THE FUTURE DEVELOPMENT
OF AIR TRANSPORT
IN SOUTH EAST ENGLAND

MAY 2003
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Aviation’s contribution and importance

Aviation is an important sector of the UK economy, contributing 1.4% of GDP, or around £12.6bn in 2002. It generates 180,000 jobs directly and supports half a million other UK jobs. Aviation facilitates the export of a wide range of goods and services from all sectors of the economy. This is an industry in which Britain, despite its small size, plays a world leading role.

Aviation provides almost all international public transport services to and from the UK, and carries a significant share of international cargo transport, connecting Britain with every part of the globe. Aviation is facilitating the UK’s transition to a more sustainable economy.

Britain is an outward looking trading nation. Aviation’s importance has long been recognised and Britain has pioneered many new developments since the inception of aviation. As a result, the UK has developed one of the world’s best and most extensive networks of international air services.

The UK’s air transport network is an irreplaceable national asset which is valued and used by a great variety of people and businesses in the UK. A key element of this network is the range of services provided from Heathrow, the UK’s only internationally competitive hub airport, which is particularly important for intercontinental services because of the connections it provides.

We agree with the Government’s overall forecasts of traffic growth, but the UK’s ability to capture the economic benefits of this potential will depend on where and when the new runways are added. The different dynamics of longhaul and shorthaul travel need to be taken into account and the need for UK airlines and airports to be able to compete in increasingly contested markets.

We expect longhaul traffic to grow more quickly than shorthaul, at around 4% pa over the next 30 years. A large portion of longhaul services need to be located at an efficient, competitive hub airport providing a good network of connecting services.

Heathrow today caters for 80% of longhaul travel at the London airports but it is now being challenged as the world’s leading international hub.

A competitive hub at Heathrow

Heathrow is suffering from increasing congestion, delays and a lack of capacity for new services. As a result, the UK’s international transport network is eroding, while Continental airports are building up their networks. Paris CDG, for example, now offers a greater range of destinations than Heathrow. Amsterdam offers more flights to UK regional airports than Heathrow can.

Action is needed to ensure the UK has a competitive inter-continental hub, or the success of the UK aviation industry and London’s position as a World City will decline.

There is an overwhelming case for developing Heathrow. Adding a short runway in 2011 would be sufficient to maintain the competitiveness of the UK’s aviation hub at least until 2030. The new runway would be used for shorthaul flights, including restored UK regional services, to free up capacity on the main runways for longhaul growth.

Two hubs?

A major question posed by the Government is whether the UK could grow a second international hub airport alongside Heathrow. No other city in the world has developed two competing inter-continental hubs and we do not believe this would be possible in London in the coming 30 year period. A new

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1 Oxford Economic Forecasting Report 1999. £12.6bn is calculated as 1.4% of UK Gross Value Added at Factor Cost of £903.3bn in 2002.
hub could not compete with established hubs at Heathrow and on the Continent, particularly if it was in an inconvenient location, or if operating costs were high.

The two-hub concept depends on constraining Heathrow. We believe this would result in significant loss of economic benefits, disruption to the successful UK aviation industry and damage to the UK’s international air services network. It would also weaken the long term chances of any regional airport developing into a second UK hub.

Consumers make their own choices in competitive markets. Many passengers denied access to Heathrow will not use Stansted or Cliffe instead. Transfer passengers are more likely to use Continental airports. Some businesses would relocate near to better continental hubs. Holidaymakers may go by car or decide not to come to the UK. Government intervention could stop Heathrow’s success, but it could not make an inconvenient or expensive airport succeed.

We also note that a brand new hub at Cliffe, while superficially attractive, would not avoid environmental difficulties. Despite the noise advantage, we understand that Cliffe is opposed by the relevant local authorities and by national environmental bodies. It would also appear to be difficult to integrate the airport into UK airspace. We are not aware of any serious positive support for Cliffe.

Developing non-hub airports

An internationally competitive hub is needed to allow growth of longhaul services. Away from the hub, the main requirement is to allow shorthaul growth, which is expected to be slower and to generate lower economic benefits.

There is considerable scope for shorthaul traffic growth to make use of spare airport capacity in the South East. Regional airports such as Birmingham could also cater for more locally generated shorthaul demand.

As spare airport capacity fills up, the case for building a second new runway becomes strong. Gatwick is the preferred location from a commercial perspective, because it is well located for passengers, has good rail connections and is an established based for charter airlines. This could be developed after 2019 or beforehand if local communities agreed and the case can be made.

Heathrow first

The net economic benefits of all options starting with a new short runway at Heathrow dwarf those of non-Heathrow packages, even when an allowance is made for environmental costs. Our assessment of the overall economic benefits of adding a short runway at Heathrow, net of “global warming” costs, is £37bn.

The Government’s analysis, which in our view understates the economic benefits of developing Heathrow, relative to the other hub options at Cliffe and Stansted, still shows that Heathrow generates by far the greatest economic benefits per unit of capacity.

Adding a wide spaced runway at Gatwick, following one at Heathrow, would increase total net benefits to £65bn.

Later in the period, there is likely to be demand for a third new runway in the South East. Our analysis indicates that adding this runway, at Stansted for example, as the third part of the “package” would increase total net benefits to £80-90bn.

However, given uncertainties in forecasting this far ahead, we cannot be certain that a viable case could be made for building a third new runway in South East England during the 30 year period. We recommend that the option is kept open so that the case can be reviewed nearer the time.

Sustainable development

Consistent with the Government’s sustainable development policy, which requires a balanced approach towards economic, social and environmental issues, we recommend that the overall policy aim should be to capture as many of the economic benefits as possible, while dealing responsibly with environmental impacts.
The most important environmental issue, climate change, is not affected by runway location. We have long accepted that aviation’s contribution to global warming can and should be managed. The immediate priority is for aviation to take responsibility for carbon emissions, the main contributor to global warming. The most efficient and effective way forward is for aviation to be brought into an open international system of emissions trading. We do not support a tax on kerosene.

There is no case for adopting a policy of demand management simply to avoid making difficult decisions about expanding national infrastructure. Policies to deal with environmental issues, such as emissions trading, will have an effect on demand, but these effects have been incorporated into Government traffic forecasts. Fixing a limit on growth would be unsustainable.

Local environmental impacts will be significant for all options. These differ according to location and must be addressed.

Managing local impacts at Heathrow

Building a third runway at Heathrow would, in our view, be sustainable if it is accompanied by an environmental framework to limit local noise and air quality effects.

We have sought to engage local communities in consultation as part of the process of developing this response and we remain willing to engage in future consultation exercises. We propose that the runway is moved East so that the Church, graveyard and ancient Tithe Barn at Harmondsworth can remain in situ. Fair compensation should also be offered to those whose properties are seriously and unavoidably affected.

We provide evidence to demonstrate that the new air quality limits can be met. We also explain that noise impacts could be maintained within the level recommended by the T5 inspector as a limit after 2016.

The new Heathrow runway should be used only by relatively small, quiet aircraft - and not by large aircraft (such as Boeing 747s or the new Airbus A380 super-jumbo), or by older, noisier aircraft over QC1. There would be no need for any flights before 6am on the new runway or any increase in night flights on the other runways.

A wider rail network is needed at Heathrow, incorporating through running rail services to double existing rail capacity.

The development of a third runway at Heathrow would be sufficient to meet the airport’s needs until at least 2030.

Implementing the White Paper

The steps needed to implement the White Paper must be planned and managed or progress will be too slow. It will have taken 22 years to develop Terminal 5 from the date of the last airports white paper in 1985. This period must be condensed into 8 years if a new runway is to be built by 2011. We make some suggestions for how this could be done, under the Government’s leadership.
CONTEXT AND BACKGROUND

Structure of this response

1. In this document, British Airways comments on the questions raised by the Government in its consultation paper reissued in February 2003. We have tried to follow the Government’s structure as much as possible.

Section 1 (addressing questions 1-4) sets out our views on the sustainable growth of aviation and how the continued development of a major international hub fits in with that strategy.

Section 2 (addressing questions 5-13) examines the options for hub development and options for accommodating shorthaul and cargo growth. We provide a detailed critique of the Government’s economic assessment and present our own analysis of the benefits of three main options. We then make particular recommendations about location and timing of runway development in South East England.

Section 3 (addressing questions 14-21) proposes ways to deal with the main local environmental and community issues. Our proposals are intended to be consistent with sustainable development principles and with aviation’s international legal framework. We have concentrated on Heathrow, where there is a strong case for development. We have not examined airports such as Cliffe which we do not consider to be viable in economic terms, even though there would be significant environmental impacts. We have, however, looked at the surface access requirements.

Section 4. We discuss implementation of the White Paper.

Policy background and challenges for the current review

2. In the 20 years since aviation and airports policy was last reviewed, there have been major changes to the structure and operation of the industry and the UK has been at the forefront of change. UK airlines and infrastructure providers have been released from State control and markets have been steadily liberalised.

3. In the EU, normal competition law has taken over from prescriptive regulation and a single free market has been created. Policy for a number of related areas has been, or is being, transferred to the EU – most recently for safety, security and noise. The consumer, the economy and the industry have all benefited from these changes.

4. The noise climate has improved, despite rapid growth, and fuel efficiency has increased. However, the challenge of dealing with global warming has arisen and must be addressed.

5. In contrast to other forms of public transport, aviation contributes to public revenue.

6. The policies of the 1980s have been beneficial from most perspectives, but they have failed to secure the infrastructure necessary to accommodate the needs of a market oriented air transport industry.

7. Existing policy is inadequate in this area. There are weak and poorly coordinated mechanisms for implementing agreed policy. The system of airport regulation includes no disbenefits for congestion and the planning process for major infrastructure projects is inordinately long.

8. Heathrow, the UK’s only international hub airport is congested throughout the operating day. Rising delays increase airline costs while devaluing the product that can be offered to the flying public. By default, demand and delay management systems have developed to cope with capacity shortfalls.
9. Opportunities to expand overseas are heavily constrained by nationality requirements affecting airlines and aircraft.

10. These problems have caused longhaul carriers to retrench while the networks of continental rivals have grown. As the quality and scope of the UK's international transport network stagnates, London's position as Europe's leading world city is being put at risk.

11. The recent rise of the "no frills" sector has obscured the problems of congestion and stagnation. The success of this sector owes much to short term factors that cannot form a long term basis for UK aviation policy. "No frills" carriers have been enticed into under-utilised airports by artificially low charges and the ability to achieve high aircraft utilisation rates. En-route charges and safety regulatory costs have been subsidised for operators of small aircraft by the weight element of charges, which is a historical anomaly. Over time, uncongested airports will fill up and these airlines will face rising costs.

12. As Government policy is updated, these changes need to be taken into account. In a liberalised economy, financed by private capital, the options chosen by Government must reflect the commercial needs of the industry as part of the balance of economic, social and environmental issues. Heathrow's historic and locational advantages are significant.

Continuity of Government airport policy

13. Major policy statements made in the past have a bearing on the current debate.

14. Similar considerations of national versus local interests always apply when developing airports (and perhaps all national infrastructure) and the current ground has been well trodden many times already.

15. Dramatic new options, such as a multi-runway Stansted or a new airport on the Kent marshes have been rejected in favour of more modest schemes and incremental development at established airports, especially Heathrow.

16. While this approach and all potential options need to be reconsidered, there were good reasons for past policy decisions. Heathrow has always been the best location from a commercial and consumer perspective and, despite the superficial attraction of alternative sites, significant local impacts arise at any site.

17. We consider that commitments made by previous Secretaries of State should be respected if possible, so that long term stability and consensus can be created. Local people are unlikely to put any weight on commitments made by the present Secretary of State if past promises are swept aside without good reason.

18. Airports, along with their departure and arrivals paths, are here to stay, just as trunk roads and railways create permanent veins and arteries across the landscape of Britain. Airports need to be embedded in local and regional development plans. This is much more likely to happen if the new policy draws continuity with the past as well as setting expectations for the next 30 years.

Policy statements on runway options

19. In the 1985 Airports Policy White Paper, the Government unreservedly accepted the Public Inquiry Inspector's recommendation that, as a planning condition for Stansted's current terminal development, he should make an unequivocal declaration of intent that a second main runway would not be constructed (para 5.36).

20. The Secretary of State required BAA to dispose of the land that had been reserved for a second runway and BAA did so. It is not clear what has changed since then or whether any weight will be placed on this commitment.
21. At the same time the Government reaffirmed the policy that Gatwick should develop to its full potential as a single runway airport (ibid para 5.22), recognising the planning agreement between West Sussex County Council and BAA ruling out promotion of a second runway at Gatwick until 2019.

22. Following the 1985 policy, the RUCATSE studies examined the question of where runway capacity should be provided. Options including a new full length runway at Heathrow and other full length runway options at Stansted and Gatwick were reviewed. The outcome in 1995 was, in effect, a shelving of the question and a dismissal by the Secretary of State of the options then under review. More environmentally sensitive options were to be considered.

23. The current Heathrow proposal for a new short runway has reduced dramatically the adverse impacts compared with the RUCATSE option, while most of the economic benefit has been preserved.

24. In 2001, the Government approved Terminal 5 at Heathrow. The planning conditions, in particular a 480,000 atm limit, do not preclude another runway being built at Heathrow. The inspector’s recommendation for a movement limit was made on a precautionary basis to protect the noise climate. It was clearly capable of being revised. In any case, the limit applied to the two existing runways. We do not consider that the addition of a new runway is likely to increase the number of movements on the two existing runways beyond that point.

25. The question of whether or not another runway should be built at Heathrow was not within the remit of the Terminal 5 inquiry. Accordingly, no runway development proposal was presented to the inspector.

26. The parties opposed to Terminal 5 made representations that future runway development should be ruled out, but it was impossible for the inspector to come to a considered and independent view either on the merits of a particular proposal or on the general case for or against.

27. The inspector’s recommendation to rule out development of another Heathrow runway was made ‘…on the basis of evidence available to me…’. The evidence was one-sided and therefore insufficient to come to an independent and informed judgment. The inspector’s qualification acknowledges that limited weight should be placed on this recommendation.

28. The Secretary of State’s decision kept the runway question open so that its merits could be reviewed properly: ‘The Secretary of State sees the future of Heathrow generally as a matter for the review of airports policy…The remainder of this letter is to be read with this observation in view’. The remainder of the letter included introduction of the atm limit.

29. To conclude. Previous Government decisions have ruled out ever developing another runway at Stansted, developing a runway at Gatwick before 2019 and developing a full length runway at Heathrow. However, developing a short runway at Heathrow is entirely consistent with previous Government commitments.

The urgent need for clear policy decisions

30. Terminal 5 will help to increase the passenger handling capacity at Heathrow, but the twenty two year process of getting it means that the next stage is already needed. The process has exposed fatal flaws in the planning system, which appears to be incapable of dealing adequately with large national infrastructure projects.

31. It is not simply a problem of massive cost and delay, or that the adversarial approach exacerbates divisions rather than reconciling them. The main issue is that the outcome of the process is completely uncertain even when a development appears to be consistent with published Government policy.

32. We conclude that a Heathrow option, in particular a short runway, is just as open in policy terms as any of the other main locations, especially full length runways at Stansted and Gatwick. In fact, Heathrow is the only one of these three at which Government has not stated its opposition to another runway either in or since the 1985 Airports Policy White Paper.
The current review

33. The current review should result in a clear and strong policy framework which endorses the best policy choices and creates a strong presumption in favour of particular options when it comes to the public inquiry.

34. Every option contains difficulties as well as advantages. We welcome the Secretary of State’s public statements that “doing nothing is not an option”. It is clear that the present Government, unlike previous administrations, will provide leadership to deliver national infrastructure, based on a coherent 30 year policy. This is a new approach by the Government to aviation policy.

35. Policies on sustainable development also provide a new framework for balancing economic, social and environmental factors.

The National context

36. Our response to this consultation is made in the broader context of the needs of national aviation policy. It should be taken together with BA’s response in 2001 to the national aviation policy consultation and our detailed response to the other UK regional (RASCO) airport consultations.

37. We support the provision of sufficient well located airport capacity throughout the UK to meet the needs of passengers and freight shippers.

38. The most important and difficult decisions to be taken are those on the provision of capacity in south east England. That is where demand is greatest, capacity constraints are tightest, environmental challenges are greatest and the adverse consequences of inaction or delay on the UK aviation industry, and economy are the greatest.

39. As the Government identified in its consultation paper, there are particular benefits of hub airports that cannot otherwise be achieved. For that reason, British Airways is convinced that the most important decision to be taken by the Government will be to approve the urgent building of a regional runway at Heathrow as the foundation of a national strategy for airport development.

The international context

40. Aviation is an international business. National policy must be consistent with:

- the EU single aviation market
- EU competition law;
- The Chicago Convention and ICAO policies;
- global solutions to climate change.

Why SERAS is important to British Airways

41. British Airways is involved in an intensely competitive struggle with other international network airlines, where access to airports, and the ability to operate there punctually and efficiently are key success factors.

42. In developing airports policy, the government must recognise that aviation is a commercial activity. Its successful development requires conditions to be created which allow commercial airlines, such as British Airways, to sustain and develop air services profitably.

43. British Airways’ development as a global network carrier has underpinned the success of the UK aviation industry, particularly over the last two decades. We have the third largest airline industry in the world - after the US and Japan. UK airlines carry the second largest number of international passengers and British Airways was until very recently the largest airline (by revenue passenger kilometers) outside the US.
44. To continue to develop as a global airline, British Airways needs access to the capacity which will allow it to serve new destinations and develop new services to existing points on its network. Our experience in the 1990s trying to develop Gatwick as a “complementary hub” has shown that we cannot successfully split our hub operation across two airports in the London system. British Airways believes that the long-term commercial success of its business as a major UK-based network airline hinges on BA having access to growth opportunities at a major London hub airport. In our view, that can only realistically be achieved by continuing to develop London Heathrow.
SECTION 1 – HOW MUCH CAPACITY SHOULD BE PROVIDED?

Q1 Should new airport capacity be provided in the South East over the next 30 years and, if so, how much? What are the main reasons for your answer and how does it measure against the environmental, economic and social objectives of the Government’s strategy for sustainable development?

45. Despite the current problems in the airline industry, there is strong, long term underlying demand for growth in air travel, driven by economic growth and international trade. Aviation delivers significant benefits to the UK economy.

46. However, we do not support a “predict and provide” policy response - and it would be quite misleading to characterise existing Government policy as such.

47. At the other extreme, a moratorium on runway capacity growth is equally unsustainable. It would stifle the UK economy and jeopardise the competitiveness of a successful international industry. It would also deny the British public the considerable cultural and social benefits of access to foreign travel.

48. A sustainable aviation policy should seek to balance economic, social and environmental impacts. We believe it is possible to realise the substantial economic and social benefits of expanding the aviation industry, while taking proper account of the environmental and local impacts caused by new airport development.

49. To achieve this, we believe expansion in the London airport system to 2030 should take the form of further development of Heathrow as an international hub airport, accompanied by at least one and possibly two additional runways at other South-East airports - mainly to accommodate shorthaul services.

50. Our analysis of specific options is set out in more detail in our responses to Q6 and Q7 below. In this answer we deal with the general approach to airport capacity expansion.

Realising the economic benefits of UK airport expansion

51. The growth of air travel generates economic benefits for three main reasons:

- Business and leisure travellers value the ability to travel and access to air transport services;
- Air transport is an important industry in its own right, generating value-added which raises GDP both directly and in supplying industries;
- Aviation is part of the infrastructure giving access to the global economy. High value-added industries, such as financial services, high-technology manufacturing and pharmaceuticals, are particularly dependent on air transport.

52. The most comprehensive and up-to-date assessment of the economic benefits of aviation is the 1999 report from Oxford Economic Forecasting (OEF).2 This showed that aviation made a direct contribution to the UK economy of more than £10 billion in 1998, equivalent to 1.4% of GDP. This would be valued at over £12 billion in current prices. OEF estimated that the industry employed 180,000 people directly, and generated additional jobs in firms supplying the aviation industry, as well as boosting employment indirectly through induced effects in other sectors of the economy, including tourism. In total, the aviation industry provides or supports around 750,000 jobs in the UK.

53. There are also very valuable “wider benefits” to the UK economy from the high productivity of the aviation industry, from the way it facilitates growth in other high productivity sectors, and from its role in attracting high quality inward investment.

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54. Aviation provides part of the economic infrastructure that oils the wheels of business, allowing it to take place efficiently and effectively. Companies need quick and easy access to their markets; they need to be in contact with other companies in order to sell their products in a range of markets across the globe; and they innovate using the cross-fertilisation of ideas that comes from networking and contacts with others from a broad range of backgrounds and cultures. Air travel is essential for all these activities. It is not therefore surprising that the rapidly growing sectors of the economy over the longer term, including the so-called knowledge industries that rely heavily on human capital and knowledge, are intensive users of air travel.

**Forecasts of air traffic growth**

55. The degree to which airport capacity needs to expand to realise these economic benefits depends on the rate of growth in air travel.

56. For a number of years, British Airways has argued that market maturity means that the very strong growth of the past (5-6% per annum) should not be projected into the future and that the underlying growth of air travel in a mature market such as the UK should be in the 3-4% range.\(^3\) In the light of our analysis of market trends, the government’s current forecasts for air travel - which are used in the airport consultation documents - are a reasonable assessment of the future outlook for growth, recognising the uncertainty which attaches to any forecasts over such a long time horizon.

57. According to these forecasts, the number of passengers travelling to/from UK is projected to increase by 3.5% per annum over the next 30 years - in the midpoint of our forecast range.

58. Demand in SE England is projected to grow more slowly - by 3.2% per annum - as this market is already more mature.

**Longhaul demand**

59. The government forecasts suggest that longhaul travel will grow more rapidly than shorthaul travel as further-flung destinations come within the reach of leisure travellers and globalisation boosts intercontinental business travel. Also, the dynamic economic long-term growth of Asia is likely to lead to rapid growth in longhaul travel to that region. Longhaul services create greater economic value than shorthaul flights because few if any alternatives are available and fares (per passenger) are higher.

60. While longhaul services require fewer movements (and therefore take up less runway capacity) than shorthaul flights, a significant proportion of passengers need to connect from or to other flights. This means that most longhaul flights must be accommodated at an efficient and internationally competitive hub airport, where a mix of longhaul and shorthaul services can be integrated into a network, providing frequent connections to key UK and European business and trading centres. The principles of hub operation is explained more fully in our answer to question 2.

**Shorthaul demand**

61. Shorthaul flights currently account for over 80% of scheduled flights in the London airport system. As longhaul travel is more dynamic, we would expect that proportion to fall to around 75% in 2030. Shorthaul services provide lower economic benefits than longhaul.

62. Shorthaul services require significant amounts of runway capacity because they carry fewer passengers in each aircraft and require greater frequency of service. A smaller proportion of shorthaul passengers connect with other flights. This provides more flexibility about airport

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location. However, a significant number of shorthaul services will still be needed at hub airports to connect with longhaul flights.

63. In our response to the RASCO consultation, we support the development of regional airports to enable more direct services to operate from them. Expanding regional airports close to the South-East (eg Birmingham) could help take the pressure off South-East airports. But the scope for this substitution is limited. Also, this will be offset by the need to expand hub capacity to maintain the access for regional services to connecting longhaul services.

Taking account of the environment

64. The growth of aviation has some negative environmental effects, which fall into two broad categories: the impact of aviation on global warming, through carbon dioxide and other emissions; and the effect on communities around airports. These global and local effects need to be taken into account in the way aviation develops, though neither is an argument for totally preventing runway expansion.

65. Our approach to managing local noise and air quality issues is discussed fully in our response to question 16. At Heathrow Airport, in particular, we believe it will be necessary to establish a framework for managing the environmental impact of the airport if a new runway is added. With good environmental management, further expansion at Heathrow and other London airports would be sustainable.

66. We also believe that the global warming costs of aviation are not a barrier to continued expansion of UK aviation. First, as we show in our response to question 6, BA estimates that the net economic benefits of our preferred airport development strategy outweigh the environmental costs (valued in line with the government's methodology) by a factor of as much as ten. Second, as the DfT forecasts show, reflecting global warming costs in the price paid by passengers does not materially affect the demand outlook which underpins the case for further capacity expansion.

67. For CO₂ emissions, British Airways has long supported the participation of aviation in an open emissions trading scheme as the most economically efficient and environmentally effective way of ensuring that aviation reflects the cost of these emissions.

68. The participation of aviation in an open global emissions trading regime is complicated by the Kyoto treatment of emissions from international bunker fuels, which has the result of excluding international aviation emissions from the agreed global caps. Without amending the Kyoto protocol, this problem cannot be addressed fully until the second Kyoto commitment period from 2010, when new caps need to be agreed by the parties. However, progress can be made towards this goal. Participation in the EU emissions trading scheme may be a useful intermediate step, as would be a voluntary commitment by airlines on fuel efficiency.

69. We are responding separately to the government’s consultation on economic instruments.

How much runway capacity?

70. Government forecasts suggest that “unconstrained” air travel demand in South-East airports will rise by around 2½ times between 2000 and 2030. Under the “maximum use” scenario - with no runway expansion - less than 40% of this extra demand can be accommodated, and this requires a scale of expansion at Luton which is probably unrealistic (see Table 14.4 of consultation paper).

71. By contrast, the government figures show 75% of the extra demand can be accommodated with a short runway at Heathrow and one additional runway in the South-East of England*. We believe that a second runway at Gatwick can deliver equivalent economic benefits to a second Stansted runway as explained in Q6. 90% of unconstrained business travel demand

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* This is based on Scenario 12 - with the additional runway at Stansted
can be accommodated under this option. Q6 and Appendix I explain that the capacity benefits at Heathrow may have been understated.

72. Given that the bulk of the economic benefits are linked to business travel, this suggests that a “Heathrow plus one other” strategy should be the central planning scenario for South-East runway expansion to 2030. This is supported by our analysis of economic benefits as set out in Question 6. There are even stronger positive economic benefits for a “Heathrow plus two more” strategy, but the case for a third new runway is clearly conditional on the strength of demand many years from now, and this creates a degree of uncertainty. In Question 7 we recommend reserving this as an option.

Q2 Should the government aim to maintain at least one large hub airport in the South East? Is a second hub plausible, and if so, should the government seek to promote one, and what would it need to do to achieve this?

73. The word “hub” is often misused to describe an airline’s operating base (eg “easyjet’s hub at Luton”); or simply to distinguish a large airport from a small one. It is important to be clear about what a hub is.

74. The essential characteristic of a hub is that it serves as a major connection point for passengers and/or cargo. A hub develops only if the airport and at least one major airline deliberately organise their operations to provide convenient and efficient transfer services.

75. Critical elements which need to be organised include: a broad mix of routes, coordinated flight timings, baggage and other terminal facilities, through check-in / ticketing and marketing of connections.

76. Airport operators cannot create a hub airport without attracting an airline whose strategy it is to build an integrated and competitive air service network at the airport. If the airport can also draw in the airline’s alliance partners and franchisees, the network can be extended beyond the destinations that are within the reach of the main carrier. A successful hub will then grow organically as other scheduled international airlines compete with the base airline. From a passenger perspective, these other airlines help to extend and enrich the network available at the airport, a process which is facilitated by the IATA interlining process.

77. However, many airlines, notably ‘no frills’ operators and charter operators, positively avoid organising their operations in this way. Their presence at an airport does not help to create a hub. It is no coincidence that no frills operators are attracted to cheap, non-hub airports with fewer facilities, reflecting their different business model.

78. The absence of a network airline at Stansted airport helps to explain why that airport is not a hub and why it cannot sustain inter-continental air services - despite its considerable advantages, including:

➢ a large number of shorthaul operations to the UK and Europe;
➢ high quality facilities;
➢ the Government’s open invitation to foreign airlines; and
➢ strong demand arising in the London area.

79. There have been no significant examples of longhaul operations except at strong hub airports.

80. If the UK wishes to have a competitive network of intercontinental air services, the UK’s internationally competitive aviation hub airport must be improved and allowed to grow. If this is done, there would be no need for a second hub in South East England.

81. We explain below that a two-hub policy is not only unnecessary, but that it would damage the UK’s aviation interests and the economy. At best, if one or more network airlines could be induced to operate at the second “hub”, strong parts of the network would be split or duplicated across two airports and this would reduce support for thinner routes, while
saddling the airline(s) with permanent and unsustainable competitive disadvantages. At worst, much of the traffic forced out of Heathrow would flow to Continental hubs instead, leaving the second London "hub" as an expensive white elephant.

82. Having established broadly what a hub is, we now review the economic advantages of a hub. We will then identify the essential characteristics of successful hubs before looking at Heathrow’s relative advantages and current status. Lastly we consider the feasibility of operating two hub airports in the South East.

The economic importance of an international hub

83. The consultation paper acknowledges the important benefits of hubs, referring to the range and frequency of services generated at a strong hub airport (para 2.20). The resulting network of services benefits business and leisure travellers by increasing their choice of travel options. By making a region a more attractive business location, hubs help to bring vital inward investment and thus to stimulate economic performance.

84. We can identify a number of reasons why increased economic benefits flow from a hub, as distinct from a general purpose airport:

- A hub draws connecting passengers onto international routes, particularly intercontinental routes, to help fill the aircraft. This supports “thin” routes that would not otherwise be viable, allowing airlines to offer a much wider choice of destinations. The economies of the South East and many UK regions benefit by being connected (via the hub in the case of UK regions) to a more extensive global network and a wide choice of flights. The increased number of relatively well-off foreign tourists visiting the UK also boosts other sectors, such as tourism and retail. The unique ability of a hub to capture potential international growth also boosts Air Passenger Duty revenues for the Government.

- A successful hub provides a sound base for a competitive airline industry. Airlines based there can serve traffic flows that would otherwise travel via Continental hubs, eg India-US traffic or Europe-US. This boosts the UK economy in the same way as other exports (eg from manufacturing industry). Growth and employment is generated across the economy that would otherwise flow to competitor nations. These benefits spread well beyond the SE, through local employment at regional airports, through purchasing of goods and services from companies across the UK and through relocation or outsourcing of non-core functions, such as aircraft maintenance, or telesales, which typically go to regeneration areas such as South Wales or the North East.

- Global networks provided by aviation hubs are valued highly by business passengers, as reflected in prices paid for business fares. Lower price-sensitivity compared with leisure travel shows that business passengers value aviation services more highly than leisure passengers. This indicates the importance of good aviation links to many UK based businesses.

- Strong global networks are a magnet for high-technology industries, other high value-added activities - including financial services and corporate headquarter functions - and international investment. Providing the infrastructure which supports these global airline networks therefore gives a significant boost to national productivity.

85. A successful hub must be well-placed to serve the local market, with good road and public transport links. These services will be valued more highly than at other airports.

86. This means that without a competitive hub, the UK would lose the ability to serve many intercontinental points and the UK’s international transport network would shrink generally. People would find it much less convenient to travel beyond Europe, because frequency of service would be reduced along with a loss of destinations. International companies would find London a less attractive business location, increasing the risk of a drift to the Continent. Direct employment in aviation would fall along as would procurement from UK companies. Support services such as engine maintenance might also have to move to the Continent if specialist centres were able to consolidate their size advantages to offer a more competitive service. Air Passenger Duty revenues would fall and the tourism and retail sectors would
suffer from the loss of high spending non-European tourists. These effects would be most marked in the South East, but they could also cause significant damage in regions where the economy is weaker generally and the benefits provided by aviation are particularly important.

A hub airport must provide an efficient base for at least one network operator.

87. The extra complexity and cost of operating an integrated network is made worthwhile by the competitive advantage that it offers the airline. This flows from offering passenger things they value highly: the ability to fly direct to far-flung destinations (many of which are of immense value to British organisations with interests in those regions); a choice of flights that meet their own timing preferences; and flexibility to switch to a later flight if plans change. This helps attract more profitable business passengers and supports stronger yields. Studies have shown that hub operation creates unit cost advantages through the use of larger aircraft and higher load factors (because traffic is “blended” from a number of different transfer markets). These benefits can be passed on in lower economy fares.

88. Another key benefit to airlines of this approach is the ability to tap markets that they cannot serve directly. Thus BA can offer flights between the Middle East and the US by offering passengers facilities to transfer between flights at Heathrow.

89. A successful hub requires a substantial presence by at least one large carrier, or an alliance of carriers which allow new spokes to be added to the network. If non-hub carriers take too many scarce Heathrow slots, network airlines are forced to cut thinner routes to maintain frequency and remain competitive on thicker routes. At Heathrow, this has resulted in a fall in the number of shorthaul destinations, including services to the UK regions. A hub airport therefore also ensures a degree of competition and frequency of service on both shorthaul and longhaul routes that would not otherwise be available.

Essential characteristics of successful, internationally competitive airport hubs

90. Successful hubs do not develop automatically or by chance. They need to attract network airlines by offering:

- **connectivity** - airlines must be able to provide efficient flight connections;
- **capacity** - a large number of arriving and departing flights need to be able to interconnect efficiently and space is needed to allow the network to grow;
- **convenience** to local passengers, close to a large market with good road and public transport;
- **cost-effectiveness** - the cost of building the runways, terminals and necessary access links and moving in (in the case of a new airport) must be affordable and proportionate

**Connectivity**

91. The first requirement of a major international hub airports is that it must allow international airlines to offer efficient and convenient transfers so that an integrated network of air services can be built up.

