

The Mayor of London's submission to the Airports Commission
Outline proposal for long term aviation capacity



A new hub airport for London and the UK
Isle of Grain

July 2013



FOREWORD

I have long been convinced that the UK needs to take a bolder approach than ever before to respond to our shortage of world-class hub airport capacity. It is necessary to ensure that London and the UK can continue to compete at the highest level in the world.

I am responding to the Airports Commission's request for detailed proposals, and have assessed my favoured options against the range of criteria the commission have specified. I have considered the costs and benefits of air travel to the economy, the environment, and wider society alongside the rate of future demand growth and airline and alliance behaviour. The only workable solution is a new, single hub airport.

I am making three separate submissions to the Airports Commission. Each is an option for a new hub airport serving London and the UK. Given current levels of information, they are all credible and deliverable. They have different and in some cases profound impacts, but in each case, the positives far outweigh the negatives. An Isle of Grain location would be at the heart of the Thames Gateway, offering an excellent balance between maximising the economic and regeneration impacts of a new hub airport, whilst reducing and managing the negative impacts of aviation. I am convinced that any of the three options would be far better decisions than reverting to our tried and failed method of incremental expansion – a runway and a terminal here and there. I am also convinced that each option will enable the UK to have an airport that will fully meet its needs

for the foreseeable future, something that will never be possible at Heathrow.

I believe that a new hub can be environmentally sustainable, and could represent excellent value for money to the Government when considered in the context of the nation's economic development needs as a whole. By providing all of the necessary evidence, I am calling on the Commission to set out in its interim report at the end of this year that our priority is for additional hub airport capacity. It should explicitly reject suggestions that Britain does not need a hub airport or that a hub can be "manufactured" by asking airlines and passengers to treat discrete and disparate airports as a "virtual" hub or a "dispersed" hub. I want to see the Commission take forward these three locations for further assessment, and for its work to set the groundwork for an Aviation National Policy Statement and a delivery plan for a new hub airport.

Boris Johnson
Mayor of London

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I **A NEW HUB AIRPORT AT THE ISLE OF GRAIN** **- INTRODUCTION**

London and the UK need a new hub airport, at a single site. The Mayor's responses to the Airports Commission's Discussion Papers have made very clear why this capacity and the improvements to connectivity are both necessary, and compatible with the Government's climate change commitments. Three sites can potentially meet our needs. This is why the Mayor is making three separate submissions to the Commission, describing each proposition and its impacts.

This document sets out one possible way of developing a new hub airport serving London and the UK. The focus of this submission is a new hub airport at the Isle of Grain, approximately 30 miles east of Central London. It is a proposition which is both credible and deliverable. This document responds directly to the questions posed by the Commission in their Guidance Document 02 - Long Term Capacity Options: Sift Criteria which are set out in this document.

The content of this report examines a combination of issues and impacts, those which are:

- broadly common to any effective new hub airport serving London
- specific to an effective hub airport at an Isle of Grain location

The Isle of Grain has the space to accommodate a world-class, efficient hub airport, avoid the overflying of Greater London, and the potential to catalyse growth and development across the Thames Gateway – the largest regeneration area in the UK - and East London. It could take advantage of close proximity to the London Gateway port, and enable a flexible night flying regime. Excellent surface access connections, building on existing and planned infrastructure will get passengers, staff, and freight to and from the airport quickly, and in an environmentally sustainable way. Heathrow will have to take on a different role, but it can be part of the solution. It could offer London a redevelopment opportunity of unprecedented size and scale.

A new airport at the Isle of Grain:

Key features

- A world-class hub airport opening in 2029, providing a substantial increase in capacity able to facilitate hub operations. This will maximise and improve the reliability and resilience of London and the UK's global connections, fully meeting demand to 2050 and beyond.
- Connectivity for London and the whole of the UK will be transformed. London and the UK will become the best connected city and country in the world.
- A comprehensive package of brand new, high quality and environmentally sustainable surface access connections will make the airport readily accessible, and generate wider benefits across London and the southeast.
- Development and growth in London and the UK will be unlocked, including across the Thames Gateway, the UK's largest growth and regeneration area.
- 10.7 million people within a 60 minute public transport journey.

Advantages

- Space to accommodate the size of facility required – around 55 kilometres.
- Overflying of Greater London avoided and worst areas of noise and poor air quality are over water.
- Opportunities for a far greater degree of night flying than currently possible at Heathrow, Gatwick or Stansted.
- Development and growth in London and the UK, and catalysing growth in the Thames Gateway, the UK's largest growth and regeneration area.
- Synergies with London Gateway port, existing shipping channels can be kept fully navigable.

Challenges

- Exposing 31,500 new people to aircraft noise.
- Displacing approximately 2,000 residential dwellings, and existing and disused energy generation and storage facilities.
- Mitigating and compensating the impacts on large areas subject to national and international biodiversity designations.

2 THE PROPOSITION: AIRPORT AND SURFACE ACCESS

Commission question - What is the nature, scale and timing of capacity delivered by the proposal? How will the proposal support or enhance the UK's status as Europe's most important aviation hub?

2.1 The Mayor's vision

The Commission and the Government must give serious consideration to developing a new hub airport at the Isle of Grain, accompanied by a comprehensive, wide-ranging package of rail and road improvements. The Isle of Grain can accommodate the new hub airport that London and the UK needs:

1) It could accommodate the world-class airport London and the UK needs, with:

- **Four new runways**, able to accommodate up to 200 air traffic movements (ATMs) per hour¹. Average runway utilisation would be around 75 per cent to ensure operational resilience.
- **Sufficient capacity** and suitable design so the airport can expand in line with demand, able to fully meet Government forecasts of more than 170 million passengers per annum at the UK's principal airport in 2050. This capacity will enable the 'waves' of traffic characteristic of an effective hub airport.
- **Minimum connection times of around 45 minutes**, ensuring that the airport is attractive to airlines and to passengers who want to use the airport as a hub.
- **All markets and route types served**, with the airport able to fully accommodate all relevant aircraft codes and classes, including regional, medium, and longhaul passengers and freight-only aircraft.
- **Minimal noise impact and operational flexibility during the night**. An Isle of Grain location would expose fewer than 5 per cent of the number of people to noise compared to a similarly sized airport at Heathrow.
- **A target opening date of 2029**. Following the work of the Commission, and an Airports National Policy Statement, a Hybrid Bill covering a new hub airport and surface access links could be passed by 2019. A nine year construction phase could see a new hub airport and its supporting access links open in 2029.

2) It could offer excellent and environmentally sustainable surface access connectivity, providing benefits to travellers across the South East:

- **Key Central London locations including Waterloo, London Bridge and St Pancras accessible in under 30 minutes**, by combining new, planned, and committed rail improvements.
- **Around 10.7 million people with access to public transport links within 60 minutes reach of the hub airport**, including areas such as northwest and southwest London, southeast Kent, and places as far afield as Woking and Reading.
- **A target public transport mode share of 65 per cent**, a significant improvement on the proportions currently travelling to and from London's airports by public transport.
- **Benefits also being realised by non-airport users**, such as those travelling between Central London and Canary Wharf, and from West to East London.

3) It could underpin growth and regeneration across the UK and the Thames Gateway:

- **Supporting 388,000 jobs nationally by 2050, resulting in a cumulative UK GVA increase of £726 billion** between 2015 and 2050.
- **Further adding 0.5 per cent to UK GDP by 2050** due to international connectivity improvements, which would have a value today of £6.9 billion per year.
- **Creating 134,000 new additional jobs locally**, generating £16.6 billion in GVA per year.
- **Catalysing further jobs and development** in a number of 'zones' in Kent, Essex and London establishing a 'corridor' of development alongside the major transport links connecting the airport.

4) It would require Heathrow to take on a different role, but this would offer a huge opportunity for:

- **More than 40,000 new jobs**, including in sectors such as hi-tech manufacturing, creative design and higher education, able to benefit from a large, accessible site.
- **New homes for up to 184,000 people**, which could be accommodated in an area the size of the Royal Borough of Kensington and Chelsea.

Heathrow cannot be the future hub airport that London and the UK needs

- Its two runways operate at 99 per cent capacity and can only accommodate around 50 arrivals and departures in a peak hour – rendering it unable to operate as an effective hub, with 'waves' of arrival and departure.
- It accommodates around 70 million passengers per annum, but is constrained and lacks sufficient space to grow to accommodate long-term demand for aviation.
- Night flights are severely restricted and without this capability Heathrow misses opportunities in supporting early morning longhaul arrivals and larger freight operations
- It exposes 766,100 people to unacceptable levels of noise, by far the highest number in Europe; additional runways would exacerbate this problem.
- Heathrow expansion is highly controversial and has resulted in decades of indecision.

2.2 A future hub airport that meets our needs

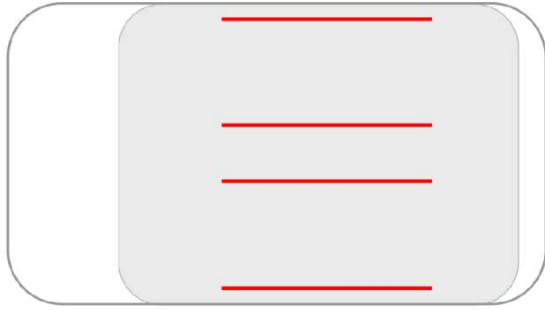
A brand new hub airport designed and built at a new location will make optimum use of space, and offer excellent facilities for its customers and users – passengers, airlines, and freight transporters.

A new airport would be designed for rapid and ready modular expansion. It would be able to fully meet demand decades into the future without becoming less efficient and more constrained as it grows. A new airport would also avoid a number of significant risks and the added complexity associated with undertaking major construction jobs on or adjacent to a live airport site.

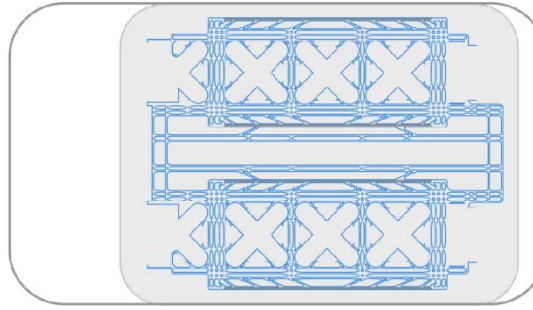
Transport for London have worked closely with Atkins and Pascall+Watson who have brought to bear their considerable experience in designing and developing major airports the world over, to develop a potential future hub airport footprint that can deliver the Mayor's vision. This document sets out one of a number of possible ways of bringing forward a new hub airport on the Isle of Grain. The first thing to establish is a potential airport footprint, the evolution of which is illustrated in Figure 2.1.

Figure 2.1: The process of developing a potential new hub airport footprint

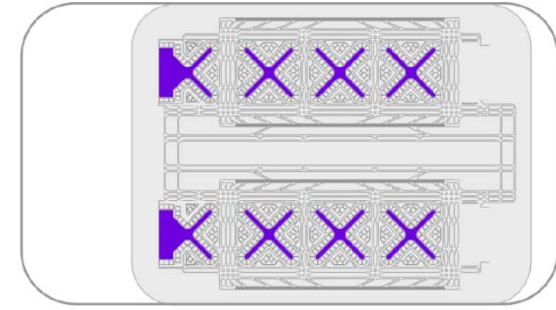
Runways - 4 independent runways delivering a high capacity hub operation, circa 1million movements per annum at 75% utilisation



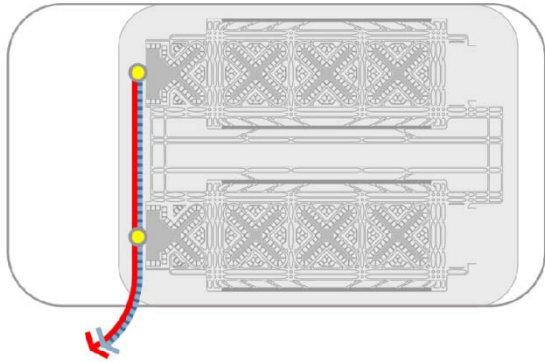
Taxiways - network maximises efficiency & minimises delays by providing End Around Taxiways eliminating runway crossings



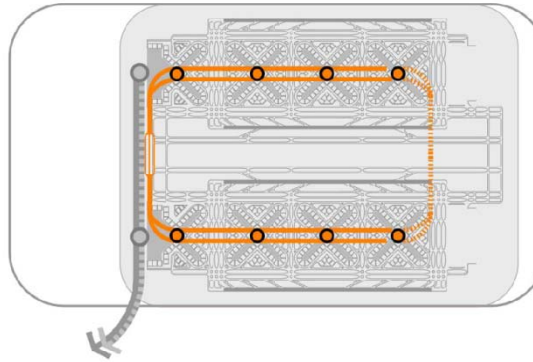
Terminals - Flexible airline hub facilities with twin terminals and satellites providing capacity for 180mppa



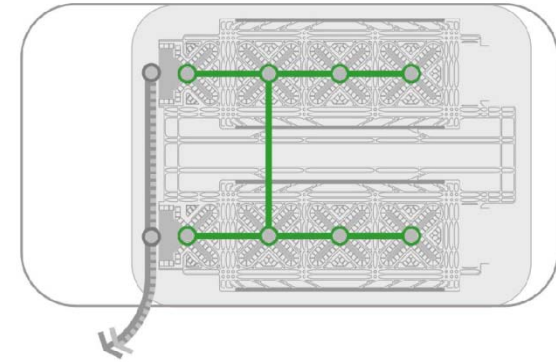
Surface access - public transport interchanges prioritises rail and coach services supporting a world class public transport mode share



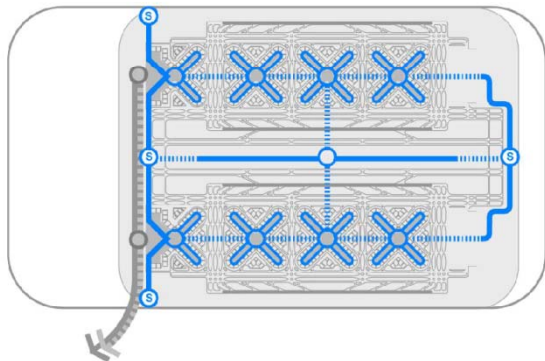
Hub transfers - with world class connections via airside people movers delivering 45 - 60 minute minimum connection times



