



Consideration of Consultation Responses

July 2015

Airports Commission
6th Floor Sanctuary Buildings
20 Great Smith Street
London SW1P 3BT

Web: www.gov.uk/government/organisations/airports-commission

Email: airports.enquiries@airports.gsi.gov.uk

© Crown copyright 2013, except where otherwise stated

Copyright in the typographical arrangement rests with the Crown.

You may re-use this information (not including logos or third-party material) free of charge in any format or medium, under the terms of the Open Government Licence. To view this licence, visit www.nationalarchives.gov.uk/doc/open-government-licence/ or write to the Information Policy Team, The National Archives, Kew, London TW9 4DU, or e-mail: psi@nationalarchives.gsi.gov.uk.

Where we have identified any third-party copyright information you will need to obtain permission from the copyright holders concerned.

ISBN 978-1-84864-162-4

Contents

Chair's Foreword	4
Section 1: Introduction	5
Section 2: Consideration of Consultation Responses	11
2.1 Scope and Structure of the Appraisal	12
2.2 Consultation and the Commission's Wider Process	16
2.3 Strategic Fit	20
2.4 Economy Impacts	33
2.5 Local Economy Impacts	37
2.6 Surface Access	41
2.7 Noise	48
2.8 Air Quality	56
2.9 Biodiversity	59
2.10 Carbon	61
2.11 Water and Flood Risk	63
2.12 Place	65
2.13 Quality of Life	68
2.14 Community	71
2.15 Cost and Commercial Viability	75
2.16 Operational Efficiency	81
2.17 Operational Risk	84
2.18 Delivery	85
2.19 Late Responses to Consultation	87
Annex A: Reports in the Commission's evidence base that have been updated or created since consultation	88

Chair's Foreword



The public consultation the Airports Commission launched last November is certainly one of the most extensive ever undertaken on a public policy question in the UK. It stimulated well over 70,000 responses, from individuals, public authorities, trade associations, companies, NGOs and campaigning organisations of varying kinds.

This report provides an overview of the responses received in the various areas of the Commission's analysis and explains how it has responded to the points made in its *Final Report* and recommendations, published at the same time. More detail is available on the Commission's website.

In a number of areas respondents made important points which required further consideration. This report describes the further work done. Overall, the consultation exercise has a significant effect on the *Final Report*, especially on the conditions which should be attached to any airport expansion, on the environmental policy implications, and on the way local communities should be involved in future.

The Commission and its staff are very grateful to all those who responded, especially to those individuals and organisations who did so in a voluntary basis. They can be assured – even if the outcome is not the one they would have favoured – that their efforts were worthwhile.

A handwritten signature in black ink that reads "Howard Davies". The signature is written in a cursive, flowing style.

Howard Davies

1. Introduction

- 1.1** This document records the key themes made in response to the Airports Commission's consultation on three options for expanding the UK's aviation capacity, and the Commission's response to these points.

Background to the consultation

- 1.2** On 11 November 2014 the Airports Commission launched a consultation on three options for expanding the UK's aviation capacity. The three options – a second runway at Gatwick, an extension of Heathrow's northern runway, and a new runway to the north west of Heathrow – were short-listed in the December 2013 *Interim Report*. The consultation period lasted for 12 weeks, closing on 3 February 2015. During this period over 70,000 responses were received from all parts of the UK as well as overseas. The Commission is grateful to all respondents for their contributions.
- 1.3** At the point of publication the consultation materials formed the latest stage of the analysis of the UK's aviation connectivity needs undertaken by the Commission. The full body of this work was conducted over two and a half years and comprised multiple calls for evidence, consultations and the *Interim Report*. Full details of its entire programme of work can be found on the Airports Commission's website.

Work undertaken before the consultation

- 1.4** The Airports Commission was set up by the Government in November 2012 as an independent body. Its remit was to examine the scale and timing of any requirement for additional capacity to maintain the UK's position as Europe's most important aviation hub. It was tasked with identifying and evaluating how any need for additional capacity should be met in the short, medium and long-term.
- 1.5** In its *Interim Report* the Commission identified a need for one net additional runway in London and the South East by 2030, and shortlisted for detailed appraisal and public consultation the three options listed above. It also announced that it would undertake further work into the feasibility of an airport in the inner Thames Estuary. This work concluded in September 2014, at which point the Commission ruled out further consideration of an airport in this location.

1.6 In April 2014, further to a six week consultation, the Commission published its *Appraisal Framework*. This document contained objectives against which each of the schemes would be judged, and details of the assessments that would be undertaken. In May 2014 updated versions of the three options were submitted to the Commission by the scheme promoters: Gatwick Airport Ltd, Heathrow Hub Ltd (a private organisation separate from the airport itself) and Heathrow Airport Ltd. The Commission then undertook a detailed analysis of each scheme, the results of which were the subject of the consultation discussed in this report.

Consultation aims

1.7 The main goals of the consultation were to:

- test the evidence base the Commission had assembled;
- understand stakeholders' views as to the accuracy, relevance and breadth of the assessments undertaken; and
- seek views on the potential conclusions that might be drawn from them.

1.8 The Commission also welcomed evidence and ideas about improving the short-listed options (for example, through mitigation measures to address specific impacts).

1.9 To prompt responses in these areas the consultation posed eight questions, set out below.

Questions inviting views and conclusions in respect of the three short-listed options	Q1: What conclusions, if any, do you draw in respect of the three short-listed options? In answering this question please take into account the Commission's consultation documents and any other information you consider relevant.
	Q2: Do you have any suggestions for how the short-listed options could be improved, i.e. their benefits enhanced or negative impacts mitigated?
Questions on the Commission's appraisal and overall approach	Q3: Do you have any comments on <u>how</u> the Commission has carried out its appraisal?
	Q4: In your view, are there any relevant factors that have not been <u>fully addressed</u> by the Commission to date?

Questions inviting comments on specific areas of the Commission's appraisal	Q5: Do you have any comments on how the Commission has carried out its appraisal of <u>specific topics</u> (as defined by the 16 appraisal modules), including methodology and results?
	Q6: Do you have any comments on the Commission's <u>sustainability assessments</u> , including methodology and results?
	Q7: Do you have any comments on the Commission's <u>business cases</u> , including methodology and results?
Other comments	Q8: Do you have any other comments?

Work undertaken since consultation

- 1.10** The consultation process has greatly enhanced the Commission's work. Respondents suggested ways to improve the short-listed options and highlighted areas for development in the evidence base, in many cases submitting analyses that could be considered alongside or incorporated into the Commission's own work.
- 1.11** Since consultation a great deal of work has been undertaken to address these comments. Measures to amend or enhance the short-listed schemes have been considered, and substantial new pieces of analysis have been undertaken to address questions or concerns raised through consultation. Over 50 technical reports are being published alongside the *Final Report*, either to update existing analysis, or as entirely new pieces of research. These pieces of work are referenced throughout this document, and are summarised at a high level in **Table 1**. A full list of all the reports in the Commission's evidence base that have been updated or created since consultation is published at Annex A.

