water supply) and Thames Water (sewage and waste water treatment). We have recorded the details of these consultations, and no issues have been raised that would suggest that there are any significant impediments to our Engineering Plans. We will continue to work in close cooperation with these stakeholders to identify and integrate ongoing technological developments and innovation prior to, and during, construction and operation.

In line with our established commitment to engage openly with our stakeholders, we are also working with local stakeholders to introduce a Community Flood Risk Forum, to provide ongoing communication and dialogue with our local communities.

We remain committed to building upon our award winning biodiversity performance through retaining the Biodiversity Benchmark and work with Gatwick Biodiversity, amongst other stakeholders.

2.3 Fuel

Gatwick's fuel facilities currently have inbuilt spare capacity and can accommodate significant increases in traffic before the fuel infrastructure comes under capacity pressure. Full details are included in the Fuel Strategy Appendix.

The future developments, which would not be required until 2040 and beyond 2050 are viable and deliverable and would constitute minor works.

Up to 2040, a two runway Gatwick Airport would need no fuel related enhancements as the fuel facilities operate well within current capacities of the infrastructure. As a result there is no further impact on any aspect of the various community, environment, construction, noise or economic aspects considered within the sections in the Commission's Appendix B.

Between 2040 and 2050, the inbound delivery infrastructure could continue to serve the airport fuel demand, but the on airport storage capacity would come under pressure. One additional fuel tank would be required within the current GASHCo (Gatwick Airport Storage & Hydrant Company) demise, which represents only a minor enhancement to the fuel infrastructure.

By 2050, further fuel related enhancements would be required, comprising upgraded pumping capacity on the inbound delivery pipelines plus the construction of two additional fuel tanks the location for which is identified on the Master Plan (Operational Efficiency - Master Plan Appendix), north of the cargo sheds and the associated pipework.

We will continue to explore and integrate technological developments in fuel provision and use, to support enhanced sustainability performance. To this end, we are undertaking a review of how we can further utilise preferential charging to encourage/reward use of 'green' aircraft fleet, and the fuel efficiency and noise reduction benefits this can generate. We will also continue to support industry research into the use of alternative fuels for aircraft and the environmental performance gains this can deliver.

3. Geo - Environmental

We have undertaken a desk-based ground conditions assessment to identify the likely existence and severity of any contamination that may be present, and whether there are any other ground conditions that would present particular difficulties for the construction of the development.

The assessment shows that there are no past or current landfill sites on the development area, nor have there been any previous heavy industrial land uses such as gasworks or chemical plants. This is in stark contrast to the proposed Heathrow development where significant decontamination from legacy landfill sites will be required. Heathrow may have as many as 39 landfill sites, both legacy and active, on their proposed site.

The studies show that the Gatwick scheme is expected to encounter only a limited volume of contaminated soils and groundwater, mainly associated with historic airport maintenance uses, a petrol station, some areas of minor industrial/commercial activity and a small number of waste recycling and management activities. There are no sites of geodiversity interest at the site, and hence no predicted impacts on geodiversity.

Details are contained within the Geo-environmental Appendix.

In our construction waste strategy, described in section 4.2, we expect to be able to remediate and reuse within the development all of the demolition and earthworks waste streams, with the exception of very limited amounts of hazardous wastes.

We note that at Heathrow, the northwest runway scheme would remove the Lakeside Energy from Waste (EfW) facility at Colnbrook, just west of the M25 and south of the M4. This £160m Grundons facility only became fully operational in January 2010. This facility would need to be re-provided which, due to the third party dependence would likely prove to be extremely challenging.

4. Surface Development

4.1 Compliance

Within our Operational Efficiency - Master Plan Appendix we demonstrate that Gatwick with two runways meets all relevant requirements of the CAA and other regulatory bodies.

We have engaged with the CAA Safety and Airspace Regulatory Group and have briefed them on the main aspects of the two-runway Master Plan. In these meetings we have not requested, nor been given, any formal approval of the contents of the Master Plan. However no significant points of concern or objection have been raised and this has helped us take the designs forward with confidence. Our consultants have carried out a safety review and checked to ensure all statutory regulations can be met. This is detailed in Appendix B of the Operational Efficiency - Master Plan Appendix.

Reference has also been made to European Aviation Safety Agency (EASA) requirements where appropriate. These are not yet fully implemented in the UK; however, they are closely based on International Civil Aviation Organisation (ICAO) Standards and Recommended Practices and hence closely align with current CAA Aerodrome Licensing requirements.

We have also had regard to other relevant guidance where available. For instance the impact of Department for Transport Public Safety Zones (PSZs), on existing and proposed land uses has also been considered. (See Public Safety Zones Appendix).

Airspace

The runways will be capable of operating independently of each other and simultaneously.

Although detailed airspace design has not yet been undertaken, our advice to date from NATS supports the proposed level of throughput that can be achieved within an appropriately re-designed airspace system. Similarly NATS have not indicated any reason why the addition of a second runway at Gatwick would adversely impact current operations at other airports, including Redhill Aerodrome.

Future airspace design will be strongly influenced by long standing policy to reduce flights over populated areas and to enable noise and emissions reducing techniques to be followed by all aircraft.

We would also expect flight tracks to become more concentrated than they are at present owing to improvements in aircraft navigational performance.

For the purposes of this submission we have asked National Air Traffic Services (NATS) to provide best estimate flight paths based on a two runway airport. These allow calculation of noise contours, and, have broadly, demonstrated the feasibility of two runway operations. The introduction of new flight paths and other wider airspace changes would be the subject of public consultation in the future.

Further detailed information can be found in the Airspace Appendix.

4.2 Delivery

The Master Plan shows how almost all of our development lies within our safeguarded boundary and the environmental mitigation measures (described in the Mitigation Strategies report) which are integral to this have been included in both programme and cost plan.

The proposed site at Gatwick is predominantly greenfield land. Demolition activities and related land clearance will be limited to a relatively small number of residential and commercial properties, there is little contamination to address and remediate, and no major tunnelling or temporary road diversion works.

Construction Programme

The programme for delivery includes all aspects of surface development including preconstruction requirements such as demolition and land clearance. It also reflects utility requirements and how their simplicity of delivery assists our programme (details in the Construction Programme and Risk Profile Appendix). Gatwick has developed a robust delivery plan which shows that we can have a second runway operational by 2025 – which we believe is around 5 years ahead of the Heathrow options.

Our Delivery Programme has been devised to align built capacity with the forecast demand. To achieve this Gatwick has adopted a phased approach to demand sensitive elements of the Master Plan, in particular Terminals, Piers, Surface Access and Stand Capacity. The phased approach of construction to match capacity with demand is not only good construction practice to minimise impacts upon both the airport and the surrounding area, it also ensures that the programme is financeable.

Further details on the programme pre-construction are detailed in the Development Strategies report, with reference to the Construction Programme and Risk Profile Appendix. The programme will be managed in accordance with Gatwick's Construction Delivery and Transition Report which describes the proposed Project Implementation Plan.

Within the report prepared by Turner and Townsend - Construction Programme and Risk Profile Appendix details are given on the engineering requirements and associated costs which will be encountered during each phase of delivery. This includes assumptions on:

- services delivery (for construction and final operation), including energy , drainage and water supply;
- earthworks;
- construction specifications;
- road / water course diversions; and
- Logistics plan – including establishment of proposed logistics centre, road works to enable site access, plant requirements and siting etc.

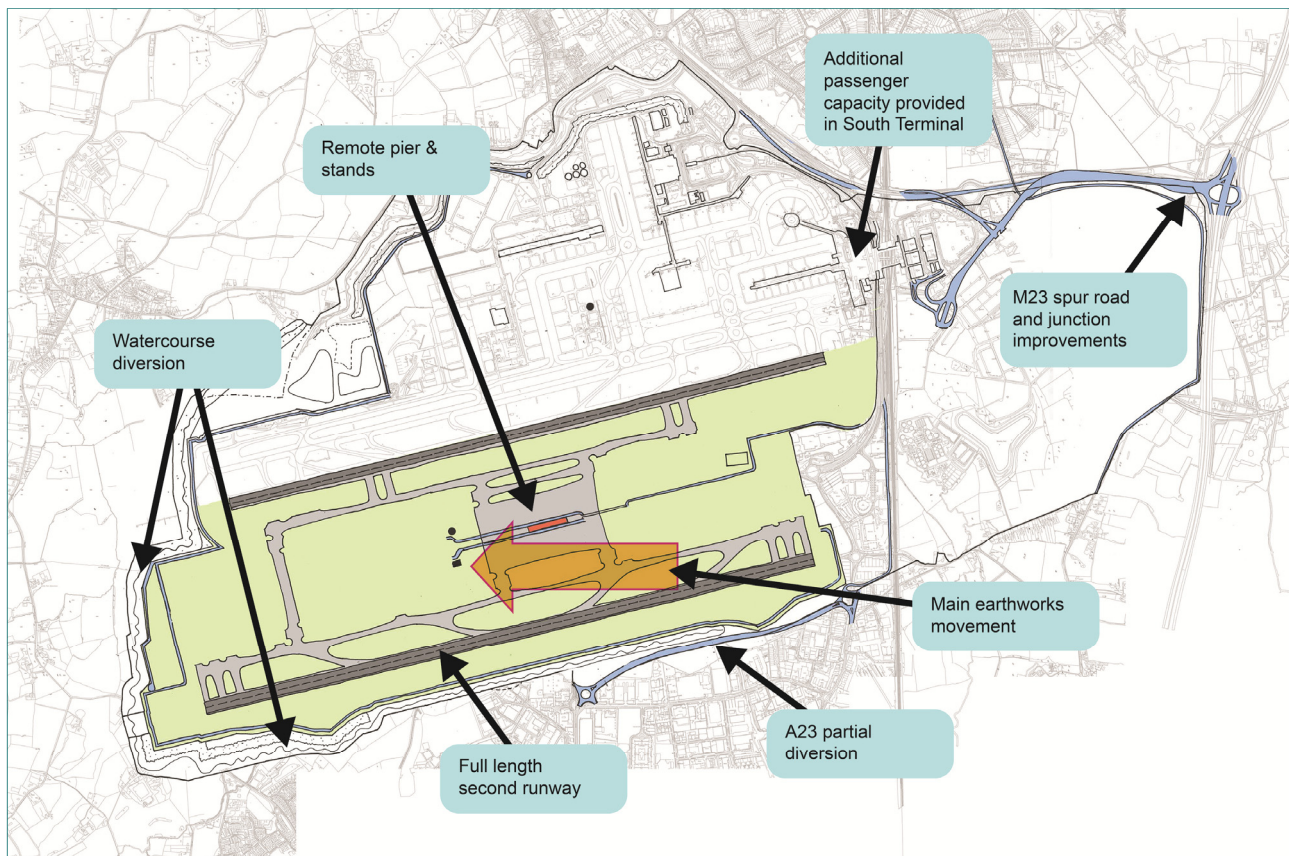
We have a high level of confidence in our construction programme and therefore a comparably high level of confidence in our ability to deliver at the costs we have estimated. The subsequent phasing drawings outline both the infrastructure to be delivered within each phase and also the current proposals for site set up and logistics based on the principles of efficient delivery and minimising impact to the operation and local communities.