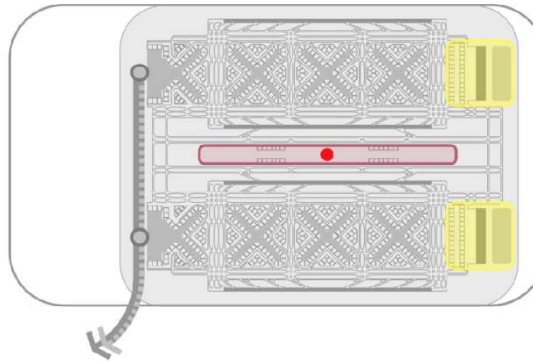
Baggage system - decentralised build & break for efficiency & performance supporting hub transfers



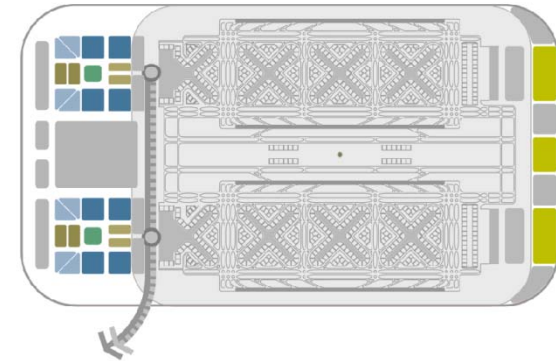
Airside roads - A resilient network linking operational areas



Airport & airline technical support facilities - for airline line maintenance, freight and general airside operations



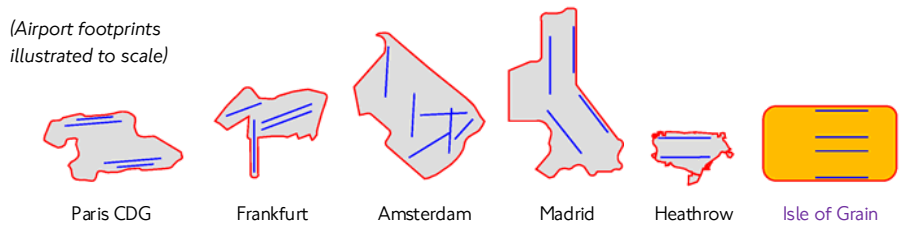
Landside zones & airport city - encompassing hotels, offices, conference & logistic support facilities, developed by the private sector



2.3 An efficient airport layout

An airport configured in this way offers an extremely efficient airport layout, and a significant improvement on other European hub airports. While the footprint of a new London hub would be of a similar size to Amsterdam and Madrid, it would be able to accommodate more than three times the number of passengers. It would also be a more efficient use of space than either Paris or Frankfurt. This is set out in Figure 2.2.

Figure 2.2: Comparison of principal airports in Europe and a new hub airport at Isle of Grain



	As currently configured					
	Paris CDG	Frankfurt	Amsterdam	Madrid	Heathrow	Isle of Grain (2050)
Site Area (km ²)	30.7	23.7	54.5	53.5	13.5	54.7
Passengers per annum (millions)	60.9	56.4	49.8	49.6	69.4	180
Air Traffic Movements per annum	506,900	487,200	420,000	429,000	480,000	1,000,000

2.4 A phased introduction of capacity

A new hub airport designed in this way could fully meet our needs to 2050 and beyond – with a capacity of up to 180 million passengers per annum (mppa). The Government’s own forecasts identify that Heathrow would have demand in excess of 170mppa by 2050 if unconstrained by capacity.

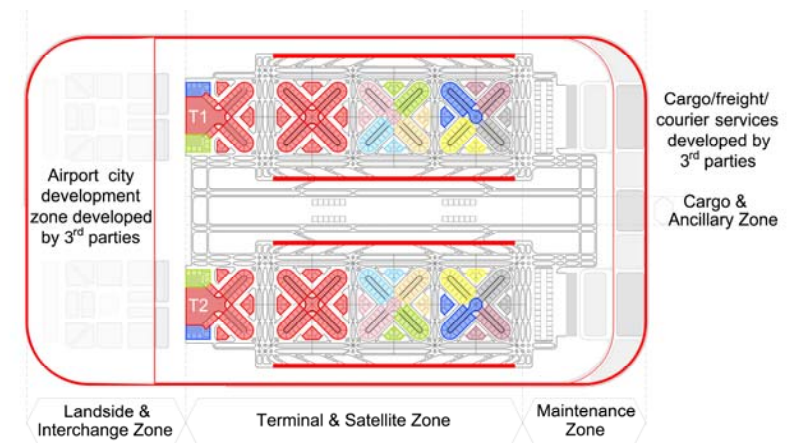
To be successful, a new hub airport will have to be bigger and better than Heathrow from the start. It is assumed that it will accommodate all of the traffic from Heathrow on day one, as Heathrow’s operations relocate to the new hub airport overnight. The DfT forecast Heathrow will accommodate 82mppa in a capacity constrained scenario in 2030. The remainder of traffic at the new hub will comprise a small amount of additional traffic that will have

been suppressed by Heathrow’s capacity constraints. The new hub is therefore assumed to open with a throughput of 90mppa.

All relevant planning permissions and consents will be secured in one go, but the airport will be built in phases. It will grow quickly within the first 5 years of operation. It is reasonable to expect a well planned new airport to be a success once it opens. With plenty of spare capacity to attract new custom, it could fully meet expected (DfT unconstrained Heathrow) demand of 119mppa by 2034. The new hub would have the capacity and quality of service offering to fully meet unconstrained demand beyond 2050 – where it could accommodate in excess of 170mppa.

The new hub airport will have enough capacity to operate a resilient service at all times. It would open with a full complement of 4 independently spaced runways to ensure robust and flexible hub operations are available from the outset. This is a key benefit of the investment. Terminals and satellites will be designed and constructed to ensure that expansion is planned, simple, and does not disrupt normal operations. A potential approach to phasing the construction of the airport to respond to growing demand is set out in Figure 2.3 and Table 2.1.

Figure 2.3: Airport phasing and build-out



Terminal Phasing
Gate Capacity MPPA

2029 — 90	2035 — 138	2050 — 180
2030 — 104	2040 — 150	Post 2050
2032 — 118	2045 — 166	Post 2050

ASSUMPTION:

Terminals open with processing capacity for 80 mppa in each terminal in 2029. Additional capacity for 15 mppa is added in both 2035 and 2045.

Table 2.1: Airport capacity growth

Airport capacity (million passengers per annum – mppa)	2029 (opening year)	By 2035	By 2050
Runways and taxiways	180	180	180
Terminals and transport facilities	120	150	180
Satellites and gates	90	120	180

Heathrow is unable to offer the capacity the UK needs

- London and the UK's status as a leading world aviation hub must be safeguarded. The global economy is growing fast. Heathrow is not able to service our long term needs. London's connectivity to key markets should not merely keep pace, but should lead and innovate.
- Heathrow is essentially operating at capacity, serving 70 million passengers annually. It will not be able to cope with the Government's forecasts for demand of more than 170 million passengers annually by 2050.

2.5 The surface access proposition

Commission question - What estimate has been made of the surface access requirements of the proposal for both existing and/or new infrastructure?

A key part of the proposition is the provision of a comprehensive package of rail and road enhancements, making the most of current and planned schemes such as Crossrail, High Speed 1 and 2, and the new Lower Thames Crossing project, as well as building brand new links. A target public transport mode share of 65 per cent will not only make a new hub airport a more sustainable solution but will also avoid placing undue pressure on the road network.

TfL have worked closely with Atkins to design a rail and road improvements package for a new hub airport at the Isle of Grain, which not only ensure that the airport is appropriately served, but that the new and enhanced links have wider benefits across London and the South East. The proposition meets the following requirements:

- Sufficient capacity to accommodate airport trips in the places and at the times that it is needed.
- Integration with existing/planned networks including HS2 and a new Lower Thames Crossing.
- Levels of service commensurate with the expectations of users.
- Facilitating appropriate levels of connectivity and accessibility to key UK population centres, areas of economic growth, and key international destinations.
- Mitigation against adverse impacts on the performance of the wider transport network, while exploiting opportunities for transport benefits to non-airport users.
- A genuinely attractive proposition, encouraging people to use sustainable modes for airport access. This will further limit the airport's adverse impacts on the environment.

Meeting all of these requirements will require a balanced package of both public transport and road infrastructure and non-infrastructure measures.

Rail connections

The proposed Isle of Grain rail strategy integrates existing and planned infrastructure to maximise airport connectivity across London and the UK. It also delivers significant benefits to non-airport users. The components are described in Table 2.2, and illustrated in Figure 2.5.

Table 2.2: A new hub airport at the Isle of Grain – the rail connections

Rail strategy component	Connectivity impact
Central London Airport Express	High speed connectivity to key London destinations - Waterloo (28mins) Riverside (14mins), Canary Wharf (20mins) and London Bridge (24mins)
HS1-HS2 link	Direct high speed connections to St Pancras, Old Oak Common (29 minutes) and onward connectivity via HS2 to Birmingham and the North
Crossrail extension	Extensions from Abbey Wood via Dartford and Gravesend to provide an additional rail alternative to/from Central London
Local rail connections	Connections to South Essex (via the Thames Crossing), North Kent and South East London, including radically enhanced connectivity to growth and regeneration areas such as the City, City Fringe, Riverside and Thames Gateway

To maximise the public transport mode share, it is assumed that the rail network is in place from the day the airport opens.

Road connections

A phased enhancement of the highway network has been assumed. Some enhancements are potentially only needed beyond the early years of airport build-out. Interventions have been planned to accommodate the needs generated by the airport's construction. Road provision in the long term will also be dictated by general changes in traffic levels and land uses. Some costs of the assumed road interventions may in practice be borne by (or shared with) other delivery agencies as non-airport related road traffic increases. The interventions proposed are described in Table 2.3, and illustrated in Figure 2.5.

Table 2.3: A new hub airport at the Isle of Grain – the road connections

Road strategy component	Purpose
Airport access roads	New access roads and widening of existing roads, to provide efficient access, with two links to provide resilience
Lower Thames Crossing (LTC)	Collaboration with DfT to ensure LTC has enough capacity for peak airport demand.
Capacity enhancements to the M25 and the A2	Widening and enhancement to mitigate against delay and congestion for airport and non-airport users.

Surface access investment will be required regardless of location

- Substantial expansion at any existing or new airport location in South East England, including Heathrow, will require significant investment in surface access infrastructure.
- Proposals for a four runway Heathrow building on the existing infrastructure would involve a more dispersed development of terminals, making it more complex and expensive to provide the necessary surface access.

2.6 Siting the airport and the surface access links, and their spatial context

AIRPORT AND SURFACE ACCESS DESIGN ASSUMPTIONS : SUMMARY	
Opening year	<ul style="list-style-type: none"> • 2029
Capacity	<ul style="list-style-type: none"> • Opening capacity of 90mppa with a full complement of 4 x 4000m runways • Expand terminals and satellites to allow for 180mppa capacity by 2050
Operating features	<ul style="list-style-type: none"> • Few constraints around night flying. New hub can accommodate substantial demand between 2100 and 2400, and 0400 and 0600 hours – and retains the flexibility to accommodate some night operations as required • Minimum connection times (MCTs) for passengers transferring of around 45 minutes
Passenger demand	<ul style="list-style-type: none"> • Heathrow takes on a different role. Traffic at Heathrow will relocate to the new hub • 90mppa in 2029, the opening year • In 2034, the new hub airport will fully serve DfT unconstrained demand - 119mppa. • From 2034 through to 2050 airport throughput mirrors DfT unconstrained demand, reaching 170.1 mppa in 2050. • 1 per cent growth per annum after 2050.
Rail / Road demand	<ul style="list-style-type: none"> • Percentage of airport passengers who are transferring during peak hours, 35 per cent. • Airport passenger surface access mode share: 65 per cent public transport, 35% private car.

The eastern end of the Hoo peninsula is 30 miles east of Central London. The local area is sparsely populated, relatively flat and open. Historically, the area has accommodated farming, energy generation and storage, shipping, and industrial land uses, as well as a small number of settlements. It is located in an 'arc' of towns stretching from Gillingham, Chatham, Rochester and Gravesend to the south, to Grays, Tilbury, Basildon and Southend to the north, as well as being at the heart of the Thames Gateway regeneration area – the largest in the UK.

The Mayor's preferred Inner Thames Estuary location is illustrated in *Figure 2.4 – siting and key considerations*. This map identifies a number of key considerations that have influenced this recommendation. The new road and rail links described above, and the associated key development zones that they could stimulate are illustrated in *Figure 2.5, the spatial context*. The remainder of this document is focussed upon exploring the impacts and deliverability of the airport and the surface access links.