Table 1: Summary of new work undertaken since consultation

Appraisal Module	Summary of work undertaken since consultation
Strategic Fit	In addition to reviewing and updating the demand forecasts and scenarios, further work has been undertaken to consider the competition impacts of expansion and mechanisms to influence connectivity outcomes, particularly domestic connectivity.
Economy Impacts	Work has been conducted to further test the macroeconomic S-CGE analysis, and a new piece of work has been completed to consider wider economic impacts via a more conventional welfare approach. These approaches have been tested against various carbon policy sensitivities.
Local Economy Impacts	The forecast demand for new amenities and housing, and the assessment of land required to meet this demand, have been reviewed. Similarly, the analysis on the sizes and behaviours of local labour markets have been reviewed.
Surface Access	A new process of dynamic roads modelling has been completed on specific local and strategic roads. Further analysis on levels and impacts of road freight, research and sensitivity tests on demand management measures and a review of the resilience of surface access links to both Heathrow and Gatwick have also been completed.
Noise	A new review of the health and social impacts of noise has been conducted, along with further analysis of night flights and the effects associated with changes to fleet mixes. An optimised set of flight paths for the Heathrow Airport Extended Northern Runway scheme has been produced and tested, as has a respite scenario at Gatwick.
Air Quality	Detailed dispersion modelling has been completed and the results of this work put out to consultation. All discussion of this work is contained in the report <i>Consideration of Air Quality Consultation Responses</i> .
Carbon	Sensitivities have been constructed to investigate how potential policy mixes could be implemented to meet the Committee on Climate Change’s planning assumption, and further work has been undertaken on the carbon-traded appraisal.
Quality of Life	The various health analyses from across the appraisal framework have been collated into one comparative assessment, and additional analysis has been produced to understand the value of leisure travel on people’s quality of life.
Community	New research has been completed considering comparative international compensation and mitigation packages. And a review has been undertaken of the equalities impacts of each of the three short-listed schemes.
Cost and Commercial Viability	A review of cost estimates has been produced, alongside a piece of work considering amendments to scheme designs that could reduce overall costs. Market soundings and additional research have been completed to improve understanding of the availability of private finance.
Operational Efficiency	A review of the risk of accidents occurring has been completed by the Health and Safety Laboratory, and the airfield capacity estimates for each of the schemes have been reviewed by the Commission’s advisors.

Published responses

1.12 Consistent with its approach to an open and transparent process, the Commission has also published on its website the substantive, technical responses submitted to the consultation. This numbers around 200 responses, and comprises submissions from both organisations and members of the public.

Purpose of this document

1.13 This document records the key themes raised by respondents to the consultation and the Commission's response to these points.

1.14 As the primary aims of the consultation were to test the evidence base assembled and understand respondents' views as to the accuracy, relevance and breadth of the assessments undertaken, this report is mainly focused on the responses that were relevant to these topics.

1.15 Respondents to the consultation did not necessarily restrict their comments to the analysis on the three short-listed options; they also touched upon topics covered by the Commission earlier in its process. This document tells the reader where to find the evidence base pertaining to the key points raised by the stakeholders – be that in the consultation documents or elsewhere – and offers a high level explanation of how these points were addressed. Where new work has been undertaken by the Commission in response to points raised, a brief explanation of this work is provided.

Annex B – Analysis of the Airports Commission's Consultation Responses

1.16 Further detail on the consultation – including a summary of the themes raised by respondents, a coding framework capturing all of the points made in the more than 70,000 responses, and an explanation of how the consultation was managed and how responses were analysed – is contained in the report *Analysis of the Airports Commission's Consultation Responses*, attached at Annex B. This report has been produced by the consultancy firm SYSTRA on behalf of the Commission.

1.17 Whereas the primary function of Annex B is to provide details of what consultation responses said (including a full coding framework of every point made in responses), the main body of this *Consideration of Consultation Responses* report explains how the Commission has considered and responded to the key themes raised, and to comments that materially affected its analysis.

1.18 SYSTRA's work has been used as an input into the independent analysis of runway capacity options undertaken by the Commission and its Secretariat. Whilst Systra has handled many of the functions of capturing, storing, analysing and summarising responses, the Commission has at all times been ultimately responsible for all aspects of the consultation. All work undertaken by SYSTRA on behalf of the Commission has been reviewed by the Commission Secretariat.

Document structure

1.19 This document is structured in relation to the 16 modules in the Commission's *Appraisal Framework*. The objectives of each module are set out at the start of each chapter.

1.20 There are three exceptions: the first chapter, which considers comments received on the scope and structure of the appraisal; the second chapter, which considers comments received about the consultation process itself; and the final chapter, which gives a summary of late responses to the consultation.

Air quality consultation

1.21 In its *Consultation Document* the Commission acknowledged that whilst the high-level air quality modelling presented for consultation enabled a comparison to be made of the scale of impacts and risks associated with each option, its intention was to supplement this analysis with more detailed dispersion modelling. Consultation responses reinforced the view that this work – and the opportunity to comment on it – would be of value to a wide variety of respondents, particularly those in close proximity to the airports.

1.22 This supplementary dispersion modelling was completed and put out to consultation on 8 May 2015 in the report *Air Quality: Local Emissions – Detailed Emissions Inventory & Dispersion Modelling*. The modelling provided further information on how the local and EU limit values could be affected by expansion of either Heathrow or Gatwick, and potential measures to mitigate these effects. Full details of the additional air quality consultation, including the Commission's conclusions in this area, are set out in the report *Consideration of Air Quality Consultation Responses* and the *Final Report*.

Section 2:

Consideration of Consultation Responses

2.1 Scope and Structure of the Appraisal

Appraisal and assessment

- 2.1.1** A number of respondents submitted general comments on the Commission's appraisal. Positive comments focused on the thoroughness of the analysis, the breadth and depth of the evidence base and the fair, objective and balanced nature of the assessments. The following negative comments were also received: that some of the assessment conclusions were unrealistic, or in the context of the *Sustainability Assessment*, relied too much on subjective judgements; that it was difficult to compare the performance of the three schemes against each other; and that not enough had been done to test the accuracy of figures put forward by the scheme promoters.
- 2.1.2** In general, the independence of the Commission was identified as a strength of the assessment, although some parties questioned whether the assessment was truly independent, suggesting that the appraisals were either commercially or politically driven.
- 2.1.3** The appraisal was undertaken in line with the published *Appraisal Framework*, which was the subject of a consultation in early 2014. Judgements on the type and severity of particular impacts were made as objectively as possible, and informed by the Commission's independent consultants or expert advisors. Where appropriate the results of the assessments were expressed in a manner which aided direct comparison between the three schemes, for example quantitative results, or by rating sustainability impacts on a five-point scale from 'highly supportive' to 'highly adverse'.
- 2.1.4** Any appraisal information submitted by scheme promoters was always rigorously tested for accuracy, and where the Commission's assessment results differed from a scheme promoter's results this was spelled out clearly in the consultation documents.