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Runway opening phase construction scope

The objective of this phase is to have an operational runway by 2025. Early works involve watercourse diversions and diverting the A23 south west of the London to Brighton railway line. This enables the main earthworks to be complete, followed by the construction of the runway and the remote pier. The main works in this phase are illustrated below.

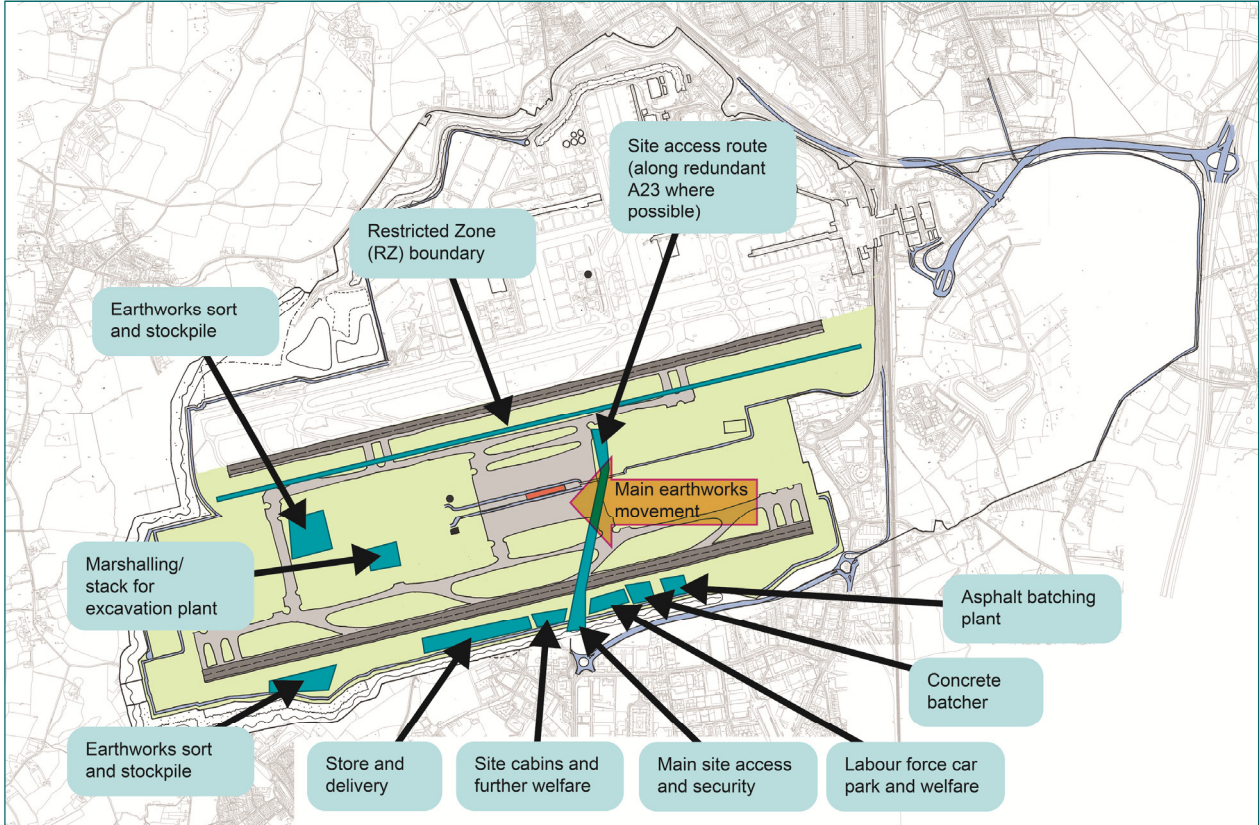
FIGURE 4: RUNWAY OPENING PHASE – SCOPE



Runway opening phase construction logistics

We have further illustrated below the current proposed logistics set up for this phase of the project. This has been designed to minimise impact on existing operations and local communities whilst ensuring optimal use of the site for effective project delivery. Within the Construction Programme and Risk Appendix further consideration is given to road access and impacts outside the airport boundary.

FIGURE 5: RUNWAY OPENING PHASE – CONSTRUCTION LOGISTICS PLAN

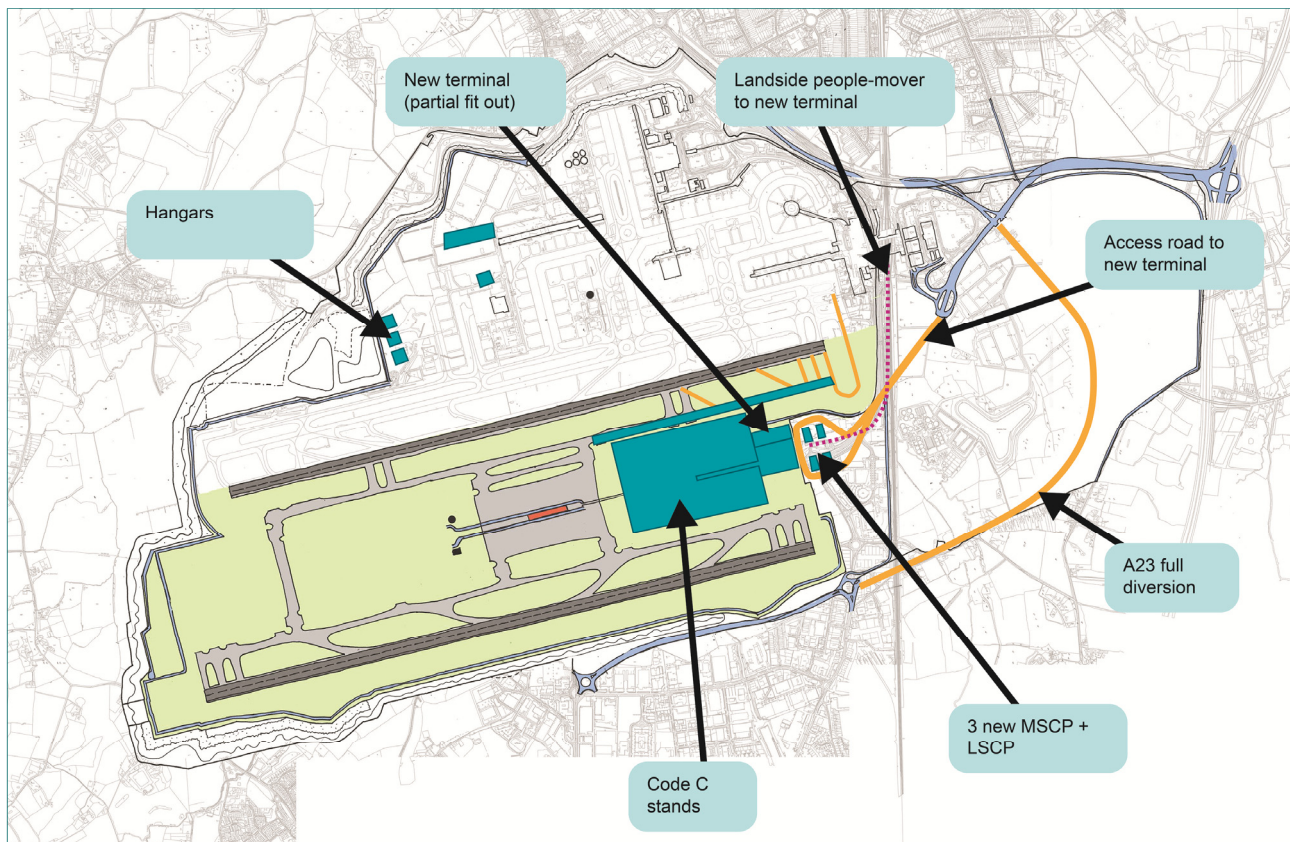


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Phase 1 construction scope

Phase 1 construction is driven by the requirement to meet 2030 passenger demand. The first section of the new terminal and contact pier are constructed after the civil works for the airside Automated People Mover (APM). A23 diversion to the new permanent alignment allows the landside APM to be built in this phase. The main scope is illustrated below.