Figure 2.4: A new hub airport at the Isle of Grain – siting and key considerations

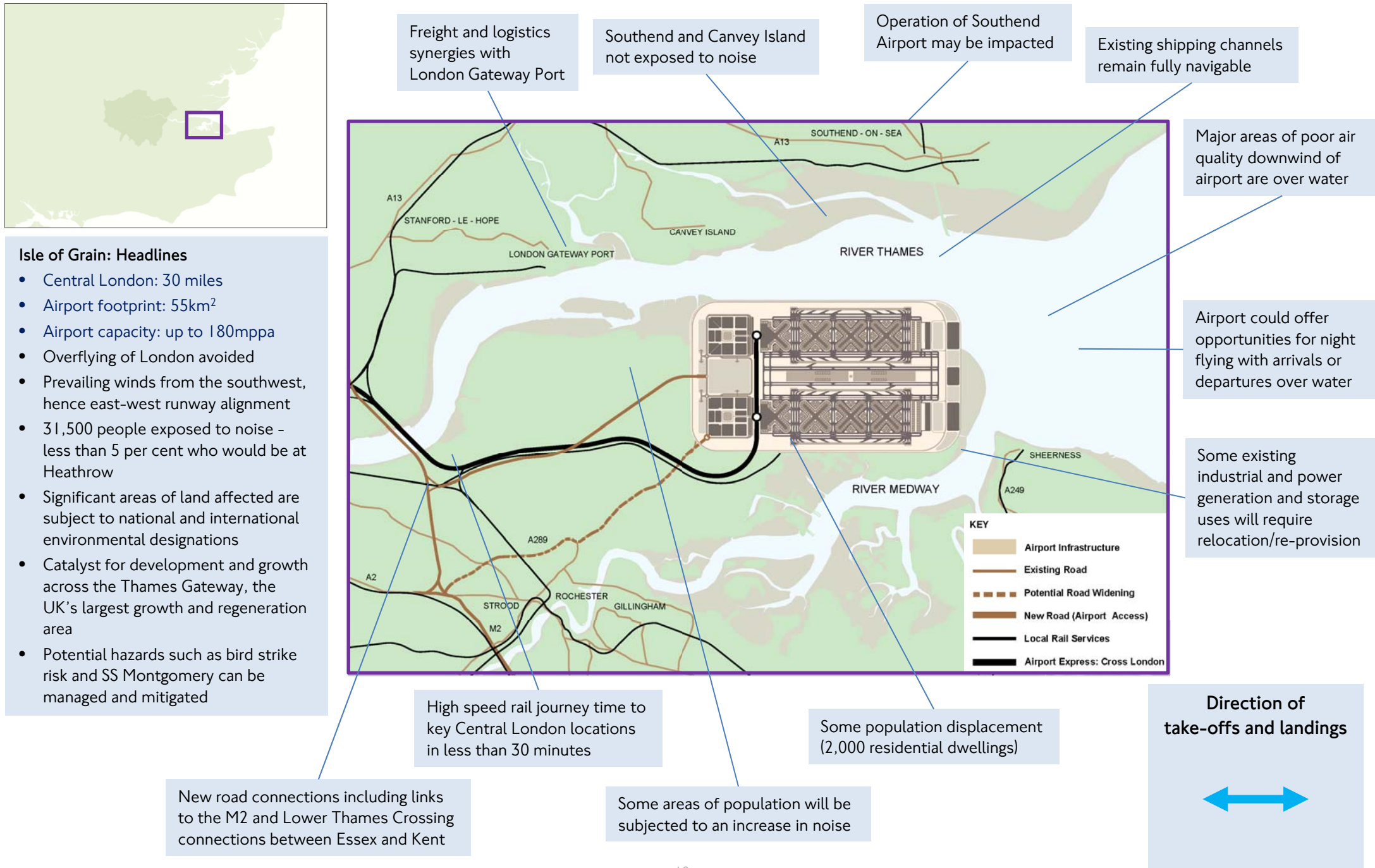
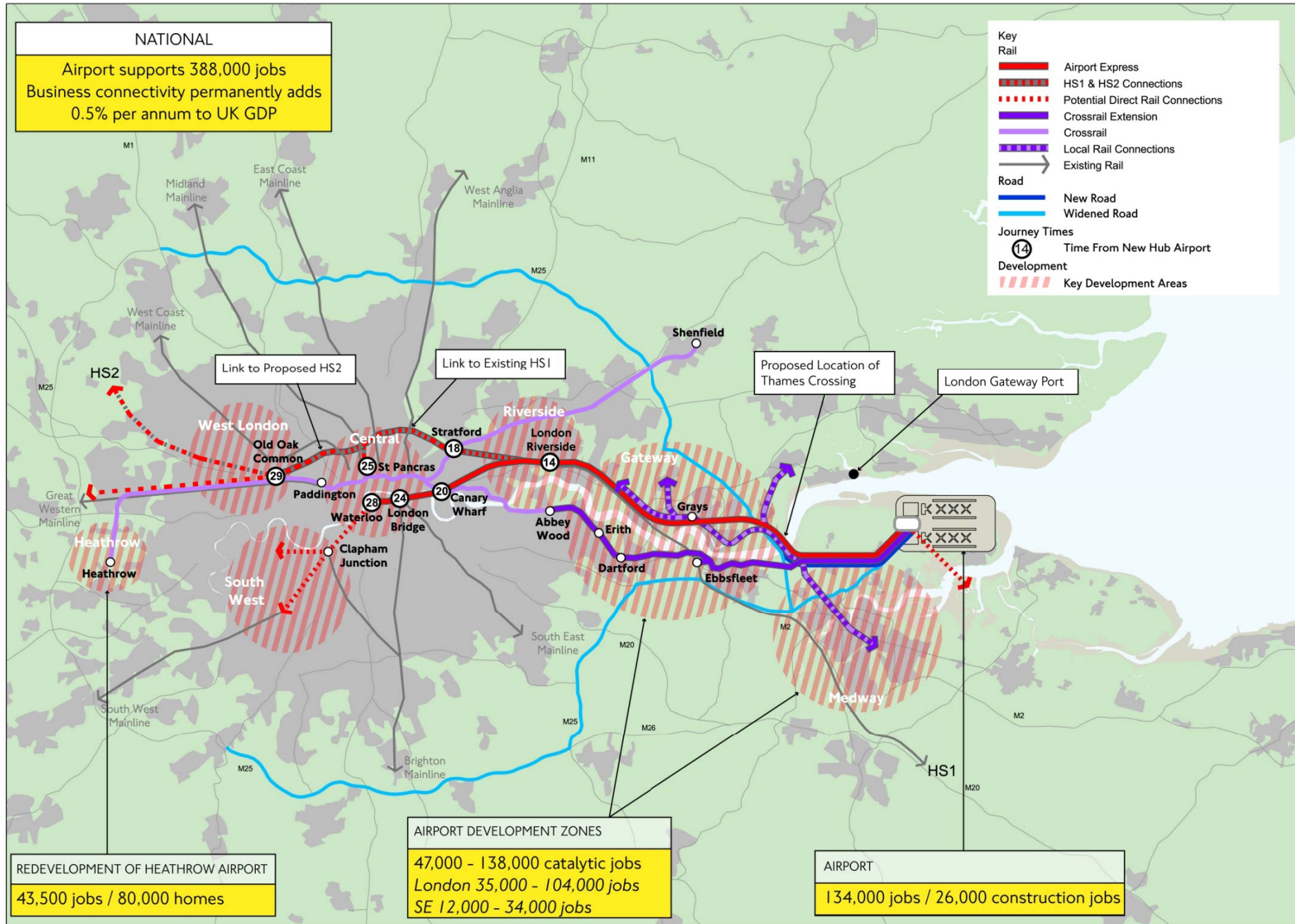


Figure 2.5: A new hub airport at the Isle of Grain – the spatial context



3 THE ECONOMIC IMPACTS

Commission question – What are the potential national economic impacts of the proposal?

Commission question – What are the likely impacts of the proposal on the regional / local economies surrounding a) the proposed site for new or enhanced capacity and b) other airports affected by the proposal?

Oxford Economics, Ramboll, Atkins, York Aviation, Regeneris and Innovacion have worked with Transport for London to identify the potential long term economic benefits for London, the South East and the UK of a new hub airport at the Isle of Grain, driven by a step change in connectivity and the UK's participation in global business. This assessment is based on the proposition set out in Chapter 2.

3.1 Impacts on the UK economy through the provision of international connectivity

York Aviation have compiled a detailed route-by-route analysis of the potential global connectivity on offer at a new hub airport, compared to alternative scenarios. A new four independent runway hub airport at a single site will offer:

- A 75 per cent increase in destinations served by Heathrow currently and a 13 per cent increase in the number of destinations served in total by the London Area Airports.
- Substantially improved connectivity to areas of international business growth and emerging markets. More than 40 new destinations in these markets will be added, including six new country markets. The expanded range of destinations is particularly notable to the large, rapidly growing countries of China, Brazil and India: eight more destinations are added in China, three more in Brazil and three more in India compared to the next best option.
- Nine new domestic connections (16 domestic destinations in total), complementing the improvements to pan-UK connectivity enabled by the planned new High Speed Rail network. There will also be a substantial increase in frequencies on many existing domestic air connections.

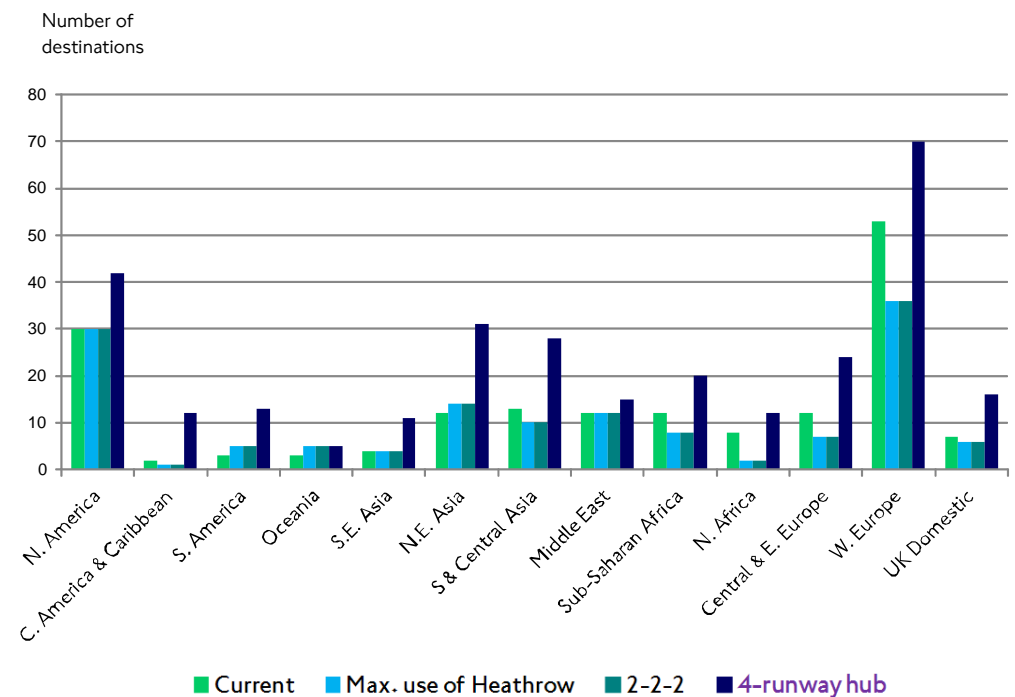
By 2050, the proposed new four independent runway hub is projected to serve a total of 299 destinations with 9,226 flights per week², the distribution

of which compared to Heathrow currently, Heathrow in 2050, and a distributed expansion model (2-2-2) is set out in Figure 3.1, below.

Heathrow cannot meet our connectivity needs

- A new four-runway hub would serve 159 more destinations and more than double the flight frequencies than would Heathrow in 2050, without new runways or terminals.
- A distributed hub model, or 2-2-2 (two runways at each of the three main London airports) would not offer any connectivity advantages. It is difficult to envisage Gatwick and Stansted becoming meaningful competitors to Heathrow, even with substantial investment.

Figure 3.1: The connectivity benefits of a new hub airport – destinations served, by world region, by scenario³



The potential long-run productivity growth that could arise from such an increase in aviation connectivity has been modelled. The economic benefits include ready access to new and fast growing markets, and quicker adoption of new ideas. The long-term economic benefit of the increased capacity provided by a four runway hub airport is to permanently increase the UK's GDP by 0.5 per cent by 2050⁴. In terms of current GDP this is worth £6.9 billion a year and is in addition to the demand-side employment and output impacts which are discussed in Section 3.4 below.

Each UK region is already heavily dependent on exporting to emerging markets. This is forecast to need to increase if the Government is to fulfil its economic ambitions.

Overall, a new hub will substantially improve the UK's ability to connect to areas of international business growth and emerging markets. Through its role in enabling domestic connectivity the new hub airport will also provide benefits to all regions of the UK. For some areas it will provide hub connectivity for the first time, for others it will either reintroduce connections that have been lost or enhance the existing offer.

Heathrow is not a hub for the UK regions

- Domestic connections have steadily decreased at Heathrow to only 7 destinations currently. A new hub could support 16 domestic routes, at increased frequencies, and ensure that the UK regions had excellent global access.

3.2 Facilitation of UK trade in goods and services

The new hub airport will significantly support the UK's ambition for increasing trade in goods and services globally. Aviation plays a critical role in supporting trade between countries, both in terms of trade in goods (via air cargo transport) and in services (via air passenger transport). Goods traded by air accounted for 35 per cent of the value of the UK's non-EU trade in 2012, with a value of £120 billion. Nearly two-thirds of companies report that passenger services are either vital or very important for sales, marketing and servicing or meeting customers⁵. Currently, the UK's high-value service industries, such as banking and finance, accountancy, insurance, pension funds and advertising - which provide 2.4 million jobs, one third in London - are those most reliant on air transport for international connectivity. They are also fast growing: more than 63,000 new jobs were created in these sectors between 2010 and 2011 alone (+2.7 per cent).

The global economy is forecast to become even more dependent on trade over the next decade, with world trade projected to increase by over 90 per cent by 2021⁶. The UK government has put forward ambitious export targets for 2020: a doubling of the current levels of trade to £1 trillion by 2020 and to have 100,000 UK companies exporting. Demand remains weak in both the UK and European markets. Excellent aviation connectivity will benefit UK businesses looking to trade with the emerging markets in Asia, Latin America and the Middle East, whose middle class markets are expanding rapidly.

3.3 Impact on tourism and VFR

As the world's sixth most popular tourist destination, tourism is a key sector for the UK worth £106.3 billion in 2012⁷ (6.8 per cent of GDP). The UK is ranked 8th out of 184 countries in terms of the GDP contribution of tourism.

The new hub airport will significantly enhance the UK's potential for tourism given the importance of air travel and London's role as a gateway for all regions of the UK. A new hub airport will allow the UK to potentially attract more than 70 million non-business travellers by 2050⁸ and capture the economic benefits that flow from the £1,100 spent, on average, by each long haul passenger.