- 2.1.5** Further to reviewing responses the Commission has concluded that no measures to amend its overall approach to appraisal are required.

Appropriateness of areas selected for appraisal

- 2.1.6** A further criticism of the appraisals, made in relation to many of the individual modules, and to the *Business Case and Sustainability Assessment* constructed for each scheme, was that they focused upon an inappropriate study area, excluding people from the analysis who thought that they would in fact be heavily impacted by the new development. Respondents normally argued that the appraisal area was too narrow and constricted to account for all of the impacts of the schemes. Examples of this included respondents arguing that the noise assessment area was too limited, that the impacts on people's quality of life were considered in too small a locality, that the surface access assessment failed to factor in the impacts on communities or transport networks at some distance from the schemes, or that the environmental assessments failed to appreciate how impacts in one area could have knock-on effects in another. Where these concerns were specific or numerous, they have been discussed in the relevant appraisal section below.
- 2.1.7** Across the appraisal, the size and scale of assessment areas were defined in conjunction with expert advisors and considered in relation to guidance on best practice and the precedents set by similar appraisals. Rather than adopt a one-size-fits-all approach, the size and scale of the assessments were tailored to individual areas of the appraisal. The terms of each assessment were set out in the *Appraisal Framework*, which was itself subject to consultation early in 2014.
- 2.1.8** Having reviewed its suite of assessments the Commission believes that it has conducted its assessments over appropriate areas, meeting its requirements (set out in its terms of reference) to consider the local and national implications of the proposals, whilst keeping its analysis proportionate and accessible.

Assessment of current airport impacts

- 2.1.9** A common theme in responses was that the assessments pre-supposed that the current situation at both airports, particularly in relation to environmental costs such as noise and air quality, was acceptable, when in fact this was not the case. This argument was often supported by the assertion that proposed mitigation measures such as compensation packages needed to be implemented now, irrespective of any decision on the new runway. Relatedly, a number of respondents argued that the Commission had either failed to do an assessment of the current day situation

at each airport, or that the assessments it had undertaken on the present situation were inadequate.

2.1.10 In most appraisal areas no assessment was undertaken of current impacts at each airport. Where an appraisal did undertake or make reference to an assessment of current day impacts, such as considering current day numbers of people affected by noise, the consultation did not seek views on the acceptability of these situations. Rather, across the appraisal the Commission considered the impacts of each scheme in relation to 'do minimum' scenarios in future years. These do minimum scenarios forecast the future operation and impacts of the airport (whether Heathrow or Gatwick) in a scenario where it is not expanded, considering future changes likely to happen to the airport as a result of background or prevailing trends. A do minimum benchmark treats the airport as a changing, rather than static, entity, and therefore allows for a more revealing analysis of the future expansion options than consideration against current day situations.

2.1.11 Further to reviewing consultation responses the Commission has concluded that no additional work is required in this area.

The impact of expansion on the 'losing' airport

2.1.12 Some respondents argued that the assessments failed to consider the impacts of expansion on the other short-listed airport. For instance, some respondents argued that no assessment is undertaken of impacts on the local economy surrounding Gatwick in 2030, in a scenario where Heathrow is expanded. Some respondents observed that the omission of such assessments meant that the appraisal was not comprehensive.

2.1.13 Some assessments, such as passenger forecasts, air transport movements forecasts and airspace assessments, do consider the impacts of expansion at the short-listed site that is not taken forward. Equally, future impacts at short-listed localities not selected for expansion were considered by the Commission in the various do minimum assessments of each option. However, these assessments considered future scenarios absent any airport expansion, and did not consider the impact of one short-listed site remaining static whilst another short-listed site was expanded. Further to considering this issue, the Commission believes that it has no requirement to consider future secondary impacts on its two short-listed locations any more than on its non short-listed locations (such as, say, Birmingham Airport or Stansted Airport and their localities), and has therefore done no specific further work to address these areas above and beyond any analysis of sectoral, national or regional impacts already present in the appraisal.

Business Case and Sustainability Assessment

- 2.1.14** A number of comments were received on the *Business Case and Sustainability Assessment* constructed for each scheme. Most of these comments related to specific areas of the appraisal, and have been dealt with in the relevant sections of this report.
- 2.1.15** A common comment was that the *Sustainability Assessments* and their judgements overstated the benefits of the expansion options whilst understating their disadvantages. This comment related both to the judgements put forward on sustainability impacts, and to the depth of analysis in some areas of the appraisal compared to other areas.
- 2.1.16** The judgements on sustainability impacts were reached further to expert advice from the Commission's advisors, including members of the Expert Advisory Panel. As set out in the consultation documents, these judgements have been reviewed in light of responses to consultation and the further work that these have entailed. Further to this review the Commission has retained the majority of the sustainability impact judgements made at the point of consultation, but adjusted its judgement in some areas, namely Economy Impact, Local Economy Impact and Quality of Life. (Note, further to the consultation on air quality dispersion modelling, the Commission's views on the air quality objective impact judgement are set out in the report *Consideration of Air Quality Consultation Responses*.)

Decision-making process

- 2.1.17** Some respondents argued that it was unclear from the consultation materials how the Commission intended to weigh the different appraisal objectives and outcomes in order to make its final decision. Respondents asked that the scoring and weighting system be made explicit, or stated that such a system should be devised if it did not already exist.
- 2.1.18** The *Appraisal Framework* stated that 'The Commission does not intend to specify any weightings in relation to individual modules, but will assess each proposal against the objectives [described in this framework]', and was clear that the Commission's final decision would be underpinned by a consideration of all of the objectives. Further to a review of consultation responses the Commission still considers its process to be appropriate and robust and does not intend to amend this approach.

2.2 Consultation and the Commission's Wider Process

Scope of the consultation

2.2.1 Some respondents argued that the scope of the consultation was too narrow. In particular they said that the consultation documents did not fully consider the following, alternative methods of meeting the UK's connectivity needs: the option of expansion via an airport in the inner Thames Estuary; options to expand existing airports that had not been short-listed; or the option of not expanding at all and refocusing efforts on other options, such as high-speed rail or redistributing flights away from the South East.

2.2.2 The last two of these comments are discussed in the Strategic Fit section of this report, with reference to the analysis undertaken in the Commission's *Interim Report*. A more detailed analysis of the feasibility of an inner Thames Estuary Airport was published by the Commission in summer 2014, in the report *Inner Thames Estuary Airport: Summary and Decision Paper*. The Commission is content that these themes were covered appropriately in its previous publications and did not need to be discussed again in the consultation documents, which were developed to enable comparison between the short-listed schemes. Nevertheless, the consultation questions encouraged respondents to comment on the totality of the Commission's work, and comments received on these topics have been reviewed and considered as part of the analysis.