92. Large aircraft are needed to reach destinations beyond Europe. This affects the economics of longhaul scheduled air travel, because more passengers are needed to make a destination viable. Airlines must therefore draw on a larger catchment area than the immediate vicinity of the airport for all but the strongest routes. Transfer passengers are drawn in on flights from the UK and Europe, and from other inter-continental points. This process benefits UK and European routes by allowing more frequency of service and/or more competition. As a result, connecting passengers account for 33% of passengers on longhaul services from London, whereas the proportion for shorthaul services is around 25%.

93. Network airlines, which can only operate from hub airports, build up good frequency of service and a wide range of destinations in ways that facilitate the necessary connections. They also link up with other airlines where there is a mutual benefit (as in the case of independent franchisees) to improve the network further.
94. The ability of a hub to support an efficient transfer operation is therefore a prerequisite for any airline wishing to build up a competitive network, especially if it includes intercontinental routes.

**Capacity**

95. The growth of longhaul services to meet rising demand depends on the availability of capacity at an internationally competitive hub airport in SE England, which can attract local demand and enable passengers to make efficient connections.

96. If non-network airlines operate at a hub airport, they take up capacity without contributing to the airport’s overall network. This reduces the effective hub capacity of the airport. Furthermore, non-hub airlines (charter, freighter and no-frills) do not wish to pay for transfer infrastructure. Therefore it is preferable for non-hub services to be operated at a different airport than hub-services.

**Convenience**

97. In order to achieve the high volumes of traffic that they depend on for intercontinental services, hubs need good access to a large local market of air passengers, as well as a substantial volume of connecting passengers, in order to build up a critical mass of services. For this reason, successful hubs must be in a good geographic location - close to the main business, tourist and population centres that it serves, and well served by surface transport, both public transport services and road networks.

**Cost-effectiveness**

98. Building a new hub would be extremely expensive compared to adding to the existing hub. In many other countries where this has been done, there has been a substantial element of state funding. High airport charges at a new airport could significantly reduce demand especially from transfer passengers.

**Heathrow’s advantages as the UK’s established hub**

99. Heathrow has long been the leading European hub, drawing its advantage from the strength of the aviation market in London and SE England and the ambitions of British Airways to offer the best global network. BAA, British Airways and other companies have invested heavily in the airport over many years and its facilities are extensive. It has many characteristics of a successful hub already, though congestion reduces the scope to expand and undermines the efficiency of transfers. Heathrow still has an enviable reputation as the world’s leading international transport hub. It is home to BA, one of the world’s leading network carriers, and Star, the world’s biggest airline alliance, also has a major presence. Heathrow’s position, facilities and reputation put it well ahead of other sites as a location for a successful international hub airport.
Heathrow’s decline

100. Heathrow’s position has, however, been sliding over the past decade. Infrastructure constraints have prevented expansion of air services. Congestion has resulted in huge inefficiencies for airlines and unattractive transfers for passengers, with long waiting times and lost baggage. Destinations have been squeezed out. In 1990, Heathrow offered direct services to well over 200 different destinations, with only Frankfurt able to offer a comparable figure. Heathrow was well ahead in terms of the number of services, with around 50% more frequencies. Over the next decade, continental European hubs expanded rapidly, as shown in Table 1.

101. The 1990s were a decade of strong growth for air travel. Other European airports, especially the main continental hubs at Amsterdam, Frankfurt and Paris Charles De Gaulle, all added significantly to capacity to take advantage of this demand. Their networks broadened as new destinations were added. Paris CDG, which now has four runways, has more aircraft movements than Heathrow. Amsterdam and Frankfurt have also been expanding runway capacity.

102. Heathrow suffered a relative decline in the number of services and destinations and an absolute decline in the number of destinations, as weaker destinations were dropped to accommodate frequency growth on stronger destinations. This process was driven by economic pressures and the need to remain competitive with other European hubs in core markets.

103. While London is one of the world’s biggest and most important business and financial centres, generating significantly more demand for air travel than any other European city, its hub airport has dropped to fourth place in terms of number of destinations served by direct flights.

104. Since 2000, the industry has hit a major downturn as a result of the combined effects of terrorism (September 11th), general economic slow down, wars in Afghanistan and Iraq and most recently SARS in Asia. This has resulted in a temporary reversal of the trend, with Heathrow sustaining and even increasing its number of destinations (because of its stronger local demand and chronic capacity constraints), whereas Paris and Amsterdam both lost destinations, especially by ‘other end of route’ carriers’, in the face of depressed demand. Second level hubs at Brussels and Zurich have fared even worse, with the loss of Sabena and Swissair respectively and the emergence of smaller airlines in their place.

105. However, the period since 2000 has been highly unusual and unrepresentative of longer term trends. As markets recover, Heathrow’s position will slip further until new runway

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**Figure 1: Heathrow’s advantages as a hub**

<table>
<thead>
<tr>
<th>Characteristic of a successful hub</th>
<th>Heathrow’s advantages</th>
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<tbody>
<tr>
<td><strong>Connectivity</strong></td>
<td>Direct services to almost 200 destinations</td>
</tr>
<tr>
<td></td>
<td>T5 will have world-class facilities and other terminals will also be upgraded. Transfer infrastructure in place (flight connections, transit and baggage links, premium lounges etc.)</td>
</tr>
<tr>
<td><strong>Capacity</strong></td>
<td>The addition of one short runway would provide the same or greater overall capacity than either of the four-runway options (see Appendix I)</td>
</tr>
<tr>
<td><strong>Convenience</strong></td>
<td>15 miles from central London, compared with 27 miles to Gatwick and 35 miles to Stansted.</td>
</tr>
<tr>
<td></td>
<td>Situated in an economic growth area (West London/Thames Valley).</td>
</tr>
<tr>
<td></td>
<td>Served by an extensive network of rail, tube, coach and bus services – and this could be enhanced by the new AirTrack rail line.</td>
</tr>
<tr>
<td><strong>Cost-effectiveness</strong></td>
<td>Expanding Heathrow would be considerably cheaper than developing Stansted or Cliffe as hubs.</td>
</tr>
</tbody>
</table>

**Table 1: Number of destinations served by major European airports**

<table>
<thead>
<tr>
<th></th>
<th>AMS</th>
<th>CDG</th>
<th>FRA</th>
<th>LHR</th>
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<tbody>
<tr>
<td><strong>1990</strong></td>
<td>201</td>
<td>210</td>
<td>254</td>
<td>227</td>
</tr>
<tr>
<td><strong>1995</strong></td>
<td>227</td>
<td>229</td>
<td>285</td>
<td>213</td>
</tr>
<tr>
<td><strong>2000</strong></td>
<td>228</td>
<td>261</td>
<td>263</td>
<td>136</td>
</tr>
</tbody>
</table>
capacity is provided. Heathrow may stay ahead in terms of passenger numbers, but Paris and Frankfurt could catch up around the turn of the decade.

106. Heathrow is the only one of 3 or 4 potential global hubs in Europe (the others being Frankfurt, Paris Charles de Gaulle and probably Amsterdam) that could fail to meet its hub potential through inadequate runway capacity.

107. Heathrow can develop into a hub with as much hourly capacity as Stansted or Cliffe, at significantly lower cost and with much greater potential of success. It would then remain competitive with the premier hubs in Europe, with a throughput comparable to that at Paris, Charles de Gaulle (with four runways) and Frankfurt (with its new runway), and greater than at Amsterdam.

Is a second London hub airport viable?

108. It should be clear from the above that hubs are long term strategic entities, which are built up gradually over time. They cannot easily be moved without significant cost and loss of benefits, to both airlines and users.

109. In the face of growing inadequacies at Heathrow and the long term prospect of a shortage of space, BA attempted to split our network between Heathrow and Gatwick, putting significant effort and investment into making Gatwick “the hub without the hubbub”.

110. We found it necessary to duplicate many costs and routes. Connecting passengers needed to support inter-continental services were divided between the two airports, which helped neither. We stuck with this policy for many years, expecting losses at the outset. Ultimately however, the attempt failed and we cannot see how a split hub could succeed in future.

111. If airport capacity was created at an alternative location, the best prospect of turning this into a viable second hub viable would be to persuade a major network carrier to move all its operations there (to avoid the split hub problem). However, carriers will be unwilling to move. With established operations at Heathrow and other airports already, the costs of moving to a new hub would be considerable.

112. More importantly, any carriers that moved would make their revenues vulnerable to competition from carriers remaining at Heathrow. More travellers – especially lucrative business travellers - start and end their journeys nearer to Heathrow, by virtue of its proximity to central London and its good transport links. And Heathrow is more convenient for other regions of the UK than other proposed airport sites. These advantages are likely to remain in 2030, whatever the proposed surface access improvements.

113. No airline would contemplate a move without firm guarantees that would make it viable to operate there and be able to compete with carriers based at Heathrow and at major European hubs. For example:

- a sufficient amount of new capacity at the outset to allow a major airline alliance to move its network en-bloc;
- state funding/subsidy of airport constructions costs; (it could not be funded by an airport developer and pre-funding would be unacceptable to airlines at that airport and to airlines at other airports);
- a development agency approach to address planning constraints (similar to London Docklands);
- publicly funded high quality road and rail infrastructure to overcome the location disadvantage;
- a firm commitment that the airport would not be subject to environmental operating constraints.

114. These stringent conditions would represent a significant departure from current policies. However, without them, airlines could not and would not move.
115. If airlines will not willingly move their services to a second “hub”, they would have to be forced to move there. This is implicitly recognised by Government modelling in which major development at Stansted or Cliffe require a very large number of services to be “seeded” onto the new airport as soon as the airport opens in 2011. In the case of Stansted, the amount to be seeded represents around 40% of Heathrow’s longhaul services in 1998. However, seeding is explicitly not a transfer of services away from Heathrow and other airports. It is assumed that there is no reduction at existing airports (unless justified by falling demand). This implies a substantial jump in the number of longhaul flights. In order to fill the extra flights, there would have to be a substantial increase in the number of connecting passengers.

116. We can envisage three potential “seeding” approaches, each requiring government intervention, which are discussed in Appendix II. All of these methods have severe drawbacks.

117. Even if airlines could be moved, passengers also have to be persuaded to go there. The new “hub” would have to offer significant advantages, such as a much better schedule of flights or lower fares to overcome the serious locational disadvantage. Massive investment in public transport would help, but not if it resulted in significantly higher costs of operating at the new hub. The only way to enforce a shift of a critical mass of longhaul services would be to restrict Heathrow. However, we believe this would result in a significant loss of consumer benefit.

118. Even as demand increases, we cannot see how another south east hub could evolve naturally. It would be a high risk strategy to set out on a policy designed to create a second major hub which may not be viable for many years, if at all.

119. No other city in the world has succeeded in developing two hubs, though plenty of cities are served by more than one airport. Generally, multi airport cities have one hub and other airports play a complementary role, such as supplying capacity for foreign carriers or services for the local catchment area. In the case of Paris, Charles de Gaulle is the hub airport and Orly caters primarily for domestic services.

120. New hub airports have been developed in cities such as Hong Kong, Denver and Munich, but these have succeeded only by closing the old hub airport and moving the entire operation. In the case of Montreal, where the existing hub was kept open, the new airport failed to secure the expected benefits.

121. The case for a second hub is not proven and could be damaging to the interests of the British economy. There must be a significant likelihood that it will never be viable to operate two hubs in the south east: and that one hub airport providing a home for a global network, capable of competing with the services offered from rival European hubs, will be adequate to meet that essential need. Other needs for air services could be met, and the relevant capacity provided, at other south east airports, which could continue to grow organically and sustainably on the basis of their existing strengths.

122. We do not believe that a second London hub airport is needed to meet demand if one short runway is built at Heathrow. Nor do we believe the conditions will exist in South-East England over the next 30 years to develop two major hubs. It would make more sense to develop a second UK hub airport away from South-East England, to serve the growing air travel market in either the Midlands or the North. In our response to the airport consultation papers for other regions we discuss the case for such a policy.

Q3 Are there any benefits of aviation to passengers, the aviation industry or the wider economy that the Government should aim in particular to secure through its airports policy? Are there any drawbacks it should aim to avoid?

123. Airports policy needs to be realistic about the commercial environment and to build on existing success, if the potential benefits to passengers, the aviation industry and the wider
economy are to be achieved. First and foremost, this requires continued development of an internationally competitive aviation hub, as explained in our responses to Questions 1 and 2. This will bring to the UK and its citizens:

- fast, convenient and good value public access to a wide range of destinations
- one stop connections between UK regions and almost every continent around the globe
- an innovative and successful UK aviation industry
- benefits to national productivity from having good scheduled air travel links to the global economy.

124. The benefits of continuing to develop Heathrow as an efficient and competitive hub, while addressing the main environmental issues, should therefore be a core element of the government’s aviation strategy and its airports policy.

Drawbacks to avoid

125. We believe there would be significant drawbacks to the economy, to the British airlines, to passengers, to London’s status as an international city and to regional airlines, from failing to develop Heathrow as the UK’s premier international transport hub. These adverse effects should be avoided.

126. Government policy should also aim to overcome existing drawbacks caused by severe congestion at Heathrow. In particular:

- the growing reluctance of other countries to grant new or increased route rights to UK airlines while their own airlines cannot secure enough slots at Heathrow;
- built-in delays and congestion which cause great inconvenience to passengers, reduce aircraft and crew utilisation for airlines, pushing up costs and fares, and burn unnecessary fuel as aircraft hold in the air and on the taxiways.

127. These drawbacks would become acute under the “maximum use” scenario envisaged by the Government. It is completely unrealistic and inefficient for passengers and airlines to wait for infrastructure to fill to bursting point before allowing expansion.

128. The Government should avoid giving policy support to encourage development of a hugely expensive “white elephant” airport that could never operate economically. A second hub airport in South-East England is not needed, would not work and would undermine the prospects of developing a successful hub at Heathrow, or perhaps at one of the regional airports later in the period. These problems should be avoided as a matter of policy.

Q4 Should the Government seek to ensure that the potential employment benefits of aviation growth are spread to those people and localities which are most in need of such benefits? If so, what should be done to achieve this?

Regional development should not determine airport location

129. British Airways supports the desire to spread the economic benefits of aviation as widely as possible and our proposals are designed to achieve this. The continued development of Heathrow as a hub will continue to serve UK regions as well as a large part of the South East, while good public transport will broaden the spread of employment and other benefits in the local area.

130. However, trying to spread the economic benefits of aviation by siting airport capacity where there is inadequate infrastructure and where commercial airlines do not want to operate is a recipe for disaster. The economic benefits cannot be spread around in this way.

131. There are several examples of airports in the UK (and overseas) which have spare capacity, or ‘potential’ but which are underused because they have inadequate markets to support them. Some in the UK have been referred to in the consultation (e.g. Manston, Alconbury). Overseas, Montreal Mirabel is the classic example of a failed airport built in the wrong place for political purposes.
132. Aviation is a commercial activity that must respond to the forces of the marketplace. Airlines that fail to do so go out of business. Airports see traffic flow elsewhere unless they offer what airlines and passengers need. British airports and airlines must make their own way, free of state aid of any kind, competing against foreign airlines at hubs with superior facilities and fewer constraints on growth. Government policy must take these market forces into account and not attempt to use aviation as an instrument of government regional policy, as they do with the forms of transport that fall under Government control and funding.

Benefits can and do spread to other regions

133. All the English regional development agencies (RDAs) support the building of a third (regional) runway at Heathrow. Large and small airports in other regions of the UK supporting this. They do not see Heathrow as competing against them, but complementing their development.

134. An important and unique advantage to UK regions comes from increasing the number of direct flights to Heathrow, and by permitting restoration of services that have been squeezed out. Providing easy and convenient access to the network of international services from Heathrow – to destinations that would not be viable from the regions because of insufficient demand - allows companies in the regions to engage in transactions with global business and financial centres. This would help to attract new inward investment, with all the associated employment and other economic benefits.

135. The nature of the runway proposal, at 2000m long, would be too short for long haul operations. This provides assurance that a significant proportion of flights would serve shorthaul destinations even as demand increased over the years. It may be possible to design guarantees that 5-10% of flights (11,000-22,000 atms) on the new runway would be reserved for new regional destinations (allowing, for example, 5 - 10 destinations to be served 3 times a day).

136. UK regional passengers would also benefit from faster and more efficient connections at Heathrow which would make it more viable to do business overseas. These include:

- shorter taxiing delays (by about 10 minutes)
- less average takeoff and landing delays (bringing down the average significantly reduces the chances of long delays on occasion)
- many more long haul/mid haul flights to connect to
- automated passenger and baggage transit between terminals
- better onward surface connections - additional direct rail services, into S London/Waterloo, Surrey, Thames Valley and Hampshire. Crossrail to the West End, City and canary Wharf.

137. Other economic spin-off benefits to UK regions by British Airways alone currently includes devolved maintenance (in Cardiff and Glasgow), IT (in Newcastle) and reservations (in several centres). These devolved benefits result from Heathrow’s historic success. Regions and localities in most in need of employment benefits can offer added value to attract commercial activity, for example by providing a skilled workforce or lower cost services than are possible in the South East. Growth at Heathrow would increase pressure on airlines to devolve activity away from the South East in order to remain competitive. This creates direct and tangible business opportunities for regional economies.

London and S.E. Region

138. It is reasonable to expect employers at well used popular airports to pursue recruitment, training and public transport measures to help spread employment opportunities coming from new airport development to deprived areas within reach of those airports. This can and should develop as a “win-win” approach, since employers should also benefit from recruiting in a larger pool. Government policy should focus on promoting best practice rather than forcing particular outcomes.
139. Heathrow is on the boundary of the London Development Agency (LDA) and South East Development Agency (SEEDA) areas. These RDAs recognise the need for Heathrow to have a third runway, to enable them to be economically competitive with other European regions. Regional plans need to be adapted to enable these benefits to be fully captured if Heathrow gets a third runway.

140. The more distant Gatwick, and still more remote Stansted could make only a small contribution to the growth of 600,000 jobs over the next 10-15 years, in London itself, envisaged in the Mayor’s draft London Plan. The centrifugal effect on London’s economy of seeking to develop a new hub at Stansted, Gatwick or Cliffe, well beyond London’s boundary, would operate against the Mayor’s core strategy of reviving London. The flow of resources for investment in transport infrastructure, housing and local services would of necessity have to be focused on north Essex and Cambridge (in the case of Stansted), Sussex (in the case of Gatwick) and North Kent/South Essex (in the case of Cliffe) if such massive developments were to have a chance of success.

141. Heathrow has been hugely successful in underpinning the economy of west London and the Thames Valley. It has the potential to more in future, with another runway, for example by assisting with regeneration of areas of deprivation around Heathrow. We suggest the government invites the LDA, SEEDA, the Mayor of London and other key local planning authorities to work with the promoters of the Heathrow regional runway after the White Paper is produced to co-ordinate plans so as to secure the benefits that Heathrow expansion can bring to those areas that most welcome them - and to avoid unwelcome pressures in other local areas.

142. The London Mayor’s draft Spatial Development Strategy and the related Heathrow City initiative have identified the “Heathrow Opportunity Area”. BA is an active partner in the Heathrow City initiative, which is one of the UK’s seven city regeneration initiatives (one of four in London). This area includes such centres as Hayes, Southall, Yiewsley and Heston. The Mayor envisages the creation of 87,000 new jobs in West London by 2016. The new runway could contribute 45,000 Heathrow-related jobs towards this goal.

143. On the north side of the airport, the more general Heathrow area of opportunity, including Feltham to the south and Hounslow to the east, is identified in the Mayor’s London plan and by the LDA as needing to generate 45,000 new jobs in the next 10-15 years. To the west, Slough also benefits from the jobs and prosperity which Heathrow brings.

New Rail Links spread the benefits of Heathrow’s regional runway across London

144. New links associated with expansion of Heathrow could spread the potential employment benefits to new parts of London. In particular, AirTrack would open up areas to the south and east of Heathrow (for example Wandsworth and Lambeth). Crossrail, from the GWR mainline to the north, could provide access to East London. The strength of passenger demand at Heathrow increases the viability for such rail links. As well as increasing employment opportunities further afield, these rail developments would allow firms to locate further away from the airport.

145. The revival of the Paddington area, the second largest development opportunity in London (after Canary Wharf), will benefit directly from the very fast link to the airport provided by the Heathrow Express.

Damage to the area if the new runway is not built

146. Failure to build the regional runway is expected to result in 49,000 fewer airport related jobs in 2015 compared with the situation if the runway was built (representing a loss of 4,000 existing jobs). The direct effects of long term stagnation and decline would be felt not only in west London, but more broadly across the wider London and UK economy. The long term damage could be substantial.

147. We would also expect a substantial loss of jobs resulting from relocation, stagnation or failure of existing businesses in the area that were partly or wholly dependent on the existence of Heathrow.
148. These impacts could be even worse if Heathrow were to be restricted as a matter of policy, to stimulate the creation of another airport elsewhere.
SECTION 2 – WHERE TO PROVIDE ANY NEW AIRPORT CAPACITY?

Q5 To which criteria should the government attach the most and least weight in reaching decisions about the location of any new capacity, and why?

149. The government should base its policy on sustainable development, seeking to realise the economic benefits of aviation while dealing responsibly with environmental impacts. Airports policy, in particular, therefore needs to reflect the commercial requirements of the aviation industry, otherwise the funds required to develop the infrastructure and to deal with environmental issues will not materialise.

150. Environmental issues are likely to vary from location to location and some may be location specific, making the overall environmental picture difficult to compare. Proper scientific assessments are needed to ensure that the correct weight is attached to assessments of the external impacts of aviation.

151. Aviation can only make a relatively small contribution towards achieving broader goals of regional development, development of new rail links and environmental improvement. Aviation policy should not be used to pursue all these desirable outcomes in ways that put the potential economic benefits of aviation at risk.

152. The approach to assessing and balancing criteria should therefore be market led. The viability of a particular combination can be assessed against the following criteria:

- Does the option provide sufficient capacity to meet sustainable demand, reasonably near to where it arises, thereby allowing the potential economic and social benefits to be captured?
- Does the capacity provide a globally competitive hub for the UK, which is essential for the competitiveness of the UK economy?
- Does the capacity combination meet the needs of non-hub operators, eg: charter, no frills, freighters
- Does the capacity contribute to an overall national policy for air transport?
- Can the environmental and community impacts be managed sustainably?
- Can an adequate network of convenient surface access links be provided?
- Can the development be funded by aviation operators and passengers without damaging competitiveness, and is any public funding commensurate with wider economic benefits?
- Are the risks acceptable and manageable?

Q6 What are the relative merits of these alternative combinations of possible airport development as set out in Chapter 14?

The government’s analysis of costs and benefits

153. In our view, the net economic benefits from developing Heathrow are substantially greater than those that would arise from establishing an alternative hub in south east England. This conclusion is supported by the government’s estimates of the net benefits generated by different runway packages, as set out in Chapter 14 of the SERAS consultation document.

154. The presentation of the government’s figures underplays Heathrow’s relative economic advantages. However, these figures do demonstrate that Heathrow provides much greater benefit for each extra unit of capacity than new “hub” options at other locations.

155. Our own analysis takes into account a number of qualifications to the government’s analysis of benefits and cost, including:

- different estimates of passenger capacity at several of the airports (at Heathrow, for
example, passenger throughput achievable with a new short runway is much higher
than government estimates);

- an allowance for risk, which under revised Treasury ‘Green Book’ procedures should be
  included explicitly in the analysis of costs and benefits (this is clearly much greater in the
  new hub packages than options based on incremental development at existing airports);

- estimates of economic losses resulting from policies designed to “seed” passenger
demand to the proposed new hubs at Stansted or Cliffe;

- adjustments to net costs of essential surface access improvements for new hub
options;

- estimates of global warming costs and “wider” economic benefits, both of which are
acknowledged by the government as being of vital importance.

156. Adjusting for these factors considerably reinforces the scale of benefits arising from a new
runway at Heathrow. It is essential that the government takes these factors into account
before coming to any policy conclusions, because poor options, such as Cliffe, currently look
better than they are, while high benefit options, such as Heathrow, look worse.

157. We estimate that the total net benefits could be as large as £37 billion for an extra short
runway at Heathrow, and up to £86bn if two further runways are constructed elsewhere
subsequently. This represents an enormous potential prize. That prize is greatest, having
taken account of global warming costs, if first of all a new runway is built at Heathrow.

158. We discuss these matters in more detail in the following sections. But first we consider the
nature of the economic benefits that are shown in the government’s consultation document.

The direct benefits to passengers of new airport capacity

159. Government estimates of the benefits of building new runways are driven principally by
gains to airline passengers, with smaller benefits accruing to freight users, airports and
government revenues. Passenger benefits are derived from two main sources.

- Extra runway capacity allows more people to travel. The magnitude of passenger
  benefits is therefore directly related to the physical quantity of additional passengers that
can be handled.

- Existing passengers benefit from extra frequencies, giving more choice of flight times
  and reducing waiting time. They are also more likely to be able to fly from an airport that
  is easily accessible. These benefits depend partly on the additional capacity and partly
  on time savings, especially among business travellers. The government’s figures
  demonstrate that this ‘quality’ element of benefits is, as expected, considerably higher
  for options that include a new Heathrow runway.

160. Both factors, additional capacity and its incremental value, are important in understanding
the economic benefits of new runway investment. Heathrow-based options score well on
both counts, better than alternative hub packages.

Higher ‘quality’ of passenger benefits at Heathrow

161. Heathrow is the airport of preference for many passengers, especially business and other
regular travellers. Many will have based decisions on work and home locations around the
ability to reach Heathrow, benefitting from its close proximity to central London and its good
surface access. The economic benefits from each unit of new capacity are greater at
Heathrow than at other airports, as these passengers benefit from increased choice of
flights and less waiting time at the airport.

162. Heathrow also has greater hub potential than other airports, reflecting the higher share of
capacity held by British Airways, the network hub carrier. Our research suggests that this is
an important factor in increasing the range of destinations that can be served from any hub
airport, and this range would not be feasible at other hubs. Heathrow is also able to
dedicate a greater share of its capacity to the operations of network airlines, as fewer scarce
slots are taken up by charter services or the flights of the no frills carriers. The same is not
true for other airports in the London area.
163. The government’s estimates of net benefits encapsulate many of these effects, as shown in Table 2. This presents the government’s figures, which show the level of net benefits per million passengers per annum of extra capacity. It shows that all the packages containing a new runway at Heathrow - whether on its own or in combination with new runways at other airports - score extremely highly in terms of the level of benefits generated for each unit of extra capacity. Top of the list is a single runway at Heathrow, on the basis of the figures for the government’s package 5A (with mixed mode operation on all three runways at Heathrow), which we can use as a proxy for the benefits arising if we use our own estimates of the additional passenger numbers that could be handled at Heathrow (as explained under the next heading).

164. Options for major new hubs at Stansted and Cliffe are at the bottom of the heap, producing significantly fewer benefits relative to the large amounts of additional capacity. This is especially true for Cliffe, where benefits per added unit of passenger throughput are a quarter of those generated by some Heathrow options. The multi-runway packages at Stansted also produce relatively poor returns.

165. This is a crucial point. It is right to consider total net benefits produced by each of the government’s options. But it is clear that benefits from some packages - especially the new large airport hubs at Stansted or Cliffe - stem from the delivery of a large slug of extra capacity, each unit of which does not produce much in the way of benefits. The Heathrow-based options on the other hand, which add varying quantities of new capacity, yield a much higher overall intensity of benefits.

166. The government should be conscious of this distinction in reaching its decisions about the location of new airport capacity. A package of runway expansion which delivers a lot of new capacity of low benefit intensity may be subject to greater risk that the benefits will not be realised. Such projects - large scale, high cost and high risk, but low relative returns - will be more difficult to finance than one where the costs are lower and the benefits are more assured.

167. Furthermore, the higher the benefits generated for each additional unit of capacity, the more likely it is that they will outweigh the costs of mitigating the environmental costs. It would be folly to provide new runway facilities driven simply by the volume of passenger capacity, without regard to the value of the benefits generated. Providing extra capacity must be justified by the economic benefits delivered, taking account of aviation’s environmental impact. A new runway at Heathrow easily passes this test; major new hubs at Stansted and Cliffe do not.

Table 2: Net benefits of added capacity are much greater for Heathrow packages than “second hub” packages

<table>
<thead>
<tr>
<th>New runways</th>
<th>Added capacity</th>
<th>Net benefit per mppa of new capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mppa</td>
<td>£m discounted at 6%</td>
</tr>
<tr>
<td><strong>Heathrow packages</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LHR 128 mppa capacity</td>
<td>39</td>
<td>140</td>
</tr>
<tr>
<td>LHR + LGW close parallel</td>
<td>54.5</td>
<td>133</td>
</tr>
<tr>
<td>LHR + LGW⁶</td>
<td>75.5</td>
<td>129</td>
</tr>
<tr>
<td>LHR + LGW (2)</td>
<td>107.5</td>
<td>124</td>
</tr>
<tr>
<td>LHR + LGW + STN</td>
<td>101.5</td>
<td>123</td>
</tr>
<tr>
<td>LHR + STN</td>
<td>86</td>
<td>116</td>
</tr>
<tr>
<td>LHR + STN (2)</td>
<td>106</td>
<td>116</td>
</tr>
<tr>
<td><strong>Non-Heathrow packages</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LGW (2) + STN</td>
<td>115.5</td>
<td>103</td>
</tr>
<tr>
<td>LGW (2)</td>
<td>68.5</td>
<td>96</td>
</tr>
<tr>
<td>LGW + STN (2)</td>
<td>82.5</td>
<td>86</td>
</tr>
<tr>
<td><strong>Alternative hub proposals</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STN (3)</td>
<td>94</td>
<td>82</td>
</tr>
<tr>
<td>STN (2)</td>
<td>67</td>
<td>68</td>
</tr>
<tr>
<td>Cliffe (4)</td>
<td>113</td>
<td>31</td>
</tr>
</tbody>
</table>

⁵ LHR packages are based on the assumption of 128 mppa capacity with a new runway, ie option E6 (package 5A)
⁶ Figures are based on a wide spaced runway at Gatwick, though we favour a southern dependent parallel or segregated mode option which would deliver a similar increase in passenger throughput.

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Adjustments to the government’s estimates of runway capacity

168. The government’s estimates of extra passenger capacity at airports have a significant bearing on analysis of the resulting economic benefits. We believe some adjustments should be made.

169. At Heathrow, better design and location of the proposed new runway and associated facilities could increase capacity, on a conservative basis, to 125 mppa, rather than the 116 mppa assumed in the consultation document.

170. Conversely, the capacity that could be made available from runway expansion at Gatwick and Stansted appears to be over-estimated. (The implications of the relationship between runway capacity and passenger throughput and the effects at Heathrow, are discussed in detail in Appendices I and III.)

171. The government’s figures therefore under-estimate by a significant amount the potential net benefits of adding a new runway at Heathrow. The difference can be illustrated by referring to the government’s estimates of the benefits of a new runway at Heathrow in the case where mixed mode operation is implemented on all three runways (published in the supporting documentation to the SERAS consultation as package 5A (option E6)). This case assumes that passenger capacity at Heathrow rises to 128 mppa, which is only slightly higher than our estimate of 125 mppa passenger capacity at Heathrow even with segregated mode operation on the two main runways. Table 3 compares this with the government’s estimates of benefits arising from a new runway with passenger capacity of 116 mppa - package 5B (option E4) - on the same basis as table 14.6.

172. Our estimates of Heathrow capacity therefore increase net benefits of a new Heathrow runway from £7.8 billion shown in table 14.6 by around £2.5 billion. This increase should be added to all options that include expansion at Heathrow.

The impact of revised Treasury guidance on investment appraisal

173. The Treasury published last year a revised version of its “Green Book”, which offers advice on appraisal and evaluation of public sector infrastructure projects. A key change is the “unbundling” of the 6% discount rate into a single time preference rate of 3.5%, based on people’s preference for receiving goods and services now rather than later, and separate factors for risk, “optimism bias” and other matters. This is designed to achieve greater transparency. Factors such as risk will now be dealt with in the form of a cost uplift to reflect typical experience of cost overruns, and an assumption about delay in project completion which defers the realisation of benefits.

174. The overall impact of this change is favourable to airport development, since greater weight is given to the stream of benefits arising in future years. It therefore raises the discounted value of the benefits figures for all the packages of runway options presented in the SERAS consultation document.
175. Table 4 shows the government’s estimates of the impact of Green Book changes on costs and benefit figures of using a 3.5% discount rate, and assuming 44% uplift in costs and a three-year delay. The lower discount rate raises cost estimates by 30-40%, but gross benefits are more than doubled. Only part of the net benefit increase is forfeited when costs and benefits are adjusted for ‘optimism bias’.