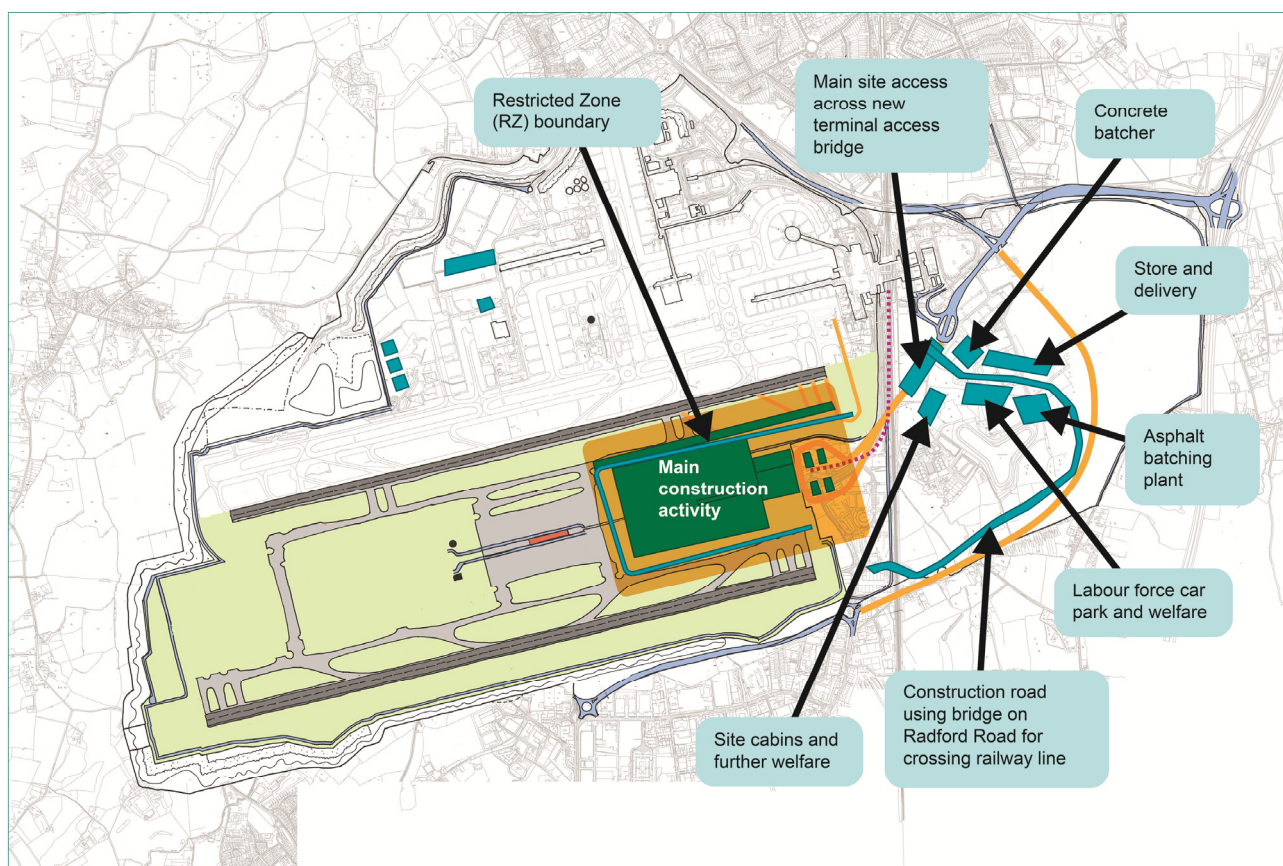
FIGURE 6: PHASE 1 - SCOPE



Phase 1 construction logistics

Phase 1 construction logistics again follows the same strategy as the runway opening phase, minimising the impact of construction on airport operations and neighbours whilst optimising the location of the site set up. In this phase the focus of construction activity has shifted and consequently site logistics would also relocate to avoid interference with the new operational runway.

FIGURE 7: PHASE 1 CONSTRUCTION LOGISTICS PLAN

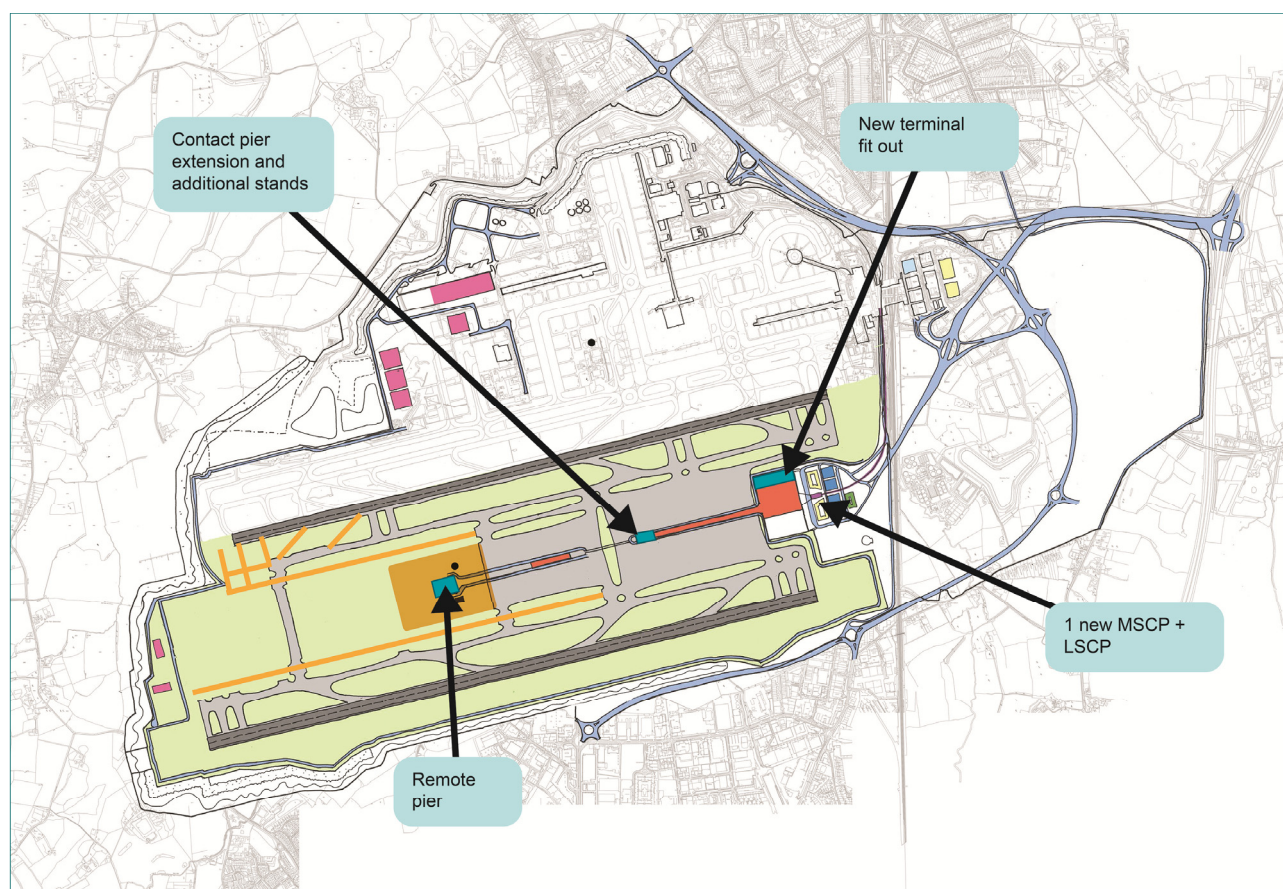


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Phase 2 construction scope

Phase 2 construction is driven by the requirement to meet 2035 passenger demand. The main scope for the phase is completion of fitout of the new terminal and construction of the remote pier. The main scope for phase 2 is illustrated in Figure 8 below:

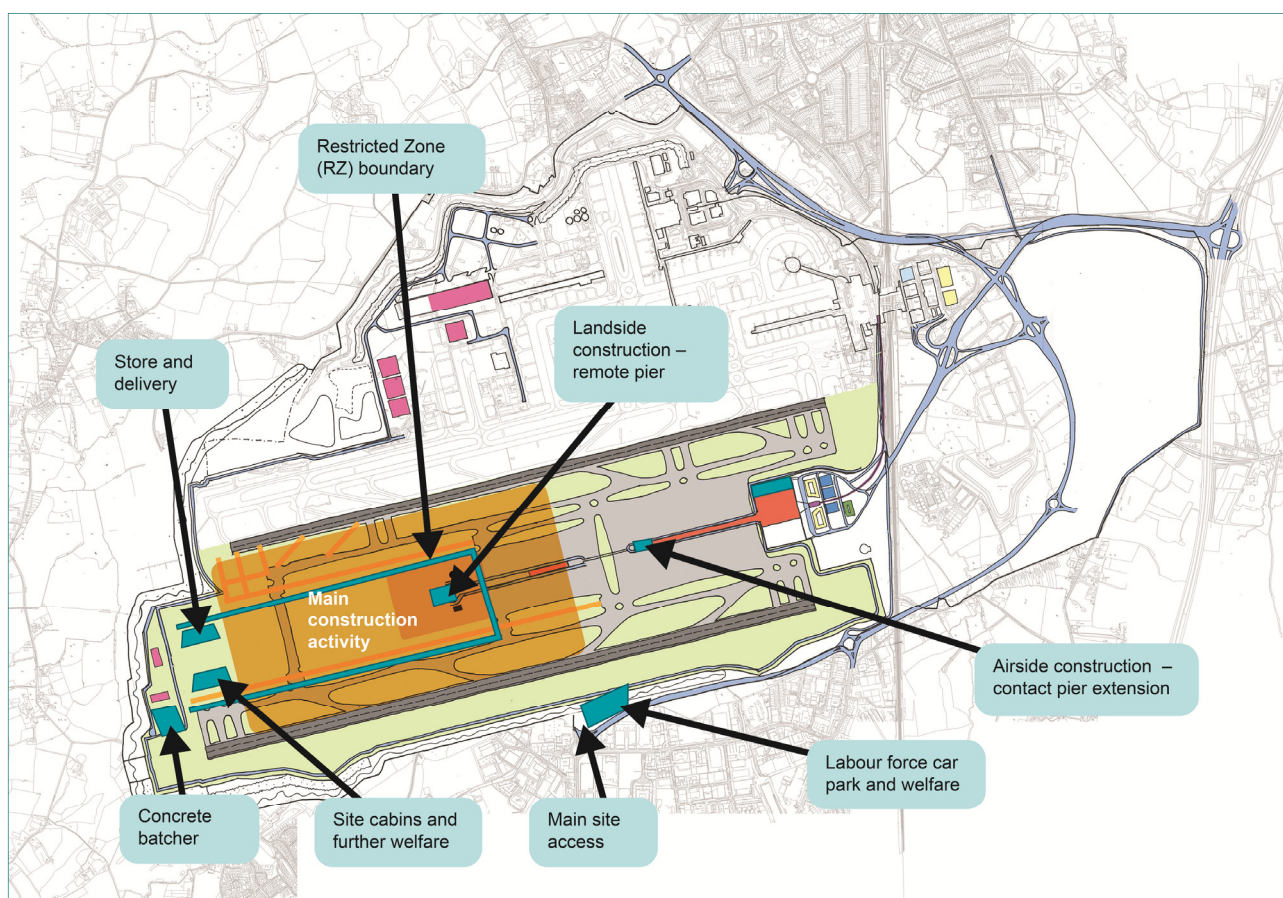
FIGURE 8: PHASE 2 - SCOPE



Phase 2 construction logistics

With the operation of the new terminal and runway some construction activities, i.e. the contact pier extension, will be required airside. However, the main activity, construction of the remote pier, can still be delivered landside by creating a temporary Restricted Zone (RZ) boundary around the site.