Accessibility of the consultation

2.2.3 Some comments were submitted relating specifically to the consultation. A recurring theme was that the consultation was inaccessible, either because of limited access to or publicity of the public evidence sessions held during the consultation period, or because the language of the consultation documents was too technical for a non-expert to understand. The argument was put forward that greater levels of engagement between the Commission and the general public would have made the consultation more accessible. Other respondents said that the consultation period was too short, or that insufficient time was set aside to consider new pieces of evidence published during the consultation. Further responses stated that it was not always easy to differentiate between the

engagement of scheme promoters and the Airports Commission, and in some cases complaints were made that scheme promoter engagement was confusing.

2.2.4 The Commission's consultation was designed to be accessible to a comprehensive and diverse group of stakeholders. The consultation could be accessed in a range of alternative formats and translated into other languages. Extensive national media coverage on the day of the consultation launch raised public and stakeholder awareness and this was supplemented by social media and emails to stakeholder organisations. Public discussion sessions held in the Heathrow and Gatwick areas – plus a regional engagement event held in Manchester, organised by the independent platform Runways UK – helped to maintain the public profile of the consultation.

2.2.5 The public discussion sessions at each short-listed site comprised invited panellists (Members of Parliament, leaders of local authorities, community groups and business interests) speaking both for and against the proposals, followed by live questioning from the Commission, all undertaken in front of a public gallery. Audience members were also provided the opportunity to make statements expressing their views. Tickets for the event were promoted through social media and targeted emails to community representatives, and were available on a first come first served basis. Demand for tickets was high and both events were fully booked (although not all places were filled on the day), with members of the public forming the majority of attendees. Transcripts from the events were published on the Commission's website during the consultation. The two discussion sessions were followed by evening public drop-in sessions, hosted by the Commission Secretariat, which were open to all members of the public to come and find out about the consultation and how to respond to it. These events were promoted through the Commission's twitter feed, communication with local community groups and through letters to local media outlets. The Commission considers that its promotional and engagement activities were proportionate and effective, and that interested parties were both aware of the consultation and how to respond to it.

2.2.6 At the event in Manchester, Sir Howard spoke about the regional implications of airport expansion and advertised the national consultation. Again information on this event, including a link to a video of Sir Howard's speech and question and answer session, was posted on the Commission's website during the consultation period.

2.2.7 The information put out to consultation was substantial and technical in nature, covering highly-specific topics such as noise, air quality and economic modelling, and the Commission recognises that some parties may have had difficulty engaging

with some of the material. To help respondents access the material the information published was tiered, with a non-technical summary designed to explain simply each scheme and its impacts, underpinned by more detailed analyses and technical reports. This approach – and the consultation questions – were designed to make the consultation accessible for all types of respondent. At all stages of designing and implementing the consultation advice was taken from an expert peer-review body, and the Commission is content that the final consultation documents were appropriate for allowing considered scrutiny of its work.

2.2.8 The consultation lasted for twelve weeks, an appropriate consultation period for a major consultation on a topic of national importance. During the course of the consultation a few amendments or additions were made to the consultation materials, either to correct errors identified by respondents, to respond to requests for further information to be published or, in one case, to publish a supplementary piece of analysis (which was flagged in the original consultation materials). In all cases it was judged that these changes would better inform responses. All changes were advertised via the Commission's website. The Commission is content that it provided an appropriate and reasonable period of time for the consultation.

2.2.9 The materials published on the website clearly differentiated between the Commission's analysis and that of scheme promoters, and where the Commission's assessment results differed from a scheme promoter's assessment results this was spelled out clearly in the consultation documents.

Campaign responses

2.2.10 In the latter stages of the consultation, further to concerted efforts by campaign groups to encourage responses, some respondents expressed concern that the weight of responses submitted by campaign groups would skew the Commission's analysis.

2.2.11 The analysis of consultation responses is centred on the strength of the points raised in consultation, and not the frequency with which these points are raised, and therefore the Commission's review of responses has not been skewed by the weight of responses submitted by campaign groups.

Local residents' opinions

2.2.12 A large number of respondents stated that the opinions of local residents had been insufficiently considered in the appraisal, and that more should have been done by the Commission to elicit and understand local residents' views, including the views

submitted by local MPs and other elected representatives. Another very common theme, stimulated by a campaign in the Gatwick area, was that the consultation documents were wrong to state that 'local opinion is mixed' on the issue of expanding Gatwick, arguing that in fact opposition to Gatwick expansion was very strong in the area.

- 2.2.13** The opinions of local residents and of their elected officials have been considered carefully by the Commission in its analysis of consultation responses. (In addition, meetings and discussions with elected representatives local to the short-listed sites have occurred throughout the course of the Commission's work – details of the Commission's meetings are published on its website.) As described above, during the consultation the Commission held public evidence and drop-in sessions in the vicinity of the short-listed schemes, in which the views of local residents could be expressed and their questions answered.
- 2.2.14** If the Government were to take forward the Commission's recommendation further consultation with local communities would be required, for instance as part of the planning process, to inform the development of new flight paths or as part of the determination of appropriate mitigation and compensation plans. These processes are discussed further in the *Final Report*.
- 2.2.15** The Commission has noted the view that there is strong opposition to expansion of Gatwick in the local area as part of its analysis of consultation responses.

2.3 Strategic Fit

Objectives	<p>To provide additional capacity that facilitates connectivity in line with the assessment of need;</p> <p>To improve the experience of passengers and other users of aviation;</p> <p>To maximise the benefits of competition to aviation users and the broader economy; and</p> <p>To maximise benefits in line with relevant long-term strategies for economic and spatial development.</p>
------------	---

Challenges to the conclusions of the *Interim Report*, including the assessment of need

- 2.3.1** Several respondents to the consultation disagreed with the assessment that the UK needs one net additional runway in London and the South East to come into operation by 2030. Some respondents stated that the need for greater capacity had not been sufficiently demonstrated, claiming that there was no need for any new aviation capacity, either due to the increased prominence of viable alternatives to aviation – such as video-conferencing – or because traffic could be distributed away from London and the South East to unfilled capacity elsewhere in the country. Relatedly, some respondents expressed the view that capacity options could not be agreed until greater clarity was achieved on the function of the expanded airport.
- 2.3.2** Other respondents called for more than one of the short-listed options – and sometimes even more airports – to be expanded before 2030, often arguing that this would provide greater choice for passengers and encourage competition between airports, or that the market should dictate where future capacity ought to be built.
- 2.3.3** Further responses agreed that expansion was necessary but argued against the choice of the three short-listed options. Particular support was expressed for expansion at Stansted, Luton, Birmingham and in the North (no particular location defined), with arguments provided for why there was a more compelling case for expansion at these (and other) airports than at the short-listed sites.