<table>
<thead>
<tr>
<th>£ billion, present values</th>
<th>Discounted at 6%</th>
<th>Discounted at 3.5%</th>
<th>Discounted at 3.5% + optimism bias adjusted$^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>LHR</td>
<td>2.9</td>
<td>8.3</td>
<td>6.3</td>
</tr>
<tr>
<td>LHR + LGW</td>
<td>4.8</td>
<td>13.8</td>
<td>10.8</td>
</tr>
<tr>
<td>LHR + STN</td>
<td>7.4</td>
<td>20.8</td>
<td>17.1</td>
</tr>
<tr>
<td>LHR+LGW+STN</td>
<td>10.0</td>
<td>28.4</td>
<td>23.8</td>
</tr>
<tr>
<td>STN (3)</td>
<td>7.7</td>
<td>22.4</td>
<td>18.1</td>
</tr>
</tbody>
</table>

176. The methodology proposed in the Green Book is based on the argument that projects are subject to substantial optimism bias on delivery timescales and costs, particularly against estimates made in the early stages of development. The guidance distinguishes between:

- **standard civil engineering projects** - “not requiring special design considerations, eg. most new roads and some utility projects”;
- **non-standard civil engineering projects** - “requiring special design considerations due to space constraints or unusual output specifications, eg. innovative rail, road, utility projects, or upgrade and extension projects”.

177. We believe that a major airport development - such as Cliffe or a large expansion of Stansted - should be classified as a "non-standard civil engineering project", where the top of the range for cost over-run is 66% and project delay is 25%. It is hard to see that there has been any mitigation of the risks attached to the projects at Stansted and Cliffe. The main factor contributing to optimism bias on capital expenditure estimates in non-standard civil engineering projects is inadequacy of the initial business case, with political and economic factors being the main contributors to delays in the duration of the project. These factors are likely to be highly relevant for a major project such as Cliffe.

178. But at Heathrow, there has already been a good deal of mitigation because of the work that has already gone into planning the third runway, and because the development is more modest in relation to the existing size of the airport. This might appropriately be classified as a “standard civil engineering project”, where the top of the range cost over-run figure is 44%, and project delay is 20%. Here the main risks typically arise from mitigating the environmental impact of the project - something already considered in detail in the case of Heathrow. Therefore a figure considerably lower than 44% is appropriate for evaluating the new runway at Heathrow, together with a minimal delay in project completion.

179. This approach appears consistent with BAA’s assessment that a new runway at Heathrow would be “financially viable and fundable”, whereas it does not regard as feasible the proposals for three new runways at Stansted or for a new hub at Cliffe.

**Seeding would result in loss of total benefits**

180. In the government’s modelling, longhaul growth at Stansted is generated by “seeding” 40% of Heathrow’s 1998 longhaul services. A more extensive pattern of seeding is employed to install the necessary critical mass of all types of services at Cliffe, with charter services seeding from Gatwick and “no-frills” services seeded from Stansted in addition to longhaul services from Heathrow.

181. Even if this were feasible, displacing longhaul services from Heathrow to another airport would involve a serious loss of economic benefit, as London’s longhaul network fragmented, lost density and became less competitive as a result.

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$^2$ 44% cost uplift, and 3 year benefit delay
182. Seeding essentially involves duplicating services at the new ‘seeded’ hub as well as the original airport. As discussed in question 2, it is difficult to imagine this happening without coercion. Such duplication is a recipe for financial difficulties, as is amply demonstrated by the current circumstances of the aviation industry, and as our own experience of attempting to operate a second hub at Gatwick also shows. It is inconceivable that a significant degree of duplication could persist for anything but the shortest time period without bankrupting one or more of the airlines concerned. The government’s analysis of costs and benefits makes no allowance for the extra costs to airlines of transferring existing operations to a new hub, nor for the costs of duplicating operations at two hubs for any length of time.

183. Since Heathrow is the preferred choice of airport for many travellers, and it has an established track record of successful operation as an international hub airport, it is inevitable that many services established at the new ‘seeded’ hub would quickly gravitate back towards their original home airport.

184. The logic of this is implicitly demonstrated in the government’s modelling of the seeded options, which shows that the seeded services have to rely on international transfer passengers to fill otherwise empty seats. Because of this, the seeding process itself does not generate an increase in net benefits - in fact the corresponding runway packages without the seeding assumption generate slightly higher benefits than their seeded equivalents.

185. Since traffic will naturally gravitate towards its preferred airport given the choice - and for many passengers the preferred airport is Heathrow - it is evident that seeding results in benefits being attributed to the Stansted or Cliffe hub options in the government’s figures, although they are actually being generated by passengers flying from their preferred airport at Heathrow. The government would therefore be obliged to introduce an element of compulsion if it were to pursue a policy of developing a new hub airport at Stansted or Cliffe. For instance, it might limit Heathrow to flights to shorthaul destinations only - or it might even consider closing Heathrow altogether. We have considered potential “seeding” options and their effects in Appendix II.

186. Any method of forcing air travel to an airport that is not its natural choice will inevitably sacrifice a portion of the benefits of new airport capacity. Restricting growth at Heathrow would result in a significant loss of consumer benefits, as many passengers were forced to fly from inconvenient airports, or switched to continental European hubs. This would cause long term damage to the economy.

187. Seeding could only work in the way envisaged if substantial sums of public money were used to develop the new second hub, in order to make it an attractive and competitive airport of choice, without constraining other airports. In the analysis in Table 7 below, we have implicitly assumed that the government subsidises an airline - or airline alliance - temporarily in order to establish an unprofitable network of services at the new hub airport. However such a policy seems wholly unlikely in practice.

188. Since these extra costs of seeding have not been included in the government’s analysis of costs and benefits, we believe that net benefits of all options relying on “seeding” have been significantly overstated. The government has not made the case for a new hub airport.

**Costs of surface access improvement are treated inconsistently**

189. Surface access costs of the different runway packages do not appear to be presented on a comparable basis. New surface access costs associated with a single new runway at Heathrow seem inordinately high compared with those for multi-runway packages at Stansted or Cliffe, despite the existing high quality and quantity of surface access provision at Heathrow.

190. If new hubs are to be established at Stansted or Cliffe, they would need to have equally good surface access links if the benefits to the economy from business travellers are to be realised. These new hub airports would require significant investment in road and rail infrastructure, yet the contribution towards these costs in the analysis appears to be small.

191. In the case of Cliffe, for example, costs would be very large, partly because no transport

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links exist at the moment and partly because of the remote location and the need for dedicated links which would serve the airport alone. At Stansted, BAA states that it has not yet been able to identify rail access options that would be suitable for building three new runways.

192. Table 5 shows that the government’s figure for surface access costs at Heathrow amounts to half the capital costs of constructing a new runway. Developments at Stansted or Cliffe are likely to demand much more investment in surface access, given that little is currently in place, so the costs of surface access should be proportionately much greater there. As a minimum, we expect a similar share of the project’s capital cost to be spent on surface access. In practice, it could be significantly more than this.

193. This suggests that, on a conservative basis, surface access costs associated with building three new runways at Stansted would be at least £3 billion, more than £1 billion higher than the government’s estimate. At Cliffe, surface access costs would rise by nearly £4 billion to £5.75 billion or more. We discuss surface access in more detail in our answer to question 20.

Global warming cost of airport expansion

194. The government’s recent consultation document, Aviation and the Environment: Using economic instruments, presents two scenarios for the impact of airport development on global warming - a constrained capacity case and a high capacity case in which runways are provided at LHR, LGW and STN.

195. Assuming that the high capacity case respects the Gatwick 2019 agreement, carbon dioxide and passengers for these two scenarios are:

<table>
<thead>
<tr>
<th>CO₂ (mT)</th>
<th>Pax (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High capacity</td>
<td>53.19 263</td>
</tr>
<tr>
<td>Constrained</td>
<td>39.49 185</td>
</tr>
<tr>
<td>Difference</td>
<td>13.7 78</td>
</tr>
</tbody>
</table>

196. This implies a cost of 0.17564 tonnes of carbon dioxide per additional passenger, or 0.0479 tonnes of carbon, similar to figures for south east airports in 2000 (20.92 mT of carbon dioxide generated by 117m pax, giving 0.1788 tonnes of carbon dioxide per passenger). Applying the government’s radiative forcing ratio of 2.7 to cover non-CO₂ global warming effects, and valuing at the official carbon price for 2030 (£100/tC), generates a global warming cost of £12.93 per additional passenger in 2030.

197. In the LHR and LHR/LGW scenarios, demand rises roughly in line with capacity, so this can be treated as the cost per additional unit of passenger capacity. We assume aircraft fuel efficiency gains of 1.3% pa in line with assessments by the Intergovernmental Panel on Climate Change (IPCC). Discounting at 3.5%, based on steady growth in passenger volumes between 2011 and 2030, and including benefits to 2060, gives a figure of £94.4m net present cost for every million extra passengers.
198. In the Stansted and Cliffe hub scenarios, demand growth up to 2030 only takes up some 77% of the increase in available capacity. The global warming cost per unit of additional capacity will therefore be lower, and we have applied a 15% discount to the unit cost in these scenarios. For similar reasons, a 7.5% discount is applied to the LHR/LGW/STN option.

199. This creates global warming cost estimates (shown in Table 6) which are almost sufficient to wipe out the government’s estimates of total net benefits (excluding wider economic benefits) from building a new hub at Cliffe, and the benefits of a multi-runway hub at Stansted would be significantly reduced.

200. We have not costed local environmental impacts of runway expansion. We do not see any major new impacts in the case of Heathrow-based packages, but there would be local costs for other options.

**Wider economic benefits of air travel**

201. The discussion in paragraphs 14.32 to 14.37 of the consultation document recognises the value of “wider” economic benefits of airport expansion and accepts the need to reflect them in the analysis, but they are not quantified in the government’s analysis. This is a serious omission, as they represent the larger part of the benefits of air travel to the UK economy.

202. The most rigorous analysis of the wider economic benefits of aviation to the UK economy was provided by Oxford Economic Forecasting (OEF) in their 1999 report. Their methodology was based on analysing the contribution of increased output in transport industries to individual sectors of the UK economy. This allowed a quantification of the boost that the growth of aviation can provide to national productivity, both because aviation itself is a high productivity growth sector and because it also serves to boost productivity in other sectors.

203. OEF’s results were generated using a full macroeconomic model of the UK economy, such as that used by the Treasury to produce the government’s economic forecasts. This model takes into account the fact that as aviation expands and draws resources from other sectors of the economy, there is a loss of output in those other sectors which must be set against the gains from a stronger aviation sector.

204. OEF calculated that a 25 million addition to the number of passengers would boost the UK economy by 0.3% of GDP, or just under £4bn at 1998 prices. However, these benefits are derived mainly from the extra business passengers who can be carried when the aviation industry expands. OEF argue that a loss of 25m business passengers would represent a cost to national GDP of around £10 billion, equivalent to £400 per passenger. We have further allowed for OEF’s estimate that a portion of these benefits are already incorporated in the government’s estimates of passenger benefits in the form of gains in consumer surplus. Adopting a conservative approach, we have deducted the whole of OEF’s estimate of business passengers’ consumer surplus of £3.7 billion, producing a benefit per passenger of around £250.

205. This figure can be applied to the government’s own estimates of the additional business travel generated by the new runway options, which are shown in table 14.7.

206. According to the government’s analysis, developing Heathrow as a hub with the addition of a new short runway permits an increase of 5.1 million business passengers using airports in the south east of England by 2030, above what would be possible with maximum use of existing runway capacity. Using our own higher figures for the gains in passenger capacity

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Table 6: Global warming cost estimates

<table>
<thead>
<tr>
<th>New runways</th>
<th>2030 capacity gains</th>
<th>Global warming cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mppa</td>
<td>£bn, discounted at 3.5%</td>
</tr>
<tr>
<td>LHR</td>
<td>39</td>
<td>3.7</td>
</tr>
<tr>
<td>LHR + LGW</td>
<td>75.5</td>
<td>7.1</td>
</tr>
<tr>
<td>LHR + LGW + STN</td>
<td>101.5</td>
<td>8.9</td>
</tr>
<tr>
<td>STN (3)</td>
<td>94</td>
<td>7.5</td>
</tr>
<tr>
<td>Cliffe (4)</td>
<td>113</td>
<td>9.1</td>
</tr>
</tbody>
</table>

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8 Heathrow packages are based on the assumption of 128 mppa capacity with a new runway, ie Heathrow option E6 (package 5A). The same assumption is used for Gatwick as in Table 2.
achievable at Heathrow, we estimate that this gives rise to wider economic benefits of some £30 billion, discounted at 3.5%. If a further runway is built at another London airport, the wider economic benefits could rise to more than £50bn.

Conclusions - Heathrow development delivers the greatest economic benefits

207. The net economic benefits present an overwhelming case for developing a third runway at Heathrow, even on the basis of the government’s figures. Making the adjustments discussed above would strengthen Heathrow’s benefits even further. Table 7 below adds in our estimates of the “wider” economic benefits and summarises the main elements of our analysis for five main options.

Table 7: Discounted present values of runway packages

<table>
<thead>
<tr>
<th>£ bn, discounted present values</th>
<th>LHR - 3rd runway</th>
<th>LHR + LGW</th>
<th>LHR + LGW + STN</th>
<th>STN 3 new runways</th>
<th>Cliffe 4 runways</th>
</tr>
</thead>
</table>

**Government estimates of economic benefits @ 6% discount rate**

1. Benefits/mppa new capacity (£m) 140 129 123 82 31
2. Additional capacity (mppa) 39 75.5 101.5 94 113
3. Total benefits discounted at 6% 5.4 9.7 12.5 7.7 3.5

**Impact of new Green Book methodology**

4. Revaluation at 3.5% discount 14.4 26.5 35.2 22.4 15.7
5. Benefits after optimism bias adj10 10.8 20.8 27.9 14.9 5.4

**Other cost adjustments**

6. Global warming cost -3.7 -7.1 -8.9 -7.5 -9.1
7. Costs of “seeding” - - - -3.1 -3.8
8. Surface access costs - - - -0.6 -2.3
9. Total after cost adjustments 7.2 13.6 19.1 3.7 -9.7

**Other benefits**

10. Wider economic benefit 29.8 51.1 67.1 48.5 56.3
11. Total net benefits (£bn) 37 65 86 52 47
11a. Benefits/mppa new capacity (£m) 950 860 850 550 410

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9 The figures for this illustrative case are based on the government’s option of a wide spaced runway at LGW, though we favour a southern dependent parallel or segregated mode option which would deliver a similar increase in passenger throughput - see Question 7.

10 Assumes three year project delay and 44% cost uplift for Heathrow options, five year project delay and 66% cost uplift for Stansted and Cliffe hubs.
208. The results demonstrate the superior economic benefits generated by a new runway at Heathrow, compared with the proposed new hubs at Stansted or Cliffe, despite the much larger number of extra passengers handled.

209. The government’s figures show conclusively that the level of benefits from each additional unit of capacity are significantly superior for schemes based around a third runway at Heathrow than for runway expansion packages at other airports. This makes the Heathrow-based runway options ‘safer’, in that the expected benefits are more likely to be delivered, and there is less financing risk associated with them. It also makes it more likely that the benefits will outweigh the cost of mitigating the additions to global warming attributable to new runway developments at Heathrow than at other airports.

210. Government’s cost and benefit estimates under-state the benefits generated by a new runway at Heathrow - including an under-estimate of the passenger capacity delivered at Heathrow, an over-optimistic assessment of surface access cost requirements at new hub airports, and failure to incorporate the implied costs associated with the ‘seeding’ of services to new hubs.

211. We estimate that a new short runway at Heathrow - a low cost, low risk, but high return project - could by itself deliver net benefits of £37 billion, even after the costs of global warming. This is a substantial prize for Britain, its economy and its travellers.

212. Adding a second new runway at Gatwick (or Stansted, although the high benefits per unit of new capacity suggest that Gatwick is the best location) would increase the net benefits to £65bn. A third runway, such that there is a new runway at all three London airports, could push total benefits up to £80-90 billion. Uncertainties about the pace of future demand growth might mean that the delivery of these benefits cannot be guaranteed in full, at least to the same extent as for the first two runways. But on the basis of these figures, a third runway should not be ruled out at this stage.

213. The benefits from the new hubs proposed at Stansted or Cliffe are much smaller, especially when considered against the additional capacity of around 100 mppa that either would produce. Indeed the benefits from a single new runway at Heathrow are three quarters the size of those from a new hub involving three or four new runways at Stansted or Cliffe.

214. We believe it is essential to secure the future of Heathrow, the one internationally competitive hub airport in London and the south-east of England. We have demonstrated clearly that benefits are greater - and more easily achievable - for a package of two or three new runways in London and the south-east of England over the next thirty years, as long as the package is based around a new runway at Heathrow. Our analysis suggests that the “wider” benefits of increased air travel are much smaller, and could be at greater risk, if the government attempted to develop a second hub at Stansted or Cliffe. A prize of more than £80 billion is available from a ‘Heathrow first’ strategy, £30 billion more than could be generated by a new hub at Stansted.

Q7 Giving reasons for your answer, which combinations do you prefer and which do you not favour?

215. We start this question by discussing the options that are acceptable to British Airways (including better options, not listed) and explain how capacity could be built up. We state our vision for the Heathrow option. We also discuss Gatwick, but in less detail. Finally, we review the options that would not be acceptable to British Airways.
216. The following packages are acceptable, in principle, to British Airways:

- Heathrow and Gatwick one new runway each
- Heathrow and Stansted one new runway each
- Heathrow, Gatwick and Stansted, one new runway each (the third one subject to later review)
- Heathrow one new runway

217. As explained below, we consider the best package to be as follows:

- Approve one new Heathrow runway for immediate construction,
- Identify the need for a second new runway, preferably at Gatwick taking account of the 2019 agreement, or at Stansted, for construction in time to meet sustainable economic demand.
- Identify and protect potential sites for a third runway (a second Stansted runway or a second Gatwick runway). Review economic, social and environmental factors 10-15 years into the 30 year policy before deciding whether to go ahead.

218. As the economic case for a second Gatwick runway is stronger than that for Stansted, it would probably be better to wait until the 2019 agreement has expired and build at Gatwick a little late rather than at Stansted. Alternatively, if the Government and parties to the Gatwick agreement agree, development at Gatwick could be brought forward.

219. It is not necessary to decide now which of the Gatwick options to build. However it would be prudent to protect both southern options, and decide between them (or a variant of them) after more local consultation, should there be a decision in principle to build a southern parallel runway at Gatwick.

220. The case for building at Stansted after Heathrow is strongest if demand is running strongly ahead of forecast in 10 years time, and the parties to the Gatwick agreement wish it to run its full course.

221. If the Government decides to build 3 runways BA would support building one new runway at each airport (Heathrow, Stansted, Gatwick or Heathrow, Gatwick, Stansted). We are doubtful that the case will be strong enough for 2 new runways both located at Stansted or Gatwick to be built.

222. In addition to these major airport development options, there may be scope for further development at smaller airports, such as Luton, London City, Southampton etc. to meet market need, especially for shorthaul traffic. These airports may accommodate some 10% or so of south east demand by 2030. How these options may play out in capacity terms is shown in Appendix I.

Options acceptable to BA all start with a new 2000m runway at Heathrow.

223. The primary strategic need for BA, for London and the UK is to have a competitive global hub as quickly as possible and this requires an increase in runway capacity at Heathrow. We have made the case for a hub in Question 2 and explained the economic and capacity advantages of Heathrow in detail in Question 6. In our view, the case for Heathrow is overwhelming.

224. All packages including a Heathrow runway assume that runway is built first, reflecting the fact that the national need and benefits are greatest at Heathrow. This might not happen if sequencing were left to the discretion of the airports operator, so this needs to be stated in the White Paper.

225. In the answer to question 2 BA has set out its analysis of the reduction in routes that has been taking place at Heathrow as other hubs have grown their range of destinations. Carrying this analysis forward, BA's has shown that only by adding runway capacity at Heathrow will the range of destinations and frequencies, particularly on longhaul routes, be expanded across the south east, and competitiveness on this important measure thereby maintained or improved. These are the additional services that create the greatest economic benefits.
226. Using analytical techniques, an indication of the number of destinations served by 2015 under different runway options has been gained. BA has considered the outcome under 4 scenarios:

- no new runway
- one new runway at Heathrow
- one new runway at another SE airport (using Stansted for example)
- one new runway at Heathrow and another SE airport

<table>
<thead>
<tr>
<th>Figure 2: Number of destinations under scenarios</th>
<th>2000 data</th>
<th>LHR</th>
<th>STN</th>
</tr>
</thead>
<tbody>
<tr>
<td>No new runways</td>
<td>189</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td>LHR 3 runways</td>
<td>257</td>
<td>113</td>
<td></td>
</tr>
<tr>
<td>STN 2 runways</td>
<td>161</td>
<td>180</td>
<td></td>
</tr>
<tr>
<td>LHR 3, STN 2</td>
<td>254</td>
<td>178</td>
<td></td>
</tr>
</tbody>
</table>

227. Figure 2 shows that Heathrow is forecast to drop destinations if it does not gain a new runway, continuing a trend established in the 1990s. It is forecast to gain destinations if a new runway is built. The difference is that Heathrow would have more than 90 additional destinations in 2015 compared to the situation without a new runway. Heathrow could have more than 250 destination by 2015 with another runway compared with about 190 now and about 160 if no new runway is built.

228. Under all scenarios Stansted could be expected to serve more destinations. With destinations increasing by about 20 with no new runway (using up remaining capacity), and about 90 with an extra runway.

229. However, to serve UK passengers effectively, the number of destinations served by individual airports is less important than the number of destinations served by London as a whole, and the type of destinations served (with long haul being more valuable than short haul).

230. In 2000, London’s airports served 288 different destinations. Figure 3 shows that there is a high degree of overlap in the routes served:

- Destinations served by 3 or 4 of London’s airports are high density domestic/shorthaul routes eg Edinburgh, Amsterdam, Madrid;
- Heathrow’s unique offerings are mainly longhaul services, some of which can only be supported by a network operation eg Singapore, Seattle;
- A number of routes served by Gatwick alone are American routes restricted from Heathrow by bilateral agreements eg Atlanta, Dallas, Houston;
- Stansted’s unique offerings are all short haul destinations, mainly serving the leisure market eg Biarritz, Perpignan, Ibiza.
231. Since 2000, as explained in Q2, the position at Heathrow has stabilised and it is Gatwick that has lost destinations during the recent period of weak demand. Stansted’s short haul destinations have increased, and as expected remain limited to short haul and charter passenger services. The extent of overlap in destinations served continues to be very considerable, and BA believes this analysis of the way the range of services would develop, depending on whether a runway is built at the Heathrow hub or elsewhere, remains robust.

232. Analysis of cities with multiple airports shows that as frequencies fragment across different airports, the degree of overlap of routes correspondingly increases. On this basis, BA has estimated in Table 8 how much the networks of airports may overlap and how this would affect London as a whole.

233. If no new runways are added in London, the number of destinations served is likely to decrease as i) Heathrow will drop destinations to compete on frequency, and ii) destinations added at Stansted and Luton are likely to duplicate the most profitable high demand short haul routes already served by Heathrow and Gatwick.

234. A new runway at Heathrow should benefit London as a whole, as the network operation supports new destinations. Currently there are more longhaul than shorthaul destinations offered from Heathrow. With a new runway, it would be reasonable to assume a similar proportion of new destinations added to the network would be longhaul.

235. Adding a new runway at Stansted only would not provide similar benefits. The Stansted network would replicate short haul destinations already served by other London airports. The total number of destinations served at London would lessen, as destinations served only from Heathrow were reduced, especially long haul.

236. This analysis identifies the unique contribution of Heathrow. Other south east airports should also be expanded but not as hubs. They can develop successfully serving mainly short haul markets for charter services, no frills, and the denser point to point traffic flows with sufficient demand to support services at a sub-regional level. For these types of services it would be beneficial to have more than one airport capable of accommodating growth to avoid over dependence on one location. However, ATC complexity and substantial investment in improved surface access would have to be taken into account (especially for the Cliffe option).

**BA’s recommended package**

237. Taking these factors into account, BA believes that the BEST OPTION for south east airport development would be as follows:

238. **STEP 1**: Heathrow

   - Add one regional runway. Increase capacity by 36mppa (from 89mppa to 125 mppa).

239. **STEP 2**: Gatwick

   - Add one runway.
   - This second runway to be located preferably at Gatwick, either after the expiry of the agreement not to promote a second Gatwick runway before 2019, or earlier if this can be renegotiated and there is a sufficiently strong case to do so. If this proves impossible, it may be worth considering adding a runway at Stansted as an alternative. We recommend the Gatwick runway is located in the zone between the close and wide spaced southern parallel options put forward in the consultation. This could produce

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Destinations</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>288</td>
<td>n.a.</td>
</tr>
<tr>
<td>No new runways</td>
<td>247</td>
<td>-41</td>
</tr>
<tr>
<td>1 new runway LHR</td>
<td>316</td>
<td>+28</td>
</tr>
<tr>
<td>1 new runway STN</td>
<td>252</td>
<td>-36</td>
</tr>
<tr>
<td>2 new runways LHR+STN</td>
<td>320</td>
<td>+32</td>
</tr>
</tbody>
</table>
either a pair of dependent parallels operated in mixed mode or independent parallels operated in segregated mode.

- Either option would increase capacity more securely by about 35-37 mppa from 38-40 mppa on a single runway to some 75 mppa. That should be sufficient into the 2020s.

240. **STEP 3: Stansted**

- For the last decade of the period, an option should probably be kept open for a second runway at Stansted in case a strong enough case could be made at the time. (If Stansted were developed in Step 2, the Gatwick option should be kept open.)

- A Stansted wide spaced runway would be likely to increase the airport’s capacity by 25-30 mppa from some 30-35 mppa, to 60-65 mppa, on the expectation that, as now, mainly shorthaul traffic (no frills and charter) as well as freighters continued to seek to expand into any new Stansted capacity.

241. Table 9 sets out this balanced growth scenario.

**BA’s vision for Heathrow**

242. Appendix III contains an overview of BA’s preferred Heathrow option, as part of a package (or combination) of developments. This sets out a number of land use and infrastructure improvements, and comments on the option (E4) in the consultation document. In broad terms the analysis sets out why our variant of Heathrow option E5 would be better than E4, which has some clear deficiencies.

243. In Questions 14-20, we make a number of recommendations for dealing with the major environmental, community and surface access issues. In Appendix V, we summarise our discussions with local communities.

244. The vision for Heathrow is that it becomes a truly competitive global hub, with a wide range of destinations, a competitive level of frequency and an integrated network of national and local rail services. It would serve the south east and, through improved connections, the rest of the UK. Modernisation of existing infrastructure and new terminal facilities would improve service quality. Automated passenger and baggage links would be established between the new and modernised infrastructure. Runway delays would be cut to levels to allow efficient, punctual operations.

245. In particular appendix III identifies:

- a better location for the new runway to avoid St Mary’s Church, the cemetery and the Great Barn and to retain road links from Harmondsworth and Sipson (especially north of the M4)
- an illustrative location for a low profile, passenger satellite or terminal to the north of the A4 on land between Sipson and Harmondsworth. This will improve capacity, reduce taxing, fuel burn and emissions, reduce delays for passengers, and improve aircraft utilisation
- an illustrative layout of an automated underground passenger and baggage network needed to link terminals 1 to 5 and the new satellite/terminal
- the need to develop the Eastern area (from T1 east to the airport boundary), and how this can be accomplished to provide more operational stands and taxiways and a more efficient and greater aircraft hangar capability
- how landscaping might be provided near Sipson, Harmondsworth and the Crane

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**Table 9: Balanced growth of passenger capacity at SE England airports (mppa)**

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2020</th>
<th>2030</th>
</tr>
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<tbody>
<tr>
<td>LHR</td>
<td>95</td>
<td>110</td>
<td>125</td>
</tr>
<tr>
<td>LGW</td>
<td>40</td>
<td>55</td>
<td>75</td>
</tr>
<tr>
<td>STN</td>
<td>30</td>
<td>35</td>
<td>63</td>
</tr>
<tr>
<td>LTN</td>
<td>17</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>LCY</td>
<td>4</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Rest</td>
<td>3</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>189</td>
<td>229</td>
<td>299</td>
</tr>
<tr>
<td>R/w open</td>
<td>LHR</td>
<td>LGW</td>
<td>LGW</td>
</tr>
<tr>
<td>2011</td>
<td>2018</td>
<td>2024</td>
<td></td>
</tr>
</tbody>
</table>

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11 LGW southern dependent parallel or segregated mode option (capacity of 75 mppa)
12 LGW option if parties agree to change 2019 agreement or if later date is chosen.
Valley on Heathrow’s eastern boundary;

- how certain key facilities should be relocated to achieve environmental improvements.
  Notably: demolition of the Eastern hangar ‘TBA’ with its engine testing pen to reduce community noise; and relocation of BA’s large operational report facility to directly above the expanded rail network, on land between T5 and the M25 (significantly reducing travel to work by car):
- the need to reduce delay and congestion and to improve minimum connection times.

246. We recommend that these changes to the Heathrow option are reflected in the White Paper.

**Gatwick**

**Additional sub-question:** *If the combinations on which you comment include one new runway at Gatwick, please make clear if you have any preference for or against the two options for one runway (close parallel or wide-spaced) and why.*

247. We do envisage a new runway at Gatwick and we recognise that there are pros and cons of the two possible options. The more widely spaced option provides greater capacity but has more significant environmental impacts, and as such, there is no clear ‘best’ option.

248. BA believes therefore that the optimal Gatwick option may depend on proposals for elsewhere in the South-east. For example:
- if two runways are included in the White Paper (at Heathrow and Gatwick) then, depending on the reasons for not planning to meet all demand, this is likely also to strengthen the case for the wider-spaced Gatwick option.
- if three (or more) runways are considered e.g. one runway at each of Heathrow, Gatwick and Stansted, there may be merit in going for the option at each location which minimises environmental impact, providing a balanced package of benefits across the region.

249. It is also likely that growth scenarios will change over time. It is abundantly clear that demand at Heathrow demonstrates a requirement for another runway. Although Gatwick benefits currently from Heathrow overspill, the runway is full and it is very likely that Gatwick could justify an additional runway. The economic case would be stronger and the justification for a wider spaced option greater, the closer to the expiry of the 2019 agreement that the detailed decision to go ahead is taken.

250. However, while it is clear that SE demand will continue to grow, the *actual distribution* of that demand growth across the SE is less clear. For example, no frills carrier strategies - providing point-to-point services to a clientele that are prepared to travel to obtain low fares - may to some extent be able to manipulate some sectors of demand. The willingness (or more typically unwillingness) of carriers to split operations between more than one airport will dictate where aircraft services are provided and will also influence travel patterns. Finally, the willingness of operators to pay such airport charges as are necessary to fund runway developments may vary between locations, influencing the scope and timing of developments. As such, it is not possible to assess with accuracy at this stage the precise distribution of actual (as opposed to natural) demand. BA would therefore suggest that, where it can be done within manageable levels of blight, that options be kept open.

251. In particular, BA would suggest that potentially both alternatives for LGW runways to the South (and potentially options with other separations, see below) and a STN close parallel could be protected as future options, following a Heathrow runway option, with one or more being developed after 2018 (or if LGW first, after 2024).

252. BA has some doubts about the capacities claimed for the widely-spaced runway option to the South. While ICAO standards have recently changed to permit independent operations at 1035m (the 1995 standards required 1525m), this proposal is right on the limit, and the full capacities of independent operations may not be achievable in practice.

253. If mixed more were operated on both runways there would be negligible scope for runway crossings on the Northern runway without reducing capacity. All operations on the Southern
runway would then need to use facilities between the runways. BA believes that the space between the two runways and facilities shown is inadequate for the volume of traffic assumed. In our view, the additional facilities proposed could only accommodate 20-25mppa.

254. If mixed mode were not operated on the two runways, all aircraft operating from the existing terminals would need to cross the existing runway on either arrivals or departures, reducing capacity on that runway and overall throughputs. Similarly if stand capacity between the runways was inadequate for the southern runway, runway crossings would be required, also reducing throughputs.

255. If, as we believe, the capacities anticipated in the consultation document cannot be achieved, this would change the balance of the options.

256. British Airways also notes that other runway options are possible in this location with separations between the 375m and 1035m options indicated by the government. In particular, a separation of 760m or more would enable independent, segregated operations and could provide much of the benefits of the wider spaced runway, with reduced environmental impact. This option, which we believe would raise the capacity of Gatwick from 38-40 mppa to some 75 mppa, is the one we have used to calculate the economic benefits of a ‘Heathrow First’ strategy in answer to Q6.

Unacceptable options - combinations which omit a 3rd Heathrow runway

257. We are unable to support some options for reasons that flow from our responses to earlier questions, especially Question 1 (on growth), Question 2 (on hubs) and Question 6 (the economic analysis). Question 5 (on the weight the Government should attach to different considerations) lists criteria that we refer to under this heading.

258. The options that would be unacceptable, in our view, are:

- Base case (no development)
- Maximum use of existing runways (and no more)
- Stansted one new runway
- Gatwick one new runway
- Stansted two new runways
- Gatwick two new runways
- Stansted three new runways
- Any combination of the Stansted and Gatwick which exclude Heathrow.
- Cliffe: four new runways

Base Case and Maximum Use of existing runways

259. These combinations fail criterion 1. Neither option would secure sufficient economic benefits. Air travel would become increasingly congested, and expensive (Table14.5 identifies an average fare premium of £112 to £135 at the 3 main SE England airports.) There would be adverse impacts on the wider economy as inward investment decreased and inbound tourism curtailed as foreign passengers went to cheaper, more accessible countries and cities. London is the key gateway to the regions of the UK, and a ‘must see’ part of most foreign tourists itineraries if they are not dissuaded by price from coming to the UK.