The potential of visiting friends and relatives (VFR) passengers from growth and emerging economies alone is significant⁹. In 2011, 4.2 million people used air travel for visiting friends and relatives in London, spending £2.3 billion and accounting for half of all inbound VFR trips to the UK. Air related VFR spend in London from visitors from growth economies has been increasing by 11 per cent per annum since 2002 and average trip length is 23 days compared to just six nights for visitors from EU15 countries. VFR also brings important social benefits for a city as diverse as London and enhances our ability to attract the best talent.

3.4 Impacts on the local and national economy through both direct and indirect effects

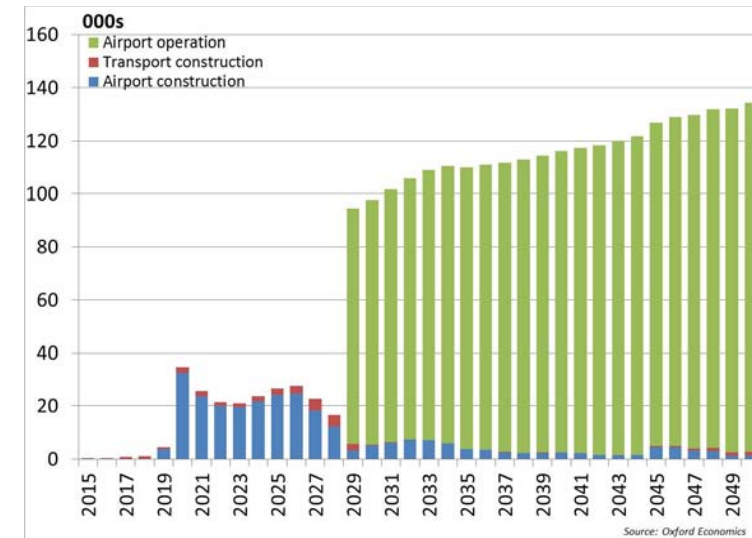
The development and operation of the new airport and its transport links will generate significant new employment and productive activity¹⁰. The effects will flow through to other parts of the local and national economy through supply chain effects. Those building or working at the airport, on the transport links, or in the associated supply chains, will spend some of the money they earn, creating further impacts. These effects have been quantified¹¹.

- Phase I of airport construction starts in 2020 and lasts until the airport enters operation in 2029. A second phase of airport construction starts in 2025 and runs to 2050. Phased construction of road and rail links start in 2015 until airport opening and are then followed by renewals.
- By 2025 airport construction will generate a net total of 24,000 local area construction jobs generating £1.34 billion in local GVA. Ground construction will add a further 2,000 local jobs and approximately £130 million in local GVA. These impacts are net and account for the displacement of local labour from other jobs.

When the airport opens and as its operational use expands, a very large number of permanent additional jobs will be created locally. Defined on the basis of commuting, the local impact area that will benefit includes Medway, Swale, Maidstone, Tonbridge and Malling, Gravesham and Dartford.

By 2050 operations of the new hub airport will generate 132,000 jobs worth £16.4 billion in local GVA per annum. There will also be small local impacts arising from the operation of the surface transport link and on-going construction (both contributing about 2,000 net local jobs). The new hub airport will trigger high levels of growth in transportation, logistics and storage, wholesale and retail, administration, and accommodation and food services. As well as a wide range of low and high skill job opportunities the airport will permanently raise the productivity level of the local area. The local employment impact is illustrated in Figure 3.2, and the national and local employment and GVA impacts are set out in Table 3.1.

Figure 3.2: Additional local employment (net) created in the Isle of Grain local area



With exceptional levels of public transport provision, the 160,000 new permanent airport and construction jobs would be accessible to London’s growing workforce.

Table 3.1: Employment and Gross Value Added (GVA) created by construction and operation of a new hub airport at the Isle of Grain including ground transport links (2050)

	By 2050	
	Employment	Annual Gross Value Added (GVA) £2013
Total UK Jobs and Economic Output Supported <i>(Gross National Economic Impacts)</i>	388,000	£42.3 billion
Additional Local Jobs and Economic Output Created <i>(Net Local Economic Impacts)</i>	134,000	£16.6 billion

Nationally, the airport will support 388,000 jobs¹² by 2050 and generate a cumulative GVA impact of £726 billion between 2015 and 2050 – about £20 billion each year. This is in addition to the permanent annual supply-side improvements to the UK's economy discussed in Section 3.1.

3.5 Catalytic effects

A new hub airport will also trigger additional job creation through catalytic induced effects. There is substantial international evidence of this phenomenon with businesses benefitting from locating adjacent to an airport or in a corridor running from the airport towards the city.

A new hub airport on the Isle of Grain is conservatively estimated to trigger the creation of a further 47,000 to 138,000 catalytic jobs¹³ around the airport and in the key development zones (illustrated in Figure 2.5). Based on global evidence, the airport corridor would include science and business parks, conference facilities, hotels, logistics, healthcare/medical services, higher education and advanced manufacturing as well as additional residential development.

Geographically, an Inner Estuary Aerotropolis¹⁴ would comprise an 'Eastern Growth Wedge' stretching in a corridor from Southend and Swale in the east, through Medway, Thurrock, Barking and Dartford to central London and Heathrow in the west.

3.6 Alignment with local and regional economic strategies

As part of an integrated infrastructure and development plan a new hub airport will support the high rates of growth that are forecast for London¹⁵:

- A population expanding by 2.1 million people from 8.2 million in 2011 to 10.3 million in 2036 at a rate of about 84,000 people each year.
- A labour market expanding by 850,000 jobs from 4.9 million in 2011 to 5.8 million in 2036 at a rate of about 35,000 each year.

Regional and local strategies, the London Plan, and the economic development strategies, core strategies and other relevant plans for the local area will be transformed by introducing a new hub airport at the Isle of Grain. The scale of growth will be much larger than is assumed in the plans and consequently the strategies would need to be revised to maximise the economic and social benefits for London, the south east and the UK.

3.7 Impact on inward investment to the UK

With net investment inflows of £41 billion into the UK in 2010, over 94,000 jobs depend on Foreign Direct Investment (FDI) in the regions and countries of the UK. FDI is particularly important in the North East, the West Midlands, Northern Ireland and Wales. There is a significant evidence base showing a clear link between air connectivity and inward investment. Transport links are an essential factor in the location decision of 52 per cent of companies and 63 per cent of firms stated that air transport was vital or very important to investment decisions. Other research suggests that FDI increases by 50 per cent after a first direct connection to a foreign region¹⁶.

3.8 Impacts on Heathrow Airport

There will be economic impacts from relocating Heathrow's activities to a larger hub airport in 2029 and implementing a carefully planned redevelopment scheme for the airport site immediately on closure¹⁷. With its location, the dynamism of the surrounding economy, the high growth forecast for London and the current transport provision Heathrow offers a unique development site in terms of location and scale. For this assessment, the complete closure of Heathrow has been assumed, though in practice a small airport could remain.

In the long run, closing Heathrow would not reduce the UK's total employment and GVA. All of the economic activity associated with the airport will find alternative uses elsewhere in the economy. Any job loss does not mean a rise in unemployment. With a relocation, large-scale redundancies are avoidable. Whilst some of the Heathrow workers will find alternative employment in the local area, others will be attracted to regional opportunities using the excellent public transport connections. Those currently employed in skilled airport operational jobs would be able to transfer to the new hub airport.

In a residential redevelopment scenario¹⁸, that is consistent with the current London Plan, the area would have an additional 184,000 residents (approximately 80,000 households) and four town centres by 2053 as well as many thousands of construction jobs and increased supply chain purchasing during redevelopment. GLA forecasts anticipate that London's population will increase from 8.4m in 2013 to more than 9.6 million in 2030 – an increase of more than 1 million people¹⁹. Given the scale and location of the site, there is also potential for significant high value, knowledge intensive uses, for

example, bringing together higher education and science / innovation parks as part of an international offer.

The switch from employment use to the creation of a new London Borough is estimated to result in a net loss of 33,500 jobs locally which is fewer than the jobs that London is forecast to create each year in the future (35,000). Furthermore, between 1998 and 2008 London and the South East created more than 94,000 jobs each year. These impacts are summarised in Table 3.3.

Table 3.3: Employment impacts of Heathrow closure and residential redevelopment (to 2053)

	By 2053
	Employment
Closure of Heathrow	-77,000
Residential redevelopment	+43,500
Total	-33,500
<u>Annual job creation in London to 2036 (GLA Forecast May 2013)</u>	+35,000
<u>Annual job creation in London and the South East 1998-2008 (ONS)</u>	+94,190

3.9 Impact on the freight and logistics industry

Aviation infrastructure is critically important to the air freight industry and London's six airports facilitate 76 per cent of the UK's air cargo. Sustaining enough aviation capacity to meet future air freight demand is the first step in encouraging trade growth. However, with increased global trade the UK's demand for air freight, in both bellyhold and dedicated cargo freighters, could treble by 2050.

The difference between forecasts to 2050 for air cargo and the DfT's constrained forecasts of total Air Traffic Movements represents economic activity that may not pass through London. While some surplus demand may be met using airports outside the London area or even airports in continental Europe, it would be at a higher cost and represent a welfare loss. Modelling the lost value of these traded good involves analysis of a range of air cargo forecasts (e.g. DfT, Boeing, and Airbus) and then estimating the financial value.

Using this approach²⁰ it is estimated that by 2020 up to £21 billion worth of air cargo could be lost to London airports due to capacity constraints. By 2050, this loss rises to £270 billion due to an increase in capacity constraints. A new hub airport would substantially remove these freight constraints by increasing both capacity and operational periods.

3.10 Additional economic benefits

A new hub airport at the Isle of Grain would have a range of other economic benefits not quantified in this assessment²¹. These include:

- **Crowding relief and user time savings** - particularly on the congested central London corridors for non-airport traffic and on congested parts of south east road network.
- **Wider economic development opportunities**
 - Releasing supply-side (infrastructure and market conditions) constraints on growth in the South East of England could trigger new jobs and housing; additional housing could improve affordability and support the London labour market.
 - Agglomeration benefits – maximising the clustering potential of industries and workforce.
- Impacting in a similar way to Crossrail, there would also be wider economic benefits (e.g. agglomeration) arising from the investment in rail capacity

improvements to support an expanding central London. These user and wider benefits for central London rail investments alone are conservatively estimated at between £12 and £15 billion.

ECONOMIC IMPACTS : KEY FINDINGS

- The additional business connectivity offered from a new hub airport will permanently add 0.5 per cent to UK GDP by 2050, currently valued at £6.9 billion.
- Nationally, a new hub airport would support 388,000 jobs by 2050 and result in a cumulative UK GVA impact of £726 billion between 2015 and 2050.
- Locally, by 2050 the hub airport will create 134,000 new jobs generating £16.6 billion in local GVA per annum. Significant expansion would occur in transport, retail and accommodation sectors and local productivity levels will increase.
- By 2025 airport construction will generate a net total of 24,000 local area jobs generating £1.34 billion in local GVA.
- By 2020, up to £21 billion worth of air cargo could be lost to London airports due to capacity constraints. By 2050, that amount rises to £270 billion due to increasing capacity constraints.

4 THE IMPACTS ON PEOPLE

Commission question – How will the proposal impact upon the passenger experience (eg. choice, cost, accessibility, etc?)

4.1 Impact on price of air travel for the consumer

If airport expansion is to be feasible, it must address the needs of passengers, offering meaningful choice, a quality experience and reasonable fares. A new hub airport on the Isle of Grain will:

- Encourage airline competition by having capacity for new entrants, routes and frequencies, in sharp contrast to a highly constrained Heathrow, this will have a positive impact on fares and improve airlines' service offering.
- Safeguard passenger choice of airports, between an effective hub airport with a comprehensive shorthaul and longhaul network and more local non-hub airports with a selection of popular routes, mostly shorthaul and leisure focused.
- Need to be regulated appropriately, because hub airports by their nature have no perfect competitors. This will – in conjunction with market forces – maintain airport charges at a reasonable level, as well as securing investment for ongoing improvements to facilities. The impact of charges levied by the airport as a result of its commercial requirements is discussed in chapter 8.
- Be designed to offer significant operational efficiencies, helping further reduce costs, by, for example significantly reducing the delays and resilience issues that plague Heathrow today, by introducing ample runway, apron and terminal capacity.
- Have the space to improve the overall passenger experience, allowing for a more spacious terminal design and improved facilities dedicated to premium passengers.

It is also important to emphasise that the airport's surface access connections have been designed to offer fast, direct, rail connections that bring the airport front door to many different locations across London and the southeast and beyond. Remote city air terminals could be implemented and optimised for multi-modal access, and offer check-in and bag-drop facilities.

London needs a proper hub airport that offers a world-class passenger experience

- Heathrow's piecemeal evolution has resulted in long connecting times and convoluted routings for aircraft, passenger, baggage, and cargo transfers. Despite recent developments, using the existing infrastructure will continue to place limitations on the overall passenger experience at Heathrow.

4.2 Impacts on identified regeneration or growth areas – including on local business and employment

Commission question – What are the likely social impacts of the proposal, including impacts around the proposed location for new capacity, and around any other airports which would be affected, for example on employment, housing and local communities, vulnerable groups, quality of life and health

There is a clear national strategic case for locating a new hub airport to the east of London - providing a 50 year+ spatial framework for the long term expansion and development of London and the South East. Despite London's track record and prospects for continued economic success, the capital faces a range of challenges and potential growth constraints:

- A chronic and growing shortage in the supply of housing affecting affordability, labour market performance, economic growth and global competitiveness.
- Although London and the Greater South East drive the UK economy, substantial concentrations of persistent deprivation and unemployment remain. These are particularly evident in east London and the Thames Gateway - areas identified as growth locations in current planning documents.
- The Thames Gateway offers the single largest latent supply of development land in the Greater South East (34 per cent of the total for housing). This capacity, which does not exist at other locations in the South East, will be required to accommodate the potential development opportunity that a four run hub airport would trigger in the long term.
- Focussing long term development where it is needed could protect Green Belt and rural areas in other parts of the UK and avoid increases in congestion in other areas. This is effective stewardship of the UK's scarce land resources while supporting national economic growth.