- 2.3.4** The Commission's assessment of the need for additional aviation capacity and the analysis underpinning that assessment can be found in the *Interim Report*. In reaching its conclusion that the UK needs one net additional runway in the South East to be operational by 2030, the Commission considered the following factors: future demand for aviation, factoring in the impact of technologies such as video-conferencing; the pressure the London airport system is forecast to be under by 2030 through to 2050 absent runway expansion and the negative consequences of this, including reduced levels of domestic and international connectivity and worsening resilience; the substantial economic benefits and connectivity increases that would accrue from airport expansion in the South East; the effectiveness of measures to distribute demand away from airports in London and the South East (ultimately finding that these would detract from the UK's overall levels of connectivity and be less efficient in carbon terms); and the type of airport system that could best deliver the UK's connectivity requirements, concluding that the optimal approach is to continue to invest in an airport system that caters for a range of airline business models.
- 2.3.5** The assessment of need also, however, recognises the future factors which limit the scope for airport expansion, such as the need to grow aviation in line with the UK's climate change commitments, and the conditions necessary to attract private finance to fund the expansion. Full details of these arguments are set out in the *Interim Report*. Further to reviewing consultation responses the Commission remains satisfied with its assessment of the need for additional capacity.
- 2.3.6** The *Interim Report* also sets out the sifting process that led to the shortlist of options for expansion, and the reasons why other options were not taken forward. This process comprised a review of over 50 initial options, considered in relation to a wide-range of criteria including strategic fit, surface access, environmental impacts, impacts on people and communities, cost, operational considerations and delivery issues. The Commission remains satisfied with the conclusions of this work.

Plausibility of future forecast scenarios

- 2.3.7** Several respondents to the consultation argued that one or more of the demand forecast scenarios were based on unrealistic assumptions of how global and aviation industry trends may develop. Specifically, these included doubts over the likelihood of a second hub being established at Gatwick, of low-cost carriers moving to Heathrow, and of low-cost long-haul becoming a sustainable business model. Whilst all of the scenarios were subject to scrutiny by various stakeholders,

the *low-cost is king* scenario was the most heavily criticised, with airlines in particular questioning its underpinning assumptions and connectivity outcomes.

2.3.8 It is important to note that the scenarios were not devised in order to present the most likely states of the world in the future. Rather, they were constructed (1) to assess whether one net additional runway was needed in London and the South East by 2030 under different states of the world; and (2) how robust each of the short-listed options for new capacity would be to long-term structural changes affecting demand and supply in the industry. To this end, the Commission believes that the scenarios have been effective in allowing it to test the robustness of the short-listed options across different potential future states of the world.

2.3.9 Post-consultation the comments on the plausibility of the scenarios were carefully considered, and the technical queries and comments raised by respondents were reviewed by advisors. This work confirmed the robustness of the scenarios approach.

2.3.10 In addition, to further test the plausibility of the *low-cost is king* scenario an additional sensitivity test has been run on this analysis. At consultation, under *low-cost is king* the Gatwick Second Runway proposal performed more strongly comparative to the two Heathrow options than in any other scenario. It was not clear, however, to what extent that result was dependent on the higher economic growth and lower operating cost predictions in *low-cost is king*, rather than being driven purely by the changes in industry structure (such as the use of low-cost services by transfer passengers) incorporated into the scenario. Therefore, a sensitivity test has been run using the same macroeconomic assumptions as the *assessment of need* scenario and the industry-structure changes from *low-cost is king*. The results of this sensitivity suggest that Gatwick has the highest economic efficiency benefits of the options. Therefore, it can be concluded that the scheme's high performance under this scenario is driven by the industry-specific interventions, such as seeding, rather than higher economic growth and lower operating costs.

2.3.11 The Commission has incorporated these latest pieces of analysis – contained in the new report *Strategic Fit: Review of Airports Commission's Forecasts and Scenarios* and the revised report *Economy: Updated Transport Economic Efficiency Impacts* – into the evidence base used to inform its decision.

Demand forecasting

2.3.12 Some respondents argued that the Commission's forecasts underestimated future demand for aviation, whilst others argued that they overestimated it. In particular

some respondents criticised the Commission's forecasting methodology, and the National Air Passenger Allocation Model (NAPAM) in particular. One of the scheme promoters criticised this model, and suggested alternative models and modelling results that could be considered. A further set of responses argued that very long-term projections for air travel had not been factored into the analysis, and that this was a weakness of the appraisal.

2.3.13 The Commission's 2013 report *Discussion Paper 01: Aviation Demand Forecasting* sought responses from stakeholders on the best and most appropriate ways to forecast future aviation demand. On the basis of this consultation it was concluded that the Department for Transport's aviation passenger demand model offered the most robust forecasting tool available to assess national demand for aviation in the UK, but that a range of improvements could be made to enhance its performance. A series of upgrades were made to this model prior to the *Interim Report* – including better factoring in of competition from international hubs, revisions to the input data used and an improved methodology for handling risk and uncertainty – and the updated model remained the basis of the Commission's forecasts at the point of consultation.

2.3.14 In the light of comments received at consultation, two additional pieces of analysis have been undertaken on the existing scenarios. The first is a review of the key criticisms made by respondents, including concerns regarding the plausibility of the forecast outputs and of the forecast scenarios used. The second is a review by a member of the Expert Advisory Panel of the main alternative forecasting model identified. These pieces of analysis can be located in the new reports *Strategic Fit: Review of Airports Commission's Forecasts and Scenarios*, *Strategic Fit: Expert panellist review of alternative forecasting model* and *Strategic Fit: Expert panellist review of the Airports Commission's forecasting model in relation to the alternative model provided in consultation*. Both of these reviews provided positive assessments of the demand forecasting model used by the Commission, concluding that it is the most suitable tool available for the task, and that the various points raised by the consultees do not provide persuasive evidence that the airport allocation model is inaccurate or biased. The reviews also identified limitations in some of the other modelling options put forward to the Commission in consultation.

2.3.15 Separately, two additional sensitivity tests have been undertaken, one using the latest input data in the forecasts, such as new oil prices and GDP forecasts, and the other removing the adjustments made to ensure the forecasts align with actual data. The results of these tests – which show a small increase in underlying

passenger demand on the one hand, and a reduction in model performance on the other – are published in the updated report *Strategic Fit: Updated Forecasts*. The forecasts have been compared against those of airlines, as well as the aircraft manufacturer Airbus. The Commission believes it has produced the most robust demand forecasting data possible to inform its final decision.