Stansted One, Two or Three New Runways
Gatwick One or Two New Runways
Stansted and Gatwick combinations
Cliffe Four Runways

260. These packages fail criterion 2, in that they do cannot provide a successful global hub for the UK. Only Heathrow can meet the criteria that enable this test to be passed. It would be unacceptably high risk not to build on Heathrow’s position as the UK’s global hub, and not restore its eroded competitiveness with European global hubs.
261. The criteria and conditions to take into account are set out fully in answer to Question 2. All these conditions would need to be met, but we are not confident that any of them can be met. The costs would be great, as would the risks that would be run, with the consequence being the near certainty that the UK would not be able to maintain a globally competitive hub.

262. These multiple runway options at for Stansted, Gatwick and Cliffe also fail on criteria 6 and 7. They are unlikely to be funded by the aviation industry, and so would require public subsidy or underwriting, and they are inherently risky, by not following a market led approach, aggravated in some cases by proposing to provide all the new capacity at one location.

Q8 If you think either Gatwick, Cliffe or Stansted should be developed as a hub airport, should the Government take action to ensure such development can be financed and subsequently fully utilised and if so what form should any action take?

263. As explained in Questions 2, 6, 7 and Appendices I and VI, we do not support the development of a second hub in South East England and we describe the damage that “seeding” policies would cause.

264. BAA has stated that, if airports are not to be subsidised, significant increases in charges would be needed at Stansted to fund runway development, and Cliffe airport would have charges several times higher than Heathrow, even after the large increases being implemented at Heathrow to pay for and to pre-fund its own development programme (in terminal 5 and other terminals).

265. The Civil Aviation Authority, as the airport regulator, has decided that each airport must pay for its own development, without cross subsidy. BA fully agrees with this. In our view, there is no case for cross-subsidising inherently weak airports from strong ones. If airport users cannot pay to pay the reasonable costs of an airport’s development, then the development is probably unsustainable.

266. In summary, non-Heathrow hubs suffer from serious drawbacks:

- four runway options (Cliffe & STN) provide no more total capacity than 3 runways at Heathrow;
- much of the capacity at a second “hub” would be used by non-hub operations;
- two hubs provide far less economic benefit than one hub which can compete against strong European hubs (because of the loss of network density needed to support new routes/frequencies and competition between the two hubs for the best network);
- dependence on “seeding” - a high risk approach;
- higher costs and a longer development period.

267. Although the Government has not reviewed the airspace considerations and no information has been provided, we understand that it could be difficult to integrate a major new airport into the South East, especially in an extremely busy airspace. There may also be implications for airspace management in neighbouring countries. We therefore recommend that the Government reviews airspace feasibility of Cliffe and Stansted before any decisions are taken.

Q9 (Other South East airports) Should the Government encourage the development of smaller airports to meet as much of the demand as they can attract?

268. The smaller airports can contribute to meeting the needs of SE England to a limited extent. They can make no significant contribution to broadening the range of services, or to the crucial global hub role that only Heathrow can fulfil.

269. They can accommodate charter, no frills and other point-to-point sub-regional demand. As set out in Q1 and elsewhere, these markets embrace a large proportion of short haul traffic.
270. Luton is the main airport in this category. Others of note are London City and Southampton (where BA is developing a growing network of point-to-point services).

271. In BA's scenario for airport development (see Q7), we have allowed for substantial growth at these and other airports. By 2030, we agree that Luton with a suitably extended taxiway system and supporting infrastructure could handle up to 25 mppa, London City up to 5 mppa, and other south east small airports, led by Southampton, up to 6 mppa - in total meeting more than 10% of south east demand.

272. Heathrow can generate far greater economic benefits and should take precedence in the design and use of air space.

Q10 Should support be given for a specialized low cost/freight and maintenance facility at Alconbury?

273. We do not see a strong case for developing Alconbury as a specialist freight airport, as explained in Question 13. Cargo carried in the baggage hold of passenger aircraft is likely to remain the main means of transporting air cargo. East Midlands airport appears to be the preferred choice of the major freight consolidaters and this could accommodate some of the growth in freighter movements. Other sites in the South East, eg Manston airport in Kent, could also help to relieve pressure on the major passenger airports.

274. As with any small airport, Alconbury could help to meet local demand and provide specialised services. However, the projected scale of expansion would have little bearing on the larger developments required in the South-East to meet demand and to support an internationally competitive hub airport.

Q11 If so, what conditions, in broad terms, should be attached to this support?

275. Any policy support given to Alconbury should be in line with the government’s objectives of sustainable development. The key issue is whether the broader economic benefits justify the costs of the development including the supporting road and rail infrastructure and whether such an airport operation would be commercially viable.

Q12 What views do you have about the six sites identified in the SERAS study as having the potential to cater for the demand for Business and other General Aviation?

276. It is important to recognise that general aviation and business aviation represent private forms of transport. As private transport, we believe that capacity should be provided in a way that does not constrain public transport services operated by scheduled and charter airlines.

277. Conflicts between private and public air transport services may arise over the use of airspace.

278. We would therefore be opposed to any plans to increase the use of Northolt Airport, as this would conflict with Heathrow airspace.

Q13 How far should the Government make specific provision for the air freight sector in its decisions about future airport capacity in the South East? What might this involve in practice?

279. British Airways is the tenth largest cargo airline in the world and the largest in the UK. In 2001/02, BA transported more than 750 thousand tonnes of freight, mail and courier traffic serving some 160 destinations in 76 countries. More than 900 million tonnes of cargo was carried in each of the previous two years. World Cargo generates revenues of some £500 million a year.
280. The government projects 4.2% growth pa in general air freight over the next 30 years, with the rate falling as markets mature. Express packages are forecast to grow nearly twenty-fold from 1998 to 2030, at over 10% per annum, increasing share of total air cargo from 20% to 52% by 2030, as in the US.

281. We share the Government’s view that express packages will be a rapidly growing sector of the market, but are more cautious about the UK’s share reaching US levels. Distances between centres of population are much greater in the US, making air transport more essential for speedy delivery. The four largest European countries have a similar population to the United States but occupy less than a sixth of the land mass. Road and rail are therefore likely to retain a larger share of the market than in the USA.

282. We expect this segment of air freight to grow at around 6-7%, in line with the historic growth rate of air freight, while general cargo markets mature. This would produce an express package demand of 3m tonnes in 2030, less than half of the government’s projected 7.1m tonnes and reducing total air freight from 13.6m to 9.5m tonnes. We expect the share of the express segment to rise from 20% at present to just over 30%, not dominating the market as the government’s forecasts suggest.

283. It is important to make allowance for air freight growth in UK airport policy. Air freight is an important segment of world trade, carrying up to 40% of the value of goods transported according to some estimates. Facilities for air transport of goods as well as people should be provided so that the UK can benefit from trade within an increasingly globalised world economy.

284. Currently, 80% of air freight entering the UK is carried on passenger aircraft. Heathrow is the UK’s largest freight airport and 13th largest in the world. With the development of a new Heathrow runway and the continued shift to longhaul traffic, air freight capacity of Heathrow should increase in line with passenger capacity.

285. The government’s estimate that Heathrow’s air freight capacity could grow to around 2m tonnes from its current level of just under 1.5m therefore appears to be an underestimate. In our view, Heathrow (with three runways) could carry 3m tonnes of cargo, nearly a third of projected UK demand in 2030. Heathrow acts as an air cargo hub, just as it does for passenger traffic. Expanding Heathrow should allow airlines to develop this hubbing capability to increase the economic benefits of expansion.

286. Exploiting the full potential of baggage hold cargo is consistent with the government’s desire to make most efficient use of existing runway capacity and to reduce the overall environmental impact of air transport. Heathrow’s ability to accommodate a significant increase in cargo would reduce the need for growth in air freighter movements. As argued earlier, we also believe the demand for air freight growth has been overestimated because of optimistic assumptions about express package growth.

287. Government policy for accommodating air freight growth in South-East England needs to start by realising the potential of major passenger airports. As explained in Question 10, we do not see a need to develop Alconbury as a freight airport. Spare capacity at other airports, as at Stansted at present, can also be used for air freighter movements. Other airports, such as Manston, may be able to accommodating some air freighter movements where they are commercially and environmentally sustainable.

288. However, the most obvious focus of a major gateway for dedicated air freighter traffic lies outside South-East England, at East Midlands airport. With good road and rail links, such a facility could serve demand in South-East England and elsewhere in the UK.
Q14 Are there any specific conditions that you feel should be attached to any or all of the airport options described in Chapters 7-11?

Sustainable Development

289. British Airways’ approach to sustainable development of airports is set out in answer to questions 1 and 16. Airport development should take place where it can secure significant economic benefits providing the associated environmental issues can be managed adequately. Achieving the economic benefits is a prerequisite for being able to fund appropriate environmental solutions.

290. In some circumstances conditions could play a role as part of the management system. Any conditions should meet the criteria developed by ICAO and be:

- environmentally beneficial
- technically feasible
- economically reasonable

General Principles

291. Conditions, which are a form of regulation, are not the only or always the best way of securing environmental improvement. The scope for voluntary agreements should be considered, since these can often be more flexible, effective and cheaper. Equally, the Government itself has a significant role to play, for example through introduction of effective land use measures and determining airspace issues.

292. We believe the following types of condition would be appropriate for all airport options:

- a master plan should be produced for the airport illustrating future land use and infrastructure and incorporating an integrated environmental management programme to address local noise, air quality and surface access issues;
- stronger and clearer land use controls including appropriate mitigation measures;
- avoiding adverse environmental/community impacts where possible;
- rapid and frequent rail access (maximum 30 minutes) to city centre for any multi-runway airport;
- minimum adverse impacts on ecologically important locations.

293. Any conditions should depend on the precise details of the proposal. BA has paid particular attention to the Heathrow option and the following details relate to it; they reflect our discussions with local community and local authority representatives. We have not addressed all the conditions that would need to apply at other options.

Heathrow

294. A number of planning conditions apply to Heathrow following the approval of terminal 5. In the Context and Background section (at the beginning of this paper), we explain that developing a new runway is not inconsistent with the movement limit set at the time of the Terminal 5 decision. It is important to note that the movement limit related to two runways only and was designed to prevent a worsening in noise. The Secretary of State’s decision on Terminal 5 did not rule out a third runway and said that this matter would be considered on its merits, which is what is now being done.

Master Plan for Heathrow

295. An illustrative master plan for Heathrow with a regional runway should be produced. This master plan should provide for certain conditions to be met notably:

- the regional runway’s location allows for preservation in situ of St Mary’s Church,
graveyard and the Great Barn in Harmondsworth.

- an automated passenger and baggage transit system is provided between the stands and passenger facilities serving the new runway and the then five terminals between the existing runways.
- the maintenance areas of Eastern Heathrow be modernised and redeveloped to absorb the increase in demand for hangars from existing runways without going outside the airport boundary.

**Airport Noise**

296. We recognise the need to achieve a sustainable balance in airport development.

297. We set out below our views on the government’s suggested conditions for controlling the noise impact of a third runway at Heathrow.

298. Total airport noise, including that from the third runway, could be restricted to remain within the noise condition set by the Secretary of State when approving terminal 5. This criterion was not to exceed the $57\text{Leq}_{16\text{h}}$ airport noise contour area of 145 sq km. Even though a new runway, by bringing significant economic benefits, might in principle be able to justify an increase in noise, BA accepts the Government’s recommendation ‘that a contour cap of this nature should also be a condition of any approval for a third runway at Heathrow’ (para 16.33). However, this would have to be part of a balanced approach (see question 16) and careful consideration would have to be given to the actual mechanism (see Question 17).

299. The consultation says government would also be looking for a very clear commitment from the industry that goes beyond the minimum requirements of the ICAO noise standards coming into effect for new aircraft from 2006 (para 16.34), and for a limit of QC1 on the type of aircraft permitted to use the new runway (para 16.37). The Government could deal with this by setting a condition to require all aircraft on the new third runway to meet the standards of Chapter Four and to have a maximum QC rating of 1.

300. BA’s position on night flights is described in Question 19.

**Local air quality**

301. Heathrow Airport, and the surrounding areas, experience the same pollution ‘events’ as measured in Central London. Thus, with respect to imposition of standards or limits, the airport should be treated no differently from anywhere else covered by the National Air Quality Strategy, and should have to comply with the same standards as those set, for example, in Central London.

302. In this respect there is no need for any specific additional conditions related to Local Air Quality, as the National Air Quality Strategy (Air Quality Limit Values regulations 2001), and the EU Directive 96/62/EC, and Daughter Directive 1999/30/EC, already supply the relevant legal safeguards.

303. However, if the government is to take a positive decision in favour of a third LHR runway, it needs to be satisfied that these statutory provisions can be met, as Heathrow airport continues to grow and develop. In our answer to Q16 (and Appendix IV), we set out evidence that initial government estimates of the likely scale of the breach of EU limits has been vastly overestimated. Our analysis - and that of the BAA - points to a very limited contribution of the airport to off-airport NO2, resulting in comparatively small exceedances of the 2010 annual NO2 limit to the NE of the airport, once likely improvements in aircraft technology and airport management have been taken into account. NO2 emissions which are predominantly from road sources are also expected to halve from 2000 levels by 2010–15.

304. As the largest single operator at Heathrow Airport, British Airways believes it has a responsibility to work with the BAA and other airlines to ensure that NO2 limits in the community are consistently met around Heathrow as use of the third runway builds towards its capacity in 15 and more years from now. As part of this process, it may be appropriate to introduce a limit on air transport emissions in the Heathrow area, linked to a historic baseline, similar to that we are proposing for noise. Further improvements in modelling and
measurement would be needed to establish a robust framework, but British Airways would be prepared to work with the government, local authorities, the airport operator and other airlines to develop an appropriate framework for limiting airport NO2 emissions, which could subsequently be incorporated into the planning conditions for a third LHR runway.

Surface Access

305. This subject is dealt with in detail in question 20. The Piccadilly Line and the Heathrow Express will already have been extended to T5 before a third runway opens. Heathrow Express fulfils the condition of having a high speed, frequent city centre link.

306. The government could consider whether it would be feasible to require plans to be developed which would enable the majority of air passengers to access the airport by public transport.

307. The Secretary of State has required the station under T5 to be built large enough to provide for through running trains. Rather than making it a condition for the opening of another Heathrow runway that such through services are brought into operation, the Government should simply provide strong policy support for such a link in the White Paper, and direct the SRA to allocate a proper share of public funds.

Q 15 Are there any impacts reported in the Chapters on individual airport options that you consider unacceptable

308. We do not see adverse environmental impacts in general as “show-stoppers” as long as they can be adequately mitigated. In the case of a third runway at Heathrow, we believe this is the case and we have set out in Questions 14, 16 and 17 how this can be done. We believe the same is true of the Gatwick option.

309. We have not commented on all the environmental impacts of runway development options at other airports. However, we are concerned about some of the difficulties that appear to be associated with the development of Cliffe. Chiefly:

- potential airspace/air traffic issues;
- potential conflicts with bird habitats - this may be a safety and an environmental issue;
- inability to provide sustainable surface access by public transport.

310. Heathrow is already a major international airport and the addition of another runway will not fundamentally change the character of the environs in which it is located.

311. All other options for multiple runway airports (at Stansted, Gatwick or Cliffe) would be intended to create an entirely new hub, with the much more fundamental changes in the character of the area concerned (including the broad environmental and social impacts) that would have.

312. We consider therefore, that in addition to the first essential step of adding the regional runway at Heathrow, that subsequent phased addition of one runway at places like Gatwick and Stansted are more likely to be environmentally acceptable as well as economically justifiable.

313. Regarding Heathrow, we find some of the assessments of impact implausible and some of the ratings ascribed to specific issues difficult to understand and this is discussed in our answers to Questions 16 and Appendix IV.

314. We do not believe any of the environmental impacts relating to a new 2000m Heathrow runway are unacceptable. Balanced and proportionate solutions can and should be developed to address key environmental impacts. We have suggested some possible conditions (in Q14) and an approach to management of the issues in Qs16-20.
General approach to the management of local environmental impacts

315. A great deal of work and effort has been applied over many years to address the environmental impacts of aviation, and huge progress has been made as a result. For example, an international system of aircraft certification has resulted in significant long term improvements in aircraft noise and emissions performance.

316. The current framework of comprehensive controls and policies at international, regional, national, and local airport level have been described in Chapter 16 of the consultation. It is important to airlines, who operate internationally, that national and local management of environmental issues is consistent with this broader international framework.

317. ICAO has developed a “Balanced Approach” to the management of airport noise (as described in 16.5). This is a constructive and practical approach for addressing local issues in a proportionate way.

318. Although there are differences between the impact of noise, which is aircraft dominated, and emissions, which are dominated by other considerations, it is our view, that a “balanced approach” could also be applied to the management of local air quality.

319. Economic instruments may also have a role to play within a balanced approach to local environmental management, but these would have to be thought through carefully as discussed in Question 1.

320. It is particularly important that the opinions of relevant stakeholders are taken into account in the development of airport programmes to manage noise and air quality issues.

Integrated Environmental Management

321. An integrated environmental management framework for Heathrow should be set up to include performance indicators and reporting.

322. A broad stakeholder based integrated environmental management group could be set up to make recommendations, working within a framework established by DfT. This may involve a reassessment of the roles of the Consultative Committee and of ANMAC.

323. Specific work areas within the broad stakeholder group could include:

- total airport noise management system;
- total airport air quality management system;
- land use compatibility;
- community investment management.

324. We have held a number of discussions with local community groups at Heathrow as described in Appendix V.

MANAGING EMISSIONS IN THE AIRPORT AREA

325. Total airport air quality management for the Heathrow airport local area would form a key part of an environmental management system and should be integrated by BAA into a Master Plan for the airport. This approach could also be adopted at other UK airports as necessary.

326. At Heathrow, an expert group should be nominated to oversee the measurement, prediction, reporting and management of the air quality impacts from the airport, to ensure that stakeholders are adequately informed before making decisions or drawing up plans.
327. We recommend that this expert group is based on the existing “Steering Group” set up by British Airways to improve understanding of emissions production and dispersion close to the airport.

328. The group should be able to assess the likely impact of future development at Heathrow airport on air quality and consider the potential role of targets and mitigation options as required.

329. The “Balanced Approach”, as developed by ICAO and the European Union for noise mitigation also provides a useful framework for an air quality management system, but bearing in mind that local air quality issues are dominated by off-airport sources. This has four elements.

- Source reduction
- Operational measures
- Land use management
- Operational restrictions as the last resort.

Nitrogen Dioxide

330. Appendix IV deals with this issue in detail. In this question we provide a short summary.

331. It is important not to overlook the Government’s statement that the published concentrations were not intended to predict likely absolute levels, but instead should only be used for relative comparisons of the options. This is because the modelling is still in its early stages.

332. Modelling work carried out by British Airways and BAA, incorporating an increasing data base of measured concentrations of NO$_2$ near Heathrow, suggests that local air quality impacts of nitrogen dioxide (NO$_2$) at Heathrow will be significantly less than those published in the consultation documents. In particular, we think it unlikely that any residential area outside the airport boundary would be exposed to levels above the new precautionary limits set from 2005 in the 2001 Air Quality Limit Values Regulations 2000.

333. Our analysis, which has involved key stakeholders and experts, differs from the Government’s in several important respects:

- More realistic modelling using line sources for aircraft rather than volume sources;
- Better assumptions about actual engine take off power settings;
- Use of recent data from 19 monitors sited across the airport;
- Use of benzene measurements as a proxy for distinguishing the relative contributions of cars and aircraft at different sites;

334. A Government statement in December 2000, that “Research findings have consistently demonstrated that aircraft take-off emissions are not significant contributors in terms of air quality around airports” and further that “Road traffic has been found to be the dominant source of emissions and the problem, here and elsewhere, is being addressed through technological improvements that will lead to a progressively cleaner road vehicle fleet", further supports our conclusions.

335. Forecasts by the GLA and NAEI suggest that background emissions from road vehicles will reduce to below half their present value by 2015, which will bring down the relatively high background NO$_2$ levels around Heathrow.

336. Even though we believe the new limits will not be breached even with a third runway at Heathrow, we have identified potential mitigation options if it becomes necessary at a later date to reduce NO$_2$ concentrations in residential areas close to the airport.

337. Airlines will continue to invest in environmentally efficient aircraft. The engines that power 77% of British Airways fleet are already lower than the internationally agreed CAEP/4 standard for NOx. In future, NO$_2$ levels from our aircraft’s main engines will reduce, both as a result of new acquisitions and due to modifications to the existing fleet. For example, 30 of
our B747 aircraft have already had their engines modified to the RB211-524H-T standard, reducing emissions of NOx from these aircraft by nearly 50%.

338. Major sources of NO\textsubscript{2} emissions from the airport are the ground fleet and ground and auxiliary power units. Emissions from these are being addressed in a number of ways.

339. Fixed Electrical Ground Power (FEGP) and Pre-Conditioned Air (PCA) facilities will be incorporated on airport stands as part of the conditions for Terminal 5. Provided BAA ensures these services are available for use, these should allow significant savings in APU running time, and hence result in a huge reduction to the NOx inventory from aircraft APU’s.

340. British Airways currently operates about 600 electric vehicles at Heathrow airport, one of the largest fleets in Europe, and this would be expanded for an increase in services due to the third runway. We are also pursuing the use of alternative, more sustainable fuels for the rest of our ground vehicle fleet.

341. In addition ongoing upgrades to the airport ground vehicle fleet will also offer significant improvements to the ground level NOx inventory. It should be noted that because of the maximum vehicle age OSI, an almost complete turnover of these vehicles will be required before the new runway is operational.

NOISE MANAGEMENT

342. Despite extensive research on possible health effects of aircraft noise exposure, there is no scientific basis for limiting noise at any particular value. There are large differences between individuals because a large part of the response to noise is subjective in nature.

343. Annoyance and sleep disturbance are the most commonly reported effects of aircraft noise, and whilst there is insufficient evidence to describe these as health effects, they do affect the quality of life, to varying degrees, of those living close to airports.

344. It is important to recognise that regulation and voluntary action has had the effect of internalising external costs related to current aircraft noise at Heathrow to a large extent. International standards on aircraft noise and agreements on phasing out older aircraft have played a major part in this. A whole range of operating restrictions including the use of airspace, night restrictions, and airport ground operations ensure that noise impacts are reduced to the minimum, especially at Heathrow.

345. The existence of residual impact does not mean that external costs are not being absorbed by business. However, given societal pressures for continual improvement, we recognise the need for continuing airport noise management, consistent with sustainability criteria and the balanced approach.

346. British Airways now operates one of the quietest aircraft fleets in the world. Over the last 25 years, noise from BA flight operations has reduced by over 80%, despite the significant increase in traffic.

347. The UK Government’s approach should be based on the International Civil Aviation Organisation (ICAO) adopted ‘Balanced Approach’ to noise management at airports, as set out in paragraph 16.5 of the consultation paper. This approach requires full cost-benefit analysis of four elements which are described in more detail below:

- reduction of aircraft noise at source;
- land-use planning and management to contain the number of people affected and to improve insulation standards;
- Aircraft operational changes;
- Operating restrictions.

Policy aim and approach

348. BA considers that the policy objective should be to minimise the total number of people (and sensitive developments) exposed to high levels of aircraft noise, in order to maintain or
349. An objective which is expressed in terms of the number of people exposed, rather than the size of a contour area, would provide more flexibility in finding balanced solutions. For example, flight path/directional changes might reduce the number of people affected without affecting the size of a contour.

350. Achieving this objective will require a balance of measures at Heathrow, with strong focus on land-use planning and mitigation management.

351. Costs and benefits associated with each potential measure are likely to vary with distance from the airport. Close to airports (in high noise zones), land-use management will be the most cost-effective approach and much greater use of this will be needed.

352. At further distances from airports, the balance of potential options need detailed examination using the principles inherent in the Balanced Approach.

353. Noise management proposals could be developed within an airport stakeholder group, and might include the following issues:

- examining potential options for reducing the total number of people exposed to high aircraft noise or
- maintaining total noise within the level set when an airport development is approved
- defining noise zones for planning and mitigation;
- promoting and encouraging good operational practice and voluntary initiatives.

**Source noise reduction**

354. Advances continue to be made in aircraft source noise reduction. The noise “footprint” of the Airbus A319 is much smaller than the similar sized Boeing 737-200 that it replaced.

355. The challenge now is to build on this achievement. The European Commission’s research target, for a 10 decibel reduction in new production aircraft noise by 2012, is directing the attention of manufacturers towards the need for further improvement.

356. As technological improvements continue, trade-offs with other environmental impacts will become more pronounced. For example, technology to reduce noise may increase gaseous emissions and vice versa. The potential impact of policies to reduce noise at source on other environmental objectives must always be considered carefully by policy-makers, and arbitrary “stretch targets” must be avoided. Environmental improvement targets for aircraft cannot be set without reviewing technical feasibility.

**Land-use measures**

357. Airlines can only be part of the solution. Over the last 40 years, land-use planning guidance around airports has had virtually no impact in limiting residential growth in areas close to airports in the UK. This “encroachment” cannot be allowed to continue unchecked.

358. A step change in the priority given to this element of the Balanced Approach is needed as part of a long term solution. There is significant potential for reducing the impact of noise on local communities. Until now this element has been given little weight and the overwhelming burden of reducing noise impacts has fallen on manufacturers and airlines. However, technological limits, such as the trade-offs between noise and emissions performance, mean that future improvements cannot come only from technology.

359. Stronger planning legislation, introducing noise compatibility action zones and considering proportionate financial packages linked to mitigation options such as buy out offers and insulation is long overdue. We believe noise compatibility action zones are the most appropriate structure for tackling any new noise issues.

360. **Mitigation zones** should be established for areas exposed to new noise disturbance. They should be used to define the type of mitigation options required, including relocation and
sound insulation.

361. **Planning zones** should be established for all areas exposed to high aircraft noise to prohibit further incompatible development such as residential properties, schools and hospitals.

362. We recommend substantial strengthening and simplification of guidance and regulation for airport land-use planning & management. There are well advanced policies of this nature in other countries, for example the USA and France.

### Reducing noise by optimising operational procedures

363. There is limited scope for further improvement in flight operational procedures and it is important to recognise that it is not feasible for safety reasons for airlines to adopt a range of different flight procedures for different airports. Existing procedures have been designed to minimise aircraft noise without compromising safety:

- **Departure** - noise abatement procedures recommended by ICAO for reducing engine power after take-off.
- **Approach** - continuous descent (CDA) into airports, to avoid flying lower than necessary (this is particularly important at night).
- **Preferential use of runways** - can minimise the number of people affected, even though it may not offer the best use of runway capacity.
- **Noise preferential routes** - Concentrating departures on to routes designed to minimise the number of people exposed to noise – by over flying motorways, where there are already high noise levels, for example.

364. We suggest setting up a Stakeholder technical working group at Heathrow to consider further optimisation in this area. The group might include DfT, NATS, CAA-DAP, CAA-ERCD, Airport, Airline, Community. This group would feed into the suggested overall environmental management stakeholder group described in response to Q14. Work could include:

- **Evolution of CDA by improving flight track planning information, including greater use of advanced aircraft navigation systems.**
- **Investigation of a steeper approach to the third runway, working with aircraft manufacturers, NATS and ICAO subject to aircraft safety criteria.**
- **Displacement of Heathrow main runway thresholds so that arriving aircraft are higher at any given location than they currently are.**
- **Evaluation of the use of new navigational equipment and air traffic control systems for example to concentrate flight routes (as has happened in Brussels at night in order to minimise the number of people affected and minimise the cost of sound insulation) or to disperse them (as has been implemented in Sydney in order to share the impacts)**
- **NATS has a key role to play in the further optimisation of operational procedures, including CDA and the investigation of steeper approaches to a third runway at Heathrow. Development of infrastructure at Heathrow also provides an ideal opportunity for a substantial review of airspace and ATC operating procedures.**

### Operating restrictions

370. There may be a place for proportionate operating restrictions as provided in the Balanced Approach, under which all measures are tested for cost-effectiveness. This is discussed in Question 14.

371. On the particular question of ‘action by airlines that goes beyond the minimum requirements of the ICAO Chapter 4 noise standards’, it is important to note that this would contravene the EU Operating Restrictions Directive 2002/30/EC and may result in disproportionate effects on large numbers of modern fleets currently operating including Boeing 737s and Airbus A320s.
Q17 What are your views on the following points on the control of noise impacts:

Do you think that caps on the size of noise contours are the best way to determine a noise limit for an airport? If not, what other limits might you suggest?

372. As noted above, in principle, the objective should be to minimise the number of people and sensitive developments exposed to aircraft noise above a given level, balanced with the economic and social advantages of airport expansion.

373. Fixing a limit on the size of a particular contour area is a practical way to achieve this objective and would correlate closely with population if no significant changes are made to flight procedures and air space routes at an airport. A stable operational pattern means that, although an area based measure takes little or no account of the significant population density differences around the airport, that is no particular disadvantage.

374. However, an “area cap” takes no account of benefits from two significant types of potential noise improvements:

- airspace and operational changes; and
- land use measures.

375. These could potentially be of significance at an airport like Heathrow, where the population density is nine times greater under the Eastern approaches to Heathrow airport than under the Western approaches.

376. Airspace design changes (such as the location of holding points), design of noise preferential routes, air traffic procedures (such as vectoring or descending aircraft too early) and operational rules (such as Westerly preference and the Cranford “Agreement”) make significant differences to the local noise climate. These factors are not under the control of airlines or airports.

377. If improvements are made in airspace and operational procedures these should be “counted” (and for example, an area based contour adjusted to recognise the improvement) in any assessment of noise impacts even if there is little or no overall reduction in the size of the contour area.

378. Land use policies could also bring significant benefits to local communities, without affecting the overall size or shape of noise contours. Some areas should be designated as being unsuitable for noise sensitive development, and planning restrictions applied to reduce population density in these areas over the long term. Less affected areas should be subject to higher building standards which incorporate greater noise insulation. These measures could reduce the impact of noise and avoid conflict between airports and local communities.

379. In answers to question 14 and 16 BA has reiterated its acceptance of the Heathrow ‘145 sq km noise contour’ cap, or a limit of a similar nature. However, we recognise here (and in our response to Q16) that an area contour measure should be translated into population impact terms, assuming a way could be found to do this, and in any event should be revised to take account of significant operational and airspace changes.

380. Any measure used to monitor and manage aircraft noise must be simple, practicable, understandable, and allow comparisons over time. Fixed limits must also be transparent, easy to administer, consistent with EU law on operating restrictions and simple to enforce.

381. Leq area contours are an established overall measure that meet some but not all these criteria. Importantly, the annual Leq contours also report on the number of people in the affected areas.
382. Noise contour limits have been set as conditions at Heathrow (T5) and Stansted (for 25 mppa).

383. Leq contours (or future measures of a similar nature) will need to comply with the EU Operating Restrictions Directive. As, in the UK examples, they are not fixed on the ground they will not encounter the problems experienced in other countries, of variation due to the effects of different wind patterns from one year to the next.

384. Despite some drawbacks with the Leq contour, the principle can be adapted to achieve an equivalent result. It is helpful to consider separately:

- the overall policy aim - which must be met and measured, to give proper assurance to local people, and
- specific regulatory limits or other measures - which are needed to achieve the aim in a proportionate way.

385. Contours, together with the population impact numbers will remain, in our view, the best measure of local noise impact. Crucially, they offer the following advantages:

- they allow a clear aim to be set as part of a decision to allow airport expansion
- they take account of total daytime airport noise and allow measurement over time, to identify long term trends;
- they can be used to assess the adequacy and efficacy of policies and particular measures to manage airport noise;
- they facilitate discussion between all stakeholders, even those who are not scientific experts on the complex subject of noise.

386. An essential feature of a noise limit, however, is that it must be capable of being regulated and enforced simply. An area contour limit cannot be regulated as such, but needs to be translated into practical procedures relating to the operational noise characteristics of the planned and actual aircraft flying at the airport in question. Operational restrictions could also be devised, as set out below, to ensure that the number of people affected by the contour area recommended by the Terminal 5 inspector would not increase after 2016.

387. Limits are only part of a broader noise management system (as described in the earlier questions in this section), so we consider it essential that land use measures and airspace changes should be included as potential measures for achieving the overall “cap”.

Measurement consistency and continuity

388. We are aware of the ongoing Government study considering attitudes to aircraft noise (ANAS) that aims to validate the applicability of Leq in describing the effects of airport noise. Also, the implications of applying the requirement within European Directive 2002/49/EC to produce airport noise contours using the Lden metric may need to be considered at some stage. Any changes from these various sources will require re-calibrating the noise contours in a neutral way (or freezing the modelling to set aside all changes for the purpose of determining compliance with the contour limit).

If you agree with the concept of contour caps, what size of noise contours might be desirable and feasible for each option?

389. British Airways expects a noise contour “cap” to be devised for any of the airports that are expanded by the addition of new runways. It is important such “caps” are objectively justified as required by the balanced approach to noise management at an airport.

390. In the case of Heathrow, we suggest that the 2016 noise cap set by the T5 decision, or one of similar nature, is retained, translated into population terms, and then incorporated as a firm commitment in the White Paper. (See question 14). Since this is a level of noise that was objectively justified on the basis of the economic benefits accruing to Heathrow with two runways, the additional benefits arising from a third runway should in theory justify higher noise levels. However, we recognise that Government policy is to minimise the noise impacts where practicable and therefore we agree that the growth in traffic should be limited.
within the “cap” that has already been established by the T5 inspector.