FIGURE 9: PHASE 2 CONSTRUCTION LOGISTICS PLAN

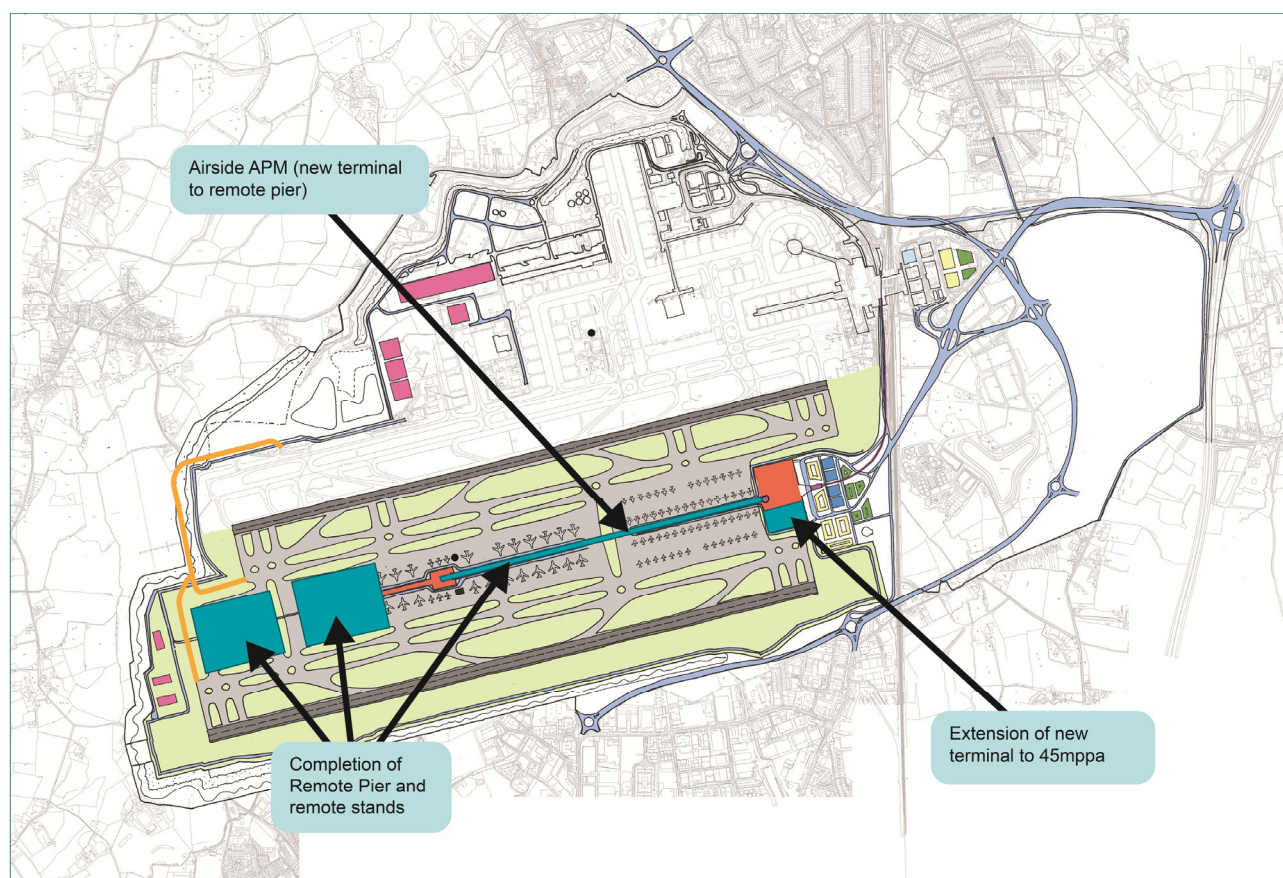


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Phase 3 construction scope

Phase 3 construction is driven by the requirement to meet 2040 passenger demand. The main scope is on completing the airside APM and extension of the remote pier. The main scope for Phase 3 is illustrated below.

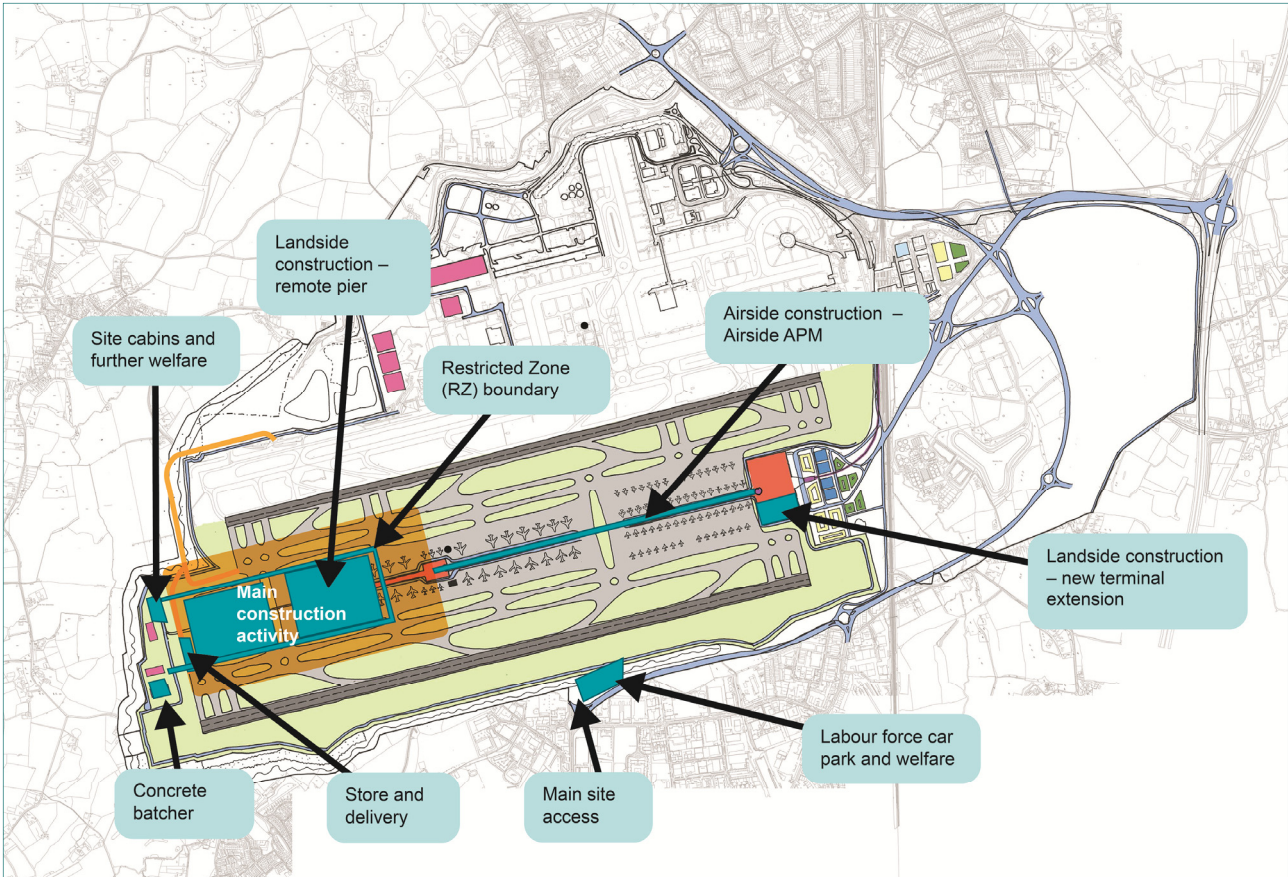
FIGURE 10: PHASE 3 - SCOPE



Phase 3 construction logistics

In this final phase the remote pier can continue to be delivered landside although construction of the Airside APM will be airside.

FIGURE 11: PHASE 3 CONSTRUCTION LOGISTICS PLAN



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4.3 Costs and Commercial Viability

In Figure 12 below we summarise the forecast costs associated with the phased programme previously described, with full details contained in the Capital Cost Forecast Appendix.