Presentation of results across scenarios

2.3.16 At the point of consultation forecasts from different scenarios were applied to different parts of the appraisal. None of these scenarios was treated as a ‘central’ or ‘baseline’ forecast: as explained above, the purpose of the scenarios was not to use them to identify a single correct or most plausible future, but rather to enable consultees to understand the variability of the forecasts and appraisal results for each scenario as a result of different assumptions about long-term economic growth and industry development. Some respondents to consultation mentioned that presenting analysis across all five scenarios led to wide ranges of results which made it difficult to interpret or draw firm conclusions from the assessments.

2.3.17 The approach adopted for consultation had both advantages and disadvantages. It ensured consultees were presented with a rich data set in relation to each of the schemes and ensured the assessments incorporated a range of possible outcomes. In doing so, it reduced the risk of drawing conclusions on the basis of over-simplistic assumptions, for example that recent trends in passenger demand growth – either in general or at specific airports – would necessarily continue into the future. It also provided a helpful indication of what the best-case and worst-case impacts of capacity expansion could be.

2.3.18 It also, however, led to a complex approach to forecasting, with multiple results being produced for each short-listed proposal and – as a consequence – wide ranges of appraisal results elsewhere, such as noise impacts and economic benefits.

2.3.19 In response to respondents’ comments the approach adopted at consultation has been amended. A single scenario – the *assessment of need* scenario – is now used as the starting point for the analysis of impacts, with the results of this analysis then tested against other scenarios as appropriate.

2.3.20 The *assessment of need* scenario has been selected due to its position in the mid-range of the scenarios, its use of verifiable historic relationships in the growth and allocation of demand and, in particular, its use of central projections of economic and population growth, oil prices and other drivers. These are most likely to be in

line with the assumptions used by other relevant decision-makers when making their assessments of future demand, including airlines and aircraft manufacturers. They are also broadly in line with the assumptions which will be used by the UK Government in considering the recommendations in the *Final Report*. In its review of the forecasts, discussed under ‘Demand forecasting’ above, the Commission’s advisors supported the decision to present all assessments in relation to the *assessment of need* scenario, noting that its relevance and likelihood was not specifically criticised by consultation respondents, and that it was recognised as relevant by the aviation industry.

- 2.3.21** The Commission believes that the approach outlined above responds to concerns regarding the complexity of the scenario-based approach and simplifies the presentation of the analysis, enabling the relative performance of the three short-listed options to be assessed more easily.

Economic assessment on the basis of carbon emissions being constrained to the Committee on Climate Change’s planning assumption

- 2.3.22** A number of respondents argued that in a carbon-capped future expansion at Heathrow or Gatwick would inhibit further growth at regional airports. This topic is dealt with in the Carbon section of this report.
- 2.3.23** Some respondents argued that the assessments were unequal and inconsistent in their treatment of carbon. Specifically, some respondents commented on the need to monetise transport economic efficiency impacts of expansion in the carbon-capped forecast, whereby emissions are capped according to the Committee on Climate Change’s (CCC’s) planning assumption. Others stated that the Commission should identify the additional policies that would need to be in place in order to meet the CCC’s planning assumption – that gross CO₂ emissions from UK aviation in 2050 should not exceed 2005 levels (37.5MtCO₂) – in the case of expansion. And some further respondents argued that environmental impacts should be monetised in the carbon-traded scenario.
- 2.3.24** Since the consultation, further work has been undertaken to complete a fuller economic assessment of the case for airport expansion incorporating the CCC’s planning assumption. At the time of the consultation it had not been possible to assess the transport economic efficiency or wider economic impacts in this scenario. Since then, the Commission has developed an approach to monetising these impacts in order to complete the assessment. Specific sensitivities have also been used to investigate how new technology in aviation could be implemented to

meet the carbon target and how a potential policy mix could work. These analyses suggest that incorporating the CCC's planning assumption would reduce the potential transport economic efficiency and wider economy benefits that derive from expansion, though the economic case for expansion remains. In addition, the case for expansion has been considered in the extreme scenario in which the wider economic benefits of expansion were nil. Even in this extreme scenario the strategic case for expansion remains persuasive, as it would deliver significant resilience, competition and connectivity benefits. More information on the carbon-capped appraisal is available in the updated reports *Strategic Fit: Updated Forecasts and Economy: Updated Transport Economic Efficiency Impacts Assessment*, and the new reports *Economy: Wider Impacts Assessment* and *Strategic Fit: Letter to Lord Deben Chair of Committee on Climate Change*.

2.3.25 Since the consultation, further work has also been undertaken to complete a fuller appraisal in the carbon-traded scenario. At the time of consultation an assessment of the growth in greenhouse gas emissions from each of the short-listed options had been completed in the carbon-capped scenario, but not the carbon-traded scenario. This additional analysis has now been completed. The analysis suggests that emissions are greater in the carbon-traded case than the carbon-capped case, due to higher volumes of passenger demand. This growth in emissions is, however, not sufficiently large as substantially to alter the monetised impact relative to other parts of the appraisal framework. For the full set of results see the new report *Carbon: Further Assessment*, which can be read in relation to the report *Carbon Assessment* published as part of the consultation. Further information on the carbon context within which the Commission is operating is clearly set out in the front of the *Business Case*.

Mechanisms to influence connectivity outcomes, including connectivity between London and the rest of the UK

2.3.26 A number of respondents argued for limiting or favouring access to the expanded airport, suggesting that one or other type of airline was either detrimental or beneficial to the UK's connectivity, and that access to the new capacity ought to be controlled accordingly. Specifically, some respondents suggested that 'green slots' should be earmarked for services of lower environmental impact; other respondents, including some airlines, argued that certain types of carrier, such as network carriers, ought to be prioritised during the future slot allocation process.

2.3.27 The connectivity outcome most frequently argued for by respondents was an uplift in connectivity to London from the nations and regions of the UK. A number of

respondents to the consultation, including Members of Parliament, local authorities and regional airports, but also a wide number of individual respondents, stated the importance they assign to connectivity between the UK regions and London, and to the onward connectivity provided by London's airports. A clear theme that came out of the consultation was a desire for this connectivity to be guaranteed in the future, particularly to the UK's most peripheral regions, and regardless of which airport is expanded. To support this aim some respondents submitted analysis highlighting the positive economic impacts of ensuring connectivity between London and various parts of the UK.