391. We could not support a contour based on actual noise at some arbitrary future date, such as the date when the Government approved the planning application for a new runway. This would penalise airlines for achieving noise reductions in the interim period, creating perverse incentives to operate noisy aircraft for as long as possible to preserve a noise entitlement. Furthermore, this might lead to severe operational constraints and costs that could not be justified by an objective valuation of the relative costs and benefits.

392. We have not considered what would be the appropriate cap for airports other than Heathrow.

How do you think a contour cap might be regulated and enforced?

393. The sizes of noise “caps” should be established in the Air Transport White Paper for each new runway. In the case of Heathrow, this level has already been announced by the Secretary of State when approving T5. However, at other airports, consultation would be needed to establish a reasonable level. The White Paper should also indicate the Government’s views on how the cap might be regulated and enforced in practice, and/or on the process to be used to develop new regulations and to consider potential land use measures and airspace changes.

394. Once the “caps” were set in the White Paper, local communities would have firm reassurance about the noise impact of a particular runway development, and there would be a clear framework for working up the detailed planning application.

395. Technical discussions could then be held between the airport, airlines, the scheduling committee and government on designing the specific measures necessary to ensure that the noise “cap” would be met. The local community should be consulted as part of this process.

396. Existing groups such as ANMAC and/or the airport consultative committee might get involved to ensure that the mechanisms chosen met the stated objective, were proportionate and overcame legal and practical difficulties. The full range of potential solutions available under the “balanced approach” should be considered. Land use planning and airspace changes should not be ruled out.

397. The public inquiry would then be able to check whether an adequate solution had been developed before granting planning approval for the particular runway scheme. This would ensure that the “cap” would be met. It would leave several years for details of the schemes to be decided, and appropriate mechanisms to be put in place.

398. One possible approach would be to institute a similar approach to the night quota system currently used at SE England airports, based on noise Quota Counts (or perhaps using an EU aircraft noise scale if one is agreed).

399. Initial allocation of noise quota to airlines would be sufficient to allow continuing actual operations and growth. Airlines and ACL, working with the airport, could then devise incentives for airlines to improve noise efficiency, to encourage noise quota to be freed up and reallocated so that best use could be made of new runway capacity. Possible incentives might include giving a priority in allocating capacity to noise efficient airlines, or differential landing charges could be applied. The important point is that the industry would retain flexibility in finding market-oriented, cost-efficient solutions to achieve the agreed outcome.

400. Such an approach would need to be consistent with the slot regulations, competition law, the operating restrictions directive and scheduling procedures. It is therefore difficult to be too definitive at the moment, even though we are confident that the 2016 contour could be achieved.

401. The noise energy produced by aircraft is a major determinant of the overall noise climate, but not the only one.
402. If other methods could be found to reduce noise impacts, for example through airspace changes, this should allow the noise quota to be increased while remaining within the overall noise impact “cap” set in the White Paper. This would create strong incentives for finding new solutions to reduce noise impacts.

403. Penalties would have to be devised to provide confidence that local rules could be enforced if necessary. One possibility is that the Government set up a simple scheme under Section 78 of the Civil Aviation Act, requiring all airlines at the airport to operate within a noise quota as allocated from time to time by ACL. This would allow the airport to refuse them landing permission if they exceeded their quota and would allow the Secretary of State to intervene if this failed to work.

404. The Government would not have to get involved in setting the noise quota, but they would of course retain the right to cap movement numbers as a last resort if ACL, BAA and the airlines failed to contain noise within the White Paper “cap”.

405. This sort of approach would protect the interests of communities living under the flight paths, while allowing the industry to come up with the most efficient way of meeting the objective and to adapt this over time as necessary. The industry should be able to design a less formal process, avoiding compliance problems, by incentivising and rewarding good performance.

406. However, these are initial views designed simply to demonstrate that is would be possible to manage within a reasonable cap, and to show British Airways’ good faith in trying to reduce the noise impact of our operations. It is not a definitive proposal. As explained, we believe that the Government simply needs to fix the size of the cap in the White Paper and state some principles and the process by which the details will be worked out. There will be sufficient time to design a scheme before the public inquiry considers whether it meets the requirements set out in the White Paper.

Q18 Noise mitigation and compensation: What views do you have on the following possible measures:

407. British Airways supports an approach to noise management which contains the overall noise impact of the airport as part of an agreement to allow expansion. There have already been significant reductions and more should be possible as aircraft technology improves. We therefore believe that compensation for people currently in the noise imprint would not be appropriate. However, a new runway may create new noise disturbance in an area not currently affected to any great extent. In these circumstances, there is a case for using compensation as part of a more general package of mitigation measures, to address this.

408. We draw a distinction between mitigation of new aircraft noise impacts, which BA supports in principle and direct cash compensation as an alternative to mitigation, which we do not support except for compulsory purchase.

- **Mitigation measures** could involve sound insulation schemes or relocation of people from high noise areas, with commitment to finance such measures and relocation expenses.

- **Cash compensation** involves cash payments which do not involve any noise mitigation measures.

409. Cash compensation would be part of the compulsory purchase package for those required to move. British Airways supported the most generous option of the potential increases in Home Loss Payments put to consultation, by the Office of the Deputy Prime Minister in September 2002. This would increase maximum payments from £15,000 to £50,000 (in addition to moving expenses and the open market value of the property).

410. In general, mitigation and compensation mechanisms should be:
> long-term in their application
> equitable
> command the widest possible acceptance
> flexible, so as to offer choice

411. We understand existing noise problems but we do not accept the need for retrospective mitigation and compensation measures. Heathrow airport has been in existence for nearly 60 years, and for the last 30 years noise has been progressively decreasing in current noise affected areas. As the consultation document notes, (page 145, para 16.36) keeping the equivalent of a 145 sq km contour “cap” at Heathrow would ensure that those who experience noise today from aircraft using the existing runways would enjoy a significant improvement in the daytime noise climate.

412. We believe noise action zones are the most appropriate structure for tackling any new noise issues.

413. **Mitigation zones** should be established for areas exposed to new noise disturbance. They should be used to define the type of mitigation options required, including relocation and sound insulation.

414. **Planning zones** should be established for all areas exposed to high aircraft noise to prohibit further incompatible development such as residential properties, schools and hospitals.

415. Broad stakeholder dialogue is recommended to develop the details of airport mitigation and compensation schemes and to determine the best way of putting them into practice.

416. Following our own dialogue session (Appendix V), we welcome BAA taking a lead in moving this forward following the publication of their response to the SERAS consultation. This dialogue should continue and deepen after publication of the White Paper, should the Heathrow regional runway be adopted as Government policy. We will continue to play an active part in these discussions and we are willing in principle to discuss issues that go beyond the proposals in this consultation insofar as they are directly linked to the planning process.

417. Stronger, clearer planning law is essential to facilitate this new approach to land-use planning in the UK. We welcome the proposed review of ‘Planning Policy Guidance Note 24: Planning and Noise’. In the first instance, the definition and management of noise action zones must be focused on meeting local needs, however, the regional and national context of this new approach to land-use planning must also be addressed.

418. As recognised by the ICAO Assembly, it is imperative that the benefits gained from positive land-use planning are never eroded in the future by incompatible urban encroachment around airports.

<table>
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<tr>
<th>Should any residential property which suffers an increase in noise of 3dBA or more as a result of any of these options, and which would be exposed to a noise level of 63dBA daytime or more, be eligible for acoustic insulation?</th>
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<td>419. Yes.</td>
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<th>Should acoustic insulation for households be extended to other noise-sensitive buildings not normally eligible, such as schools and hospitals, depending on detailed circumstances?</th>
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<tr>
<td>420. Special consideration should be given to sensitive buildings affected by new aircraft noise, depending on particular circumstances.</td>
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<th>Should those eligible for insulation be given the choice of either having the insulation work done or accepting a cash payment of an equivalent amount?</th>
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<tr>
<td>421. No. Cash should not be paid without mitigatory action or legal commitment from the property owner.</td>
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</table>
Should assistance with relocation expenses be offered to households subject to very high levels of noise (such as 69dBA or more)?

422. Yes. These properties would then have to be resold with an easement making reference to aircraft noise that would be disclosed to purchasers. Examples of this kind from the USA include ‘aviation easements’ and ‘real estate disclosure’.

Should offers be made to purchase those properties which would be subject to both a very high level of noise and a large increase in noise?

423. Yes, in principle we would support such a scheme, provided the details were sensible. However, this would apply only once, as with the previous sub-question.

Should cash compensation be offered to those households suffering a significant increase in noise to a level greater than 57dBA but less than 63dBA – and therefore not qualifying for insulation?

424. No. Cash should not be paid without mitigatory action or legal commitment from the property owner. We suggest part funding of sound insulation for properties in this area. The proportion of funding could be calculated on a sliding scale related to both the absolute level of noise and the increase in noise. Studies have shown that many people who are affected by noise also benefit directly from the economic benefits and this should be borne in mind.

Q19 Do you think that a five-yearly review cycle for the night restrictions regime for Heathrow, Gatwick and Stansted is appropriate or should some other review cycle be considered and, if so, what would you suggest? Are specific night noise restrictions needed at any other airport, and if so how should these be determined?

425. Night noise is a separate issue which is subject to its own consultation process.

426. We believe it is in the interests of residents and the industry to have a stable policy which remains fixed, with periodic consultations on size of quotas. This allows the industry and residents to make informed choices over matters which have long term consequences - such as fleet procurement and buying houses. We would prefer the 5 years reviews to focus on the size of the noise & movement quotas.

427. The only reason to change or review the policy approach is when major developments occur e.g. when there is relevant new research. Clearly, the final decision from the European Court of Human Rights may have consequences for the scheme or the Government's processes and this would have to be considered at the time.

428. The consultation states that ‘None of the options we have appraised need lead to more night flights, and we have assumed no increase in night flights at any location other than at possible new airports at Cliffe and Alconbury.’ (page 147, para. 16.45).

429. We agree with this general assessment, and we will not seek an increase in the number of night quota period flights at Heathrow (see question 14).

430. The new regional runway at Heathrow would not require any movements before 6am.

431. It also seems likely that Gatwick’s current night quota flights would not need to increase if one new runway were eventually built there. However, it seems unlikely if 2 new runways were built there, and traffic quadrupled. BA does not support that option.

432. In the case of Stansted it seems less likely that night quota flights could be limited to current levels if there were to be a five fold increase in passenger throughput and rapid growth of all-freighter operations. (SERAS Consultation page 118, Freight Night Time Access).
Q20 Are there specific surface access improvements that should be made a condition of any airport option and any that should not be included?

Summary

- A full range of essential surface access facilities must be provided for any multi-runway airport.
- Government has a key role to play in setting clear policy objectives on the need for new surface transport links, and directing bodies such as the SRA to prioritise these projects accordingly.
- Heathrow will need through running rail services, doubling its mainline rail capacity, with a third runway.
- AirTrack (the Terminal 5-Staines link) should be the top priority for Heathrow.
- To reach a 40% public transport share, the large Stansted, Gatwick and Cliffe options would need 3 to 5 times more new public transport capacity than the Heathrow 3 runway option, which seems implausible.

433. Chapter 17 of the consultation paper concludes that “Further work will be required to identify in more detail the level of surface transport investment required to deliver any airport development proposals put forward in the White Paper and the allocation of costs between the airports and the transport network providers.” We agree. Nevertheless, there are a number of principles which should be applied to surface access improvements generally and against which any development option should be judged.

Essential Facilities

434. Developing a multi-runway airport at any site would require a full range of surface access facilities, including:

- Frequent, high speed city centre rail link (maximum journey time 30 mins, ideally non-stop).
- Good access to local/national rail network.
- Good local public transport access and network - particularly important for staff.
- A full range of reliable public and private transport access routes and modes.
- Convenient, fast landside and airside inter-terminal connectivity arrangements.

Criteria for conditions

435. There will be a case for attaching planning conditions to some runway development options to ensure that essential surface access improvements are delivered. However, costs should not be imposed on airlines operating at other airports, nor should the aviation industry be required to pay a disproportionate share of the costs of public transport improvements.

436. The Government must recognise that delivery of these improvements is often not under the control of the airport and it may therefore be more appropriate to direct the Strategic Rail Authority to afford a high priority to important projects.

437. Any conditions that require a service or facility to be operational by the time the airport is expanded, as well as being consistent with ICAO principles (see questions 14 & 15) should:

- meet the needs of the airport it seeks to serve in a cost-effective manner;
- address the relevant access objectives;
- be capable of attracting adequate funding;
- deliver the benefits in the required timescales.
Conditions are not always needed

438. Conventional conditions are not the only means of achieving the necessary surface access improvements. It is open to Government to give clear guidance in the White Paper to indicate the Government’s priorities and requirements, and issue direction to the SRA. The encouragement given in the 1985 Airports Policy White Paper for the creation of improved access to Heathrow resulted in the creation of Heathrow Express, so this approach has been successful in the past.

439. Outcomes could be specified rather than particular schemes or facilities. For example, public transport facilities capable of delivering a specified journey time to a city centre, or a requirement to achieve a defined public transport mode share for employee and/or air passenger journeys. Any such requirements would need to be realistic and achievable, given the likely costs and funding. This type of approach could give assurance about the outcome, while leaving airport operators and developers more flexibility to determine appropriate solutions.

440. Consideration might be given to specifying outcomes, rather than particular schemes or facilities. For example, public transport facilities capable of delivering a specified journey time to a city centre or other key destination might be stated; or a requirement to achieve a defined public transport mode share for employee and/or air passenger journeys; or the provision of a defined level of airport access capacity by a public transport mode. Any such requirements would need to be realistic and achievable, given the likely costs and funding realities.

441. This type of approach could give assurance about the outcome, while leaving airport operators and developers more flexibility to determine appropriate solutions, taking full account of changes in external circumstances.

Surface access requirements - general comparison

442. The nature of appropriate surface access arrangements will vary substantially at different airports. The prime consideration is the airport’s location relative to the markets it seeks to serve. The nearer an airport is to its prime markets, the more likely it is that access requirements can be served by public transport.

443. Almost 70% of Heathrow passengers originating or terminating their air journey at the airport (i.e. not transferring to/from another flight) have an ultimate journey origin or destination in the City of London, a London borough west of The City, or within the South-East Region to the south and west of Heathrow (the counties of Bucks, Berks, Oxon, Surrey, Hants, W Sussex).

444. We explain in Q2 that a "dual hub" strategy for London airports is not viable. If the necessary capacity development does not take place at Heathrow, therefore, this must result in forced transfer - by direction or by rationing - of flights and passengers, which would naturally be attracted to Heathrow, from there to one of the alternate sites - two of which are some distance east of London.

445. Given the location of Heathrow’s prime market west of London, it is evident that the eastern sites are poorly located to serve the main market concentrations. If passengers are expected to use these airports, it will be essential to provide attractive surface access to the west of London.

446. Even if substantial public transport capacity was provided, significant additional demand would be placed on the road network generally and on the M25 in particular, on a scale likely to exceed any capacity expansion envisaged (such as the limited development proposed by the Orbit study - which takes no account of any new airport needs).

Problems and costs with big Stansted, Gatwick and Cliffe options

447. We do not agree that the proposals made for surface access developments for the new ‘big
airport’ options (Stansted plus 2 or 3 runways, Gatwick plus 2 runways or Cliffe, have been properly costed, or would provide for the needs of the market or deliver the substantial public transport mode shares which are predicted.

448. In particular, new public transport access for Cliffe and Stansted, given their distance from London and other significant urban centres, would primarily need to be rail based. We do not consider that the proposals in the consultation paper would be capable of delivering passenger volumes on the scale required for Cliffe or the larger Stansted options at the costs stated in the consultation paper.

449. For a 40% public transport mode share, Heathrow would need to provide for no more than 8 million more passengers a year on public transport than would otherwise be the case (in the maximum use base case). This, and probably more, would be feasible with AirTrack, and other public transport improvements.

450. Gatwick and Stansted would need to provide for 24 million more passengers a year, and Cliffe 38 million (from a zero base). For comparison, the Heathrow Express and London Underground together currently carry some 10 million passengers per year, in roughly equal proportions. This is expected to grow to over 15 million by the time T5 is in operation (some 7 or 8 million each on Heathrow Express and London Underground. Investment will be needed in the capacity of the new rail links to Stansted or Cliffe so that they could provide between 3 and 5 times the capacity of the Heathrow Express (with T5).

451. Appendix VI demonstrates the scale of the challenge of providing adequate public transport links to the new big airport options, much of which would be likely to require provision at public expense, compared with the much lesser incremental growth needed at Heathrow.

452. Appendix VI also considers the potential benefits of integration with the existing and proposed public transport network in the area. The consultation paper recognises that “Airports are key transport interchanges”. This is an important issue both for the development of surface access to airports in general, and as a basis for comparison between consultation options. In essence, building on Heathrow’s existing successes presents far greater prospects of creating and exploiting a successful network, than would be the case at other sites.

Managing Road Demand

453. Our views on managing road demand and congestion are set out in some detail in appendix VI.

Surface access development proposals and conditions for each of the main sites

Heathrow

454. We consider that the potential passenger capacity of a three runway Heathrow will build up to 125 mppa, including some 33% connecting passengers. In the base case BA expects 89 mppa, including some 20% connecting passengers.

455. We would expect the proportion of passengers arriving by public transport to increase from 37% in the base case, and a 5% mode share increase should be attainable with a 3 runway Heathrow. The increase in passengers to be accommodated on public transport would therefore be some 8-9 million (as outlined above). The increase in the number of road based passengers would be smaller – perhaps about 4 million (less than a 10% increase over the base case).

456. British Airways has commissioned work which indicated that, a mix of strategic rail measures, traffic and other local management measures could result in no significant increase in demand for car access journeys above the higher end of the range that was considered when approval was given for Terminal 5.

Heathrow rail schemes
457. A through running rail route at Heathrow, utilising the west-facing rail links safeguarded for as part of the Terminal 5 approval would maximise - effectively double - the capacity of the Heathrow rail infrastructure.

458. We would expect the Government to require that through running rail services at Heathrow should be operating by the time a third runway opens.

AirTrack

459. The AirTrack project, creating a link from the South West Trains network at Staines to the Heathrow rail infrastructure at Terminal 5, is the most readily achievable and most beneficial of the potential new Heathrow through running rail access schemes, since it is practicable and has potential to gain adequate funding. In our view, it should be built as soon as possible to provide improved public transport access from the significant catchments south and west of the airport and key parts of south and south-west London.

460. We therefore welcome the Government’s statement that it is their “intention for the aviation white paper to contain proposals for improved access to Heathrow whether or not a further runway is provided”\(^\text{13}\). We would urge the Government to provide explicit policy support for development of AirTrack at the earliest opportunity.

Crossrail

461. Crossrail services to Heathrow are a desirable potential addition to existing and prospective Heathrow rail services which, by 2011, we would expect to include AirTrack together with Heathrow Express and its anticipated new stopping services to Hayes and beyond. We would therefore like to see Heathrow included on the Crossrail core route.

462. However, we are concerned that the original Crossrail vision of a regional service, adding significant additional capacity is being diluted into a new Tube-type line, replacing existing services. We cannot support any reduction in Heathrow Express services and Crossrail services to Heathrow would have to be additional to Heathrow Express if they are to add to, not reduce, the use of rail services to Heathrow.

463. We note that Crossrail is heavily dependent on outside influences entirely beyond the control of the aviation industry, including the (increasingly long term) prospects for capacity enhancements on the GWR mainline; the London Mayor; and Government funding and priorities. Recent reports also suggest that its completion may be significantly delayed.

464. A new Heathrow runway cannot therefore be conditioned on Crossrail. However, Heathrow, with a third runway, represents a significant revenue opportunity for Crossrail. Provided Crossrail did not reduce the Heathrow Express service, there could be a case for limited funding by aviation towards the extra costs of providing dedicated aviation infrastructure, for example station facilities at the airport or safeguarding for future integration with the Heathrow rail network. These costs would have to be proportionate to the direct benefits accruing to employees and air passengers using Crossrail.

Alternative Heathrow to GWR links

465. The consultation paper outlines options including a direct western link from Terminal 5 to the GWR mainline and a surface station positioned to the west of Terminal 5.

466. Either of these developments are desirable and should be protected as strategic options, but current indications are that they are not essential for the successful operation of a three runway Heathrow. Our views on these proposals are set out in more detail in Appendix VI.

High speed long distance rail v local services

467. We note the longer term prospect for a new North-South high speed line, which could open

\(^{13}\) Statement to Parliament 21 October 2002
“in 2015 or later”. We would welcome further analysis of possible benefits but consider this timescale optimistic and believe it unlikely that a substantial contribution to surface access for any runway developments would be available until late in the thirty year consultation period. We also do not believe significant scope for mode shift, or substitution of air services, would result.

468. We would therefore not regard the creation of such a line as a high priority for aviation

469. We believe there is a much stronger case for developing efficient links to local catchment areas. Around ¾ million Heathrow air passengers each year start or finish their journey in the London Borough of Richmond upon Thames. This is more than 1½ times the number that start or end their journey in the whole of the West Midlands.

470. Around 7% of Heathrow employees live in the adjacent towns of Ashford, Staines and Feltham. These places, along with Richmond, would all be served by AirTrack, improving access and reducing car dependence at a much lower cost than developing new long distance rail links.

Heathrow road schemes

471. We have not conducted or commissioned dedicated work on the Heathrow road system with three runways in operation. However, as indicated above, we have commissioned work to consider how the increase in passenger and staff traffic at Heathrow can be managed without a significant increase in car journeys over and above that considered when approval was given for Terminal 5. The road schemes under consideration are therefore those required to deal with local traffic distribution and access issues with new local foci of activity rather than a general rise in airport related road traffic.

472. The consultation anticipates dualling of the A4 west of Heathrow to M4 junction 5. British Airways would wish to understand the specific objectives and consequences of this as it is not evident that it will add significantly to overall surface access capacity around Heathrow. The provision of such a link should be retained by a decision in principle to build a third runway at Heathrow. However, we suggest that the specific case for it would need to be made in detailed plans for it to be built.

473. Work on the A4 Bath Rd adjacent to the northern boundary of Heathrow - to create a tunnel or underpass beneath the taxiway essential for the movement of aircraft between the regional runway and the rest of the airport, must be provided to make operation of the regional runway feasible. It will also be necessary to reroute the M4 spur and realign its junction to accommodate the regional runway. Options for maintaining satisfactory north/south and other local links following severance of roads around the runway site should be identified. Government should recognise these needs in any decision to proceed with a third runway and include them in the highway programme for the development.

474. The consultation anticipates the construction of a long road tunnel to link with the M3/A316. This is clearly predicated on the proposition that the regional runway is served by terminal capacity located between the two main runways or to the south around Terminal 4. As indicated elsewhere in this response, it is British Airways’ view that this proposition is flawed. In the absence of this driver, British is unconvinced of the need for such a tunnel.

475. As part of the improved public transport access package for a third runway, options should be considered for creating access, compatible with security requirements, to enable landside movements, even if only for public transport, between the southside and Central Terminal Area.

Local buses and intermediate modes.

476. As part of the package for improving surface access management, consideration will need to be given to public transport services which it might be appropriate to require or encourage. British Airways believes that this might be a good example of where required outcomes, rather than specific schemes, might be indicated by Government.
477. British Airways would suggest that the Heathrow Area Transport Forum, formed "to identify, promote and develop improvements to surface access to and around the airport" might be mandated, following a White Paper proposal, to review plans, options and initiatives and produce a co-ordinated response on preferred choices for local and longer distance bus and coach services and perhaps new intermediate mode proposals.

478. As with rail services, British Airways considers the best prospects of creating mode shift centre on providing real - and convenient - alternatives to the car for shorter journeys from staff residential and passenger catchment areas closer to the airport, rather than potentially resource-hungry longer journeys where possible users are more dispersed and the prospects of producing competitive and convenient services are lower.

Gatwick

479. British Airways broadly concurs with the view expressed in the consultation document that, for a single new runway at Gatwick, required surface access improvements might be comparatively limited and notes in particular that the consultation states that "One new runway would require no further enhancement of capacity on the strategic road network to provide for airport-related traffic beyond what would in any case be required to cater for 'background' demand by 2030".

480. We welcome the fact that enhancements are planned to the airport station and services. Rail services to Gatwick account for 22% of terminating passenger mode share, 5.5 mppa. As part of an approval for additional runway capacity, consideration might be given to requiring that rail passenger mode share remains the same or increases to a specified level. However, recognising that for the higher capacity options substantial track works, including tunnelling, might become necessary, any condition should not place unreasonable funding requirements on the airport or aviation industry.

481. We also recognise the importance of ensuring that road diversions, enhancements and junction improvements are available when a new runway opens and we therefore accept in principle that some such conditions could be included as part of any new runway proposal.

482. We are doubtful that the rail enhancements described for the three runway case would, in practice, prove adequate to facilitate an expansion in rail usage from 12.2 mppa in the maximum use scenario to 30.5 mppa. We note that the newly-published BAA/SRA joint statement on rail access states that they have not so far identified a rail strategy to support the demand in this case.

Stansted and Cliffe

483. For any option at these airports, with the possible exception of a single additional runway at Stansted, we consider the surface access proposals in the consultation documents are inadequate.

484. Heathrow, as a result of its proximity to London and its western environs, the M25, M3, M4 and M40, is very well served by a wide range of public transport options:

- it is a key hub for long distance coach services;
- it can exploit a significant local bus network;
- it is served by London underground and by the Heathrow express rail service.

485. In marked contrast, eastern sites, given their location, will need more extensive rail-based public transport access.

486. Assumptions made about rail access to these sites fail to meet a number of the key requirements outlined at the beginning of this section, especially for there to be a high speed, high frequency, city centre link. We also see three major flaws in the proposals (as explained in more detail in Appendix VI):

- Sufficient account may not have been taken of the ability of the proposed rail services to Stansted and Cliffe to offer direct links to the prime market concentrations in and beyond West London.
488. Even where rail links are proposed which might serve the market, these appear to rely on an assumption that other services can be displaced to provide capacity for airport access.

489. Rail plans do not appear to have the raw capacity to accommodate passengers on the scale required.

490. If the proposals are inadequate, the public transport mode shares as estimated in the consultation paper will not be achieved and public policy objectives on reducing car dependence could not be met.

491. At Heathrow, because of its role as a multi-modal hub, the integration of airport public transport links with other services and users, and the benefits that would flow to other users from further development, especially of rail services to Heathrow, the potential exists for spreading the costs of public transport enhancements there across a wider user base than aviation alone, and there may be a strong case for part funding by the public purse.

492. At the eastern sites, developments would be more likely to be dependent on aviation for their justification and, in principle therefore, for their funding. However, the absence of an existing integrated transport network and broad user base - and in the case of Cliffe, the absence of any existing user base to fund surface access investment - implies that such investment would be required to be found either by the developer or from public funds.

493. Investment on the scale which British Airways believes might be necessary, particularly in new rail links, is unlikely to be commercially justifiable for a developer, and the recent decision by the CAA to require that the capital investment programmes of BAA London airports should be separate, means it would not be possible (nor acceptable to the airline industry generally), to seek to finance development of one airport through charges raised at another.

494. This implies substantial public investment as the only way of achieving the additional investment required. We consider it unlikely that this would materialise on the scale and at the pace required, particularly where rapid build up of services and passenger numbers is assumed.

Eastern sites - road access proposals

495. The adequacy of road access proposals depend on several key assumptions such as overall passenger volumes, the proportion of passengers requiring surface access and staff numbers. There are some apparent inconsistencies between options and we are not persuaded that the proposals are, in all cases, realistic.

496. British Airways therefore doubts that the road network improvements postulated for options other than, perhaps, a single additional runway at Stansted, would prove adequate in practice.

Luton, Alconbury

497. As indicated in the answers to Q9 and Q10, British Airways neither supports nor opposes the development of Alconbury, and would anticipate growth of Luton to of the order of 25 mppa. We do not comment on surface access issues at these sites.

Q21 How should any surface access schemes that are required for a particular airport development option be funded?

Summary

- Aviation should contribute towards the cost of necessary and financially viable airport surface access improvements.
Financial contributions must be limited to the benefits gained by aviation users, with no cross-subsidy between airports.

Substantial public funding will also be required to reflect benefits to the economy and the wider community, consistent with other transport investment.

Agreeing the appropriate splits of benefits, and funding, is a key issue. The Government must bear in mind that access to Continental hubs are generally considered to be a State responsibility and to be funded as such.

Principles

498. We recognise the broad principle set out in the Integrated Transport White Paper and noted in the consultation document (17.4 et seq) that “aviation should contribute funding for surface access improvements, taking account of the extent to which it benefits”.

499. The two primary sources of funding for airport surface access developments are:

- Passengers, directly through fares or indirectly via airport revenues;
- Government, reflecting benefits to the wider community (facilitating sustainable development; reducing car dependence; and providing valuable services to non-aviation users).

500. Other stakeholders seeking particular outcomes might also contribute to transport infrastructure investment, including Local Authorities who wish to provide or adapt schemes to meet their own separate objectives; and those who stand to benefit from airport development. There are significant new business and land development opportunities and those who exploit them could contribute to transport improvements.

501. We do not, however, support cross-subsidy between airports for public transport improvements. Each airport and its users should contribute only towards projects that provide access to that particular airport. Nor should there be any requirement to subsidise schemes that are properly the responsibility of Government.

502. Whatever the ultimate mix of funding contributions for a particular project, it will be incumbent on the airport developer to lead the sourcing of funding for the development of surface access facilities.

503. As well as providing public funds where justified, the Government plays a central role as an enabler and authoriser of appropriate development. Policy support and statements are vital components of success. The Government can also direct the SRA to devote financial and other resources to the development of a priority project.

Practicalities

504. The practical application of these principles raises a number of specific issues:

- The appropriate split between public, aviation and other sources of funding. The consultation paper states a broad aim to divide costs between aviation and other sources (such as the SRA) in proportion to the benefits each will derive. We accept this as a broad principle, subject to the caveats mentioned at the beginning of this question. However, agreeing the derivation and proper allocation of benefits and costs, may be highly debatable in individual cases.

- The proper weight to be given to matters which are less easy to assess financially, such as the achievement of public policy. For example, an airport rail scheme may reduce car dependence and promote general economic welfare in the local area and further afield. These benefits justify greater public funding than implied by strict assessment of traditional criteria.
Developing improved public transport access at existing airports is more likely to create benefits for non airport users and for the broader economy, by building on existing transport hubs, with a wide range of connections. Developing new sites would provide smaller non-aviation benefits and would rely more on aviation, but with a smaller (or in the case of Cliffe, non-existent) user base to support this. It is difficult to see how this would be viable.

In the absence of broad benefits to non-aviation users, an attempt might be made to spread the massive (and in our view uneconomic) costs of developing public transport links to a new airport at Cliffe to be spread across all London airports. This would not be acceptable. If such development were to take place in absence of benefit to aviation users, development costs would have to be borne by the Government as a national infrastructure project. A similar argument would apply to Stansted.

In contrast, Heathrow, with its existing critical mass of users has an established role as a public transport node. Schemes, with the best commercial potential, such as Airtrack, could perhaps be funded by new forms of partnership, learning from experience gained from use of PPP and perhaps forming "Special Purpose Vehicles" as previously envisaged in Railtrack strategy statements.

Because of its location in West London, a new Heathrow runway would impose particular demands on the transport system in the area. We agree with West London Business that there is, consequently, a particular case for Government to consider additional funding for local infrastructure investment, balancing the additional impacts imposed on the area with the benefits to the national economy from the strengthening of the UK’s premier international transport hub.

In the case of Crossrail line 1, costs could be extremely high if major capacity enhancements on the Great Western mainline (such as six tracking) were ultimately to be included. It would be unreasonable to expect aviation to bear a share of these costs since an overwhelming proportion of benefits would accrue to the national rail network generally.

A further opportunity worth exploring might be a link with the Heathrow City Partnership regeneration initiative. For example, new opportunities for development and regeneration in the GWR mainline corridor could arise if Heathrow expanded. A means of securing investment from those who benefited might be considered.

505. In a broader context, it is most unlikely that benefits accruing to aviation from some of the more ambitious schemes, eg new North-South high speed rail links, would justify substantial funding from aviation.
Planning Reforms

506. From our experience as a participant in the Terminal 5 inquiry, BA has strongly supported the need for a radical overhaul of the planning system. This should allow modernisation of the country’s transport infrastructure, while preserving the ability to examine the pros and cons of any particular development.

507. Some reforms introduced or announced recently should help to speed up the process. The new “Major Infrastructure Project Inquiries Procedure” is particularly helpful in defining national infrastructure, allowing timetabling, shortening the reading of evidence, permitting the use of technical experts and mediation and curtailing wasteful cross-examination. Another welcome reform is the decision to make clear statements of Government policy, accompanied by guidance material.

508. The outcome of the White Paper, SERAS and other consultation processes are very important. The White Paper must include unambiguous policy statements which endorses specific sites for development and sequence them. Clear principles for dealing with environmental issues must also be set out and appropriate reassurances given about local impacts. This should help to narrow down the scope for uncertainty as much as possible if we are to avoid Government aviation policy being reviewed by a planning inspector in a few years time, which is what happened in the case of Terminal 5.