- The slow progress in completing the Thames Gateway project has been due to a significant infrastructure deficit and the absence of large, catalytic economic projects. A new hub airport is such a project.
- The local community will benefit from greater employment and better housing opportunities. Being in employment has been shown to have beneficial health impacts. Local communities will be affected by an increase in aviation and surface transport noise and air pollution. For some, this may be a substantial step change from existing conditions, but the number of people who would be affected is many multiples lower than those at both Heathrow now – and in the future.

A summary socio-economic profile of the Isle of Grain together with the forecast impacts is given in Table 4.1, below. The local community will benefit from: an unprecedented increase in local employment opportunities around the airport and more widely; falling unemployment; increasing incomes; increasing housing and social infrastructure provision and a reduction in out-commuting for work. The long term annual rate growth in jobs will double.

Table 4.1: Current profile and forecast impacts for Isle of Grain local area (six neighbouring authorities).

Isle of Grain Local Area <i>Medway, Swale, Maidstone, Tonbridge and Malling, Gravesham and Dartford</i>		
	Current Profile	Forecast Impacts
Population	<ul style="list-style-type: none"> Resident population of 875,000 (2011) 	<ul style="list-style-type: none"> Population increases by 81,000 residents by 2050
Housing	<ul style="list-style-type: none"> A stock of 371,000 housing units which grew by 10% between 2002 and 2012. 	<ul style="list-style-type: none"> Households increase by 35,000 over baseline population forecast
Economy	<ul style="list-style-type: none"> An economy of 401,000 jobs and 26,945 businesses Jobs grew on average by 0.48% per annum (1991-2013 including a period of comparatively strong national growth). 	<ul style="list-style-type: none"> An additional 134,000 local jobs per annum by 2050 (concentrated in transport, storage, retail, food, accommodation, administration and support services) and 24,000 construction jobs by 2025. Access to a significant proportion of up to 138,000 catalytic jobs in the airport corridor and nearby development zones. On average, in the future, employment will grow by 0.78% per annum between 2020 and 2050 – a doubling of the historic rate. Growth will peak at 1.35%/annum during the construction phase (2020-2030)
Labour Market	<ul style="list-style-type: none"> Above average unemployment (18,920 JSA claimants in March 2013) 	<ul style="list-style-type: none"> Unemployment (claimant count) falls from an average of 3.3% to 1%. A reduction in net out-commuting from 49,000 in 2012 to 5,000 in 2050.
Income	<ul style="list-style-type: none"> Levels of deprivation higher than the UK average (in Swale, Medway, Gravesham and Dartford) 	<ul style="list-style-type: none"> Personal disposable income forecast to grow by an additional 7.4% by 2050 (+£2,600).

Commission question – Improvements in access to international connectivity from areas previously poorly served?

The new hub airport will significantly improve international connectivity for previously poorly served regions of the UK. It will increase both the number of destinations and the frequency of domestic air services. By 2050, the number of domestic destinations could rise from seven in 2013 to 16 (Figure 3.1). Remote regions of the UK in particular will gain. New connections would be established to Dundee, Inverness, Belfast International, Derry, Newquay, Guernsey, Jersey and the Isle of Man. Existing services to destinations such as

Aberdeen and Glasgow will also benefit as they experience significant increases in frequency.

Commission question – Urbanisation effects particularly in rural or Green Belt areas resulting from major infrastructure?

Urbanisation would lead to positive economic impacts (primarily realised in the employment gains) and positive societal impacts, such as the facilitation of significant housing provision. Modelling forecasts that the direct, indirect and induced employment effects²² of a new airport at the Isle of Grain would increase households by 35,000 in the local area. However, 37,000 units were built over the last decade and the capacity for housing development in the vicinity is 98,620 units which could accommodate a population of 227,000²³. This capacity rises to more than 379,000 housing units across the wider Thames Gateway²⁴.

Expansion at Heathrow would have significant impacts on the Green Belt

- A four runway Heathrow including the associated commercial and residential development requires a major incursion into the surrounding Green Belt and a significant increase in house building in an already congested area. Constructing the 30,000 houses needed for the expanded airport workforce would absorb every house planned to be built in Hillingdon and Hounslow over the next 15 years. The alternative is that local residents and younger people in particular would be priced out of the housing market and unsustainable commuting patterns will be increased further.

Commission question – How does the proposer plan to engage with local communities in taking forward their plans?

A new hub airport at the Isle of Grain would have a number of impacts on the local area, but working with local authorities and local communities can ensure any issues are handled sensitively and that the appropriate mitigations are put in place.

A new hub airport will also present a unique range of opportunities for local communities in terms of the jobs created, potential for regeneration and the very significant boost to local transport infrastructure investment. Dialogue with local authorities will be essential to ensure that growth is as much as possible aligned with their existing development plans and regeneration sites. Similarly, an Isle of Grain airport, as well as creating an incredibly well

connected public transport interchange for the benefit of local people, could also support specific local transport objectives, such as a Lower Thames Crossing.

PEOPLE IMPACTS : SUMMARY OF FINDINGS

- After 25 years of public regeneration expenditure, the hub airport offers the potential to complete the original aims of the Thames Gateway and provide a spatial planning strategy to accommodate London and the South East's growth needs for the next 50 years.
- By focusing development where there is capacity - Green Belt and rural uses are protected in other parts of the UK.
- The local community will benefit from: an unprecedented and permanent increase in local employment opportunities around the airport and more widely; falling unemployment; increasing incomes; increasing housing and social infrastructure provision and a reduction in out-commuting for work.
- A new hub airport will be a powerful mechanism to address deprivation which persists in concentrations in East London and outwards to South Essex and North Kent.

5 SURFACE ACCESS IMPACTS

Commission question – Does the proposal provide effective surface access for passengers, businesses and relevant freight traffic? Will surface access plans provide the capacity needed for expected future demand? How does the proposal impact upon local traffic and congestion? What is the expected surface access split between public and private transport?

5.1 Potential surface access demand

An airport transport network must cater for a range of demands, each with their own characteristics - trip purpose, time of travel, origin/destination and mode will vary. This analysis has distinguished between air passenger, airport staff and freight, recognising that each category displays significantly different travel characteristics and requires different surface access provision.

The scale of the proposed intervention, which is described in chapter 2, is designed to meet the volume of surface access trips estimated at full build out of the airport to 180 mppa and provide excellent levels of sustainable connectivity to key destinations. Well established transport models have been applied to test transport network performance (TfL's Railplan for public transport and the Highway Agency's M25 model for road). It is assumed that during the peak hour 35 per cent of air passengers are undertaking transfer trips and do not therefore leave the airport. A target of 65 per cent use of public transport has also been set, although the proposed strategy has been tested for capacity and impact against a range of mode split outcomes.

5.2 Formulation of surface access demand

The peak hour of demand for surface access is forecast to be 07.00 to 08.00, when 32,000 air passengers will be travelling to and from the airport²⁵. It is also assumed that a further 9,000 two way staff trips will be made during this hour (although predominant staff movements will occur outside the air passenger peak because of patterns of shift working). The scale of the demand challenge in serving a new hub airport is illustrated in figure 5.1. These figures imply a forecast of around 8,000 vehicle trips to the airport, allowing for cars, taxis, buses and coaches and freight movements.

Figure 5.1: The scale of the demand challenge - 0700-0800 (peak hour, two-way person trips)

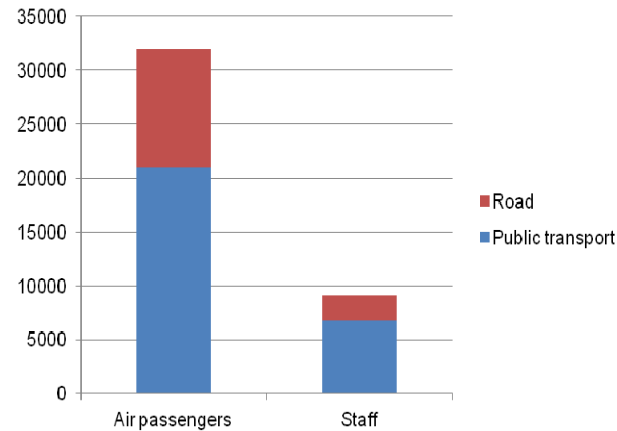
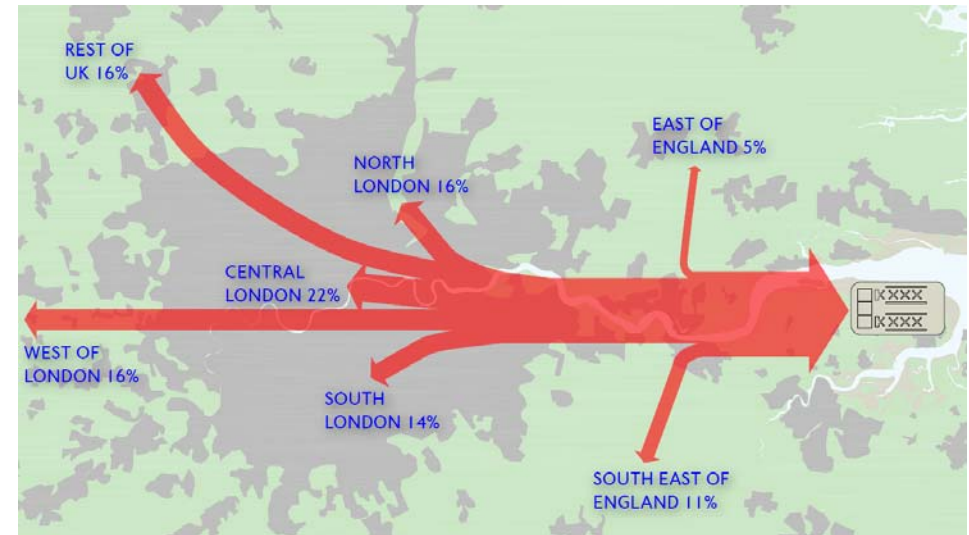


Figure 5.2: Potential distribution of air passenger demand from a hub airport at the Isle of Grain (all trips)



5.3 Distribution of trips

An analysis of current patterns of air passenger distribution at Heathrow has been conducted. Minor, conservative adjustments have been made to reflect a shift of demand towards the east of London. A more thorough review would predict a greater displacement of trips to occur. Figure 5.2 shows peak hour air passenger distribution assumptions. Half of staff trips are assumed to be drawn from a 20km 'local' North Kent/south Essex area – including key settlements such as the Medway Towns, Basildon and Dartford. With excellent public transport links and the potential for travel discounts for staff on these connections, the vast majority of the remaining 50 per cent of those employed at and around the airport could live within Greater London.

5.4 Wider benefits of surface access network enhancements

The rail proposition brings benefits to both airport and non-airport public transport users in London. These benefits will be realised in terms of new and improved travel opportunities on the London public transport network, and much needed relief on some of the busiest parts of the public transport network in Central London, notably the Jubilee line between Waterloo and Canary Wharf via London Bridge (which will reduce pressure on key peak hour bottlenecks). The Thames Gateway will also benefit from a step change in connectivity, from both high speed services and more frequent and north-south local connections.

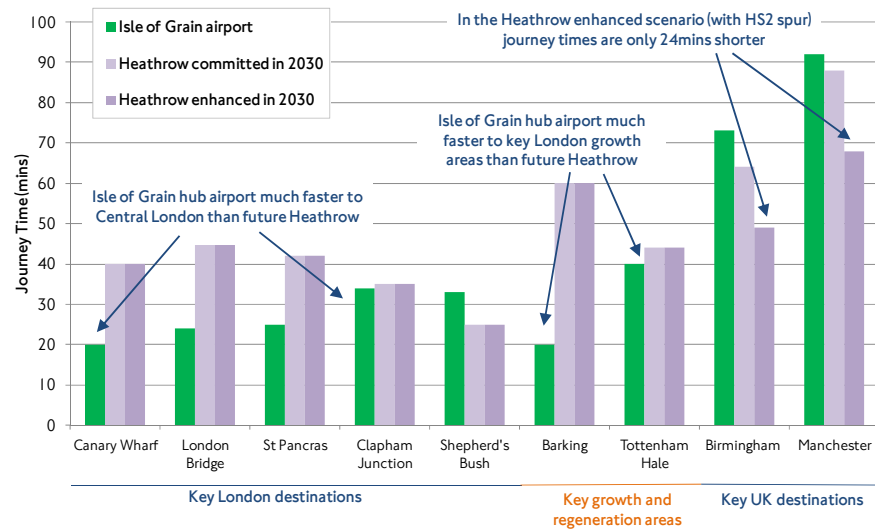
The road network strategy provides efficient access to the airport for road users, and also ensures that airport traffic does not impose additional delay and congestion on other road users.

5.5 Surface access strategy – Key impacts

Commission question – How will the proposal change journey times from major business and population centres for users of aviation services?

The proposed network of links will enable much faster public transport journey times between London’s principal airport and most key destinations in London than are currently (and will be with Crossrail) possible from Heathrow. Well designed high speed rail services could permit Old Oak Common and Waterloo to be connected to an airport at the Isle of Grain in less than 30 minutes. Most of South East England and many locations across London will benefit from shorter journey times to an Isle of Grain airport compared to a 2030 Heathrow scenario – as illustrated in Figure 5.3.