- 2.3.28** A number of respondents suggested mechanisms that should be explored to safeguard or stimulate connectivity outcomes, including ring-fencing slots (perhaps through the use of planning conditions), reducing aero charges for particular services, encouraging slot coordination committees and the slot coordinator to act in a manner conducive to connectivity outcomes and – in relation to regional connectivity – the establishment of Public Service Obligations (PSOs) between regional and London airports. Responses were also received suggesting that RAF Northolt could be used to provide domestic connectivity into Heathrow.
- 2.3.29** Further to consultation a review was undertaken of the various options to safeguard or stimulate connectivity suggested by respondents. This work built on the analysis of this topic undertaken in *Discussion Paper 04: Airport Operational Models*, the *Interim Report* and *Discussion Paper 06: Utilisation of the UK's Existing Airport Capacity*. The latest work, which reviews the possible measures and comments upon their suitability and applicability to the UK, can be viewed in the new report *Strategic Fit: On the Mechanisms that can Potentially Influence Connectivity Outcomes in the UK*. Further to considering this analysis the Commission's *Final Report* recommends that the Government allows the establishment of PSOs between individual airports, and uses them to safeguard access to individual airports and their associated connectivity. The *Final Report* also notes that structuring aero charges in order to benefit regional services could be an effective future measure to stimulate regional connectivity.
- 2.3.30** Beyond this, the Commission considers that there is no further viable legal basis through which slots could be ring-fenced to protect or limit the operation of particular airlines or aircraft at an expanded airport. Once a slot is allocated at a co-ordinated airport its use thereafter is governed by the EU Slot Regulation, which permits the slot holder to transfer its use from one route or type of service to another. There is no exemption from this rule. Any such restrictions or protections would place the UK in contravention of the EU Slot Regulation and liable to

infraction proceedings by the European Commission for breach of the UK's Treaty obligations. Any measures to ring-fence or exempt slots stipulated in planning permissions would be overridden by the requirement to adhere to the EU Slot Regulation.

2.3.31 Other measures which could affect the allocation of slots, such as the use of Local Rules, are not considered viable or effective methods in light of the legal constraints. This includes the measures suggested by respondents, such as green slots or using slot allocation criteria to prioritise traffic from one operational model over another.

2.3.32 In relation to Northolt, the Commission has not taken a position regarding the future use of civilian capacity at this airport. However, as set out in the *Interim Report*, it has not been convinced that there is a credible solution for providing a realistic transfer service between Northolt and Heathrow, or that Northolt is a viable option for addressing Heathrow's capacity constraints.

Competition benefits

2.3.33 Some respondents commented that the need for greater competition in the UK aviation sector was not adequately considered in the assessment. This comment was made both in relation to the Heathrow schemes, where respondents stated that new airlines operating to the airport will increase competition, and the Gatwick scheme, where respondents argued that expansion would enhance competition between the airports within the London airport system.

2.3.34 Some respondents, including one of the scheme promoters, argued that the benefits of competition should have been considered more fully in the economic appraisal of benefits, and should have been calculated for more years than just 2030.

2.3.35 At consultation the strategic fit analysis considered how each of the short-listed options might affect competition in the UK aviation sector and the benefits that this might provide for passengers. To support this two reports were commissioned. The first of these, *Strategic Fit: Expanding airport capacity: competition and connectivity*, looked at potential airline responses to each of the three shortlisted options, linked to the Commission's forecast scenarios, and made a qualitative assessment of how these airline responses could affect connectivity and competition in the London and UK-wide airport system. The second report, *Strategic Fit: Impacts of expanding airport capacity on competition and connectivity*, quantified those impacts, looking in particular at travel time savings and fare reductions for passengers.

- 2.3.36** This work indicated that, despite increases in the per passenger charges levied on airlines due to the high costs of expansion, the overall effect would be more likely to be a reduction in passenger fares. This effect would be due to increased competition, as expansion allows new services to be introduced and new airlines to operate from the expanded airport.
- 2.3.37** Further to consultation the more technical responses on airline competition that were submitted to the consultation were reviewed by advisors, to see whether they altered the initial analysis. The conclusions of this work were that expansion at either Heathrow or Gatwick would produce benefits of competition, as the variety of carriers and the competition between them would increase. However, expansion of Heathrow would produce higher competition benefits than expansion of Gatwick. This is because there is already a lot of competition in the short-haul market (which constitutes the majority of Gatwick's traffic) and an expanded Heathrow is much more likely to provide more long-haul connections, either by increasing the hub function of the resident network carrier or by attracting other long-haul carriers; and because excess demand is and is expected to remain higher at Heathrow than at Gatwick, so increasing capacity at Heathrow has a higher impact on removing scarcity rents in the airport system. If a low-cost carrier entered Heathrow in the event of expansion, these benefits would be amplified. The Commission has incorporated these latest findings into its evidence base.
- 2.3.38** The Commission has also carefully considered the criticism that the competition benefits are only provided for a limited number of years and scenarios. Further work was procured with advisors to estimate competition benefits for 2040 under the *assessment of need* scenario. The results of this latest work are in line with the results produced for 2030, and note that Gatwick would stimulate more competition benefits if it were to be successful in expanding its long-haul network.
- 2.3.39** This latest work can be found in the new reports *Strategic Fit: Review of Consultation Submissions – Airline and Airport Competition Impacts* and *Strategic Fit: Airline Responses to Airport Capacity Expansion – Additional Estimates of Competition Benefits*. Again, these findings have supplemented the Commission's evidence base.

Modelling the impact of aero charge changes on demand

- 2.3.40** Some respondents commented that the aero charge ranges calculated for each scheme did not feed iteratively into the demand forecasts, and argued that this restricted understanding of the likely market impact of airport charge increases at Gatwick or Heathrow. For instance, a number of airlines argued that increases in

aero charges would be passed on to passengers, reducing demand for services from the expanded airport, and argued that the analysis put out to consultation did not fully capture this effect.

2.3.41 At the point of consultation the Commission did not directly input aero charges into its demand forecasting. This was for two reasons. First, aero charge changes cannot be directly incorporated into the Department for Transport passenger demand model. In the model passengers choose airports by considering changes in generalised cost of travel (travel time, accessibility by surface access, frequency of service and shadow cost). At the personal level passengers often take account of fares in their choice of airport, which may include aero charges. But at an aggregate level, and over a whole year, differences in fares tend to average out to the extent that they are rarely a statistically significant determinant of airport choice. Aero charges are a determinant of national demand in the model. However, this is at a national rather than airport level, making it difficult to accurately determine the impacts of airport-specific charges. Therefore adding aero charges into the demand modelling would be potentially misleading, since these charges are not explicitly modelled in the current forecasts.

2.3.42 Second, in order to assess how aero charge changes can impact passenger demand it is necessary to consider how airlines respond to these changes. Airline perspectives on aero charge changes were considered in the report *Strategic Fit: Expanding airport capacity: competition and connectivity*, published as part of the consultation. This work argued that changes to aero charges would initially be absorbed by airlines through a reduction in rents, and then that the competitive market between airlines would limit their capacity to pass aero charge changes on to passengers. The ability of airlines to absorb such costs is further increased through their use of sophisticated yield management systems that are applied to air journey ticketing. Airlines are able to price discriminate between passengers (for example business and first class passengers, or time of booking), which increases the likelihood that less price sensitive passengers take on a larger proportion of the aero charge, while more price sensitive passengers can continue to be catered to with lower priced tickets. A key finding from the work was therefore that aero charge increases would not necessarily feed through to passenger fares, and consequently would have limited impact on passenger demand. There may, however, be differences between the two scheme locations, as the higher proportion of short-haul and low-cost traffic at Gatwick may (in comparison to long-haul and business traffic) limit the capability of the airlines operating these services to price discriminate between their passengers, hindering their ability to absorb aero charge increases and still operate profitable services.