509. The Government has decided not to pursue reforms to Parliamentary procedure as part of the planning reform package. We remain keen to see other aspects of legislative reform introduced as soon as possible. The aim should be to speed up the processing of major projects such as airports, new rail links and essential major road improvements, while allowing key issues to be addressed properly. The scope for procedural delays should be eliminated.

510. Several proposals mentioned in “Sustainable Communities - Delivering through Planning” (18 July) could be important for airport inquiries:

- power for the SoS to prescribe a timetable for called-in decisions;
- public inquiry improvements, for example the concurrent consideration of issues;
- reform of the compulsory purchase and compensation system;
- prescribing deadlines for statutory consultees;
- creating a more coherent structure of national, regional and local policy.

511. One aspect of reform that has so far been given little prominence in the national debate is the need for better coordination and deliverability of composite national projects, such as airports.

512. An airport developer must coordinate a large number of applications dealing with rail/road access and other site-specific matters. Terminal 5 involved 37 separate planning applications, sponsored by the Highways Agency, Railtrack, Thames Water and others, as well as BAA. The pre-inquiry preparation work took the best part of 8 years, from 1985 to 1993. This was the longest part of the process, the inquiry itself taking 5 years and Government activity 3 years. The Government’s new airport policy will be implemented only if many public and private agencies act in concert with the airport developer. Access arrangements, for example, may hinge on the outcome of separate major multi-modal transport studies. The Government should help with this coordination.

513. Policy uncertainty at local, regional, or national level was another major cause of delay at T5. The absence of a local plan (4 years after the introduction of the relevant legislation) and the uncertain status of national airport policy persuaded the inspector to review both at the inquiry.
514. Local and regional plans are now in place and the national airport policy should be published within the year. It is important that planning inspectors are directed to treat existing policy at all levels as current and that national policy takes precedence in the case of conflict. This would ensure that policy would remain the responsibility of elected representatives and they would have a stronger incentive to keep it up to date.

515. The Government’s credibility on infrastructure issues would be compromised if the planning reform process proceeds too slowly or fails to address key difficulties that led to the unacceptable Terminal 5 delays. Further action to create policy certainty is needed. Government could also play a valuable role in helping to coordinate the applications that make up a national infrastructure project.

516. Concrete next steps should include:
- Writing to local authorities and regions with airports to explain that national airport policy must be incorporated into their plans and that planning inspectors will be directed to treat local/regional plans as current except where they conflict with national policy;
- Draft the terms of reference for national infrastructure projects planning inquiries, excluding review of the adequacy/currency of national or regional policy, prescribing a fixed timetable and requiring a clear emphasis on written submissions;
- Continuing to update guidance on best practice for keeping public inquiries short but fair eg covering use of cross-examination; consideration of issues in parallel; use of data groups etc;
- Setting up a coordination group to review dependencies of related planning applications (eg surface access links) and agreeing a process for going ahead on the basis of scenarios rather than definite outcomes.

517. If the entire process, including the public inquiry stage, is improved, it should be possible to achieve the following timetable without any loss of independent scrutiny or due process, if it is properly planned and managed:
- 2 years for preparation of detailed planning applications by the developer, updating of regional and local policies to reflect the new national policy, preparation for the public inquiry by the Government, convening of data groups to establish an agreed basis of fact and coordination of related planning applications by the Government and developer;
- 1 year for the inquiry, including the publishing of the report;
- 6 months for the process of coming to decisions;
- 3 years for construction
- 18 months contingency.
APPENDIX I

PROJECTED GROWTH IN AIR TRAFFIC
AND RUNWAY CAPACITY POTENTIAL

Introduction

Government policy should aim to realise the potential growth in net economic benefits offered by air transport where possible. This requires capacity to be provided in London and the South East to allow the supply of air travel to rise. Although this Appendix deals with passenger numbers, it must be recognised that the scale of benefits varies considerably between different types of passengers. This is explored more fully in Question 6. Examining the underlying traffic projections is needed if the sustainable, profitable element of demand is to be identified and allowed to grow.

As explained in Question 2, much of the potential longhaul demand depends on there being an attractive, efficient hub available, so the location of the new capacity will affect actual growth rates.

It is also necessary to examine the potential contribution that different runway options could make. Different runways have different capacities depending how the airport is used. Thus all runways are not the same and it is important to understand the key factors that affect the ability of particular runway to accommodate passenger demand.

It is important to note that Government estimates of growth make an allowance for the external costs of aviation to focus on sustainable growth. None of the packages therefore represent ‘predict and provide’. Some potential demand growth in the government’s central case projections would be “lost” under all options. Furthermore, it will be impossible to match up demand and capacity exactly, so the practical capacity is likely to be less than the theoretical capacity. As a result, even the most ambitious of the packages - a four runway airport at Cliffe – is not expected to accommodate all passengers who would wish to travel in 2030.

The government’s air traffic forecasts

We broadly share the government’s analysis of the factors determining the number of people wishing to fly to, from and within the UK. We disagree about the efficacy of seeding policies as explained in Questions 2 and 6. The demand for air travel originates from four main sources:

- **A growing economy.** As economic activity expands and living standards rise, demand for business and leisure travel continues to expand. Trade is also a driver of business travel, tending to increase faster than the economy as a whole. Even if aviation only maintains its current share of UK GDP, spending on air travel is likely to rise by 2-2.5% pa in real terms in line with the growth of the UK economy.

- **The falling cost of air travel.** Liberalisation of air travel markets, increasing competition and rapid productivity growth have driven down the real cost of air travel significantly over the last three decades. We agree with the Government’s assumption that the real price of air travel will fall by an average 1% per annum over the next three decades. This is about half the rate seen over the past three decades, reflecting the reduced scope for cost savings from technological advances, efficiency improvements, and falling energy prices in future. However, prices could continue to fall at a faster rate, as stated in the consultation paper. For example, it remains to be seen whether there is greater scope for future cost cutting, and hence fare discounting, than assumed. This would stimulate faster traffic growth than assumed by the study.

- **Globalisation of business activity.** As barriers to trade and investment come down and information technology facilitates long distance connections, business travel is stimulated. Research by Oxford Economic Forecasting shows that the most dynamic sectors in the global economy are intensive users of air travel.

- **Network expansion by airlines.** As airline networks expand, the number of available non-stop or
one-stop journeys increases, making long distance travel viable for more journeys.

These trends suggest that air traffic will continue to grow more rapidly than UK GDP. However, the very strong growth of the past (5-6% per annum) is unlikely, given market maturity.

For a number of years, British Airways has argued that aircraft manufacturers' forecasts, projecting air traffic growth continuing at nearly 5% a year, are too high, and that the underlying sustainable growth of air travel in a mature market such as the UK should be in the 3-4% a year range.

Air travel is currently experiencing a severe downturn resulting from recessions in the world's three largest economies, added to the continuing impact of the terrorist attacks of September 11, the Iraq war, heightened fears of geo-political instability and most recently, the emergence of SARS.

Although the current downturn is unprecedented in its severity, air transport has always been subject to cyclical forces. As before, the industry is likely to return to a normal rate of growth, with some catching up of growth lost since 2001.

Our analysis of market trends suggests that the government's current forecasts for air travel, as set out in the consultation paper, are reasonable, recognising the uncertainty which attaches to any forecasts over such a long period.

According to these forecasts, the number of passengers travelling to/from UK is projected to increase by 3.5% per annum over the period 2000-2030 - in the midpoint of our forecast range. Demand in the South-East of England is projected to grow more slowly - by 3.2% per annum - as this market is already more mature. As markets reach maturity, underlying growth will slow further. The government's projections assume that air travel growth will slow to 2% per annum between 2025 and 2030, significantly slower than past trends.

Longhaul travel is forecast to grow more rapidly than shorthaul travel as further-flung destinations come within the reach of leisure travellers and globalisation boosts intercontinental business travel. In addition, economic growth in Asia is likely to lead to rapid growth in longhaul travel to that region, while relatively undeveloped markets in Africa and parts of Asia and Latin America have substantial growth potential over time.

Economic benefits generated by hub airports depend critically on the number of destinations and frequencies that can be provided. To ensure that a good network and schedule of longhaul services are available to travellers, transfer passengers are drawn in to build up services that cannot be justified only by traffic originating in, or destined for, London. As local demand builds up on thinner longhaul routes, and in times of strong demand generally, the importance of transfer passengers declines.

The government assumes that transfer passengers will grow in line with total demand. This is reasonable, but it would depend on the adequacy and capacity of the hub airport, as explained in Question 6.

Forecasts of air transport movements from passenger projections

In order to understand the amount of runway capacity needed to support a given level of passengers, traffic forecasts need to be translated into projections of air transport movements (ATMs).

Aircraft size and passenger load factors are the main factors determining how many ATMs will be required. As airport capacity becomes scarce, average aircraft size rises. This has been happening at Heathrow, where both longhaul and shorthaul aircraft are somewhat larger than at hubs on the continent. Between 1990 and 1999, the average size of shorthaul aircraft at Heathrow grew by an average of nearly 1.5% per annum. The average size of longhaul aircraft was broadly unchanged, reflecting the limits of this trend in the absence of major new developments in the longhaul aircraft market and the fact that airlines have been able to redeploy shorthaul slots for longhaul services.

There are currently some 115 mppa using the main SE England airports, and almost 1 million flights a year. The average load is therefore around 120 passengers per air transport movement (atm). At Heathrow it is over 130 passengers/atm; at Gatwick it is over 120, and at Stansted and Luton it is closer to 100 passengers/atm.
Heathrow and Gatwick are the most intensively used runways in the world. They also have the highest average loads of any major airport in Europe or the US (which typically have 80-100 passengers/atm).

An aggressive assumption, given the large average aircraft size already operating in the region’s airports, is that average aircraft size of longhaul and shorthaul together grows by 1% per annum. A key driver for longhaul will be the introduction of the large Airbus A380 aircraft towards the end of the decade.

If this aircraft size assumption is applied to future runway developments, projected demand for movements growth at SE airports would rise to nearly 2milion/year by 2030, double the current level.

Table 10 shows the capacity of major SE airports. At Heathrow & Gatwick virtually all capacity is used except in extreme off-peak periods. Stansted is full in peak hours.

If capacity is not increased until existing capacity is completely full, all runways would become as congested as Heathrow today, with rising delays and low aircraft utilisation. There would be pressure for aircraft size to rise towards 150 passengers/atm across SE England. However, is is far from clear that this would be competitively viable. What is certain is that net benefits would be reduced and the economic evaluation should reflect this.

A policy objective should, in our view, be to reduce delays and congestion at Heathrow and Gatwick to internationally competitive levels (5 minutes average, 10 minutes peak, compared with the current 10 minutes average, 25 minutes peak). Cramming all runways full before embarking on new development would not achieve this.

A well located and well managed runway could accommodate up to 250,000 flights per year but with very great congestion and delay.

This suggests that there is likely to be demand for three new runways in the South East. It does not necessarily mean that a strong enough business case could be made for all three within the 30 year period. Nor does it mean that this demand will inevitably materialise.

Depending on the layout of runways, the interaction with other runways at the same airport, and the mix of aircraft used, the capacity of new runways could vary significantly. This is particularly true when it comes to providing capacity for inter-continental air services, which need to be located at a competitive hub airport. We have therefore looked at the hub potential of various runway locations before reviewing options for providing growth of non-hub services.

### Hub Potential

Airports with four runways do not necessarily provide better hub potential than airports with three runways. In fact, both 4 runway options considered by the Government would be inferior in this respect to the 3 runway option at Heathrow.

In the following analysis we start with runways and look at their potential to accommodate passengers (as opposed to starting with passengers and working out the need for new runways as we have done above).

There are three elements to our analysis:

a) estimating the new runway capacity,

b) considering the suitability of any new capacity for ‘hub’ services

c) drawing implications for potential passenger throughputs

### a) New runway capacity
Chapter 14 of the consultation paper concentrates primarily on MPPA in assessing the added capacity of various runway options. While passenger throughputs are important, they are highly dependent on assumptions about the way the airport will operate in practice. A key determinant of passenger capacity will be the range and size of aircraft used. Another key determinant is the likely spread of demand through the day and through the year and how this changes as the airport fills up.

It is not clear what assumptions have been used by the Government at different airports about aircraft mix and demand spread, making it difficult to comment on the capacity potential of different options. Assumptions also appear to have been made about continued improvements in technology which would increase throughput (based on BAA’s “optioneering” work).

We believe it would be helpful to identify two modelling scenarios: a conservative approach, based on current capacities, and an optimistic approach, based on BAA’s work.

When comparing options, either the conservative or optimistic scenario should be used throughout. Changing the scenario would affect total passenger capacities, but it should not affect comparisons between airports.

The optimistic scenario may depend partly on technological change and partly on achieving a broadly similar mix of medium sized aircraft (an efficient mix for maximising runway capacity). Achieving the optimum aircraft mix would be inconsistent with the Government’s assumption that all airports with three or more runways would offer a wide range of services, since this implies a wide range of aircraft sizes. At an airport such as Stansted, if the current aircraft mix has been assumed in order to achieve the optimistic movement capacity, the airport would not be carrying the longhaul traffic predicted, passengers numbers would be far lower and critically the airport would not be acting as a hub.

The viability of the optimistic assumptions are therefore unclear. We have based our own analyses on the conservative assumptions.

The potential of each new runway should first be stated in terms of the number of new movements that could be accommodated. The best measure of this is peak hour movement capacity. This will make it easier to compare the potential runway capacity of different options.

### Table 11: Hourly movement capacities of runway combinations

<table>
<thead>
<tr>
<th>Capacities of runway combinations (Movements/hour)</th>
<th>Conservative (current capacities)</th>
<th>Optimistic (BAA’s view of potential)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single runway segregated mode</td>
<td>42</td>
<td>47</td>
</tr>
<tr>
<td>Single runway mixed mode</td>
<td>48</td>
<td>54</td>
</tr>
<tr>
<td>Close parallel: dependent, segregated (Mixed mode + 20)</td>
<td>68</td>
<td>74</td>
</tr>
<tr>
<td>2 Parallel: independent, segregated14</td>
<td>42 x 2 = 84</td>
<td>47 x 2 = 94</td>
</tr>
<tr>
<td>3 Runways: 2 segregated, 1 mixed mode</td>
<td>84+48=132</td>
<td>94+54=148</td>
</tr>
<tr>
<td>4 runways: 2 sets of close parallel</td>
<td>68 x 2 = 136</td>
<td>74 x 2 = 148</td>
</tr>
<tr>
<td>3 Runways: all independent, mixed mode</td>
<td>48 x 3 = 144</td>
<td>54 x 3 = 162</td>
</tr>
</tbody>
</table>

If all three Heathrow runways operated in mixed mode, this would give the airport a capacity advantage.

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14 Notes on methodology:
- Mixed mode is assumed to add 15% to segregated mode capacity. We expect capacities under either mode to increase proportionately as systems improve;
- Actual achieved runway capacities vary with aircraft mix. A large proportion of large aircraft or a wide range of aircraft sizes reduce total movement capacity.

15 The Gatwick option, involving a wider spaced runway to the South would provide less capacity, around 78-88 mvs/hour, because runway crossings would interfere with movements on the northern runway.

16 We assume at Heathrow that stands and a satellite or terminal are available north of the A4.
The capacity of the 3 runway Gatwick option, the middle runway operating in mixed mode and the outer runways operating in segregated mode would be similar to Heathrow with 3 independent runways.

By the time Stansted, Cliffe or Gatwick could possibly be built into three/four runway airports, European competitor hubs would have syphoned significant numbers of passengers away from the UK. The need to attract this lost traffic back would substantially increase development risks associated with these options, reducing the overall business case.

b) Availability of capacity for ‘hub’ services

The role of European hubs is to enable a wide range of longhaul services to be provided at acceptable frequency. This is achieved by drawing in passengers, typically connecting from shorthaul or domestic routes (transfer passengers), to augment demand from passengers flying from or to the immediate area (“point-to-point” passengers). Facilitating efficient “feed” of connecting passengers onto longhaul flights is an essential ingredient in making a competitive European hub.

The major hub flows at European airports comprise “on-line” connections (i.e on a single carrier) or within an alliance of carriers. Nevertheless, substantial flows do exist between scheduled carriers, particularly to serve additional routes but also if connection timings are better. Flexible tickets may provide for this.

This means that the size and success of a hub airport hub is greater than that of the base network carrier. The base carrier provides the necessary critical mass to make this possible. Other carriers would contribute to transfer baggage systems, offer flexible tickets and design their own network of complementary as well as competing services.

By contrast, charter, no-frills and freighter carriers offer none of these things and have no interest is creating an integrated airport hub.

BA has analysed Heathrow’s potential as a hub (in terms of destinations served) compared to other major hubs in Europe. We have identified two main drivers which increase the range of destinations served:
1. size of the airport (measured in hourly movements available); and
2. the proportion of airport capacity held by the base hub carrier.

For Gatwick and Stansted, the movements available for hub services (driver 1) is reduced in practice by the presence of a significant number of flights that do not and will not contribute to a hub - charter, freight and no-frills flights.

Heathrow has negligible non-hub operations and key European airport hubs have relatively small proportions.

Non-hub operations at Stansted and Gatwick consume a significant share of overall capacity. At Gatwick, around 25% of services are charter and 8% are no-frills, leaving 67% of slots for services that could potentially contribute to a ‘hub’. At Stansted, 59% of services are no-frills, excluding KLM UK, and 16% are charters, leaving 25% of slots potentially available for hub services.

Charter growth has been limited since the introduction of no frills carriers, but no frills growth has out-paced the market. Looking at the maximum runway options at Gatwick at Stansted, and assuming the charter and no-frills sectors combined maintain the same proportion as now, around 2 runways’ worth of ‘hub’ capacity would be available at Gatwick and less than 1 runway’s worth at Stansted. This compares with 3 runways’ worth at Heathrow.

Hub connections increase exponentially with size. European competitor airports generally have (or are planning) the equivalent of 3 independent runways worth of hub capacity. Against this background, the potential offered by Gatwick or Stansted would not be enough to offer a competitive alternative.

It might be possible to set a Traffic Distribution Rule to exclude Charters from the new hub airport, but it is doubtful that this could be done for no frills carriers within existing EU legislation. Even if this
traffic could be excluded, the overall costs of moving bases and staff would be significant and would have to be factored into the economic analysis.

In conclusion, we suggest that a 3 runway LHR offers around 50% more hub capacity than the maximum Gatwick option (3 runways) and several times that of the maximum Stansted option (4 runways). Given that the connections potential of a hub increases exponentially with the number of services, a 50% increase in hub capacity represents well over twice the potential connections available.

c) Implications of above analysis on potential throughputs

Sections a) and b) compared Heathrow and other options in terms of runway capacity and hub movement capacity. Extending the analysis to consider passenger throughputs further widens the gap between Heathrow and other hub options. There are two main reasons for this.

First, as discussed above, other airports would not have the hub capability of Heathrow. If airlines provided longhaul services, they would be based mainly on point-to-point demand. Aircraft size would therefore be smaller, reducing passenger throughput.

Second, because of the lack of connections between shorthaul and longhaul flights, there would also be less demand for shorthaul flights. Frequency of shorthaul services would probably be maintained to keep the services competitive, so smaller aircraft would be used for shorthaul flights than at Heathrow.

Charter aircraft generally have high levels of passengers per atm. However the charter market is fairly mature, with leisure travel growth taking place instead in shorter and more flexible breaks.

The artificial ‘seeded’ services at Stansted and expected in the larger Gatwick options do not reflect the likely mix of traffic and overstate the passenger throughputs.

BA’s analysis suggests that while LHR with 3 runways may be able to accommodate up to 120-130 mppa (more with mixed mode on all runways), Stansted and Gatwick might be closer to 100mppa in packages with their largest runway capacity, simply because of the traffic mix that would be expected. This is explained in the notes on calculation methodology at the end of this appendix.

Even if longhaul ‘seeding’ were somehow forced (See Appendix II), many routes would have to be dropped from London because of the lower hub potential of Stansted or Gatwick (as explained in (b above) and because even a potentially efficient hub would have to compete with Heathrow for strong routes rather than adding new thinner routes.

For foreign inter-continental carriers, if Heathrow is not available as a gateway into Europe, their likely strategy would be to start or increase operations at the next most attractive airport in Europe. This is much more likely to be an established hub such as Paris CDG.

Non-hub capacity requirements

Capacity will also be needed to accommodate non-hub shorthaul growth (and the small number of longhaul point-to-point services that do not need a hub) outside Heathrow.

The potential of airports outside SE England to accommodate locally generated demand should help take pressure off expansion in the South East. For example, Birmingham airport could cater for demand in the West Midlands. Smaller airports in the South East (e.g. Southampton) can also continue to increase shorthaul services to avoid building more new runways than is necessary.

However, it is clear that at least one additional runway, after the short one at Heathrow, will be needed to accommodate sustainable short haul growth, freighter services and longhaul point-to-point services that do not need to operate at Heathrow.

Government projections show that after building a short Heathrow runway, there would still be demand for 63m passengers, over 20% of projected demand in SE England. A full length runway, preferably at Gatwick after 2019 or otherwise at Stansted, could accommodate half of this remaining demand.
Assuming a new short runway is built at Heathrow and a new full length runway is built at Gatwick or Stansted, the projections indicate that there would still be demand for a third new runway towards the end of the 30 year period. However, it is very difficult at this stage to anticipate whether or not a strong business case could be made for building a third new runway within the 30 year period.

### NOTES ON CALCULATION METHODOLOGY

#### Annual movements

These are derived by taking the hourly capacity from table 12, using conservative assumptions.

Assume 16.5 hour operating day, 365 days a year.

Cliffe is designed to offer 24 hour operations, therefore in theory it could offer a longer operating day than the other South-east airports. We note the government’s assumption, which seems reasonable, that not much use would be made of the night-time capacity. However, it would be reasonable to extend the operating day by one hour (in the early morning). The night-time capacity could, of course, be attractive to and taken up by freighter or mail operations. On this basis annual movement capacity would be some 720,000 movements.

Take up rates of 95% (LHR), and 90% (Gatwick, Stansted) are used for current runway assessments.

Reduced take up rate of 90%(LHR) 85% (Gatwick, Stansted and Cliffe) are assumed where new capacity is provided, recognising that existing systems are over-stretched with excessive levels of delays and congestion that must be reduced.

These are potential technical capacities. Other considerations may constrain the full potential.

#### Passengers per ATM (ppatm)

The assumption that passengers/ATM will grow at 1% pa gives a growth of 30% from 2003 to 2030. As explained earlier, this is optimistic. LGW and STN shorthaul have been given higher growth rates because of the relatively low base. However the no frills model is based on sticking to one aircraft type. Domestic services at LHR have a 20% total increase because of the potential for new thin domestic routes to be introduced.

At Cliffe, we assume the same ppatm for Charter services as at Gatwick; and the same ppatm for no-frills as at both Gatwick and Stansted. We assume that ppatm for longhaul, shorthaul and domestic would be greater than at Gatwick and Stansted because the number of these ‘hub’ services is larger, boosting ppatm with transfer passengers. However they remain markedly less than at Heathrow reflecting the inconvenient location of the airport for most point to point passengers.

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17 We propose no movements before 0600 on the new Heathrow runway, giving a 15.5 hour day. Total airport atms would then be 700,000=\((42+42)x16.5x365x0.9+(48x15.5x365x0.9)\)
Traffic proportions

We assume that proportions would be similar to now and Stansted would have similar longhaul potential to Gatwick. We assume the charter market is static and no-frills growth recognises equivalent % overall growth in combined markets.

Forecasting traffic proportions at Cliffe is more difficult, as this would depend on the extent to which the airport is able to attract traffic by natural means, seeding or other methods. The government has assumed seeding Cliffe with a proportion of Heathrow’s longhaul services, Gatwick’s charter services and Stansted’s low cost services, so we have used this as a starting point for analysis.

We have assumed that Cliffe has around 10% charter services, a little less than the future forecasts for Gatwick (15%) and Stansted (12%) as the market is already fairly mature.

We have assumed that the level of no frills traffic is around 25%. This is higher than Gatwick’s current low share of 8% (which is explained by the established position of charter airlines and the lack of spare slots) but lower than the current 59% share at Stansted where the no-frills airlines are dominant.

We have assumed a level of domestic services of 5% at Gatwick, Stansted and Cliffe. Although Cliffe may have the potential to act as more of a hub than LGW or STN, and hence to attract domestic connections, it would be poorly located for most point-to-point domestic traffic.

We have then assumed the remaining slots are divided between longhaul and shorthaul ‘hub’ services in a similar proportion to LHR.

Average ppatm in Table 15 is derived from the analysis above.

Derived annual throughputs from above (mppa)

Table 14: Change in share - current vs maximum runways case

<table>
<thead>
<tr>
<th></th>
<th>LHR</th>
<th>LGW</th>
<th>STN</th>
<th>Cliffe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Longhaul</td>
<td>24%</td>
<td>12%</td>
<td>0%</td>
<td>17%</td>
</tr>
<tr>
<td>Shorthaul</td>
<td>66%</td>
<td>55%</td>
<td>20%</td>
<td>43%</td>
</tr>
<tr>
<td>No frills</td>
<td>0%</td>
<td>8%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Domestic</td>
<td>10%</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Charter</td>
<td>0%</td>
<td>20%</td>
<td>16%</td>
<td>10%</td>
</tr>
</tbody>
</table>

Table 15: Average ppatm

<table>
<thead>
<tr>
<th></th>
<th>Curren t</th>
<th>Max runways</th>
</tr>
</thead>
<tbody>
<tr>
<td>LHR</td>
<td>138</td>
<td>178</td>
</tr>
<tr>
<td>LGW</td>
<td>118</td>
<td>152</td>
</tr>
<tr>
<td>STN</td>
<td>101</td>
<td>129</td>
</tr>
<tr>
<td>Cliffe</td>
<td>N/A</td>
<td>159</td>
</tr>
</tbody>
</table>

Table 16: Annual passenger throughputs

<table>
<thead>
<tr>
<th></th>
<th>No w</th>
<th>Max runways</th>
</tr>
</thead>
<tbody>
<tr>
<td>LHR</td>
<td>66</td>
<td>125</td>
</tr>
<tr>
<td>LGW</td>
<td>31</td>
<td>102</td>
</tr>
<tr>
<td>STN</td>
<td>24</td>
<td>98</td>
</tr>
<tr>
<td>Cliffe</td>
<td>0</td>
<td>115</td>
</tr>
</tbody>
</table>

Sensitivities

The above calculation uses the conservative scenario on hourly runway throughputs. In this scenario there will be general pressure across the aviation industry to increase aircraft size as more airports would become more constrained. A relatively high increase in passengers per atm is likely (as shown above).

If the more optimistic scenario on hourly runway throughputs were used, pressure to increase ppatm would be less, but still more than now. This would be likely to increase annual passenger throughputs, but not by as much as the increase (approx 15%) in runway capacity. The implications at Heathrow would be to increase capacity to around 130 mppa. Capacity at Gatwick and Stansted might increase to 105-110 mppa. Capacity at Cliffe might increase to 120-125mppa.
APPENDIX II

ANALYSIS OF POTENTIAL “SEEDING” OPTIONS

The consultation paper explains that creating a new second hub in the South-east (in addition to Heathrow) would require artificial “seeding” of demand from Heathrow to the new hub.

Seeding is needed to generate the level of traffic growth, particularly longhaul traffic, required at the second hub to produce an economic proposal with the benefits quoted.

The Government have assumed that Heathrow can and would continue as a viable hub, undamaged by seeding. This would require a hub carrier/alliance to be present at Heathrow and at the new hub.

Given the dependence on seeding to generate a viable second hub, we have considered the feasibility and implications of two types of possible seeding mechanisms:

a) **Regulation: Traffic Distribution Rules (TDRs)**
   The Government have removed most traffic distribution rules in the UK, but some remain. Under EU law, TDRs cannot discriminate between EU carriers.

b) **Fiscal incentives**
   This involves offering incentives to move or disincentives to stay, for example by charging at Heathrow or auctioning slots.

There are 3 approaches for splitting services across airports:

**OPTION 1 Split by geographic destination**

Traffic Distribution Rules could require Westbound longhaul routes to operate from one airport, and Eastbound longhaul routes to operate from the other airport.

This would create massive commercial and operational problems, making it one of the worst of all options. All network carriers would have to split operations across both airports. It would be impossible to integrate traffic flows that are essential to the success of British Airways and Heathrow. Our Asian services need to integrate with West Coast US services for efficient scheduling. Our daylight East Coast US services integrate with Middle East services to avoid costing two aircraft per rotation. Route splitting would also take us out of the Middle-East/India to North Atlantic flows which are a big part of the current competitive advantage of Heathrow. This would be much worse even than the previous Heathrow/Gatwick split hub, where South America/Caribbean and African services went to Gatwick and most of the rest, including Asian and US services remained at Heathrow.

Another major problem is that much of the shorthaul network would have to be duplicated at both airports to feed longhaul services, providing a significant handicap compared with major EU hubs. Network airlines would also incur huge costs. We have estimated that the costs of splitting BA’s operation across Heathrow and Gatwick is £500m p.a.

For South-East businesses, neither airport would offer the full range of services. London would become less convenient and attractive as a location for international companies.

Likely outcome: No competitive hub. Neither airport would offer a full range of destinations. Significant loss of competitiveness by UK based network airlines.

**OPTION 2 Split by Airline**

This option is not feasible under TDRs. There are no regulatory mechanisms available within the EU to ensure that alliances are required to operate out of different airports.
Fiscal measures, such as charging for slots (or similar) could be used in an attempt to persuade an alliance to move. There are no guarantees that such a strategy would achieve the desired effect. At different levels of charges, different services would be impacted.

Low charging levels

Costs of moving services away from a hub are much higher if an airlines’ Head Office and support services are located there as well. Pricing mechanisms would succeed first with non-hub (standalone) services which also do not depend on connections, especially shorthaul services.

Medium charging levels

With higher charges, marginal hub routes would be squeezed out, eroding the network.

There are no guarantees that services priced out of Heathrow would be reprovided at another London airport. A marginal service operated by a network airline at an established hub is unlikely to be viable where it cannot not generate similar network benefits. Standalone services may be substituted at another European hub with a more attractive catchment area than a second London airport.

High charging levels

Very high charges would force hub carriers to review their ability to pay or consider moving their entire operation.

It is likely that the value of slots required to make these airlines move would be higher than that required to make their operation uneconomic. This is true at present given the fragile state of the aviation industry.

Where carriers/alliances have hubs elsewhere in Europe, more emphasis would be put on operating services there. Operating longhaul services at Cliffe, Stansted or Gatwick may be less economic than operating them from an alternative European hub.

Even if the strategy was seemingly successful and an alliance moved to the new hub, there would be significant implications for carriers/alliances moving to a new hub.

Option 2A: BA moves

Under this option, BA, the largest single carrier at Heathrow, (or the whole of the oneworld alliance), would shift its entire operation to the new hub.

Heathrow is British Airways home base, and BA has invested heavily over the years in facilities and people in and around Heathrow. There would be huge costs to the airline in moving its operation elsewhere and reproviding these facilities which have not been considered in the Government evaluation. Most critically these costs mean that the costs (both in total and per mppa) would be significantly larger for BA than for any other airline or alliance.

BA would face not only the costs of moving its operations, but more significantly the potential loss of revenue, since it is well recognised that Heathrow is the first choice for the majority of business passengers. BA thus faces all the risks of moving, while those carriers staying at Heathrow gain almost as much of the benefit as, if not more than, BA. The latter not only retain the advantages of operating from a superior location, but also reap the benefits of doing so at a less congested premier hub.

Option 2B: Star Alliance Move

A second possibility is that Star alliance, the second largest group of carriers at Heathrow, shifts its entire operation to a new hub. This seems to be the implied basis of the government’s assumptions about seeding. It may be slightly more likely than a BA move. Star carriers are not so deeply rooted and committed to Heathrow. They also carry a smaller proportion of UK residents, who tend to live closer to Heathrow, and have a greater propensity to use UK airlines. However, many of the disadvantages would remain, even if to a lesser extent.
Options 2A and 2B both impose huge costs and other negative impacts.

The operation of the carrier remaining at Heathrow would become uncompetitive against European competitors because of the slot purchase costs.

The carrier ‘persuaded’ to move would bear considerable relocation costs and would suffer a permanent locational disadvantage against Heathrow which is more convenient.

There is also a strong possibility that other countries would retaliate against unfair charges at LHR to protest at the damage done to their carriers, further damaging Heathrow based carriers. Such action could also impact bilateral negotiations and route agreements.

There would be significant problems in developing any airport that relied on such measures as existing airlines at Heathrow are likely to object strongly, leaving limited supporters of the development.

**Option 2C : A new carrier or alliance moves**

A final possibility is that a new carrier or alliance with relatively little presence at Heathrow, takes advantage of the new capacity to establish a new hub. This has fewer drawbacks than other options, since existing revenue is not put at risk and there are no costs of moving. However, the competitive disadvantages against Heathrow and other EU hubs would remain. Building up a presence over a period of years would be difficult, making it difficult to generate the critical mass of frequencies needed for a successful hub. The airport developer might be unwilling to finance expansion on such a speculative basis.

Likely outcome: No major alliances move; Heathrow’s network shrinks under cost and capacity constraints.

**OPTION 3: Require all Longhaul services to move**

Splitting by type of service e.g. longhaul at one airport; shorthaul at another is unrealistic. Most longhaul services rely on shorthaul feed. This would preclude retaining even one hub. The effect would be to restrict longhaul services only.