FIGURE 12: SUMMARY OF CAPITAL COST PLAN - 2013/14 PRICES

	Base Cost Plan No Phasing - 2050	PHASED CONSTRUCTION				
		2025 Runway Opening	2030 Phase 1	2035 Phase 2	2040 Phase 3	Phased Total
TOTAL ESTIMATE VALUE AT 4Q13 (excluding Risk)	£5,589,963,061	£1,674,443,484	£2,158,258,080	£857,847,323	£1,619,939,033	£6,310,487,921
A Gatwick Management	£308,290,926	£65,342,925	£128,761,295	£55,755,321	£105,271,823	£355,131,365
A1 Capital Programme Management	£308,290,926	£65,342,925	£128,761,295	£55,755,321	£105,271,823	£355,131,365
B Design	£346,827,292	£73,510,791	£144,856,457	£62,724,736	£118,430,800	£399,522,785
B1 Design consultants to DfSS Tollgate TG3,	£346,827,292	£73,510,791	£144,856,457	£62,724,736	£118,430,800	£399,522,785
C Base Construction Costs	£3,778,440,027	£741,590,019	£1,609,516,193	£696,941,514	£1,315,897,783	£4,363,945,510
C1 Enabling works	£80,084,255	£58,870,700	£18,689,455	£1,570,000	£30,000	£79,160,155
C2 Airfield Pavements comprising Runways, RET's, RAT's, Taxiways, Aprons and Stands	£642,124,803	£216,161,979	£122,834,288	£155,637,987	£240,925,185	£735,559,439
C3 Airside support facilities (APM, ATC, Hangars, Cargo, Surface Water)	£357,790,672	£70,907,340	£98,743,770	£50,169,109	£168,172,040	£387,992,258
C4 Terminal and Piers	£1,853,953,040	£91,250,000	£852,296,424	£452,429,418	£885,770,558	£2,281,746,400
C5 Surface Access including; Car Parks, Landside APM, Highway Works and Station Upgrade	£782,287,257	£264,200,000	£487,952,257	£24,135,000	£6,000,000	£782,287,257
C6 Utilities	£39,200,000	£22,700,000	£16,500,000	£-	£-	£39,200,000
C7 Operational commissioning	£13,000,000	£12,500,000	£7,500,000	£8,000,000	£10,000,000	£38,000,000
C8 Operational handover	£10,000,000	£5,000,000	£5,000,000	£5,000,000	£5,000,000	£20,000,000
D Project Specifics	£1,078,350,549	£770,219,937	£245,131,571	£30,572,175	£57,954,382	£1,103,878,066
D1.1 Land Purchase	£804,204,496	£629,204,496	£175,000,000	£-	£-	£804,204,496
D1.2 Compensation and Blight	£24,201,680	£24,201,680	£-	£-	£-	£24,201,680
D1.3 Levies and LA agreements	£50,338,727	£8,313,616	£21,846,085	£9,663,930	£18,477,449	£58,301,080
D1.4 Airside equipment	£8,800,000	£8,800,000	£-	£-	£-	£8,800,000
D1.5 Water course diversions	£52,300,298	£52,300,298	£-	£-	£-	£52,300,298
D1.6 Obstacle clearance	£17,396,250	£17,396,250	£-	£-	£-	£17,396,250
D1.7 Archaeology/ Ecology / Heritage	£5,500,000	£5,500,000	£-	£-	£-	£5,500,000
D1.8 Construction Logistics	£115,609,097	£24,503,597	£48,285,486	£20,908,245	£39,476,933	£133,174,262
D1.9 Motorway diversion	£-	£-	£-	£-	£-	£-
D1.10 Landfill removal and remediation	£-	£-	£-	£-	£-	£-
D1.11 Water treatment works - reprovision	£-	£-	£-	£-	£-	£-
E General / other Project costs	£78,054,268	£23,779,811	£29,992,563	£11,853,576	£22,384,244	£88,010,195
E1.1 Insurances	£78,054,268	£23,779,811	£29,992,563	£11,853,576	£22,384,244	£88,010,195
F Risk	£1,284,156,084	£384,282,467	£465,602,999	£212,045,848	£400,365,396	£1,462,296,710
F1 Project risks	£1,284,156,084	£384,282,467	£465,602,999	£212,045,848	£400,365,396	£1,462,296,710
TOTAL ESTIMATE VALUE AT 4Q13 (including Risk)	£6,874,119,145	£2,058,725,951	£2,623,861,079	£1,069,893,172	£2,020,304,429	£7,772,784,631

Source: Appendix Capital Cost Forecast

The programme is modular in design, allowing the phasing and design of delivery to match closely the pace and nature of the evolving demand. The first phase of the programme, which includes the opening of the new runway by 2025, requires a £2.1bn investment (out of a total of £7.8bn). This ensures that aviation demand is met at the earliest opportunity whilst reducing the initial financing challenge and moderating charges paid by airport users. Subsequent expansion phases of the programme can then follow in keeping with aviation demand - the interests of users, Government, bond holders and equity investors are all aligned in this approach.

Figure 13 illustrates the incremental capacity which will be delivered with the completion of each of the proposed phases of construction. Figure 14 demonstrates the capital cost of each phase in relation to the additional capacity released.

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FIGURE 13: CAPACITY RELEASE BY PROJECT PHASE

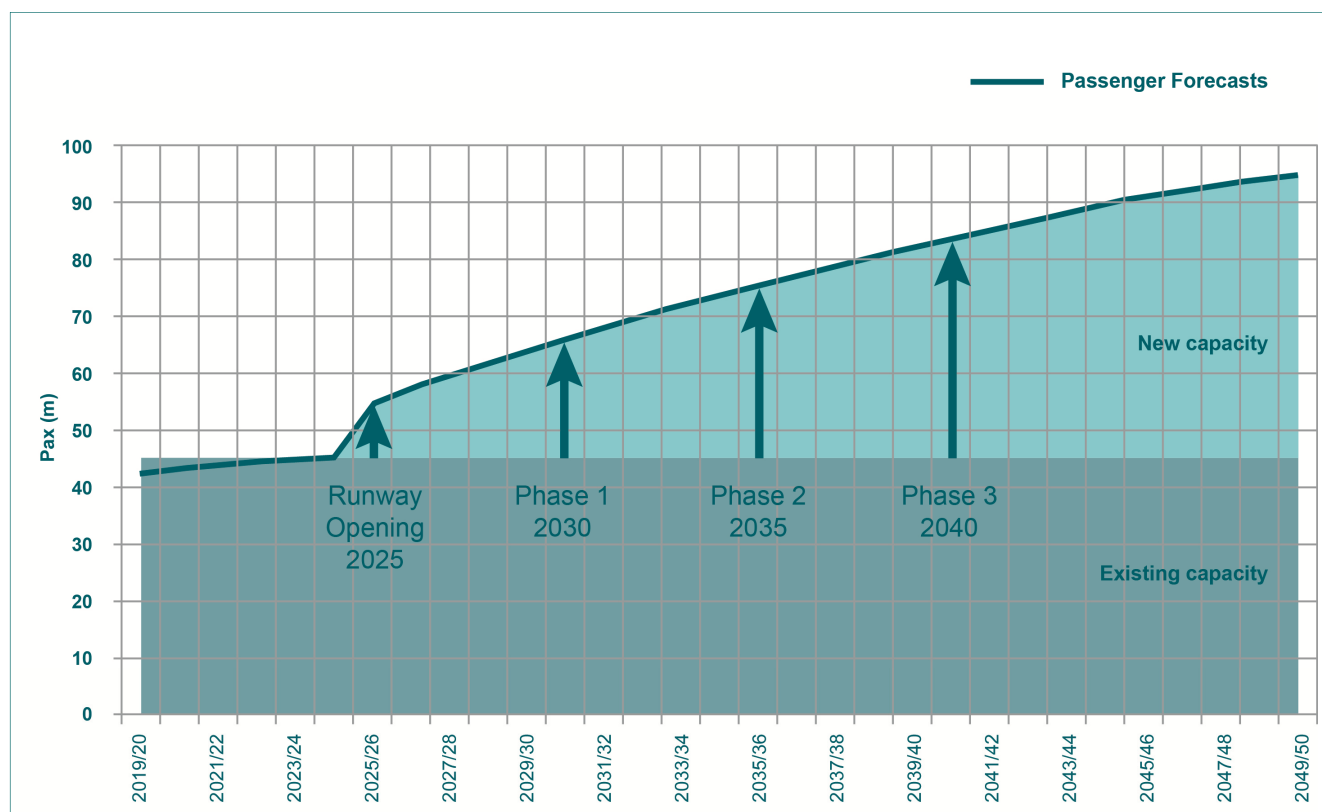


FIGURE 14: CAPITAL COST OF PHASED DELIVERY

Phase	Phase completion	Capital cost (2013/14 prices)	Total Capacity (mppa)	Incremental Capacity (mppa)
Runway Opening	2025	£2.1bn	63	18m
1	2030	£2.6bn	73	10m
2	2035	£1.1bn	82	9m
3	2040	£2.0bn	95	13m
Total		£7.8bn		

Source: Gatwick Financial Model

A lower risk, lower cost and phased capital programme is the basis for an affordable and financeable expansion.

We believe the Gatwick R2 Project is simple by comparison to many other major infrastructure projects, and undoubtedly less complex and less costly than the Heathrow options. As such we are confident that our scheme can be delivered on budget for the following reasons:

- requires the acquisition of land predominantly within existing safeguarded areas, and mainly greenfield land;
- requires limited physical changes to the local natural and built environment;

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- employs tried and trusted technical designs and engineering solutions;
- simple design solution – with minimal basement construction and no major tunnelling;
- first two phases are largely delivered in a landside environment, separate from existing airport operations;
- has limited impact on local communities and their quality of life and this is readily mitigated and offset through targeted enhancements;
- has no significant interface challenges with road or rail;
- minimal impact on current infrastructure (e.g. water treatment works, waste incinerators);
- no landfill removal with only local remediation required;
- can be developed largely in “landside” areas, independent of existing “airside” operations;
- 3rd party scope (road and rail) is confirmed and in delivery plans;
- over 80% of our base construction costs (by value) have been benchmarked;
- robust contingency provision;
- scheme has been through robust internal and external assurance reviews and a separate value management review supported by quantitative risk analysis;
- our approach to costs and programme has already been subject to peer review by a leading international construction company (Bechtel);
- as we continue to develop the detail of the scheme, and move into the construction phase we will continue to engage with our airlines through formally agreed structures to ensure continued support of the scheme, and its phased delivery.

Accordingly, not only does this result in a relatively lower cost expansion of UK runway capacity, the programme is inherently low risk and estimates and assessments can be made with a higher degree of confidence than is the case for more complex projects, such as the Heathrow options. Our risk modelling identifies a P80 level of confidence in achieving our programme timelines (detailed in - Programme Risk Management Appendix).