Figure 5.3: Comparison of future journey times from the Isle of Grain to key places in 2030

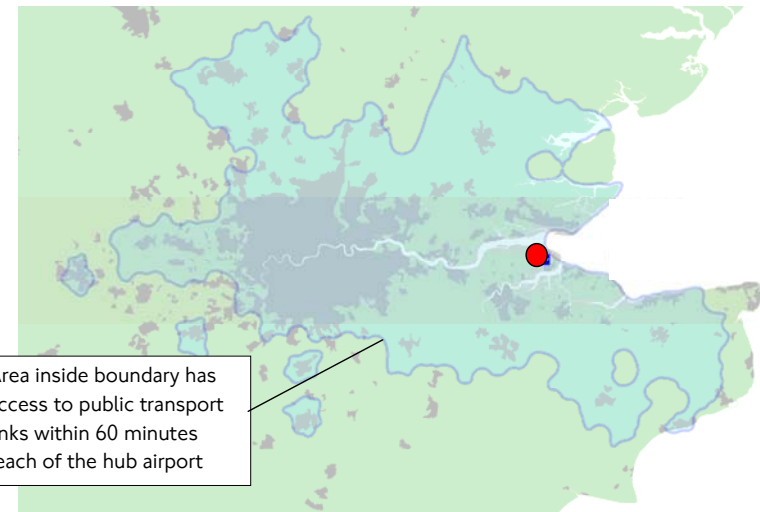


Most of London and a significant part of the South East will have access to public transport links within 60 minutes reach of the hub airport, as illustrated in Figure 5.4.

Access to an Isle of Grain airport is broadly comparable to access to Heathrow

- 10.7 million people within the 60min Isle of Grain catchment area

Figure 5.4: Isle of Grain Airport – 60 minute public transport journey time contour map



SURFACE ACCESS : SUMMARY OF FINDINGS

- Significant investment in both rail and road infrastructure, including a new high speed rail line to Central London will provide the capacity, connectivity and mode share required to ensure that a new hub airport located at the Isle of Grain is both successful and sustainable. The new rail and road links will also provide significant and wide-ranging benefits to non-airport users across the region.

6 THE IMPACTS ON THE ENVIRONMENT

New airport capacity will generate considerable impacts on the environment. This chapter identifies the potential impacts on air quality, noise, climate change, and designations of an airport at the Isle of Grain. Unless otherwise stated, the impacts of the airport at full-build out in 2050 are assumed, with 180mppa and 1m ATMs. The assessment has made prudent assumptions regarding technological improvements for aircraft and road vehicles.

To prepare this evidence, TfL has worked closely with Atkins and the Environmental Research and Consultancy Department of the Civil Aviation Authority as well as ABPmer. Initial discussions have taken place with bodies such as Natural England, Environment Agency, English Heritage, Defra, Marine Management Organisation, Crown Estate and RSPB. Discussions will need to be continued to ensure proper consideration is given to the potential impacts of a new hub airport on the environment.

6.1 Air quality impacts

Commission question – What are the air quality implications of the proposal (including impacts due to aircraft, airside operation and local surface transport links)? Are these consistent with the legal frameworks for air quality? What mitigation plans are proposed?

A high level, qualitative assessment of the potential impacts on local air quality on human health and vegetation was undertaken for 2034 (five years after airport opening) and 2050 (airport at full capacity²⁶). The assessment focused on pollutants of most concern to local authorities, Government and the EU in terms of public health compliance risks: nitrogen dioxide (NO₂), particulates smaller than 10 micrometres (PM₁₀) and particulates smaller than 2.5 micrometres (PM_{2.5}). Compliance risks in relation to air quality standards to protect public health are reported by the floorspace area of building footprint where people may be exposed on a regular basis.

Today, background air quality in the vicinity of the site is relatively good, typical of a rural location with low background annual mean concentrations of NO₂, PM₁₀ and PM_{2.5}. The most notable air pollutant sources on the Isle of Grain are two power stations, one of which (Grain) will have to be relocated. Air Quality Management Areas (AQMAs) away from the site where the annual mean NO₂ standard is already exceeded include stretches of the M25, M2 and A2.

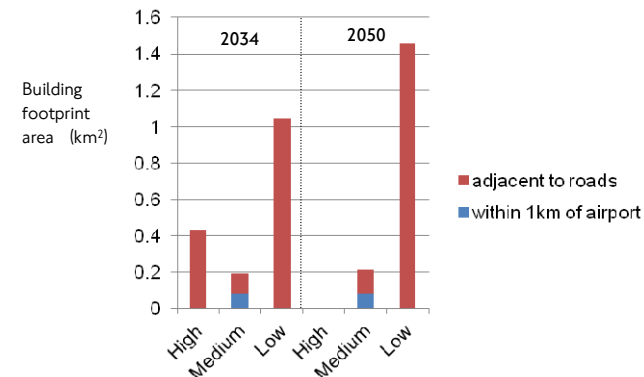
The risk of annual mean NO₂ non-compliance has been categorised as high, medium or low for the airport and new or widened road links as a result of the airport and surface access proposition described in chapter 2. This assessment is set out in Figure 6.1.

- Low risk is presumed acceptable for human health.
- Medium risk means there is a reasonable probability that mitigation will be required in places.
- High risk is presumed harmful to human health.

Categories were assigned according to:

- proximity of the new airport or new/widened roads to AQMAs
- proximity of the new airport or new/widened roads to residential areas

Figure 6.1: Air Quality Compliance Risks for Public Health in 2034 and 2050 – Annual Mean NO₂– measured by building floorspace area and the level of non-compliance risk



Air quality impacts in 2034 and 2050:

- **Airport** - there are no high risk areas in 2034 and 2050, but a relatively small area which is subject to medium risk.
- **Roads** - in 2034 high risks are anticipated within 200m of centrelines of roads with proposed widening, the M25 (junctions 2-9, 21-26 and 27 to Lower Thames Crossing) and two sections of the A2 ((between M2 junction I and Northfleet (Hall Road) and the A2/B255 junction). In 2050 it is anticipated no high risks remain because of expected reductions in

vehicle emissions from advances in and take up of cleaner vehicle technologies.

Measures to mitigate the risk of poor air quality include maximising the use of public transport access and potentially restricting access to low emission vehicles only. While the risk assessment indicates some compliance risk, it is likely that with mitigation a new hub airport at the Isle of Grain could be consistent with relevant legal frameworks.

Heathrow’s location in a densely populated area results in substantial air quality impacts

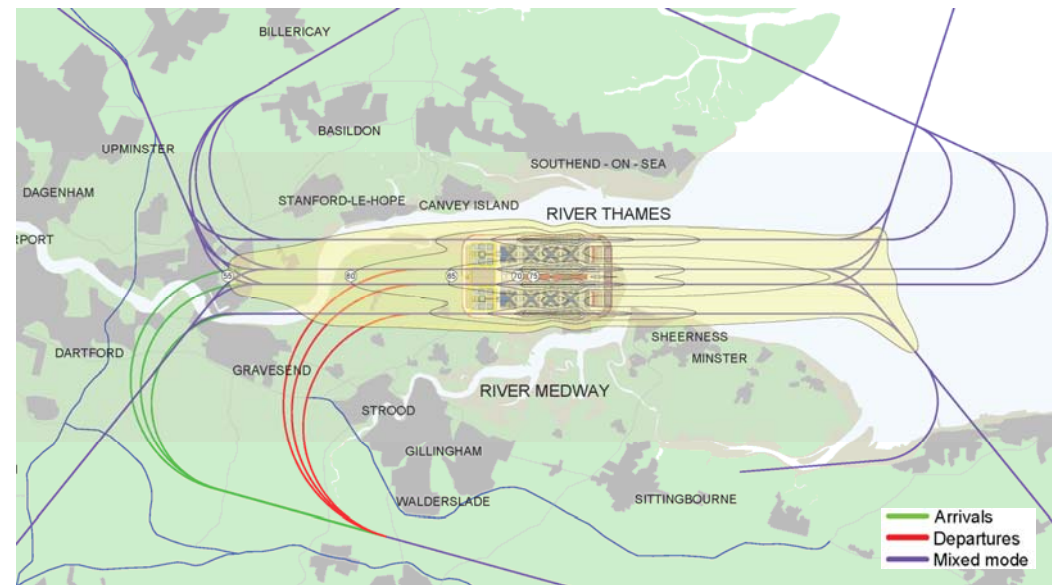
- Local air quality currently exceeds NO₂ limits at several locations around the airport and access points to it²⁷.
- An expanded Heathrow would require expansion of the existing road network, with higher traffic flows, exacerbating the local air quality impacts.

Table 6.1: Population exposed to noise by a four runway hub airport in 2050 at 180mppa²⁸

Four runway hub airport location	L _{den} over 55 dB	L _{night} over 50 dB	16h L _{Aeq} over 57 dB
Isle of Grain	31,500	1,600	8,200
Heathrow	967,000	Comparison not available	
Heathrow today (2-runway)	766,100	Comparison not available	

A new hub airport at the Isle of Grain would expose 31,500 people to noise in excess of 55dB L_{den}²⁹, meeting Government objectives to minimise aviation noise impacts³⁰. This area is illustrated in Figure 6.2.

Figure 6.2: L_{den} dB noise contours 2050



L_{den} - Much of the area within the L_{den} contours are over water or sparsely populated land. Approximately 28,200 people are exposed between 55 and 60 dB(A) L_{den}, and 3,300 would be exposed in excess of 60 dB(A) L_{den}.

L_{night} - Assuming night time operations are limited to the centre two runways, approximately 1,600 residents on the Hoo Peninsula would be exposed.

6.2 Noise impacts

Commission question – What are the noise implications of the proposal? How will the proposal alter current and predicted patterns of noise in the surrounding area? What changes to noise profiles would be seen at other airports as a result of the proposal? What measures are envisaged to limit or reduce the number of people affected by noise?

Despite recent technical advances and the commendable aspirations and efforts of many in the aviation industry, the rate of progress in reducing aircraft noise is slowing. The Commission must plan for the future on the assumption that aircraft will remain noisy and disruptive.

Table 6.1 identifies the number of people who would be exposed to different noise levels, at the Isle of Grain. An assessment of L_{den}, L_{night} and L_{Aeq,16h} noise metrics has been conducted. A comparison against the number of people a four independent runway hub airport located at Heathrow would expose to noise is provided.

$L_{Aeq,16h}$ – The area enclosed by the 57 dB $L_{Aeq,16h}$ noise contour is approximately half the area of the 55dB L_{den} contour and therefore affects a significantly lower population.

Heathrow's noise impacts are of a completely different magnitude to a new hub

- If Heathrow was the location of the four runway airport that the UK needs, almost a million people would be exposed to at least 55dB L_{den} .
- A new hub airport at the Isle of Grain would expose a mere 5 per cent of the number of people to noise in 2050 as Heathrow does today, despite being able to accommodate nearly three times as many passengers.

Minimising the number of people affected by noise

- Aircraft noise is already experienced by some communities from nearby airports. People underneath the flight paths of an Isle of Grain airport would experience a worsening of their noise environment with more, larger and lower aircraft movements.
- A number of measures could assist, including careful orientation of the runways and flight paths, the use of noise abating operating procedures, and ensuring that new residential and employment buildings are located so as to minimise their exposure to noise.
- There are some tranquil areas in the vicinity of the proposed airport - mainly coastal marshlands – that will be adversely affected by noise. There is a trade off between this loss of tranquillity and the reduction in the number of people exposed to aircraft noise at Heathrow and other airports.
- There will also be noise generated by the construction and operation of new rail and road surface access links.

6.3 Climate change impacts

Commission question – How might the proposal compare in terms of its impact on greenhouse gas emissions, with alternative options for providing a similar amount of additional capacity?

The Mayor accepts the Committee on Climate Change's recommendation that aviation passenger demand growth could be limited to 60% by 2050 (on 2005 levels). UK-wide this translates to an additional 140 million passengers per annum by 2050. Therefore, if the relocation of Heathrow to a new hub airport is assumed, that new hub airport could accommodate 180mppa and be fully compatible with this target.

A high level assessment of the CO₂ emissions from a brand new, efficient four-fully-independent-runway hub airport in 2050 has been conducted. A new hub airport has been compared against Heathrow today, and a two-runway (constrained) Heathrow in 2050. Two measures have been assessed, and the results presented in Table 6.3:

- **The CO₂ emissions from an average passenger movement.** This has been estimated based on the DfT's 2050 demand forecasting model and their assessment of a capacity unconstrained Heathrow³¹, accounting for a potential future fleet mix, and potential technological improvements, together with ATM forecasts for the Hub.
- **The potential annual CO₂ emissions from passengers and staff travelling to and from the airport.** This has been estimated based on the number of people travelling to and from the airport and their mode of travel (public transport or private car). Assumptions accounting for potential future technological improvements have been made.

Table 6.3: A new hub airport at the Isle of Grain - estimated annual aviation emissions 2050 (rounded)

	Air traffic movement (ATM) emissions Kg CO ₂ per passenger	Surface access emissions (passengers and staff travelling to and from the airport) KT CO ₂ per annum
New hub airport at the Isle of Grain, 180mppa ³²	130-140 Kg	350 (+/- 20) ³³
Heathrow today (2009 demand figure of 66mppa has been used)	280 Kg ³⁴	620 ³⁵
Two runway Heathrow (constrained) in 2050, 93mppa	200 Kg	assessment not conducted

Two key findings are observed:

- Due to both improvements in technology, larger planes and efficient hub operations, the CO₂ per passenger at a new hub in 2050 would be much less than both Heathrow currently, and a two runway Heathrow in 2050.
- Technological improvements, and a significant mode shift to public transport could result in a new hub airport – despite a more than doubling of demand – having lower surface access emissions than Heathrow does today.

An efficient hub airport with four fully-independent-runways will have valuable emissions benefits in addition to those accounted for in the preceding table. These benefits have not been quantified here, but will include:

- **Additional runway capacity** - Will facilitate landing slot flexibility which will achieve significant savings in holding times (stacking) and associated fuel use and emissions. It will allow continuous climb operations and will enable efficient management of aircraft movements such as drawing together large volumes of demand on common routes, allowing it to be served more efficiently in fewer, larger and better loaded planes.

- **Additional apron and taxiway capacity** - Larger airside areas will facilitate efficient aircraft ground activities such as taxiing using a single engine and the layout of the hub will reduce the taxi and idling periods.
- **New Build** - Opportunity to include efficiencies into the design such as implementing renewable power sources and installing ground based equipment to deliver fixed electrical ground power and preconditioned air to reduce the use of plane auxiliary power units.