TDRs could be used to achieve this.

The risks and uncertainties associated with Options 1 & 2 suggest that all longhaul services might be required to move.

This would damage Heathrow, which, with no longhaul services, would cease to operate as a hub. Average passengers per atm would be much reduced as a mix of shorthaul, domestic and charter traffic filled the airport, undermining the viability of T5. Some international businesses based in West London/Thames Valley would probably relocate, possibly outside the UK.

All new second hub proposals (Stansted, Cliffe, Gatwick) have a less attractive catchment area than Heathrow and some passengers from the Heathrow area would fly to a European hub to take a connecting flight rather than make their way to the new London “hub”. This would reduce the size and scope of the longhaul network, perhaps by as much as 30% (depending which location was chosen). This would generate a substantially inferior hub that would allow established European hubs to exploit their natural advantages of geography, convenience and size.

Likely outcome : New hub created but inferior to Heathrow. Heathrow reduced to regional airport with significant economic costs to the local area.

**Conclusions**

None of the 3 options are likely to generate the outcomes envisaged by the Government.

Options 1 and 3 are feasible but don’t provide even one hub operation in the South-east.

In option 2, no network airline would be able to justify moving from Heathrow to a new hub, where
there would be a continuing yield disadvantage and probably a cost disadvantage against rival airlines at Heathrow. The risk and costs would be borne by the carrier making the move, while their competitors at Heathrow would reap the capacity benefits.

Coercion mechanisms add costs or reduce benefits to the economy and to travellers, reducing the Government’s estimates of potential benefits.
APPENDIX III

BA’S PREFERRED HEATHROW RUNWAY OPTION

1 The Heathrow 3rd Parallel Independent Runway Concept

BA supports the concept of increasing Heathrow’s runway capacity by building a 3rd parallel runway, located to the north of the existing 2 parallel runways and sufficiently distant from them so that the new runway would operate independently of them.

BA has reviewed the version of the short runway concept, option E4, that is sketched in Figure 7B of the South East consultation document. Comments in the following paragraphs relate to that option and how we would recommend it could be adjusted and improved.

The objectives would be to reduce environmental impact and improve its operational performance and the quality of service offered to passengers. These recommended adjustments, improvements and comments on key issues are reflected in the design concept ‘Heathrow Regional Runway Option’ shown in the diagram attached to this response. Numbered location references in the diagram are identified in this appendix.

British Airways would recommend that these changes and improvements, that we have summarised in our response to Question 7, are reflected in a White Paper policy decision to approve the Heathrow regional runway concept.

2 New Runway Location and Length

BA has reviewed the precise location and length of the proposed Heathrow regional runway (location 1). We believe the option in the consultation document can be improved by a small adjustment, locating the runway slightly further to the east, and thereby preserving the Harmondsworth Great Barn, St Mary’s Church and graveyard in their current location (location 3).

3 Taxiways, Runway Crossings and Passenger and Aircraft Handling

The option E4 suggests that all aircraft using the new regional runway would taxi to and from stands and terminal facilities located between the existing runways. The aircraft stand area and passenger handling facilities are then shown as being expanded between the existing runways and also on the south side of Heathrow - by expanding T4 (on some diagrams then called T6).

BA agrees that with the increase in flights and passengers that a new runway would serve, there will need to be expansion in aircraft stands, passenger handling (new terminal or satellite development) and ancillary development, including new hangars. However, the detail of the distribution of those facilities across the expanded area of Heathrow is flawed by omitting aircraft and passenger handling facilities from the land between Sipson and Harmondsworth, adjoining the new regional runway.

Our analysis is that requiring all the aircraft using the regional runway to cross existing northern runway would:

- cut the capacity of that runway too deeply, and more than the consultation document assumes.
- increase the taxi time between the new runway and the stands. It would be too long and uncertain as, for example, landing aircraft taxied to the existing N runway, then waited with their engines running for gaps in the traffic on the existing northern runway to be created, then taxied on again on a highly congested taxiway system now trying to cope with a 50% increase in movements. Currently some 15 minutes is spent taxiing on arrival or departure at Heathrow. BA would estimate that at least 15 minutes more would be added to each arrival or departure on average, taking the total taxi time to at least 30 minutes for each aircraft arrival or departure. Especially for short haul services that is not acceptable for passengers (who would typically have a flight time of 60-90 minutes). It would:
  - be extremely wasteful, costly and un-competitive use of aircraft (which only earn revenue when in the air).
  - be very wasteful in terms of fuel burn
• generate increased ground level emissions, in particular adding to NO2

We understand that BAA share similar concerns.

In comparison, the new short runway could have a very short average taxi time of 5-10 minutes to a new terminal or satellite on land adjoining the runway. This would reduce emissions and fuel burn compared with current levels for these aircraft, as well as reduced aircraft and crew costs, and, for the passenger less frustration over taxiing.

BA has also calculated that the stand provision on the existing Heathrow airfield could not be sufficiently expanded to meet the needs of all the aircraft using 3 runways.

For all these reasons, BA considers that additional aircraft stands and passenger handling would need to be provided on the land between Sipson and Harmondsworth, so that aircraft would not normally need to cross the existing northern runway.

The precise nature of these facilities would need to be determined when the full scheme for the Heathrow regional runway and associated facilities was undergoing detailed development, following a government policy decision that the regional runway should proceed.

At this stage, BA has undertaken sufficient analysis of its own and has seen BAA’s analysis reported in their SERAS response on 12 May 2003 as a contribution to the consultation debate, to be confident that such facilities could be provided, without the need to demolish more residential properties than the consultation document indicates, and with the potential to protect remaining properties by an environmental screen (location 6). The diagram indicates (at location 2) the area in which BA considers land would need to be used to accommodate aircraft stands and passenger facilities, and perhaps a terminal building.

The area required for the new satellite/terminal and ancillary facilities can, be minimised by the better use of Heathrow’s existing land between the runways (especially at the eastern end of Heathrow, at locations 18,19 and 20) and by using the land between T5 and the M25 (location 14). This is discussed more fully below. However, BA considers that such an approach should be adopted to minimise new land take north of the A4.

The site area and operations required would be similar to those of the existing terminal 1, which predominantly handles the smaller domestic and European aircraft now. These would be a smaller, purpose designed, lower profile buildings than the big long haul dominated terminals like T4 now, or T5 under construction.

The operation of the new regional runway in this way would offer a number of advantages not only over the Option E4, but also over current operations

4 Intra-Airport Connections

Heathrow airport is, and with another runway will continue to be, an airport predominantly serving the needs of passengers in SE England.

However, connecting traffic between flights will also remain important to underpin the range of destinations that Heathrow can offer; for the regions of the UK in particular good connections at Heathrow will be vital. For these reasons, the infrastructure to make quick and reliable connections between services, and between terminals and satellites at Heathrow will be essential.

These connections need to be made by both passengers and their luggage. Heathrow lags behind other major hubs in the provision of proper automated systems to link terminals. For example, the new runway at Frankfurt airport is being planned with an extension to the existing internal automated passenger transit system and a new high speed automated baggage link to new passenger terminal facilities. This problem is pressing as T5 is under construction. For Heathrow to play the global hub role that would be explicitly underlying a policy decision to build the regional runway there will be an unequivocal need to link the existing terminals, T5 and the new regional satellite/terminal by automated passenger and baggage handling systems.
There will need to be clear endorsement through the White Paper of the provision of these automated passenger and baggage handling facilities. These would ensure good connections for passengers, but also make a significant contribution to reducing ground vehicle emissions compared with the current situation. Indicative automated landside-airside transit and baggage links are shown in the diagram.

5 Reconfiguration of Existing Land Uses At Heathrow

The SERAS consultation document rightly identifies (para. 7.6) that reconfiguration of Heathrow’s existing land use T1,2,3 and the space between the existing runways and on the south side of the airport will be required for development of another runway to be matched by additional terminal capacity.

That requirement for reconfiguration will be needed in particular at the eastern end of the existing airport from T1 to the boundary, and including all the west and east maintenance bases. The land immediately to the east of T1 will need to be developed for new larger aircraft stands, particularly as the mix of aircraft used switches increasingly to long haul.

There will also need to be a thorough reorganisation and modernisation of hangar and ancillary facilities which have evolved in a piecemeal way over more than 50 years. The aircraft to be maintained, and the nature of the maintenance task has changed hugely over that time.

To make the best use of Heathrow in the future in any event (in the maximum use base case or with another runway) will require this extensive reconfiguration and needs to be provided for in the White Paper. Without this reconfiguration, the assumed maximum use in the base case of 90 mppa will not be achieved, due to inadequate stand capacity. The capacity of Heathrow without reconfiguration of the existing eastern apron layout will be some 84 mppa.

This reconfiguration will also provide opportunities to make a number of environmental improvements including:

- building more efficient purpose designed hangars, including more efficient (CO2 reducing) heating arrangements
- relocating a contentious engine ground run pen away from the eastern boundary, currently near to Cranford.
- allowing for the redevelopment of the Hatton Cross zone as a more effective public transport interchange.

A particular requirement for these improvements to happen would be the removal of one of the oldest Heathrow buildings - the TBA hangar (location 20). This currently has Grade 2 listing, but appears to have been omitted from the consultation document’s list of building that need to be demolished as part of the Heathrow development and reconfiguration.

6 Land Between T5 (A3044) and the M25

The land between the A3044 and the M25 (location 14) is identified in current policy (the 1985 White Paper) as potentially required for airport related development. The SERAS consultation identifies a broad corridor of land in this zone to be developed in the event of the regional runway being built. BA considers it essential that this policy is restated and strengthened in the new White Paper policy, in any event, so that a programme for its use can be brought into use as T5 is being built. The land area identified should be large enough to allow for ancillary and operational support uses, and also for remedial landscaping along its fringes (to be sympathetic with the major restoration that BA undertook and achieved in the new Harmondsworth Park to the North). All the land north from the A3113 and up to the Old Colnbrook Road (check name) should be designated for a comprehensive plan for airport related uses, in association with remedial landscaping.

Since the 1985 White Paper, the policy basis for inclusion of this land in the airport in any event has strengthened further. The site is now being crossed by the new dual carriageway access road to T5. British Airways head office at Waterside has been built just to the north. Most important of all, T5 itself is under construction, and is required by the conditions of its permission to have a station box
big enough to allow for westward rail connections to be extended beyond the terminal. More broadly, transport policy is encouraging integrated transport and land use planning.

Putting all these factors together, there is an excellent opportunity to locate many of Heathrow’s ancillary functions at purpose built facilities directly over or adjoining an expanded network of rail services into T5 and connected onwards to other terminals. For example, about a quarter of all Heathrow’s workforce currently reports to BA’s Compass Centre on the northern edge of Heathrow - where there is no direct rail access. A similar operational reporting facility could be relocated to the T5/A3044-M25 zone, directly over the broadened rail network. This would contribute to a significant shift in modal share to rail transport for staff. BA would incorporate the provision of this facility in its Green Transport Plan if the policy framework for development of the land for such ancillary and operational support (not live aircraft passenger operations) were to be clear in the White Paper.

7 Capacity Of Heathrow With Short Regional Runway.

British Airways would estimate the capacity of Heathrow with T5 at some 84 mppa at reasonable service standards, without Eastern apron reorganisation, 89 mppa with that reorganisation. The consultation document (Table 7.1) states this base case capacity to be 480,000 atms and 89 mppa. That is 185 passengers per air transport movement (ppatm). To reach such throughputs towards the higher end of the range will require the reconfiguration of the areas east of T1 to be well underway.

The consultation document sets out an estimate of Heathrow’s capacity with option E4 (short third runway but all aircraft crossing the existing northern runway) as 116 mppa, assuming 655,000 annual atms. That would mean an average passenger load of 177 per atm, which appears to be a reasonable balance.

However, BA finds these assessment of the airport capacity to handle this traffic to be unsound, as set out in section 3 above.

It can indeed be achieved, or indeed bettered for both passengers and atms, with the distribution of additional stands and passenger handling improved by building north of the A4 to avoid runway crossing the capacity.

Assessment of atms

BA’s assessment of Heathrow atms, passengers and passengers per atm (ppatm) with a third runway is set out in Appendix 1 (see notes on Calculation Methodology, and footnote 17).

We would note, crucially, that BA would not wish to see all potential capacity used to its current extent (which imposes average delays of 10 minutes and more than twice this in the peak). BA have therefore assumed a small element of potential capacity is used to reduce delays to a more normal industry average of around 5 minutes.

This generates significant benefits to passengers, with reduced delays and less unpredictability, to airlines in improved aircraft utilisation and environmental benefits of reduced fuel burn and reduced noise, from less holding in stacks.

With these assumptions, BA conclude that the capacity of Heathrow with 3 runways and and average delay of around 5 minutes would be c 700,000 atms.

Assessment of Passenger Capacity

BA’s assessment of a likely Heathrow schedule with 3 runways generates an average ppatm of 178. This is consistent with the Government’s assessment of 177 ppatm. BA agree that an average aircraft load of around 177 would be reasonable and achievable some years after the new runway was in full operation (during 2020-30 in our view).

A runway capacity of 700,000 atms and ppatm of 178, implies an overall passenger capacity from the runways of 125 mppa.
We have also undertaken a review of the needs of a 3 runway Heathrow for aircraft stands and the major support facilities (especially hangars) to go with the runway development. That has concluded that the maximum ground capacity of Heathrow, with the land additions, infrastructure and reconfigurations set out in sections 3 to 6 above would lie in the range 120-130 mppa. The higher end of this range would require new technology, or mixed mode operations on the runways (as indicated in SERAS consultation document para 7.7).

The terminal, passenger satellite and stand capacity would need to be distributed approximately:
- 95 mppa on the fully reconfigured existing airport and land between the M25 and T5/A3044 (including all longhaul operations, which are particularly space hungry)
- 25-30 mppa in a new satellite/terminal between Sipson, the A4, the new regional runway and Harmondsworth, exclusively for domestic and near European regional services on quick turn rounds between flights.

8. Usage of the new runway

We agree with the Government that the new 2000m. runway would have sufficient capability to be fully used.

Even if the runway were restricted to no larger than Code C aircraft, approximately two thirds of Heathrow's existing flights could use the new runway.

In the long term, even with an increase in average aircraft size, there would be sufficient aircraft (typically of the B737 varieties and Airbus A319/320/321 family) to use fully the new runway.

With smaller aircraft transferred to the new short runway, which would be used for existing and restored or new UK domestic services and other nearby European destinations (e.g. Benelux, Rep. Of Ireland, Paris), the main runways would be opened up to increased longer range services. This would enable the Heathrow network to expand and offer a comprehensive range of services not only to London and the South East, but also through connecting domestic air services to the other regions of the UK.

British Airways has analysed the effect of another runway on the Heathrow network. This is set out in answer to Q7. It would increase to some 260 destinations, compared with about 190 now and an expected fall to 170 if no runway were built at LHR. However, that analysis did not take account of the further depressive effect on destinations of 'seeding', which would undoubtedly further weaken the Heathrow network.

9 Proposals for dealing with local impacts

Section 3 of the consultation paper asks several questions about the management of local impacts and we have answered these both in overall terms and discussed how they apply to our own version of the Heathrow option.

In particular:
- in Q14 we discuss how the White Paper should set a framework within which the need for detailed planning conditions could be established for any particular runway proposal;
- in Q15 we review whether any of the impacts would be unacceptable;
- in Q16 we discuss the approach to managing noise and emissions;
- in Qs 17&18 we address specific noise management issues;
- in Q 19&20 we review in some detail the surface access issues, including the key question of public transport access.

10 Increased capacity of Heathrow with 3 runways vs. 2 runways.

Summary

(1) 2 runways, current operational layout
84 mppa 480,000 atms
(2) 2 runways, reorganised
Eastern apron layout
89 mppa  480,000 atms

(3) 3 runways, new layout and new satellite/terminal
125 mppa  c 700,000 atms

(4) Capacity increase (3 v 2)
36 mppa  220,000 atms

The increase in capacity from a third Heathrow runway has been underestimated in the economic evaluation of benefits (which is based on an increase of 26 mppa rather than 35 mppa). In broad terms, the increase in capacity, and therefore the benefits associated with option E6 rather than E4 can therefore be attributed to an 125 mppa Heathrow, as set out here. This capacity analysis is reflected in the assessment of economic benefits of the Heathrow option, in answer to Q6.
Air Quality

Aviation emissions have an impact on both the air quality locally and on the global atmosphere, both of which need to be understood and managed.

**Global atmosphere.**

CO₂ (carbon dioxide) and other greenhouse gases affect the global atmosphere.

British Airways was one of the first airlines to acknowledge the importance of aviation’s contribution to global warming, providing expert input to the work of the International Panel on Climate Change.

We have also been involved in ICAO work of to address this issue. British Airways helped draft the Circular “Operational Measures for Fuel and Emissions Reductions”.

We support open international emissions trading to ensure that aviation emissions are properly managed to allow sustainable growth. We have promoted this within the industry and with policy makers.

As the impact of aviation on climate change is global in nature, the location of airports will not affect this to any significant extent.

As a result, this Appendix is concerned primarily with local air quality.

**Local air quality.**

The most significant emission from aircraft, from the point of view of local air quality, are the oxides of nitrogen NOₓ, and in particular, nitrogen dioxide ¹⁸.

First, other emissions species are discussed briefly.

**PM10: Particulates with a mean diameter under 10 mm.**

PM₃₅’s are produced in negligible quantities by modern aircraft engines. Although there is no specific requirements for the level of PM₃₅’s for aircraft certification, they are measured as part of the Smoke Number. However, the levels of these particles are so low as to be frequently below the detection rate of the monitoring equipment.

Measurements at the LHR2 monitor show declining levels of PM10 at the airport boundary throughout the past 8 years despite traffic growth.

Current (2001) annual mean values are 23 mg/cu.m, about half the NAQS limit of 40 mg/cu.m. The PM10 pollution rose for LHR2 shows the highest concentrations when the wind is from the north and east. As this monitor is on the northern airport perimeter, this tends to suggest that off-airport sources are the major contributors.

The level is similar to readings at other background and Suburban monitors in London during 2001, but generally lower than both kerbside and roadside locations.

Aircraft operations from the new runway are therefore expected to make little difference and will be offset by fuel efficiency improvements.

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¹⁸ NOₓ is a collective name for nitrogen oxide, and nitrogen dioxides. Emissions from aircraft are generally reported as NOₓ, as this is what is required during the certification process, however the legal air quality limits apply to NO₂, one component of NOₓ.
CO - Carbon monoxide.

Annual and short term mean levels of carbon monoxide have also been reducing during the past 8 years of monitoring. In 2001, the LHR2 monitor recorded maximum levels of half the 8 hour mean NAQS levels (10 mg/cu.m). There have been no exceedences. As with PM10s, pollution rose evidence suggests the major sources are off-airport.

Again, comparisons with other London sites in 2001 show comparable levels with background monitors, and lower levels than both kerbside and roadside locations.

HC - hydrocarbons (1, 3-Butadiene, and Benzene).

Benzene emissions are predominantly from petrol fuelled road vehicles, and so are not affected by aircraft operations. The concentrations of benzene are generally low at locations close to the airport, and measurements using grab samples from 5 dates in 2000 show levels of these hydrocarbons at or below 20% of the NAQS objectives.

In addition, the preliminary results of three moths worth of BTEX diffusion tube monitoring, carried out by BA, for a number of sites between the northern runway and the M4, suggest that the benzene levels are well below the 2010 5 mg/cu.m annual mean limit.

There is no reason to suggest that these levels will be materially higher in future years.

Sulphur dioxide.

There are no measurements of SO₂ around Heathrow airport. However, comparisons with similar urban and roadside sites suggests that levels will be significantly below NAQS limits. Analysis of future aircraft operations using the BEAM database suggests little change to these levels with the new runway.

NO₂ (nitrogen dioxide).

The production of nitrogen dioxide is the most significant airport local air quality issue.

The UK National Air Quality Strategy (NAQS) has set a short term exposure limit (1 hour mean) of 200 mg/m³ (105ppb) with up to 18 exceedences allowed, and a longer term mean annual limit of 40 mg/m³ (21ppb). These limits apply at the end of 2005 in residential areas.

The acute limit has been set on the basis of half the level that produced an observed effect on some asthmatics (about 400 mg/m³ (210ppb)), at 200 mg/m³ (105ppb). The chronic limit is set at precautionary levels, based on WHO guidelines (via EU directives which implement them). The basis of this is a 15 mg/m³ (8ppb) plus an additional 28.2 mg/m³ (15ppb) - the lowest increase over which health effects have been observed, to give an annual guideline value of 40 mg/m³ (21ppb).

As part of the National Air Quality Strategy, the Local authorities have made assessments of air quality, using models to predict the situation 2005. In several cases these have indicated areas where the annual average limits could be exceeded, and these have been designated Air Quality Management Areas as a result. Three of the four authorities surrounding Heathrow airport (Hillingdon, Hounslow, and Spelthorne) have designated Air Quality Management Areas.

Both modelled and measured levels around Heathrow airport, give levels below the 1 hour mean limits. Short-term exposure to NO₂ is therefore not an issue at areas around the airport.

Models of NO₂ distribution.

The representation of aircraft operations using models, to determine local air quality concentrations, is still very much in its infancy. Modelling advice from DEFRA suggests that aircraft inventories up to 1,000m are constructed using the emissions ICAO databank as a basis, and then "mapping emissions

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19 The EU Directive sets 2010 as the implementation date.
from the airport as a “volume source”\textsuperscript{20}. Modelling aircraft in this way is neither precise nor representative of actual operations, and builds in an additional source of error from the modelling process.

Studies carried out by Imperial College, have compared the effects of modelling aircraft in this way with an alternative, modelling more closely the aircraft flight paths using a series of strips (at least 30 in the area up to 450m). The same inventory was used (BAA’s 1998) as the basis for the comparison, with the same conservative assumptions for take-off power settings (Full power on all occasions). Results from this analysis confirms that the “strips” approach resulted in far greater concentration of the emissions within the airport boundary, and a much more rapid drop off than using the DEFRA approach.

\textbf{Figure 4:} Effect of modelling approach on aircraft emissions dispersion

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure4.png}
\caption{DEFRA modelling advice (“volume” approach).

More representative modelling (“Strips” approach).}
\end{figure}

British Airways has been aware of local concern about air quality around Heathrow for several years. We have taken steps to understand the issue, to limit emissions and to engage with stakeholders.

Over the last 2-3 years we have worked to develop a model to estimate the contribution from aircraft to NO\textsubscript{2} levels, using more representative input parameters such as actual measured take-off power settings rather than the 100\% previously assumed in other analyses. This work has been overseen by a stakeholder “Steering Group” chaired by British Airways, involving members from local authorities, CAA, DfT, DEFRA, BAA, academia and other relevant interests, which meets at regular intervals.

The model used by British Airways (EDMS v4) is the required regulatory model in the USA for calculating local air quality. Improvements have been made to the model, as agreed with the stakeholder group. These include better assumptions about operational procedures. Improvements were also made to some of the ground operations inputs, including use of actual taxi times, more representative APU operations, recorded engine ground running, etc. Throughout this process a conservative approach was adopted where, when insufficient data was available or a reasonable rationale could not be agreed, the worst possible interpretation was assumed for emissions production.

Our model plots NO\textsubscript{2} contours under 2 scenarios. The first is the base year of 2000. The second is with a new runway in 2015.

Using these conservative assumptions, Our modelling indicates that only about a third of the annual average level monitored at the LHR2 monitor, comes from aircraft. Previously it had been suggested that aircraft were the predominant airport source of NO\textsubscript{2}.

Our model also indicates that the new runway would make little difference either to the inventory of emissions or to the concentrations inside or outside the airport. We expect a steady improvement as new aircraft, meeting tighter NOx standards are introduced.

**Differences with the Government’s approach.**

Though it is accepted that the Government noted that the modelling process is uncertain and that rather than concentrating on absolute levels, those presented in the SERAS document should only be used for comparison between the different options, there are still a number of areas where the process used has significantly overestimated the emissions from aircraft operations.

The Government used two inventories to model NO\textsubscript{2} concentrations around the airport. Both err significantly on the high side of estimated emissions. The first inventory is hugely conservative with very large overestimates of aircraft NOx. The major source of error is the incorrect assumption that all aircraft take off at full power.

**Figure 5: Example of the effect of Take-off thrust on NOx production.**

The second inventory, which takes into account part of the effect of reduced takeoff thrust and some NOx technology improvements, reduces the estimate by almost 50\%. This is still conservative and results in concentrations still more than 30\% above the measured level at the LHR 2 monitor.

In actual operation, thrust levels are well below 100\%, depending on variables such as take-off weight and meteorological conditions. Thrust levels as low as 75\% during normal operations are not unknown and, for some types, can be as low as 60\%.

British Airways’ model incorporated more realistic engine thrust settings based on recorded data, and take-off procedures based on actual standard operating procedures used by the operators.
Fleet assumptions.

The Government restricted the number of different aircraft types in its modelling, and included some types that have not yet flown. We believe that the variant chosen for Boeing 747 may not be representative of most B747 types operating at Heathrow, and could overestimate emissions by up to 50%, as a result. This could be a significant source of error, given the importance of this aircraft at Heathrow.

The composition of the fleet using Heathrow in 10 years time is uncertain, and assumptions including no improvement in NOx emission technology, have been made. The inclusion of the Boeing Sonic Cruiser, B7E7 and A380 at conservative levels have now been shown to be overly pessimistic.

International limits have been applied by ICAO to aircraft NOx emissions since 1981. Stringency was increased in 1993 and in 1998 and there are proposals to do so again in 2004. There is a good history of incorporation of new technology into operators fleets, and indeed, 77% of the current British Airways fleet comply with the latest internationally agreed standards for NOx. More importantly, the major aircraft contributors to NOx at Heathrow are the larger types. In this respect our fleet of Boeing 777’s already meet the latest standards (CAEP/4) by a margin of 10-25%, and 30 of our 57 B747-400 aircraft have been modified with low NOx combusters to the H-T standard.

By 2015, all B757 and B767 aircraft are due to have retired from our fleet and the remaining B747-400 aircraft will have been converted to the H-T standard. As a result, there will be continuous improvement in source aircraft NOx emissions.

There will continue to be pressure on NOx certification standards at ICAO, lead to a high probability of most aircraft engines meeting CAEP/4 - 20% by 2010, and a likelihood of CAEP/4 - 40% by 2020. When BA is considering future aircraft and engine acquisitions, the incorporation of low NOx emissions will be a key consideration. We are already making our views known to aircraft and engine manufacturers, for example suggesting to Boeing that the 7E7 it is current scoping should aim for at least CAEP4-40% performance on NOx emissions. For future scenarios, the major engine manufacturers are continuing research into new technologies to reduce emissions of aircraft NOx by up to 80%.

Figure 6: NOx certification levels of current British Airways fleet

NOx background levels.

Government NAEI projections indicate that there is expected to be a general reduction in NOx emissions from urban road transport, from 290,000 tonnes today to approximately 160,000 tonnes (45% reduction) in 2010, and 120,000 tonnes (58% reduction) in 2015. This will have an effect on the background levels within London and at Heathrow, and the Mayor’s Air Quality strategy also points to a
reduction of NOx and NO₂ levels across several London monitoring sites consistent with the NAEI results.

Additional modelling by BAA using the Government’s model.

BAA have carried out additional modelling using the same model that the Government used for this consultation, but adjusting for the underestimate of aircraft plume lengths, overestimation of transport and other activities, and assuming the use of reduced thrust for take-off. They also investigated the sensitivity due to background levels. This analysis gives significantly lower results for the population exposed to above the 40 mg/m³ NO₂ limits of the UK objectives.

Assuming aircraft meet the CAEP/4 -20% criteria, the number of people exposed reduces from 35,000 to either 8,000, or 4,000 depending on whether the background levels are adjusted for differences between modelled and measured background levels. The modelling indicates that there are two “hotspots”, in south Harlington, and to the north of the M4 motorway, though the latter is not affected by the airport.

Measurement of actual NO₂ concentrations.

Care must be taken in interpreting the results of a precautionary approach to modelling NO₂ levels which are based on debatable modelling approaches and conservative assumptions. The Government’s own consultants, Halcrow, did not intend the numbers to be used as absolute measures of exposure, and specifically noted that they should only be used for comparing the different airport options.

Although the Heathrow airport area has the highest concentration of NO₂ continuous monitors in the whole of Europe, the results of the Governments modelling have not been “verified” by reference to any of these. The exercise carried out by BAA, indicates the levels of uncertainty experienced by using the same model, but with different input assumptions.

The closest continuous monitor near Heathrow airport is the “LHR 2” chemi-luminescent, continuous monitor, situated just within the north-east perimeter fence, about 200m from the northern runway, and 10m south of the Northern Perimeter Road. The monitor is sited some distance from the nearest residential area which is where the limits will apply, but is the closest to the runway, and records are available going back to 1993.
Analysis of readings from monitor LHR 2

Average levels of NO\textsubscript{2} here are well below the short term exposure limits (Table 17). However the annual average is currently above the limit, though by 2001 it had reduced by about 15% from its peak in 1996. With the improvements in aircraft and road transport technology outlined above, this trend is expected to continue at least until 2015.

It is well known that busy roads such as the A4, M4 and the airport perimeter road create high NO\textsubscript{2} levels and that the levels fall off rapidly away from roads and into residential areas. The rate that aircraft emissions fall away is less well understood and different modelling techniques give conflicting results. There is a need to determine long term exposure levels that are actually experienced, and over the distance that any high concentrations fall away. Unfortunately there is as yet very little information on this.

Measurement of actual NO\textsubscript{2} concentrations.

Following the first stage of modelling, BA with the help of BAA have started to measure concentrations along a transect from the south side of the airfield to the north-east, across what our modelling results showed was the area of highest NO\textsubscript{2} concentrations around the airport.

We have looked at data from 19 monitors: 11 across the airport; 7 North of the airport up to the M4 and 1 at Waterside. Preliminary results for the first 4 months show a rapid drop off from the LHR2 monitor (located 200m from the runway centreline), and up into the local community of Harlington. The monitors at the southernmost part of Harlington (between 500m and 600m north of the runway centreline) recorded the lowest concentrations of NO\textsubscript{2} across the whole transect. About a third of the amount was lost in 400m despite the presence of the Airport Perimeter Road and the A4, confirming the rapid drop-off of NO\textsubscript{2} concentrations identified by our modelling. These levels were also below the 40 mg/m\textsuperscript{3} air quality annual average objectives.

This work is ongoing, but results to date, for each month, paint a consistent picture and give an indication of trends in NO\textsubscript{2} concentrations moving along the transect, away from the airport.

Table 17: Air quality trends at Heathrow

<table>
<thead>
<tr>
<th>Year</th>
<th>mean NO\textsubscript{2} (mg/m\textsuperscript{3})</th>
<th>max NO\textsubscript{2} (mg/m\textsuperscript{3})</th>
<th>98\textsuperscript{th} percentile</th>
<th>Total ATMs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>57</td>
<td>216</td>
<td>120</td>
<td>0.39M</td>
</tr>
<tr>
<td>1994</td>
<td>61</td>
<td>288</td>
<td>126</td>
<td>0.41M</td>
</tr>
<tr>
<td>1995</td>
<td>61</td>
<td>357</td>
<td>136</td>
<td>0.42M</td>
</tr>
<tr>
<td>1996</td>
<td>63</td>
<td>428</td>
<td>134</td>
<td>0.43M</td>
</tr>
<tr>
<td>1997</td>
<td>59</td>
<td>267</td>
<td>136</td>
<td>0.43M</td>
</tr>
<tr>
<td>1998</td>
<td>53</td>
<td>180</td>
<td>107</td>
<td>0.44M</td>
</tr>
<tr>
<td>1999</td>
<td>55</td>
<td>388</td>
<td>117</td>
<td>0.45M</td>
</tr>
<tr>
<td>2000</td>
<td>57</td>
<td>174</td>
<td>113</td>
<td>0.46M</td>
</tr>
<tr>
<td>2001</td>
<td>53</td>
<td>153</td>
<td>115</td>
<td>0.46M</td>
</tr>
<tr>
<td>2002</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 8: NO\textsubscript{2} concentrations from the first 4 months of monitoring.
To try to explain the reason for the increase in NO$_2$ concentrations beyond approximately 600m from the runway centreline, we followed the suggestion of one of the Local Council members of our “Steering Group” and placed “BTEX” tubes at 5 land-side, and 1 air-side location, to measure benzene concentrations. As benzene is not present in either diesel fuel or aviation kerosene, the concentration levels of benzene gives an indication of the contribution of petrol fuelled vehicles when normalised by the NO$_2$ concentration. Low benzene/NO$_2$ ratios indicate a greater influence of aircraft and diesel powered vehicles, higher ratios are indicative of a greater contribution of petrol fuelled vehicles.

The BTEX tubes for benzene measurement were put out only after 2 months of NO$_2$ monitoring had been completed, and therefore there are two less monthly results for benzene than there are for NO$_2$.

Using all the information currently available from the modelling and knowledge of the factors likely to affect the NO$_2$ and benzene concentrations, an interpretation of the likely factors driving the NO$_2$ concentrations can be made.

It must be emphasised, that this transect was specifically chosen to gain more information in an area with the highest concentrations of NO$_2$ around the airport. Other continuous monitors close to Heathrow airport are consistently at or below the 40 µg/m$^3$ air quality objectives.