Risk Management

Our risk model is built by using industry best practice. Turner & Townsend have facilitated all aspects of the risk management approach, which is aligned to a range of recognized best practice frameworks, including The Risk Management Standard ISO 31000 and the OGC's (Office of Government Commerce) Management of Risk Guidance (MoR).

Key Risk Management activities have included facilitated workshops, multiple one to one meetings, risk review sessions, quantitative risk analysis (QRA) and reporting. Representatives of all key stakeholders were engaged to maintain accuracy of the Risk Registers and quantified model outputs. Mitigation plans and a risk retirement profile have been established.

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This risk register has then been assessed from both a qualitative and quantitative process, and the key outputs from this have been:

- A quantitative Cost Risk Analysis;
- A quantitative Schedule Risk Analysis;
- A quantitative cost risk analysis on our base estimate; and
- A mitigation plan and timeline for our top twenty risks.

These outputs have provided:

- A clearly understood risk profile for the whole programme;
- A robust provision within our cost forecast for the management of risk;
- A risk mitigation plan that is aligned with schedule requirements and delivery methodology; and
- A clear understanding at management levels of our key risks and what we need to do about them;

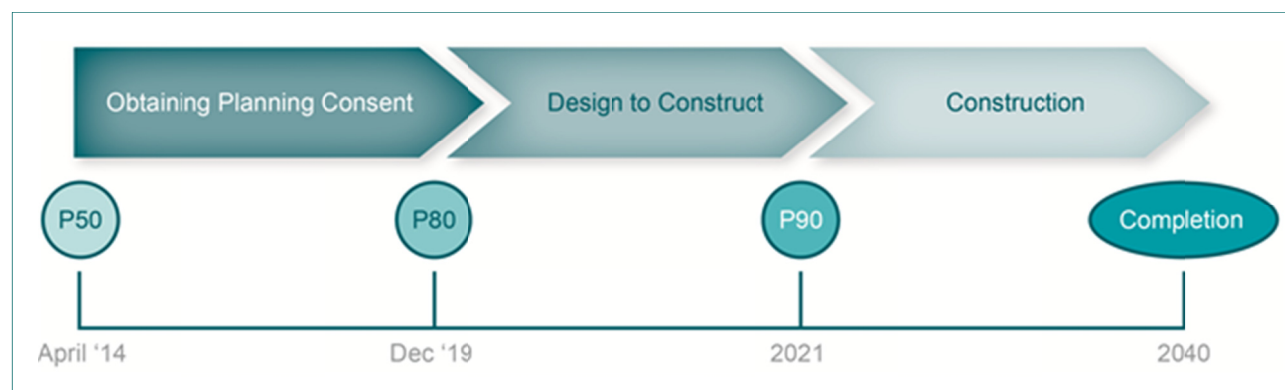
We are confident our contingency provision is robust against our scope in line with other airport infrastructure programmes. A detailed cost breakdown is provided in the Capital Cost Forecast Appendix. Our risk model confirms that this provision provides a **P50** level of confidence in our **cost** forecasts. Further analysis particularly of the scope / requirements of terminals and piers will enable a higher level of confidence to be achieved relatively quickly. A full report is given in the Construction Programme and Risk Profile Appendix and Programme Risk Management Appendix.

This process has provided us with a comprehensive risk register, developed in conjunction with all major stakeholders. This process has addressed the assessment of risk associated with the key contributory factors that have historically driven the use of Optimism Bias (Procurement, Client capability, Complexity & innovation, Environment & Business Case). We do not believe Optimism bias is appropriate for the assessment of risk on the R2 Programme because of this robust approach to risk management. The project, at Master Planning stage, has already developed a framework that matches or exceeds that of other infrastructure projects at this lifecycle stage.

The next stage for the project going forward is to identify proactive mitigation plans that provide growing confidence and assurance within the project that the forecast/budget can be delivered to, as greater certainty is gained. As progress is made towards the summary milestones shown in the graphic below, the R2 project strongly anticipates that confidence will rapidly increase once planning consent is achieved and then gradually increasing to P90 for the start of construction.

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FIGURE 15: FORECAST CONFIDENCE LEVELS FOR KEY MILESTONES



We have developed our risk management framework to align with the concerns identified by the Airports Commission in their Appraisal Framework document. The table below highlights the spread of identified risks against these categories.

FIGURE 15: RISK CATEGORIES

Airport Commission Category	Number of Risks	Number of Risks owned by Gatwick
Planning	36	12
Design	50	44
Delivery	42	33
Construction and Delivery	45	42
Transition	11	10
Total	184	141

The key conclusion from our analysis indicates a relatively straightforward construction project, while, in contrast, Heathrow have major programme and cost risks that will be very difficult to mitigate. It is this degree of certainty of project delivery to time and budget that is central to Gatwick's financing confidence that the R2 scheme is affordable and financeable.

Maintenance Costs

Given the increased competitive pressures to which the airport is subject, allowing assets to become time expired and costly to maintain would undermine our competitive position by reducing service quality and increasing costs. Gatwick currently therefore, has chosen to maintain our assets using the PAS 55 methodology (the British Standards Institution's Publicly Available Specification for the optimised management of physical assets) and have been accredited to the standard. This internationally recognised standard provides clear definitions and a 28-point specification for establishing and verifying a joined-up, optimised and whole-life management system for all types of physical assets.

The R2 assessment for asset renewal costs has assumed a standard set of asset lives dependent on type of asset. Our assumptions for asset life are consistent with our statutory accounting policies and for the purposes of our early stage cash flows, we have assumed capital renewal costs will be required after these terms.

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Further details on maintenance and operational costs are explained in the - Financial Case Appendix.

Construction - Procurement / Contracting

In the course of undertaking this work we have been able to draw on a considerable amount of internal expertise. We recognise, however, that a programme of this scale brings with it new challenges. As a result, we commissioned Turner and Townsend, a leading global programme management and construction consultancy, to advise us with regard principally to cost and programme management advice.

In addition to taking advice from Turner and Townsend, we have taken the further step of asking the construction project management company Bechtel to peer review much of Turner and Townsend's work and to advise on specific topics where we believe they have particular expertise.

This deliberate approach of setting internal challenge and review of our analysis is one which has given us added confidence with regard to the conclusions we have drawn at this stage of the project process, with regard to cost, programme and risk management.

The specific areas in which we sought the additional support of Bechtel were:

- A review of the constructability assessment;
- Preparation of an Airport Operational Readiness / Transition Plan;
- A review of the approach to cost estimates;
- A review of the approach to the various elements of contingency / risk; and
- A review of our Master Plan.

We propose to continue to work with Turner and Townsend and Bechtel to develop further our approach to managing the second runway project and to gain further confidence still with regard to cost and programme management.

We will also use this to review how the business might need to broaden to some degree the skills and expertise that may be necessary to deliver the second runway while at the same time ensuring that we continue to innovate and deliver excellent service to our passengers, airlines and other users. A formal review will be undertaken by the Board in due course drawing on the experience of the shareholders in delivering major projects whilst maintaining an efficient and effective operation.

Gatwick has an established approach to procuring major projects and programmes with considerable experience having been gained through delivering £1.1bn of capital construction projects between 2008 and 2014, known as Q5+1. In line with the drivers established in Q5+1, the R2 programme will have at its core the following:

- Being an Intelligent Client by facilitating the success of appointed Delivery Partners;
- Maintaining ultimate commitment to transparency in relations with its stakeholders;
- Early engagement of future asset operators to ensure design is right first time;
- Seeking to continuously improve programme performance and value for money;
- To champion Best Industry Practice throughout the procurement process.

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To champion continuous improvement by reviewing of lessons learnt and incorporating these into programme practices; and by monitoring the industry for process improvements and material and plant developments.

Gatwick recognises the need to drive behavioural change in the procurement of major UK construction projects and programmes in order to achieve greater efficiencies and higher levels of service for its customers, and therefore in line with the recommendations of Infrastructure UK, will enter into a period of complexity assessment to ensure selection of the optimal delivery model.

This supports the work of HM Treasury and Infrastructure UK, in addition to the Government's 2025 vision for the construction industry, and it is Gatwick's intention that through the procurement of the R2 programme that it seizes the opportunity to positively influence current and future construction clients.

The work of Infrastructure UK recognises the benefit in carrying out complexity analysis of the programme delivery environment, organisation and associated pipeline in order to select the appropriate procurement model. In addition to this, it is recognised that the capability of the sponsor, asset management approach, delivery client and the supply chain will have a critical influence on the successful achievement of the programme objectives.

In combination, carrying out these assessments will assist in ensuring that the selection of the procurement strategy is made with full understanding of the risks and opportunities that may affect successful delivery. To align to these hypotheses Gatwick will implement the following process to take the organisation from inception to the tendering and procurement of the main contracts.

Once an optimal delivery and tender strategy has been selected, the R2 Programme will seek to engage with delivery organisations in June of 2019 to enable a start-on-site of main construction works in June of 2021.

The following key areas have been identified by Gatwick as Critical Success Factors to the successful delivery of the programme:

- Collaborative working;
- Appropriate allocation of risk;
- Incentivisation of the supply chain at first and second tier level;
- Application of supply chain performance management.

In line with these, Gatwick's procurement of the R2 programme will be guided by the following objectives;

- **Deliver Value:** Achieve best affordable value in delivering the benefits identified in the business case, seeking opportunities for efficiency and economies of scale across the programme by working with the best delivery partners in the industry;
- **Effective Governance and Control:** Conduct procurement activities in a manner that satisfies the requirements of accountability and internal control, fulfils Gatwick's legal obligations, complies with financial constraints and effectively manages commercial risk;
- **Promote Standardised Approaches:** Provide and enforce effective, efficient and consistent commercial arrangements for procuring works, products and services of a common nature;

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- **Create Effective Supplier Relationships:** Recognise that in order to achieve best affordable value appropriate relationships must be developed and maintained with suppliers and their supply chains.