6.4 Designated sites

Commission question - Does the proposal affect any designated sites (Sites of Scientific Interest or Special Protection Areas) and if so how might any effects be managed?

The proposed location of the airport has taken into account designated sites and where possible has sought to reduce its impact. Nevertheless, there are a number of international and national environmental designations within the Thames Estuary. The proposal would affect the following designated sites, as defined by Natural England: Special Protection Areas, Ramsar sites and Sites of Special Scientific Interest^{36 37}.

As the proposal affects European designated sites, consideration needs to be given to the European Commission Habitats (92/43/EC) and Wild Birds (2009/147/EC) Directives³⁸.

There are a number of measures that can be used to mitigate the impact a new airport would have on existing habitats and species. These include;

- Habitat enhancement of new environments.
- Using planning and detailed design to avoid environmentally sensitive areas.

The proposed airport would directly affect approximately 1,830 ha of intertidal and subtidal habitat, and it is considered highly likely that mitigation measures alone would not be sufficient to avoid adverse effects on the integrity of at least some of the features of European sites. Although challenging, it is considered that adequate compensation – in the form of habitat replacement could be identified. Examples of compensatory schemes can be found in Europe and elsewhere, including a number of port developments in Estuaries around the UK. The cost of this has been included in the land preparation costs for the project.

Irrespective of a new airport, the Thames Estuary 2100 plan estimates £6-7bn of investment in Thames tidal defences, continuing floodplain management and intertidal habitat replacement will be required to 2100. Developing appropriate mitigation and compensation measures for the airport could contribute to the more strategic issues identified in the TE 2100 Plan³⁹.

6.5 Other significant local environmental impacts

Commission question – What other significant local environmental impacts should be taken into account?

Further detailed work is needed on a number of areas to understand the full ecological, landscape & visual, water resources, flooding and heritage impacts that an airport at this location would have, as set out in table 6.4. Impacts that surface access would have on the following areas have not been included. Further work is also required to fully understand these.

Table 6.4: Other significant local environmental impacts

	Potential impacts likely to include	Potential mitigation and next steps
Biodiversity	<ul style="list-style-type: none"> Other sites of ecological interest such as RSPB Reserves. Protected species: Great Crested Newts, Bats, Dormice, Reptiles, Water Voles, Birds and Otters. 	<ul style="list-style-type: none"> Further desk studies and comprehensive field studies required as design progresses.
Landscape and Visual	<ul style="list-style-type: none"> Loss of landscape and visual components although the airport does not fall within an Area of Outstanding Natural Beauty (AONB) or within a National Park . 	<ul style="list-style-type: none"> Future design work will provide the opportunity to identify measures to reduce visual and landscape impact which could include landscaping to aid integration with existing landforms.
Water resources and flooding	<ul style="list-style-type: none"> Site is subject to major coastal flood risk. The airport would impact upon existing watercourses and coastal processes including: wave climates, sediment transport, tidal currents and existing shoal and sandbank features. 	<ul style="list-style-type: none"> Proposal as designed and costed has assumed flood defence level of +3mOD to accommodate a 1 in 200 annual chance against coastal flooding. Further assessment should include a hydrodynamic model of the Hoo Peninsula and a coastal process model; a detailed Water Framework Directive screening could also be required.
Historical and archaeology	<ul style="list-style-type: none"> Proposal would impact on 21 listed buildings and two Scheduled Monuments (Grade II). Proposal would indirectly impact on other areas of historical interest. High potential for prehistoric, medieval and later remains. 	<ul style="list-style-type: none"> Detailed siting work could reduce impacts on historical and archaeological features.

IMPACTS ON THE ENVIRONMENT: SUMMARY OF FINDINGS

- Air quality - a new hub airport is not expected to result in areas of high risk for poor NO₂ compliance by 2050.
- Noise – considerably less noise impact with 31,500 people exposed at Isle of Grain compared to 967,000 in west London with a four runway Heathrow in 2050 .
- Climate change - the Isle of Grain proposal will emit significantly less CO₂ per passenger than a constrained Heathrow 2050.
- Designated sites - impacts will be considerable, but there are precedents for minimising, mitigating and compensating for affected areas.
- Other - further assessment of a number of potential impacts, particularly coastal processes and hydrodynamics, is necessary to ensure appropriate measures can be identified to mitigate adverse impacts.

7 OPERATIONAL VIABILITY

Commission question – Is the proposal consistent with relevant safety requirements? What operational, safety, and/or resilience risks are associated with the proposal? What measures are proposed to manage these?

Commission question – Is the proposal deliverable within relevant airspace constraints? What assumptions underpin this assessment?

A new hub airport at the Isle of Grain can be operationally resilient:

7.1 A safe, effective and compatible air traffic control solution can be found

Transport for London has engaged National Air Traffic Services (NATS) to provide expert advice on the feasibility of the potential airport layout, and the potential to develop a safe, workable airspace solution. NATS have stated that it is feasible to assume that a new hub airport could be included in a London airspace development programme, and that operational procedures and airspace changes could be developed to accommodate a new hub airport at the Isle of Grain⁴⁰.

Assuming that the closure of Heathrow would be an element of the scheme, a significant portion of London-area approach and departure flight paths would shift east, towards open waters. Air traffic patterns of nearby airports, depending on runway orientation, may require review with air traffic rules reconfigured. Close coordination with Southend, Manston and London City airports would be necessary, and the closure of Southend airport could be required.

7.2 Arrival and departure routes can be routed away from overflying Greater London and other heavily populated areas

A hub airport located on the Isle of Grain would provide benefit in terms of increased flight path safety. An airport at the Isle of Grain can ensure that almost all air traffic is routed away from overflying large population centres across London and the South East.⁴¹

7.3 The airport is located on the coast, but flooding can be prevented

A new hub airport at a coastal location on the Isle of Grain would take account of the potential for sea levels to rise, and would be built from the first phase of construction with flood defence measures protecting the site from storm

surges and sea level rise⁴². This would prevent the need for retrofitting infrastructure and ensure operational resilience is maintained.

7.4 A number of specific operational factors can be addressed

Fog – Average runway utilisation of 75% means that fog should have significantly less of an impact at the new airport than it does currently at Heathrow. Ongoing developments in precision, all-weather aircraft landing systems such as the Local Area Augmentation System (LAAS) will provide even greater safety in the future, potentially even in zero-visibility conditions.

Prevailing winds - The orientation of the airport takes into account the prevalent wind direction, with the runways lying due East West. Wind rose data from nearby Shoeburyness, deemed the most appropriate estuary weather station, has been used to confirm that the cross wind component would be compatible with modern aircraft types. ICAO Annex 14 Volume 1 – Aerodrome Design and Operations (Jul 2009) requires runways to be available 95% of the time in relation to wind conditions and advises that the cross wind component should not exceed 20 knots on more than 5% of the time. Winds greater than 20 knots, from any direction, are typically experienced at Shoeburyness less than 2.5% of the time, hence the cross wind component will not exceed the ICAO recommendation. The wind rose data for Shoeburyness is consistent with the prevailing winds across the South East of England and as such an estuary airport would not be expected to experience any increase in adverse operational impacts due to wind than other South East airports.

Existing land uses on the Isle of Grain - Two features that would require special consideration are the 244-metre chimney of Grain Power Station on the east end of the island, and 198-metre chimney of Kingsnorth Power Station on the southeast coast of the island. Additionally, National Grid's LNG (liquefied natural gas) facility, also on the south-east side of the island, is too tall and too close to the proposed airport site, and would also need to be relocated.⁴³

SS Richard Montgomery - The wreck of this munitions ship lies some 5 km east of the Isle of Grain. Even though it is within an exclusion zone under the Protection of Wrecks Act and subject to 24-hour radar surveillance by Medway Ports, several large tankers pass within a few hundred metres of the wreck daily. The former Defence Evaluation and Research Agency has concluded that the likelihood of an explosion on the ship is remote. A new

airport on the Isle of Grain is not expected to alter the level of risk associated with the wreck.⁴⁴

Bird populations - Local and migratory bird populations are present around most airports and this applies especially to coastal locations. The Civil Aviation Authority (CAA) requires that airport operators carry out risk assessments and develop a Bird Control Management Plan⁴⁵. There are a variety of established approaches for addressing bird strike, including habitat management and deterrence and dispersal systems. For example, an advanced noise-based deterrence technology being introduced at major airports in New York and Istanbul this year seeks to eliminate 95% of bird strikes within the airport perimeter.

7.5 A new hub airport has been designed to be able to adapt to a range of future demand scenarios

A new hub airport will have the ability to adapt to changing trends in aviation demand and operating scenarios, should these occur. These may include the use of larger and new types of aircraft, and changes to the demand for air cargo and freight transfer by air. As the hub will be designed for modular expansion, these and other trends can be taken into account as the airport site is built out.

OPERATIONAL VIABILITY: SUMMARY OF FINDINGS

- A new hub airport at the Isle of Grain can be designed so as to remain fully operationally resilient. There are no operational risks or hazards which are deemed insoluble.

8 DELIVERY AND FINANCING

Commission question – What is the estimated cost of the proposal, including surface access, land purchase, compensation, and any other associated infrastructure? What are the associated cost assumptions and risks?

8.1 Estimated cost of the proposal

- Capital expenditure of **£47 billion** (2013 prices, including risk) would be required to deliver a new hub airport and surface access for 90 mppa.
- Once open, an additional **£21 billion** (2013 prices, including risk) of capital expenditure would be required to expand operations to increase capacity to 180mppa by 2050.

Table 8.1: the cost of a new hub airport at the Isle of Grain and the surface access links

Element <i>£bn, 2013 prices</i>	Phase 1 (opening year, delivering 90mppa capacity by 2029)	Phase 2 (delivering 180mppa capacity by 2050)
Airport Land – acquisition and preparation	4.8	-
Airport infrastructure	17.7	14.6
Airport rail links	10.2	-
Airport road links	2.6	2.8
Total investment, excluding risk	35.3	17.4
Allowance for risk (surface access)	8.8	1.4
Allowance for risk (non surface access)	3.2	2.2
Total investment	47.3	21.0

These costs envisage a phased approach to expansion after opening in 2029 to ensure infrastructure provision keeps pace with demand. The estimates are compiled using data from major construction programmes and other international airport schemes, are normalised for the South East of the UK, and are in 2013 prices.

Capex associated with commercial development opportunities such as offices and hotels surrounding the airport footprint are not included and it is assumed that they would be delivered by the private sector.

A risk provision based on a blended set of assumptions has been added to the base costs which equates to around 34 per cent in phase 1 and 21 per cent in phase 2⁴⁶.

Commission question – Is it likely that the cost can be met entirely by the private sector? What is the likely split between public and private sector funding if not? How would the proposal be financed? What are the associated assumptions and risks?

8.2 Delivering and financing the infrastructure

Transport for London have worked alongside Ernst & Young and Ashurst to explore potential delivery options.

The scale and timescale of investment, combined with the level of risk, make it likely that **Government** will have to play the key role in delivering both the airport and surface access links. Particularly in the early (pre-operational) stage of the project, Government is likely to be the only party able and willing to provide the level of funding required and take on the associated project risks. Government support mechanisms, such as guarantees, could increase the attractiveness of the project to the private sector.

Private sector funding would be targeted at specific asset groups at specific points in the process to align with the investment appetite of private institutions. Allowing the private sector to fund later stage of construction once major (and high risk) elements are completed could prove attractive: for example, after the land preparation phase or once the airport becomes operational.

One model by which the required infrastructure could be delivered is described below – and considers: transfer of operational risk; transfer of revenue and passenger risk; complexity; value for money; ownership and control and financeability.

- **Airport land** – is acquired by the Government through compulsory purchase, authorised by a Hybrid bill. The land would be prepared through a design and build contract with a single prime contractor or multiple 'design and build' contracts. When available the Government would

subsequently lease the land to the Hub airport operator on commercial terms.

- **Airport infrastructure** – following a positive decision by the Commission, a National Policy Statement would be prepared, followed by a Hybrid Bill to deliver the on-site infrastructure. As airport operations are seen as commercially viable enterprises, this element in particular would need to be considered against state aid rules. An arms length Special Purpose Vehicle (SPV) would be established by Government to manage, plan, design, and procure the project and take it through to fruition.
- **Airport rail links** – to be constructed with Government funding, overseen by the Department for Transport, via an existing or new SPV. The model would be as per most of the UK network, with operations transferred to the private sector through appropriate franchise agreements.
- **Airport road links** – include both existing roads requiring widening, and brand new roads. The former would be done by the Highways Agency, while the latter could be delivered by either public-private-partnership (PPP) or design-build-finance-operate (DBFO) type delivery structures. Tolls or user charges may be considered, though Government might need to underwrite demand risk.

8.3 Commercial viability

As mentioned above, airport operations are seen as commercially viable enterprises. To test commercial viability, costs and revenues have been inflated over 50 years, and then discounted. A net present value (NPV) has been calculated. A value which is greater than or equal to zero indicates that the airport element of the project would be commercially viable.

The commercial viability of the airport is highly sensitive to a number of key assumptions, for example the return required for land acquisition and preparation costs, capital expenditure, the level of passenger growth at the hub airport, the profitability of the airport, and the level of aeronautical and non-aeronautical charges. The assumptions used to explore the commercial viability of the airport are set out below, in Table 8.2:

Table 8.2: Key commercial assumptions

Item	Assumption (2012 prices)
Aeronautical revenue (per passenger)	An increase to £25-30 pp by 2029 from £19pp today. Beyond 2029, charges increase in line with RPI inflation only.
Non-Aeronautical revenue	Set at £16pp from 2029 and increase in line with RPI inflation only.
Airport earnings (EBITDA ⁴⁷)	Operating expenditure set at a level to allow for an EBITDA margin of 59 per cent.
Nominal discount rates	6.1 per cent before construction, 10 per cent during construction and 8.5 per cent once operational. Operational discount rates benchmarked against current market levels, with a 1.5 per cent premium applied for construction.
Land	Purchased and prepared separately by Government, then leased back to airport operator.
Time period	Construction between 2020 and 2029 followed by a 50 yr operational period.