### Summary conclusions

The Governments modelling has grossly overestimated the effect of aircraft generated NOx on NO$_2$ levels around Heathrow airport. This has been recognised in a statement in the consultation document noting that due to modelling uncertainties, the levels should only be used to compare the different airport options.

### Table 18: Results from other continuous monitors close to Heathrow airport.

<table>
<thead>
<tr>
<th>Site name</th>
<th>OS Co-ordinates</th>
<th>Direction relative to airport</th>
<th>2001 measured NO$_2$ concentrations</th>
</tr>
</thead>
<tbody>
<tr>
<td>LHR 2</td>
<td>508400,176700</td>
<td>NE</td>
<td>52.4 µg/m$^3$</td>
</tr>
<tr>
<td>Main Road Nurseries</td>
<td>504780,175460</td>
<td>W</td>
<td>33.0 µg/m$^3$</td>
</tr>
<tr>
<td>Oaks Road</td>
<td>505740,174500</td>
<td>SW</td>
<td>28.0 µg/m$^3$</td>
</tr>
<tr>
<td>Green Gates Meadow</td>
<td>505180,176930</td>
<td>NW</td>
<td>28.6 µg/m$^3$</td>
</tr>
<tr>
<td>Hounslow 2 - Cranford</td>
<td>510300,177200</td>
<td>NEE</td>
<td>40.0 µg/m$^3$</td>
</tr>
<tr>
<td>Slough, Colnbrook</td>
<td>503546,176824</td>
<td>NWW</td>
<td>32.8 µg/m$^3$</td>
</tr>
</tbody>
</table>

Modelling assumptions used in most studies, assume full power is used for take-off, which is rarely the case. Information recorded by British Airways for a number of types confirms this, and surveys carried out by BAA, suggest that other operators follow the same procedures for reducing take-off power that British Airways applies.
Aircraft generated NO\textsubscript{2} is greatest near the end of the runways, where it is mostly produced during the take-off phase of the flight, reducing as the aircraft departs, until above approximately 100m altitude, where emissions generated by the aircraft only reach the ground in minute concentrations.

Modelling carried out by British Airways using more realistic assumptions, suggest far less influence of aircraft operations on NO\textsubscript{2} concentrations than other studies.

Modelling by BAA, using more realistic, though still conservative assumptions and the same model used by the government, shows much fewer people exposed to NO\textsubscript{2} levels above 40 mg/m\textsuperscript{3}, in the areas of south Harlington, and north of the M4.

There is limited air quality monitoring around Heathrow airport, despite having the greatest concentration of continuous monitors in Europe.

Both modelling and limited monitoring around the airport, confirms that all the UK’s air quality objectives are currently met, except the annual average of NO\textsubscript{2} concentrations at a limited number of locations around the airport.

Currently there is a very limited area close to the airport boundary, where the concentrations of NO\textsubscript{2} lie above the air quality objectives for annual average levels of 40 mg/m\textsuperscript{3}.

Monitoring carried out by BA in association with BAA, confirms a rapid drop-off of NO\textsubscript{2} concentrations, away from the runway. Measurements of benzene at the same locations, suggest that a significant amount of the NO\textsubscript{2} in Harlington is generated by petrol fuelled vehicles.

Background emissions around Heathrow airport are relatively high, adding to the relatively high NO\textsubscript{2} concentrations in some areas.

Work done by the GLA and NAEI, suggest that background emissions from road vehicles are due to reduce by 45% in 2010, and 58% by 2015.

Ground fleets used within the airport boundary, have to be replaced over a maximum period of 15 years, and some over a shorter time-scale. As a result, there will be a completely new fleet of airport ground vehicles in operation, before a new runway could open.

Calculations by British Airways on likely future fleet scenarios, confirm that there should not be any increase in emissions over the current level with operations from 3 runways at Heathrow.

When all this is taken into account, it is considered highly improbable that there will be any breaches of the air quality objective, annual average limits, of 40 mg/m\textsuperscript{3}. However, in the event it may be necessary to look at possible measures that may be used to mitigate, or reduce NO\textsubscript{2} concentrations at any localised “hotspots” that may remain.

Where necessary, there are a number of actions that may be used to mitigate or reduce NO\textsubscript{2}

Aircraft and Passenger handling facilities north of the main runways. It is important that the siting of aircraft and passenger handling facilities, required for operations on the new runway, is carried out to minimise any adverse impacts on local air quality, to the north of the main airport.

An effective mitigation measure would be to site a Satellite or remote Terminal in the area of land between Sipson and Harmondsworth, to serve the proposed runway. This would have the dual benefit of reducing the taxi times between the new runway and aircraft stands between the two existing runways, and reducing congestion and holding required to cross an active busy runway (in both directions).

Using as a basis 220,000 movements (taxi-in, or taxi-out) of Boeing 737, or Airbus A230 sized aircraft, we have calculated that this could result in a saving of 104,000 tonnes of fuel (327,000 tonnes of CO\textsubscript{2}) and 450 tonnes of NO\textsubscript{x} emissions. In carrying out this assessment, taxi times have been assumed to double and an increase of 10 minutes due to holding to cross the active runway, has been incorporated.
Reduction at source. British Airways has modified the combustors in 30 of 56 of our Boeing 747-400 aircraft, reducing emissions of NOx at Heathrow by around 700 tonnes. Some 77% of our fleet is already compliant with the latest ICAO manufacturing standard.

Rolls-Royce has set targets to develop technology that is 30% better than the latest ICAO limit by 2005; 45% better by 2010; and 80% better by 2020. These targets have been set by Advisory Council for Aeronautical Research in Europe (ACARE), part of the EU funded 5th Framework research group, involving a number of manufacturers and research institutions.

We cannot predict the rate at which such technology will penetrate the aircraft fleet using Heathrow. Nonetheless the technology to reduce NOx emissions substantially exists and will be introduced.

Other possible measures to reduce NOx emissions at source could include:
• Tightening up standards for APUs and ground based vehicles;
• Compliance with the more stringent of the EURO standards for ground vehicle fleets.
• Extending the EURO standards to other vehicles.
• More use of alternative fuels, e.g. electric vehicles, fuel cells, etc.
• Encourage alternative fuels for taxis.

Operational procedures and restrictions. As mentioned earlier, the way in which aircraft operate has an effect on emissions. For example, reducing take-off thrust reduces NOx emissions. However, this also changes the shape of noise contours. Continuous descent approach (CDA) arrivals decrease both noise and emissions. British Airways has helped to introduce a Code of Practice for CDA.

British Airways and BAA have co-operated to reduce Auxiliary Power Unit21 running times at Heathrow. We will be working with BAA on a study of airside ground vehicle emissions to identify opportunities for further reductions from all airport sources.

Ground Power Units are mobile ground based generators, which can supply power to aircraft while cleaning and maintenance activities are carried out. Unnecessary use of GPUs is regulated by BAA at Heathrow. We expect any new facilities at Heathrow to have fixed electrical ground power, and pre-conditioned air, supply systems.

Other possible operational measures could include:
• Code of best practice on recommended measures for NO\textsubscript{2} minimisation, e.g. using maximum reduced thrust on all departures, unless safety considerations preclude it.
• Lower speed limits for ground vehicles;
• Improved flow management of aircraft and ground vehicles inside the airport boundary, optimised to reduce unnecessary queuing and delaying engine-start;
• Reviewing the sites of engine testing locations.

Land use planning. As a last resort, residents would have to be moved from proven areas of high exposure and would be compensated accordingly. We do not support free-standing cash compensation in any circumstances.

Possible measures could include:
• Zoning land where local air quality impacts are likely to be highest to discourage residential development;
• Road traffic calming measures;
• Re-routing local/ airside roads or restricting access;
• Examining existing and potential new road tunnels with a view to reducing NO\textsubscript{2} concentrations (using new technology) or managing hot spots at tunnel entrances and exits.

Operational restrictions. These should be considered as a last resort. Possibilities could include:
• Limiting vehicle access to the airport area;
• Use of car parking charges to improve public transport at the airport (though this already happens, in effect, through the single till);
• Targeted revenue neutral incentives to airlines to reduce NOx emissions.

21 APUs are small engines that provide power for services while aircraft are on the ground.
APPENDIX V

STAKEHOLDER CONSULTATION

LOCAL AUTHORITY PROGRAMME

British Airways conducted detailed consultation over the period of the SERAS/RASCO consultation process. The programme was initiated by Rod Eddington, the airline’s Chief Executive and involved meetings with a combination of council members and officials from the following local authorities:

- Greater London Authority
- London Borough of Ealing
- London Borough of Hillingdon
- London Borough of Hounslow
- London Borough of Richmond
- London Borough of Slough
- London Borough of Wandsworth
- London Borough of Westminster
- Kent County Council
- South Buckinghamshire Council
- Spelthorne Borough Council
- Surrey County Council
- Royal Borough of Windsor and Maidenhead

Digest of Issues

British Airways SERAS/RASCO response reflects the issues and concerns raised by the local authorities. The following digest reflects the areas discussed during the airline’s programme of meetings:

(i) Surface Access

- Current and projected demands on public transport
- The need for new road/rail schemes for Heathrow and its environs
- The potential for the growth of traffic on local roads, as a result of the expansion of Heathrow
- Funding provision for schemes such as Airtrack and Crossrail

(ii) Noise

- Current and projected levels of aircraft noise
- The frequency of night flights and whether a third runway would add to current noise levels
- The impact of new aircraft engine designs on noise
- Mitigation measures to assist those affected by the further development of Heathrow Airport

(iii) Pollution

- New European Nox standards
- Current measurement models and additional research
- How road traffic in and around Heathrow impacts on pollution levels
- 21st century aircraft technology and its role in cutting pollution created by aviation

(iv) The Third Runway Proposal

- The relative merits of Heathrow versus Cliffe, Stansted and Gatwick
- How a short runway would link with existing terminal facilities
- The affect of a third runway on local residents and historic landmarks
- The prospects for the further development of runway capacity at Heathrow
(v) Other SERAS Options

- The economic and financial case for creating a new hub airport
- Gatwick’s current and potential role in meeting increasing passenger demand
- Stansted’s current and potential role in meeting increasing passenger demand
- Environmentally sustainability
- British Airways’ business case for Heathrow

(vi) BA’s Core Arguments for Heathrow

- Why the maintenance of a hub airport matters to the UK
- Aviation’s role in sustaining regeneration, in and around London
- How houses/ schools/ health services could be developed to meet the needs of an increased workforce at Heathrow
CONSULATIONS WITH REPRESENTATIVES OF COMMUNITY AND OTHER INTEREST GROUPS

In Autumn 2002, the Environment Council facilitated three consultative meetings sponsored by British Airways, but our participation in the meetings was limited. This appendix contains some of the points raised and our comments on them.

The focus of one meeting, attended by representatives of a wide range of interested groups, was on potential mitigation of the noise impact of new runway capacity through financial measures (compensation).

Two meetings were held with individuals from local communities around Heathrow. The objectives were to:

- listen to concerns about a third runway;
- listen to views on what could be done to reduce its impact and make it easier to live with;
- record all comments made and submit these to the government in response to its consultation document.

We have also met representatives of amenity groups with an interest in Heathrow.

The transcripts made by the Environment Council of the meetings they facilitated have been submitted directly to Government and distributed to those who attended the meetings.

British Airways is grateful to those who attended for treating the meetings as a constructive opportunity to express genuine opinions.

We understand better the concern of some residents that a new runway at Heathrow would disrupt their communities and the established pattern of their lives. We recognise that the network of neighbours, proximity to friends and relatives, long standing links with churches, shops, doctors, dentists, entertainment, support groups and other community activities are important. These are, however, personal matters. Hence we recognise the need to involve local communities fully as plans to develop further runway capacity are progressed.

Accounting for noise: a workshop to consider issues or input into the Government’s consultation on aviation. 30th September

The workshop provided strong support for further work on financial approaches to mitigation (compensation) and suggestions were made about possible elements and a framework.

Financial mechanisms are not a substitute for reducing noise impacts through other elements of a “balanced approach”. This includes reducing noise at source, improving operational procedures, land use planning; and operational restrictions.

On the effects of “new noise” on housing, we support the principle that compensation should be fair and proportionate, allowing some choice.

Relevant stakeholder involvement is needed to ensure a balance between the interests of the community and the industry. The Department for Transport should take the lead.

We have taken note of views expressed about the “unprecedented number of very angry people”.

Several points were made on the relationship of aviation to global warming. British Airways’ position on this important point is developed in another part of this response.

2. October 3rd and 7th Community Meetings

We agree that every reasonable effort should be made to reduce the direct impact on local villages though it will not be possible to avoid all adverse impacts. Significant improvements could be made by optimising the location of the runway, though this is not a matter under our control.
We believe that the Great Barn, St Mary’s Church, its graveyard and much of the conservation area of Harmondsworth could be preserved.

We believe that north south road links can and should be maintained, albeit with some relocation.

Many other conservation measures are also possible.

New arrival and departure routes have to be identified. This is a matter for the CAA and NATS, in consultation with other parties.

A new runway will not compromise safety. We have separately circulated a note on Public Safety Zones to attendees of the 3rd October meeting, as promised.

We acknowledge that the impact of a new runway would extend beyond demolished homes and that, where appropriate, fair and proportionate compensation should be made.

Productivity improvements could mean that a new runway would not increase the total number of jobs in the long term, but it would safeguard local employment.

The Government has already identified the need for passenger facilities close to the proposed runway. This is a matter for BAA as the developer to consider.

We recognise that noise and air quality are major issues and have addressed these very fully in the main part of this response.

We believe only a small fraction of the 15,000 homes mentioned would have to be demolished.

New air quality standards will apply from 2010. These standards can be met as explained in the separate Appendix on air quality.

British Airways cannot offer guarantees, but will work to minimise effects on schools. Through its Community Learning Centre, the airline is already contributing directly to the education of local children.

British Airways is one of a number of organisations supporting Freedom to Fly, a coalition of supporters that campaigns for sustainable growth of air transport.

As regards Harmondsworth Moor, in 1996 British Airways promised various community benefits including access to the park - the majority of the park is now open to the community. It is not yet clear how the parkland may be affected by any new runway. There could be restrictions on public access to Saxon Lake and possibly the lake itself could be affected. This would need to be addressed, since British Airways is obliged to maintain the park. A proposed railway line to the east of the M25 would have a substantial relevant impact, severely limiting public access to the majority of the parkland. We have recognised the issue of parkland use for some time and will continue to try to develop solutions at the Harmondsworth Moor Community Liaison Group. This is also the appropriate forum to discuss the questions of British Airways maintaining its own property, educating its staff and fulfilling the promised community benefits.

Waterside was not designed as a terminal and will not be used as such.

British Airways does not want a cross diagonal runway - this would not make operational sense.

There are no runway foundations in place.

We support the need for a better rail system but point there is very limited scope for rail to substitute for air travel. Expansion of rail capacity raises many other questions.

No one can predict the long-term future. Communities and organisations, including British Airways, have to live with change.

The argument about paying for environmental damage is complex and will be dealt with in the separate consultation exercise. More work needs to be done to determine actual costs. Other factors
also have to be taken into account, such as the expected economic benefits and the fact that airline passengers already contribute up to £1bn a year in Air Passenger Duty, which contributes to environmental costs. The question of subsidies to the aviation industry has been addressed elsewhere in our response.

Some 50% of the UK population now have holidays abroad each year.

Lack of faith in BA or BAA. We cannot respect the law and agreements made. We have respected the agreement at Gatwick and believe that something similar could be possible at Heathrow, possibly in the form of a legally binding agreement. We realise that trust must be earned, on the part of all parties. We believe that these meetings represented a move in the right direction. There is still a long way to go.

We believe it is in the best interests of our staff and others to support a third runway, but staff are free to hold their own views and to campaign accordingly.

British Airways, in consultation with the Environment Council, decided who should be invited to the meetings on 30th September, 3rd and 7th of October. British Airways invited representatives of a number of amenity groups to that meeting. Given the limited time available, the airline tried to invite a representative range of individuals. Many of those invited did not come. Nonetheless, we believe the contribution from those who attended reflected a wide range of concerns.

An offer was made to those demonstrating outside the building on October 3 for six representatives to attend. This was not accepted.

British Airways made separate arrangements to meet local authorities during the consultation period. Invitations were also extended to all local MPs, including Mr McDonnell, to meet British Airways during the consultation period. Mr McDonnell did not respond.

There has been strong support for a third runway at Heathrow, as well as considerable opposition.

The point about continuing annual meetings between the airline and local community representatives based on the airline’s Annual Social and Environmental Report has been noted - although it is not connected to the possible third runway.

All participants have been sent copies of exhibition panels prepared for these meetings and details of the link to the Department for Transport website. Participants have also been sent transcripts of the meetings.

From the records prepared by the Environment Council, it is clear that the meetings were not vehicles for endorsing British Airways support for a new runway.

We shall send copies of our response to all those who attended the meetings on October 3rd and 7th.

4. British Airways discussions with representatives of amenity groups. Note prepared by British Airways.

During the course of the consultation period British Airways has held talks with representatives of Groundwork, the Environment Agency, the environmental strategy department of the GLA, the London History Society, the London Natural History Society, local historians, Friends of the Earth and the Society for the Protection of Ancient Buildings. The Purpose of these discussions was to gauge the extent of concerns about a new runway at Heathrow and to allow British Airways the opportunity to take account of these concerns when formulating its response.

Lack of information was a general concern, the view being that the consultation documents contained insufficient information to properly judge the impacts. The balance between economic, social and environmental issues required quantitative and qualitative assessment. The accent was on technological priorities, with no recognition of the social dimension. Nor was there any detail on the conservation value of the land that would be taken. The first need, it was said, was for a proper and complete survey of the area - with very wide scoping - conducted by independent ecological
consultants, to avoid 'the fiasco of T5' where, at the outset, the inspector was faced with two opposing assessments.

The site of the runway was only one issue. There would also be considerable disturbance to land well outside the perimeter for construction and other purposes. The Colne Valley regional park was at its most vulnerable in this sector. Where to mine gravels for construction would be an issue.

It was claimed that the Government’s proposals would affect more listed buildings and herald a scale of destruction greater than any single project ever mooted since listing began. In any normal circumstances the Government would unhesitatingly turn down these proposals. The mediaeval church at Harmondsworth attracted particular attention.

There was no confidence that what was supposed to be a short runway would remain as a short runway. People believed that the next step would be to make it longer to accommodate a wider range of aircraft. None of the parties involved in this proposal - Government, airport or airlines - had any track record of credibility in sticking to undertakings, however legally binding they may appear.

It was stressed that conservation was not just about special sites it was about ordinary landscape too. If habitats were not to be lost, thought needed to be given now as to how they might be replaced. Loss of land for T5 made this even more imperative. For example, noise affected bird breeding and pollution affected plant life. There was uncertainty about what protected species might be affected, but they could include bats and great crested newts.

There was praise for the fact that British Airways had been comprehensively monitoring ecological and bio-diversity factors in Harmondsworth Moor since 1998, with detailed ecological monitoring twice a year. This would be an excellent basis for studying other areas.

It was accepted that, while ecological and cultural issues were of concern, human effects were a lot more obvious. The impact of noise would decimate the area. One person thought was that a new runway would accelerate the long-term process of replacing manufacturing base with service industries, which offered lower pay and led to degradation of the housing stock. More expansion would overload all services in the area.

It was accepted that there would probably not be any reason to change water courses. But there were 23 users of ground water in the area and the impact on them would need to be considered. The particular effects of contaminants had to be studied.

The specific site proposed by the Government was condemned universally. Moving the site to the east could ameliorate some human and heritage concerns.
Surface access volumes

As indicated in Q20 above, we believe that it is instructive to compare, at a high level, the anticipated public transport mode share and volumes at the main sites for the "maximum use" and full expansion scenarios. Table 19 below sets out this comparison. The data are taken from the Stage Two Appraisal Findings Report. “Additional” comparisons are against the public transport volumes assumed for the maximum use cases.

Table 19: Comparison - Projected Surface Access Public Transport Volumes 2030

<table>
<thead>
<tr>
<th></th>
<th>Heathrow</th>
<th>Gatwick</th>
<th>Stansted</th>
<th>Cliffe</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Maximum use&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passengers requiring surface access (mppa)</td>
<td>66</td>
<td>41</td>
<td>21</td>
<td>0</td>
</tr>
<tr>
<td>Surface access public transport (%)</td>
<td>37%</td>
<td>39%</td>
<td>39%</td>
<td>0</td>
</tr>
<tr>
<td>Surface access public transport volume (mppa)</td>
<td>24</td>
<td>16</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Additional public transport to serve 40% share target (mppa)</td>
<td>2</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>0</td>
</tr>
<tr>
<td>Additional public transport to serve 50% share aspiration (mppa)</td>
<td>8</td>
<td>5</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Assuming full development</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passengers requiring surface access (mppa)</td>
<td>85</td>
<td>88</td>
<td>81</td>
<td>89</td>
</tr>
<tr>
<td>Surface access public transport volume at 35% share (mppa)</td>
<td>30</td>
<td>31</td>
<td>28</td>
<td>31</td>
</tr>
<tr>
<td>Additional public transport to serve 35% share (mppa)</td>
<td>6</td>
<td>15</td>
<td>20</td>
<td>31</td>
</tr>
<tr>
<td>Additional public transport to serve 40% share target (mppa)</td>
<td>10</td>
<td>19</td>
<td>24</td>
<td>36</td>
</tr>
<tr>
<td>Additional public transport to serve 50% share aspiration (mppa)</td>
<td>18</td>
<td>28</td>
<td>32</td>
<td>45</td>
</tr>
</tbody>
</table>

From this analysis, we identify the following key points:

Achieving the 40% public transport share target at a three runway Heathrow would require public transport provision for 8 mppa over and above that required for the 40% target in the maximum use scenario. This is an increase of less than 1/3.

For a new airport or fully developed Stansted or Gatwick, to achieve a 40% public transport mode share, additional public transport to serve 19 - 24 mppa would be required. This more than doubles the need from the maximum use scenario at Gatwick and adds three times as much demand for public transport infrastructure at Stansted.

For a fully-developed Cliffe, a requirement to provide public transport access for air passengers at Heathrow's target public transport mode share (40%), would necessitate new capacity provision for 36 mppa. This is more than twice Heathrow's current air passenger public transport usage. It is our view that such capacity (if practically possible) would need to be developed primarily at public expense.

Airports as public transport hubs (“key transport interchanges”)

Heathrow is already a significant public transport hub thanks to the high volume and extensive scope of rail, underground and bus services.

The Heathrow Area Transport Forum have identified the following key drivers which contribute to this:

- By the nature of their operation, airports offer special potential for development as multi-modal interchanges.
• An airport of any size is an important player in the economy of its region, making significant contributions in terms of wealth, job creation and economic regeneration. The concentration of large numbers of air passengers and employees creates significant opportunities for transport providers.
• In terms of commuter planning, airports provide concentrations of employment that make large-scale site-specific mobility management schemes successful.
• Airports offer significant opportunities for developing sustainable alternatives to the car for airport and non-airport related journeys.
• By setting out to become a regional or sub-regional transport hub the airport is acting as a good neighbour, co-operating to improve network conditions.
• In regional transport plans, airports should be seen as having a positive role in helping to create effective multi-modal networks.

At Heathrow, there is already an established and extensive network in place and because of the broader potential user base of services, funding of new public transport provision is less dependent on airport-related travel, making it more likely that business cases can be made and funding solutions will be easier.

Prospects for developing a similar transport hub at other sites, especially Stansted or Cliffe, and hence the opportunity for spreading the cost burden across more users, are weak. At best, such development might be a slow process, with the potential for imposing on the public purse long periods of development funding. At worst, there would be no realistic prospect of creating a transport hub, implying either poor economic cases necessitating continuing public subsidy for any new services. Alternatively, the range of services provided would be severely limited by lack of opportunity and economic justification. We believe this scenario is particularly likely to be the case for Cliffe, as the result of its isolated position, relative inaccessibility and absence of potential links to nearby population centres or transport hubs.

Road congestion management

We note that Government forecasts, together with the results of the various multi-modal studies, now explicitly recognise that traffic volumes, and thus congestion, on the road network across the UK will continue to grow.

In the South East, the response to road congestion will therefore become an increasingly important factor in transport generally across the region, whatever the runway location decisions.

Government has indicated interest in a mix of policy options for dealing with surface transport congestion so that it does not become a serious constraint on sustainable economic development. The mix of policy options embraces improving integrated public transport, including rail investment; demand management, including congestion charging options; and judicious new road building. For specific airport development to proceed there is a need to demonstrate, for any site, that a practical programme is available using a mix of these policy approaches. We consider that such a practical mix is available at Heathrow to support the development of a third runway.

We note that recent multi-modal studies - particularly Orbit and the Thames Valley study, together with the SEERA Draft Regional Transport Strategy all recognise the importance of airport access - especially to Heathrow. They advocate, in addition to the provision of substantially enhanced public transport, including new rail access, further consideration of area charging and other demand management measures on the strategic road network.

We recognise that some degree of management of the road network may be necessary.

As indicated above in the answer to Q5, we consider it is premature to advocate the introduction of a specific road demand management scheme in the West London/Thames Valley corridor. The need for and scope of demand management in this area should be addressed in developing the details of a third runway scheme.

A number of plans should be tested, as they have different advantages and disadvantages. If a wide ranging demand management scheme (for the areas of the Orbit and Thames Valley studies) were promoted by Government for national transport policy reasons, then the implications for Heathrow should be considered within that context. If the national policy approach to road usage does not move
forward to decision in the next few years, a Heathrow scheme, with full direct control by air transport stakeholders (airport operator and airlines) over the scheme design and use of the funds for public transport investment could be considered.

We would also reiterate two key principles with which any proposed demand management scheme would have to comply.

First, any demand management scheme for the strategic road network would presumably seek to deter lower priority vehicle movements in favour of higher priority movements. It must be recognised that airport access will, for most people making such a journey, rank as a very high priority and it would therefore be inappropriate to seek to actively discriminate against airport access flows specifically in any charging or management scheme for the trunk road network.

Second, the proceeds of any congestion charge or similar demand management measure introduced at airport(s) specifically must be hypothecated wholly for public transport developments which address the needs of the site where the funds are raised.

Road access

The adequacy of road access proposals depend on several key assumptions such as overall passenger volumes, the proportion of passengers requiring surface access and staff numbers. There are some apparent inconsistencies between options. We doubt the road network improvements postulated for eastern sites for the ‘big airport’ options would prove adequate in practice.

As with overall and public transport surface access volumes (see above), we believe that a high level comparison of anticipated passenger private transport volumes for the maximum use and full development scenarios is instructive. Once again these are taken from the Stage Two Appraisal Findings Report.

| Table 20: Private Transport Volumes 2030

<table>
<thead>
<tr>
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<th>Heathrow</th>
<th>Gatwick</th>
<th>Stansted</th>
<th>Cliffe</th>
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<tr>
<td>&quot;Maximum use&quot;</td>
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<td></td>
</tr>
<tr>
<td>Surface access private transport volume (mppa)</td>
<td>41</td>
<td>25</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td>Assuming full development</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surface access private transport volume (mppa)</td>
<td>51</td>
<td>49</td>
<td>44</td>
<td>47</td>
</tr>
<tr>
<td>Additional private transport access capacity required (mppa)</td>
<td>10</td>
<td>24</td>
<td>31</td>
<td>47</td>
</tr>
</tbody>
</table>

Even on this assessment, as with public transport access requirements, the incremental capacity to meet the fully developed road trip requirement at Heathrow would relatively modest in proportion to the anticipated maximum use volumes - an increase of less than \( \frac{1}{4} \). We consider that the increase in road traffic would be lower, as the share of transfer passengers at Heathrow would be greater (at 33%) than assumed in the consultation. With a mix of strategic and local rail and bus improvement, and local management initiatives, we would expect measures could be designed, if judged to be appropriate, such that no increase in passenger car access journeys took place above the higher end of the range that was considered when approval was given for T5.

In contrast, at Gatwick and Stansted the road based requirements for ‘big airport’ developments roughly double and treble respectively compared with the maximum use base case. At Cliffe, a wholly new road infrastructure provision would need to be created and funded from scratch, to be as great as that needed at any of the other airports.

With respect to employees, we note that in 2030, passengers per employee at both Stansted and Cliffe exceed the assumption at Heathrow by over 40%. If this assumption is not well founded, as it appears to us, either the number of employee trips at the eastern sites is substantially underestimated, or those at Heathrow is overestimated.
The overall estimated a.m. peak hour highway trips (2030) from the Stage Two Appraisal Findings show Heathrow with 4,872, 4,188 at Stansted and 2,839 at Cliffe. As noted elsewhere in this appendix, we doubt that the rail provision assumed in the consultation could, in practice, deliver the public transport mode shares assumed for the eastern sites. Demand for road use at those sites is therefore likely to be greater than is assumed and the proposed road improvements, consequently, inadequate.

**Alternative Heathrow - GWR links**

Other means of delivering additional rail capacity to Heathrow from the lines running to its north (in addition to the new services from the south) should be considered. As outlined in the consultation paper, options might include providing a direct western link from Terminal 5 to the GWR mainline (safeguarding for which was a requirement of the Terminal 5 permission), permitting suitable electric trains to serve Heathrow directly from Slough, Reading or beyond.

Alternatively, a surface station positioned to the west of Terminal 5 could provide a link to the GWR mainline, permitting trains unsuitable for the Heathrow rail infrastructure to operate from Reading, Wales, the West, and, given suitable developments at Reading and elsewhere, perhaps accommodating cross-country services from the Midlands or beyond.

Either of these developments are desirable and should be protected as strategic options, but current indications are that they are not essential for the successful operation of a three runway Heathrow. However, they may contribute more broadly to regional access integration (following the Orbit and Thames Valley Multi-Modal Studies) on which decisions are awaited. Accordingly, they should be additional to, and not a substitute for, through running services. Like Crossrail, these developments are highly dependent on other things, notably capacity on the GWR mainline and Reading Station developments, which are outside airport control. It would therefore be impossible to make this a condition of airport development, or to seek funding from aviation beyond the anticipated benefits that accrue. Instead, the broader decisions on regional surface access strategy need to be taken and we would welcome Government encouragement for the SRA to include these in development plans.

Capacity improvements on the GWR mainline would remove many capacity constraints driving service substitution proposals, presenting significant opportunities to provide new airport-related and other services. However, we recognise that practical considerations and the substantial scale of the required investment make it unlikely that any single project could support the investment. Very substantial public investment would therefore be required. For the strategic transport reasons outlined above, it would not, therefore, be appropriate for GWR mainline track capacity enhancements to be a condition of 3\textsuperscript{rd} runway development and nor would there be a justification for aviation funding.

**Stansted and Cliffe rail access**

We believe there are three major flaws in the consultation assumptions with respect to rail access to these sites.

First, it does not appear that sufficient account is taken of the ability of those rail services which are proposed to provide direct access to Stansted or Cliffe from the prime market concentrations located in and beyond the western half of London. In the case of a three runway Stansted (which implies an attempt to develop it as a hub, forced transfer of longhaul services from Heathrow and excludes any further expansion at Heathrow), for example, we are very far from persuaded that "a new line to the east of the airport, allowing services to Norwich, Ipswich and Chelmsford" will contribute significantly to the provision of a plausible public transport option for passengers from south-west London or the Thames Valley.

If convenient direct rail services are not available, demand for access by car will be likely to be greatly in excess of that estimated and of the capacity of the trunk road network, particularly the M25, to deliver.

Second, even where rail links are postulated which might serve the market, it appears that these rely to an extraordinarily high degree on the assumption that other services can readily be displaced in order to provide capacity for airport access. In the case of Stansted it is assumed that "Stansted services via Stratford might be incorporated into Crossrail, but they would need to displace other Crossrail services in their current plans." In the case of Cliffe, in addition to possible conflict with
Crossrail plans, it is assumed that, inter alia, airport express services run via CTRL to St Pancras.

However, the consultation also states that “Capacity on the CTRL, and St Pancras platform capacity, will be fully utilised by international and domestic services. Choices may have to be made between different uses of the line, altering the balance between international, Kent domestics and airport services.” Particularly given increasing concern about the extent to which Crossrail may already substitute for existing services, rather than provide additional ones, we do not believe that such assumptions on substitution are reasonable or realistic.

Third, we do not consider that the rail plans assumed in the consultation document have the ability to provide passenger access capacity on the scale required. In the case of a fully developed Cliffe, for example, to achieve the 50% public transport mode share postulated in Table 20 above, and assuming 85% of this was rail, it would be necessary to provide rail access for about 105,000 passengers per day. This is more than 9 times the current use of Heathrow Express by air passengers and we estimate that accommodating this volume could require a level of service equivalent to a full-length intercity train, every 10-15 minutes, in each direction, over a full 24 hour day.

We do not believe that the rail proposals outlined in the consultation could deliver capacity on anything approaching this scale. Nor do we see any prospect of Central London terminus capacity to handle such volumes being available. Very substantial public investment would be required to massively expand or provide completely new facilities. We consider that to meet the key requirements set out in Q20, investment on a scale more comparable with the £5.8bn in the Channel Tunnel Rail Link would be required. It follows that the cost estimates for public transport development at the eastern sites are inadequate. This is dealt with further in Question 6.