To achieve the programme, we will structure the Forms of Contract to best suit the procurement objectives and route. The specific contract option for individual projects within the programme will be selected and justified through an individual procurement plan process.

Further details are provided in the Construction Delivery and Transition Appendix.

Sustainable Construction Strategy

Our Engineering Plans for waste, energy, and water show how these utility requirements can be accommodated during the period of construction. Our Sustainable Construction Strategy and best in practice environmental management plans, shows how the site will be constructed in accordance with industry leading performance, protecting the quality of life of our local communities and delivering strong sustainability performance through both construction and operational phases.

Our construction phasing ensures early establishment of site drainage, construction of surface water attenuation lagoons and river diversions and certain surface access improvements.

Construction waste

Gatwick already consistently achieves 96% reuse and recycling of construction, demolition, and excavation waste from its projects. As a result of the limited amount of contamination expected to be present on the R2 site, we fully expect that, with the right initiatives, procedures and construction facilities in place, this level of reuse and recycling can be maintained and possibly exceeded for the R2 scheme.

We have developed a Construction Waste Management Plan (detailed in the Waste Appendix).

This sets out the strategy and actions which Gatwick would bring forward for waste management during the construction of R2 in accordance with our objectives to:

- reduce construction waste through design;
- maximise the reuse and recycling of construction waste;
- minimise waste to landfill;
- seek the best environmental option for all waste streams.

The following facilities are proposed within the Construction Waste Management Plan: On Site Construction Consolidation Centre, On-Site Waste Consolidation Centre, Concrete Crushing and Shredding Facility, On-site Silt & Sediment Tanker Facility plus development of a waste food processing plant and biomass boiler to generate hot water during the construction phase.

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Carbon

Despite the large scale of the R2 project, it will be relatively free of complexity. This would indicate that the carbon footprint of the construction of R2 would compare very favourably with the much more complex construction operations and challenges inherent in the shortlisted Heathrow options. Our Sustainable Construction Strategy will reflect our low carbon approach and we will continue to explore all opportunities for integrating ongoing technological development and innovation prior to and throughout construction phases. Further details are available in the - Carbon Appendix.

Construction Disruption

Construction of the R2 project will mainly be carried out within the confines of the project boundary on safeguarded land to the south of the existing runway. This greatly reduces any disruption caused to the local area and local community.

Impact on local area

- The diversions to the A23 both temporary and permanent can be delivered offline away from the existing road and will only impact traffic flows when the new cut- ins are made.
- Diversion of the Balcombe road can again be completed before the existing road needs to be closed and before the A23 is diverted to its final alignment.
- The road diversions are not complicated. Realignments are almost wholly within the safeguarded area and do not require specialist engineering e.g. tunnelling. Heathrow, in comparison, would potentially have to tunnel the busiest section of the M25.
- Two new bridges will be required across the London to Brighton railway line for the A23 and access to the new terminal which will be completed during possession hours to minimise disruption to the railway.
- Since there are no major utilities upgrades required to be developed for the early phases of the project, there will not be any temporary loss of services to the local communities.
- Main services diversions are planned to be carried out early in the programme in agreement with the services providers to ensure that they are removed from the construction footprint before work commences thus protecting supplies to the local communities.
- Construction traffic – primarily from the A23 and M23 depending on the different phases of construction using the shortest routes into the airport.
- Construction workers car parking will be maintained within the project boundary and accessed from the M23 and A23 for all phases of the project to minimise traffic on local roads.
- Investigations into utilising the existing railhead to the south of the site will be progressed to understand the viability of its use for importing bulk materials, thus reducing lorry movements on the major roads.
- There are very limited contaminated sites and these can be mitigated locally. There are no known existing landfill sites within the construction area requiring treatment / disposal.
- It is anticipated that all excavated material will be reused within the project footprint reducing the vehicle movements on local roads.

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- Ground Noise during construction will be managed using a best practice 'Code of Construction Practice' ensuring work is carried out using the least noisy methods, i.e. bored piling instead of compression hammer. Noise barriers will also be erected around the construction works as required for the different activities.
- Air Quality during construction will be managed using a best practice 'Code of Construction Practice' to control locations of stockpiles, damping down of dusty surfaces including haul roads and effective positioning of barriers.
- Construction vehicles will be required to use Ultra Low Sulphur fuel and be Euro cat IV compliant.
- The construction programme duration to Runway Opening is relatively short for such a major project due to the simplicity of construction and the safeguarded area. Major construction work of the terminal buildings etc. then takes place between the two runways, a considerable distance away from local residences and noise abatement work, bunds and walls, will already have been erected.

Impact on operation

- The majority of construction activities will be carried out on a Landside site reducing the impact on the security posts and the requirement for escorted vehicles and personnel.
- As the new project is constructed to the South of the existing airfield, operations can continue unaffected. Connections to the existing taxiway and runway will be made outside of normal operating hours. By comparison, the complexity of maintaining access to Terminal 5 during construction of Terminal 6 may prove extremely challenging for the Heathrow option.
- Access to existing airport is largely unaffected other than the M23 roundabout works.
- Construction of the new terminal and piers can be carried out so as to not affect the operation of the two runways.
- Construction worker car parking will be positioned within the project boundary so not impacting on the existing staff car parking arrangements.

4.4 Operational

Efficient

- The compact site supports an efficient operational solution once in use.
- The siting of the new parallel runway, its unrestricted operation and the location of the new terminal and apron between the runways will mean that Gatwick can become the most efficient two-runway airport in the World. Passengers will benefit from punctual services and very short queuing and taxiing times for aircraft, meaning more on-time departures and arrivals and fewer delays. These benefits are fully discussed in the Master Plan report.
- Developing a flexible, compact and efficient airfield system that will allow rapid turnaround of aircraft and, with close proximity and rapid connectivity between terminals, will enhance the operational efficiency for all users of the airport.
- As described in the Airport Master Plan document facilities have been arranged in a logical linear manner which enables easy navigation through the airport. Minimising the journey time through the

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airport is fundamental to maximising efficiency of the airport infrastructure and ensuring a great passenger experience. Streamlined processes and the compact design of the airport will deliver very short in-airport journey times. From arriving at the terminal the majority of passengers will be able to reach their departure gate within just 30 minutes. More detailed assessments are given in the Master Plan document. An equally quick and easy journey will be offered to arriving passengers. Even for those with bags, the kerbside will normally be reached within 45 minutes of leaving the aircraft, assisted by efficient baggage delivery processes and auto-gate technology at immigration.

- The proximity of the three terminals to each other, with the excellent landside and airside connections, will result in a high level of operational efficiency for airport operators, airlines and services providers. The short distances between and within terminals mean less time will be taken for staff and equipment movements, ensuring high levels of productivity are achievable. The same is true for the airfield. Operational functions will be consolidated into locations that can readily serve the adjacent apron areas rather than being fragmented and separated by large distances.
- As described earlier Gatwick's Engineering Plans integrate the management of aspects of the airports waste streams with the energy and water strategies. This forms an important part of Gatwick's plans for sustainable resource management. Facilities to segregate waste for re-use and recycling are currently provided within the terminals and across the airport, and Gatwick requires that every company producing or handling waste on the airport adheres to the waste hierarchy. Currently on average 40% of the waste is re used or recycled with the majority of other waste being recovered and sent to an off - site Energy from Waste facility . Gatwick is committed to achieving its 'Decade of Change' target of 70% recycling by 2020. Gatwick's Engineering Plans to manage operational waste streams include the following facilities: Integrated Waste Management Facility, Anaerobic Digestion facility and a Biogas to Vehicle Fuel facility, the liquid digestate from the Anaerobic Digestion plant would provide nutrients to the proposed waste water treatment system.
- Gatwick's R2 Master Plan and associated energy and utilities strategies described within its Engineering Plans would incorporate state of the art, highly efficient technologies into the design of the R2 development infrastructure, terminal and ancillary buildings, with the aspiration to be carbon neutral in terms of both regulated and unregulated energy use across a wide range of airport energy uses by 2050.
- Already efficient transport networks at Gatwick will be further improved as a result of R2 and will be designed to promote the use of low-carbon, sustainable, public transport modes for both passengers and staff commuting. This is reinforced through our Staff Travel Plan and Second Runway Sustainability Strategy, which set out a framework for delivering our industry leading objective of achieving 60% of passengers and 50% of staff travelling sustainably by 2040.

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Flexible

- Our mid field apron has been designed to allow for a range of apron, stand and pier/satellite arrangements that can be incrementally developed at a pace tailored to match the pace and nature of growth that develops over time. This will allow a range of possible different mixes of aircraft and airline types to be accommodated.
- The New Terminal is designed as a mixed airline facility, with a large rectangular three level floor plate. A 'loose fit' approach to the design places structural columns, elevators and escalators and building service systems on a widely spaced regular grid within a modular building form. This allows expansion in increments dictated by demand, and internal fit-out which can be readily adapted without major structural modifications.

Safe and Secure

- The overall airport site is compact and will be easy to secure. The boundary can be easily monitored with further protection zones provided by the river diversion buffer zone and noise bunds.
- Terminals are sized to accommodate the optimum levels of passenger, staff and baggage screening, fire safety and security systems using known technologies and with space safeguarded for new developments.
- Access to each terminal will be from ground level or at elevated levels and will provide safe and easily controlled entry and egress from the buildings and to rail services.
- Access from below ground and tunnelled spaces has been avoided as this creates complexities for personal security and comfort as well as escape and smoke control.
- Our designs have built in flexibility should there be further safety and security requirements. For example. We have developed proposals for the construction of end around taxiways (EATs) at each end of the existing runway to allow movements between the northern apron and the new runway without runway crossings.

Further examples of this in built resilience are described in the Master Plan document.

5. Response to Airports Commission Objectives

Although much of the preceding information contained within this document and the referenced technical reports respond to the Objectives defined by the Airports Commission the summary below specifically addresses these as laid out in the Framework.