Based on the assumptions described above, it can be demonstrated that the new 4 runway hub airport that is being proposed could be commercially viable (with a positive NPV).

It is worth placing the level of airport charges in context; for longhaul routes, they typically constitute no more than 10 per cent of total airline operating costs. Moreover, the Air Passenger Duty (APD) applied to most flights departing the UK ranges from £13 to £188 per passenger.

Nonetheless, should these assumptions not be realised, it may be possible that some Government support may be required. This could additionally entail securing state aid clearance from the European Commission, specifically for the airport infrastructure.

Airport charges at a viable new hub airport are in line with levels proposed by Heathrow

- For the 2014-19 control period, Heathrow proposed an increase that would result in an aeronautical charge of £23 (in today's prices) per passenger by 2019. This is comparable to the £25-30 (in today's prices) per passenger at a new hub in 2029, necessary for a new hub airport to be viable.

8.4 Cost to Government

A range of potential sources of funding have been identified and suggested allocations put forward, based on the delivery model described above. A summary of the applicability and potential scale of these sources, and the approximate net cost to Government is given in Table 8.3.

Table 8.3: Potential net cost to Government to new hub airport sale in 2032 if the base case assumptions set out in table 8.2 are applied

£ billions, nominal	Government Funding Requirement to 2032	Private Sector Sources*	Net Cost to Government
Airport land	7	1	-6
Airport infrastructure and acquisition of Heathrow	55	68	13
Airport rail links	26	-	26
Airport road links	7	1	6
Total	96	71	25

* Following the successful transfer of operations to the new hub airport, the airport could be privatised via a sale, an IPO or a concession. The value of the hub airport at sale has been arrived at using discount cash flow analysis of the cash flows from the hub airport and the application of assumptions detailed in Table 8.2.

Notes:

- Funding requirement is captured through to 2032 in order to include receipts from the sale of land at Heathrow for development following the closure of the airport at Heathrow. New hub airport sale is assumed in 2032 following preparation of the site and permissions post operations transferring to the new hub in 2029.
- These figures differ from those in Table 8.1 for the following reasons:
 - Figures presented in Table 8.1 are real (2013) values, those presented in Table 8.3 are nominal having been subject to inflation.
 - Figures in Table 8.3 represent the net totals of a defined time period. Those presented in Table 8.1 correspond to specific phases. Some costs incurred between 2019 and 2032 include both Phase 1 and Phase 2 costs.

8.5 Legal mechanisms, risks and timescales

Commission question – What are the main delivery risks in the proposal?

The most appropriate legal mechanism to secure approval for a new hub airport is deemed to be a hybrid bill. This is the mechanism best able to grant the necessary suite of approvals – including the surface access links and the nationalisation of Heathrow.

The main delivery risks are listed below; none of them are deemed to be beyond mitigation:

- Securing significant political consensus – to ensure Hybrid Bill proceeds through Parliament and process not impacted by change of Government.
- Proving the environmental case for the airport – including appropriate mitigations.
- Securing the scale of funding required; part of this is ensuring sufficient Government protection and guarantees for private sector investors and debt holders.
- Ensuring robust governance and management, mitigating planning and construction risk.
- Ensuring a successful transition to a new hub airport.
- Introducing a new regulatory regime to support the transition and new airport landscape.

Heathrow offers neither a quicker solution nor a stop-gap

- Any expansion at Heathrow would face the same lengthy planning process and similar construction timescales as any other option, regardless of whether for one new terminal and one new runway, or multiple runways and multiple terminals.

8.6 Timescales

Table 8.4: A timeline for delivering a new hub airport and its surface access links

Time	Description of activity
2015	<ul style="list-style-type: none"> • Airports Commission make final recommendation for a new hub airport • The Commission's recommendation is endorsed by Government, who set up a special purpose vehicle (SPV) to manage, plan, design and procure the project.
2016	<ul style="list-style-type: none"> • Government publish National Policy Statement
2019	<ul style="list-style-type: none"> • Government passes a Hybrid Bill for new hub airport and surface access connections
2020	<ul style="list-style-type: none"> • Government acquire Heathrow and operate through to 2029
2020 – 2021	<ul style="list-style-type: none"> • Government acquire the required airport land
2020 – 2026	<ul style="list-style-type: none"> • Government prepare the airport land
2020 – 2029	<ul style="list-style-type: none"> • Government construct the airport and surface access connections
2028	<ul style="list-style-type: none"> • Transition to the new hub airport commences
2029	<ul style="list-style-type: none"> • Overnight move of operations to new hub airport • New hub airport opens • Close Heathrow
2030	<ul style="list-style-type: none"> • Sale of the hub airport by the Government via a sale, an IPO or a concession
2032	<ul style="list-style-type: none"> • Sale of the land at Heathrow and commencement of residential and commercial development

8.7 The Airports Commission and the Government must take a bold decision

To deliver a new hub airport at the Isle of Grain, the UK needs a clear aviation strategy, and a clear vision from the Commission. Proposals for a new airport at a similar location have been discussed for several decades. They have not been brought forward for a variety of reasons. First and foremost, it has been too easy for decision-makers to revert to the approach they know best, the bit-by-bit, piecemeal expansion of existing airports.

The Mayor of London is calling on the Commission and the Government to take a bold and urgent decision, one that is in the national interest. However this means being pragmatic about overcoming obstacles and being clear about how impacts can be managed and minimised. It also means overriding the views of those with a vested interest in existing infrastructure.

AFFORDABILITY AND FINANCING : SUMMARY OF FINDINGS

- An investment of £47 billion would be required to deliver a new hub airport and surface access for 90 mppa. Once open, an additional £21 billion of investment would be required to expand operations to increase capacity to 180mppa by 2050 and support London and the UK's growth.
- A new 4 runway hub airport for 90 million passengers could be commercially viable under a scenario where aeronautical charges of £25-30 per passenger were sustained.
- There are a number of risks associated with the delivery of a new airport and the surface access links, but none are deemed to be insoluble.

9 ENDNOTES AND BIBLIOGRAPHY

Technical notes prepared by Transport for London to enhance the evidence contained within this document are identified in **bold**. These can be made available to the Commission upon request.

¹Atkins, Technical note Isle of Grain Masterplan, June 2013.

²York Aviation, London Airports Route Networks in 2050 (TfL Aviation Unit, June 2013, Draft Report)

³York Aviation, London Airports Route Networks in 2050 (TfL Aviation Unit, June 2013, Draft Report)

⁴In March 2013 the Office of Budget Responsibility forecast UK growth to be just 0.6 per cent in 2013.

⁵Oxford Economics survey 2006.

⁶Oxford Economics global forecast.

⁷The World Travel and Tourism Council

⁸Ramboll, TN4 Impact on Tourism and other Non-Business Travel (TfL Aviation Unit, June 2013, Draft Report)

⁹Regeneris, The Economic Importance of VFR (TfL Aviation Unit, April 2013, Draft Report).

¹⁰Oxford Economics TN 5 – Impacts upon the local and national economy (TfL Aviation Unit, June 2013, Draft Report) which outlines the assumptions used including projecting future labour productivity improvements.

¹¹These effects have been estimated conservatively using input-output modelling and additional economic benefits can also be expected from off-airport passenger expenditure (e.g. hotels) and from firms near to the airport but not part of its supply chain. These types of catalytic effects are discussed in Section 4.5.

¹²Heathrow's national direct, indirect and induced job impact was estimated at 205,900 in 2010.

¹³See TN6 for detailed references. **Ramboll TN6, Impact of new hub options on Business Location, FDI and Alignment with Strategies (TfL Aviation Unit, June 2013, Draft)**

¹⁴Aerotropolis – the infrastructure and the activities supporting both aviation-related businesses and the airport's passengers. These are likely to cluster close to the airport, and around the key transport nodes in the rail and road corridors which serve the airport.

¹⁵GLA labour market (2013) and population forecasts (2012).

¹⁶**Ramboll, TN6 Impact of new hub options on Business Location, FDI and Alignment with Strategies (TfL Aviation Unit, June 2013, Draft)**

¹⁷**Oxford Economics, TN7a Impacts of Closure and Redevelopment of Heathrow Airport (TfL Aviation Unit, June 2013, Draft Report)**

¹⁸It is assumed that the 1,200ha airport site would accommodate 68,000 new residential units by 2050 and 80,000 units by 2053 accommodating a population of 156,400 and 184,000 respectively including the development of four town centres with existing public transport connections.

¹⁹Greater London Authority (GLA), Population Projections 2012 Round. 2012

²⁰**Oxford Economics, TN 10 Impacts on the Air Freight Industry, Customers and Associated Business Sectors (TfL Aviation Unit, June 2013, Draft Report)**

²⁰The airport noise assessment used the UK Civil Aviation Noise Contour Model (ANCON) and fleet mix assumptions to produce noise contours for the metrics Lden, Lnight and LAeq,16h for the year 2050. The areas of the contours were calculated along with estimates of the population and number of households exposed based on CACI 2012 UK population data.

²¹For Crossrail, on top of £16bn of user (mainly time-saving) benefits, agglomeration benefits were forecast in 2007 to have a value to UK GDP of between £15-£60bn.

²² The catalytic employment effects would also trigger additional housing demand though this would be across a wider geography.

²³ Atkins - Land and Housing Technical Note (TfL Aviation Unit, June 2013, Draft Report) covering nearby major sites for 100 or more dwellings.

²⁴ PDL Statistics CLG

²⁵ Atkins, The Mayor's Aviation Work Programme: Surface Access Technical Report July 2013

²⁶ High Level Qualitative Assessment of Air Quality Compliance Risks for a Hub Airport at Isle of Grain: Technical Note, Atkins, June 2012

²⁷ Heathrow Airport Limited, Towards a sustainable Heathrow: a focus on air quality, 2010

²⁸ ERCD Noise Analysis Report Isle of Grain, 2013

²⁹ ERCD Noise Analysis Report Isle of Grain, 2013

³⁰ DEFRA, Noise Policy Statement for England, (2010)

³¹ Atkins, Technical Note WP4 Climate Change, June 2013 using unpublished information produced in support of the DfT's UK Aviation Forecasts 2013, provided by the DfT for this analysis.

³² Atkins, Technical Note WP4 Climate Change, June 2013

³³ Atkins, Technical Note WP4 Climate Change, June 2013. (Methodology based on speed based emissions derived from highway modelling and the additional emissions associated with new/extended PT services, assuming 2050 emissions values)

³⁴ Heathrow Airport, Towards a sustainable Heathrow, 2010.

³⁵ Heathrow Airport, Towards a sustainable Heathrow, 2010. (Methodology unstated, expected to be based on surveys of activity multiplied by a standard grams/passenger km for relevant mode)

³⁶ Further information can be found in Technical Notes: Ecology Desk Study and Mitigation & Compensation Measures (Atkins and ABPmer, 2013)

³⁷ SSSIs are legally protected under the Wildlife and Countryside Act 1981, as amended by the Countryside and Rights of Way (CROW) Act 2000 and the Natural Environment and Rural Communities (NERC) Act 2006. In addition consideration would need to be given to the Water Frameworks Directive (2000/60/EC).

³⁸ The Directives establish procedures for the approval of plans or projects that have the potential to affect designated features associated with sites classified as Special Protection Areas or Special Areas of Conservation.

³⁹ Environment Agency, Thames Estuary 2100 Plan, Managing flood risk through London and the Thames estuary, November 2012.

⁴⁰ National Air Traffic Services (NATS). TfL Workshop Notes: New hub airport for London. 28 June, 2013.

⁴¹ Atkins, Technical note Isle of Grain Masterplan, June 2013.

⁴² Atkins, Technical Note WP4 Climate Change, June 2013

⁴³ Atkins, Technical note Isle of Grain Masterplan, June 2013.

⁴⁴ Atkins, Technical note Isle of Grain Masterplan, June 2013.

⁴⁵ Atkins, Technical note Isle of Grain Masterplan, June 2013.

⁴⁶ The following assumptions for risk have been made for each of the infrastructure components: 15% for Airport Land and Airport Infrastructure costs except for Land Acquisition, 50% for Airport road links and 73% for Airport rail links (including 63% for Price, Design and Development Risk and 10% for Project Integration Risk).

⁴⁷ EBITDA: earnings before interest, taxes, depreciation and amortisation

The Mayor has also published a number of reports, technical notes and responses to several inquiries into aviation and related issues over the last two and a half years. These provide valuable context to this work. All are available online at <http://www.newairportforlondon.com>

- i. TfL. *A New Airport for London – Part 1: The case for new capacity*. Published by the GLA January 2011
- ii. TfL. *The Mayor of London's Response to: Developing a sustainable framework for UK aviation: scoping document*. October 2011
- iii. TfL. *A New Airport for London – Part 2: The economic benefits of a new hub airport*. Published by the GLA November 2011
- iv. TfL. *The Mayor of London's Response to: The government's draft aviation policy framework*. October 2012
- v. TfL. *New Airport Capacity Options: Assessment criteria consultation results*. March 2013
- vi. TfL. *New Airport Capacity Options: Assessment criteria*. March 2013
- vii. TfL. *Airports Commission Discussion paper 01: Aviation demand forecasting*. The Mayor of London's response. March 2013
- viii. TfL. *The Mayor of London's Response to: The night flying restrictions at Heathrow, Gatwick and Stansted: stage 1 consultation*. April 2013
- ix. TfL. *Airports Commission Discussion paper 02: Aviation connectivity and the economy*. The Mayor of London's response. April 2013
- x. TfL. *Airports Commission Discussion paper 03: Aviation and climate change*. The Mayor of London's response. May 2013
- xi. TfL. *Airports Commission: Proposals for making best use of existing capacity in the short and medium term*. The Mayor of London's response. May 2013
- xii. TfL. *Airports Commission Discussion paper 04: Airport operational models*. The Mayor of London's response. June 2013
- xiii. TfL. *A new airport for London and the UK. Technical note - Shortlisting the options*. July 2013