Objective: “To promote employment and economic growth in the local area and surrounding region”

Expansion will deliver 22,000 employment opportunities and an additional GVA of £1.73bn per year in benefits to the local and regional economy by 2050. This equates to a circa 50% increase in the number of new employment opportunities with the operation of the Second Runway. Further details are given in the Development Strategies report.

We are committed to working towards 40% local procurement of supplier workforce and will continue our engagement with local businesses, to maximise the benefit which we can generate to local economic growth through expansion.

In partnership with local Councils, educational and skills development organisations, Gatwick is building upon its existing initiatives with Colleges to develop an industry leading skills development and employment programme which will provide a framework for engaging all sections of the community.

The Gatwick Life-Long Employability Programme will involve new schemes around schools education, an expanded skills development programme, apprenticeships, scholarships and supporting return-to-work, less able and mature sections of population.

Coupled with retention of existing jobs, this provides a highly significant stimulus to sustainable economic growth in the local area and surrounding region.

Our Master Plan describes a compact and efficient development. Whilst some loss of commercial premises is unavoidable the land take and losses have been minimised. It also makes provision to re-provide land for replacement commercial premises within it.

Close consultation with utilities providers have confirmed that the R2 plans can be accommodated within the long term plans for utilities.

Objective: “To protect and maintain natural habitats and bio diversity”

Unlike at Heathrow, there are no sites designated as being internationally important for nature conservation close by. Due to the compact nature of the site and its boundary alignment, there will be no negative impacts on any sites designated internationally or nationally for their bio diversity. Whilst impacts on small areas of ancient woodland cannot be wholly avoided, the realignment of the River Mole and its tributaries will significantly enhance opportunities for bio diversity. We are also committed to replacing woodland to the ratio of 2:1 and 3:1 for ancient woodland, providing a net gain in woodland within our surrounding area. Gatwick recognises the importance of developing with key stakeholders, particularly Natural England, the Sussex Biodiversity Partnership and the Environment Agency, a strategy to mitigate risks to the development process with respect to European and UK Protected Species. We are furthermore committed to maintaining our award winning performance through retaining our Biodiversity Benchmark status and expanding our Biodiversity Action Plans in line with this. More information is provided in the Biodiversity Appendix.

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Objective “To minimise carbon emissions in airport construction and operation”

Gatwick's R2 Master Plan and associated sustainability, construction, energy and utilities strategies described within its Engineering Plans will drive Gatwick ultimately towards carbon neutrality in terms of both regulated and unregulated energy use across a wide range of airport energy uses by 2050. We will explore opportunities for carbon off-setting of scope 1 and 2 emissions as we work to reduce emissions and ultimate neutrality.

The carbon footprint of the construction of R2 would compare favourably with the far more complex construction operations and challenges inherent in the shortlisted Heathrow options. Our Sustainable Construction Strategy and Construction Award scheme will drive technological innovation in pursuit of low carbon and carbon neutral construction practice. More information is provided in the Carbon, Energy and Waste Appendices.

Objective: “To protect the quality of surface and ground waters, use water resources efficiently and minimise flood risk”

The assessment confirms that there are no significant impediments to provision of water supply or waste water treatment infrastructure. The airport's potable water usage is well within that already provisioned for by the water supply company. The sustainable drainage strategies, river diversions and flood attenuation plans already identified, manage water quality risks, enhance surface water quality, reduce flood risk, and allow for beneficial water recycling for non-potable uses. We will continue to work with our stakeholders and our local communities through a Community Flood Risk Forum to ensure partnership delivery and best practice.

Objective: “To minimise impacts on existing landscape character and heritage assets”

The heavy clay soil of the Weald does not tend to yield large areas of archaeology. We expect that most of the surviving archaeology will be concentrated around existing sites of settlement, around the current river channels, and the alluvium from former river channels.

We will undertake a programme of recording and investigation for archaeology and buildings and work with heritage authorities to achieve the best possible outcome overall.

The Place (Heritage) Appendix details the limited number of heritage sites potentially impacted by the R2 development. Through development of the Scheme Design the Beehive a Grade II* listed building has been retained.

Unlike at Heathrow, there is no requirement to take listed buildings from Conservation Areas. We also note that Windsor Castle and Great Park will be directly overflowed by easterly arrivals to the new runway at Heathrow

Objective: “To maintain and where possible improve the quality of life for local residents and wider population”

The R2 Master Plan has been designed and engineered to protect and enhance the quality of life for local communities wherever possible. It integrates innovative design and best practice industry standards to minimise and mitigate negative impacts whilst positively contributing to the environmental and socio-economic welfare of local communities through targeted investment, and the attenuating benefit to quality of life which this brings. (Detailed in Quality of Life Appendix)

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Objective: “To manage and reduce the effects of housing loss on local communities”

As part of the master planning process and development of our Engineering Plans, we have sought to develop proposals which not only minimise the land take of the development and associated loss of housing but also to respect the safeguarded area. Our Master Plan, which includes our requirements for energy provision and for water and waste management, is compact and efficient which minimises land take requirements and corresponding community and environmental impacts, and has enabled us to keep development broadly within the existing safeguarded area. The scale of housing loss, the impact on commercial buildings and the impact on the whole community is considerably less than Heathrow.

Objective “To be affordable and financeable, including any public expenditure that may be required and taking account of the needs of airport users”

A de-risked, lower cost and phased capital programme aids an affordable and financeable expansion. As set out in more detail elsewhere in our submission, the Gatwick R2 Project is simple by comparison to most other major infrastructure projects, and especially by comparison with the Heathrow options.

Objective: “To have the equivalent overall capacity of one new runway operational by 2030”

We believe we can deliver an operational runway by 2025 and that the added benefits of doing so are considerable. Our analysis shows that a second runway at Gatwick would provide a further 45mppa (even without further increases to the capacity of the single runway) compared to a third runway at Heathrow of around 30mppa.

Our high levels of confidence in delivery at this stage of the process are driven by the benefits of having a safeguarded site to build within and no major existing infrastructure to reconfigure. We are also mainly constructing the new facilities on a landside site, without impacting the existing airport operations which, equally, will not impact our construction activities.

Objective: “To build flexibility into schemes design”

The Master Plan has been developed to ensure the R2 infrastructure will be fit-for-purpose in 20-30 years, as it is currently proposed. We have ensured that within the overall design there is flexibility to allow for future emerging and changing requirements. The ability to phase delivery adds significant flexibility.

Objective: “To meet present industry safety and security systems”

Our Master Plan has been developed to provide the highest levels of safety and security for all users. It is fully compliant with current safety and security requirements and follows industry best practice throughout. The overall airport site is compact and easy to secure.

Objective: “To maintain and where possible enhance current safety performance with a view to future changes and potential improvements in standards”

Over the time period considered in our Master Plan, it is inevitable that changes and enhancements will be made to the required safety performance and standards that will need to be met. Some are known and have been incorporated into our plans, such as the Standard 3 HBS (hold baggage screening) requirements to be implemented in the UK by 2018. Others are not known and will require airports to retrofit infrastructure and procedures to existing systems. We have developed the space planning and spatial layouts to provide the flexibility to accommodate such changes.

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Objective: “To minimise and where possible reduce noise impacts”

Our Engineering Plans and Master Plan, including the location, alignment and spacing of the runway, would help minimise the number of new people affected by noise. Our engineering plans include features such as noise bunds, noise walls and landscaping corridors to minimise and reduce ground noise impacts (Ground Noise Appendix). We will work with the members of GATCOM to explore the possibility of including a ground run pen in our master plan to further reduce noise exposure and continue to implement our industry leading noise management, set out in the 2013-2018 Noise Environmental Action Plan.

6. Conclusion

In the course of undertaking this work we have been able to draw on a considerable amount of internal expertise.

We recognise, however, that a programme of this scale brings with it new challenges.

As a result, we commissioned Turner and Townsend to advise us with regard principally to cost and programme management advice. Turner and Townsend is a leading global programme management and construction consultancy that supports organisations that invest in, own and operate assets. They have a very considerable amount of knowledge and experience of major airport projects.

In addition, to taking advice from Turner and Townsend, we have taken the further step of asking Bechtel to peer review much of Turner and Townsend's work and to advise on specific topics where we believe they have particular expertise.

Compared to Heathrow's third runway option the risks to cost escalation and programme slippage are comparatively small. At Heathrow, there would be:

- Significant disruption to the operation of the existing airport;
- The impact of construction on the surrounding area would be considerable (and the Airports Commission should take steps to ensure this is understood);
- The reliance on third parties is very high and therefore very risky.

We have demonstrated in this report that through the development of the Gatwick R2 Engineering Plans (in alignment with the Master Plan) we can deliver a simple, low risk and affordable project well within the timescales required by the Airports Commission to meet forecast demand. The report and the supporting technical reports have shown that risk is minimised for the following key reasons:

- Land acquisition required is primarily safeguarded land with limited existing development;
- The land is known to have little contamination and only simple demolition and land clearance is required;
- The requirements for all key utilities can be met within the current or planned capacity of providers and we will be building in significant resilience particularly electricity supply and flood resilience;
- Due to the relative simplicity of both Engineering Plans and construction we have a high level of confidence both with respect to costs and programme;
- Affordable – Confidence in the forecast capital cost of £7.8bn is driven by the simplicity of design and delivery. The phased approach of delivery, matching the pace and nature of demand with capacity, are key to the financing case for the R2 project;
- Flexibility; the new runway and midfield apron is located within the safeguarded area on land with minimal development which means that there are few existing constraints. This allows the midfield Apron to be designed from the outset to be flexible and adaptable;
- We have developed strong, robust mitigation and enhancement plans to protect and enhance the Quality of Life for the local communities;

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- Our Engineering Plans demonstrate our ongoing commitment to best practice in sustainability;
- The development builds on existing good practice and a record of innovative design, development and delivery of large infrastructure projects.

In summary, Gatwick is in the best location to accommodate a new runway. Compared to Heathrow, Gatwick is in the right place as it can be built much more quickly, cost effectively with much less impact both environmentally and to the local communities.