2.3.43 Further to consultation the Commission asked its advisors to consider the consultation responses that commented on the impact of higher aero charges on passenger demand. This work is located in the new report *Strategic Fit: Scarcity Rents and Airport Charges*. This analysis confirmed that higher aero charges would be very likely to be passed on to the airlines due to significant scarcity rents that are present in the system, mostly due to capacity constraints. The pass through would be more likely at Heathrow than at Gatwick for two main reasons: (1) scarcity rents are higher at Heathrow than at Gatwick; and (2) Heathrow has more long-haul traffic, and aero charges are a much lower proportion of the total cost of long-haul routes (in comparison to short-haul routes). Further to reviewing consultation responses, therefore, the logic of the Commission's original approach remains unchanged.

Alignment with Economic and Spatial Development Strategies

2.3.44 Responses to consultation raised a number of issues related to this aspect of the strategic fit assessment. Most commonly, respondents highlighted the need to consider the potential of each option to support growth outside London and the South East and thereby contribute to the rebalancing of the economy. This point is covered below in the section on Economy Impacts.

2.3.45 A second common theme, primarily voiced by respondents from the South East, stated that the assessments had underplayed the extent to which expansion at Heathrow was opposed in the Mayor's London Plan and would be contrary to the environmental policies set out in that document.

2.3.46 The London Plan was one of a number of wider economic and spatial development strategies considered in the evaluation of the short-listed schemes, including both local plans – such as Strategic Economic Plans set out by Local Enterprise Partnerships and regional development plans – and national strategic frameworks such as the National Planning Framework and Aviation Policy Framework. Further to reviewing its approach, the Commission believes that it has adequately considered the environmental policies set out in the London Plan in the context of the overlapping spatial and socio-economic strategies that were the subject of its assessment, and has undertaken no further work in this area.

Reductions in Air Passenger Duty

- 2.3.47** Some respondents, particularly airlines, argued that Air Passenger Duty (APD) rates should be reduced, and that this would boost the UK's domestic and international connectivity. Some airlines argued that the UK is currently losing business to other European airports that have lower rates of passenger tax, or none at all.
- 2.3.48** The Commission considered the possibility of differentiating the rates of APD at congested airports in its *Interim Report*, but concluded that whilst the measure may result in distributing air traffic away from the South East and around the UK, the UK's overall connectivity outcomes would in fact be diminished, and that the measure would be inefficient in terms of minimising carbon. In addition the Commission recognises the role played by APD, which currently raises about £3 billion per annum, and has the potential to be an important demand management tool used by future governments to ensure that the UK meets its commitments on aviation emissions.

2.4 Economy Impacts

Objective	To maximise economic benefits and support the competitiveness of the UK economy.
-----------	---

Economy Impact figures

- 2.4.1** Some respondents critiqued the economic impacts calculated in relation to the three short-listed schemes. This analysis consists of two elements: a microeconomic approach, which considers the welfare benefits associated with the scheme; and a macroeconomic approach, which makes use of a Spatial Computable General Equilibrium (S-CGE) model to estimate the GDP impacts of the schemes. Comments were received in relation to both of these approaches, with most comments referring to the latter. In particular, respondents questioned the scale of the economic benefits identified; the assumptions and data that had been input into the model (particularly the airport-specific assumptions on inbound and outbound passenger splits); and whether the S-CGE model was an appropriate methodology to be used in the economic assessment – with some respondents arguing that a microeconomic approach to wider economic impacts would be preferable.
- 2.4.2** In response to the points raised on the S-CGE analysis, further sensitivities were conducted to test key assumptions and the robustness of the results, and in order to improve understanding of the dynamics of the model and its sensitivity to wider economic assumptions. Sensitivities performed included changes to the passenger characteristics at the different airports, alternative input shocks and changes to the elasticities of labour supply. A further sensitivity was undertaken by applying the current inbound and outbound passenger splits for the London airport system – as opposed to the current splits for individual airports – to each of the short-listed options. This sensitivity allowed the Commission to understand better the implications of a change in the redistribution of inbound and outbound traffic based on the London average, modelling a lower share of inbound traffic for an expanded Heathrow and a much higher share of inbound traffic for an expanded Gatwick. Changes were also made to better reflect the spending patterns of inbound passengers based on where they travelled from.
- 2.4.3** The impacts of the majority of these sensitivities on the overall scale of economic impacts first modelled at consultation have been fairly marginal, though the change

to assumptions on inbound and outbound passengers had a more substantial impact, raising the GDP benefits associated with the Gatwick scheme. Whilst the scale of the benefits is clearly susceptible to changing input assumptions, the benefits remain substantial across all sensitivities, and the impacts of the short-listed schemes relative to each other also stay broadly the same (again, the changes to inbound and outbound assumptions was the sensitivity which most heavily influenced the relative performance of the schemes). Details and results of all of these sensitivities are located in the new report *Strategic Fit: Updated GDP/GVA Impacts*.

2.4.4 Moreover, further to consultation advice has been commissioned from members of the Expert Advisory Panel on the value and appropriate use of this analysis. Following this the Commission recognises that there is a strong case for the S-CGE outputs to be considered as part of its Strategic Fit workstream. Therefore in the *Business Case* this analysis has been removed from the Economic Case and integrated into the Strategic Case for each of the short-listed options. This enhances the robustness of the Strategic Case, broadening the analysis on jobs and long-term GDP impact (although the expert panellists stated that caution should be taken when interpreting the detailed GDP numbers due to the innovative application of the model).

2.4.5 In lieu of this work, and in order to ensure that the wider economic impacts of expansion continue to be captured in the Economic Case, a new piece of work has been commissioned to consider these impacts via a more conventional welfare approach. This new approach also responds to comments and suggestions made in consultation. The methodology used is based on impacts identified in the Government's transport appraisal guidance but has been extended to make it more relevant to airport expansion. The wider welfare impacts featured in this analysis include changes to international trade, agglomeration and tax take as a result of high productivity jobs. Further to this work total welfare Present Values have been calculated for each scheme, which demonstrate that the wider economic impacts that accrue from expanding Heathrow exceed those of expanding Gatwick, and these findings have been incorporated into the evidence base. The analysis on wider economic impacts undertaken since consultation can be located in the new report *Economy: Wider Economic Impacts*.

Economic benefits in the UK's regions

2.4.6 A common theme in responses was that the analysis did not present a clear enough picture of benefits that would be felt in regions other than London and the

South East, and that inadequate consideration had been given to specific regional economies. The argument was also put forward that the Commission had not adequately considered rebalancing the UK economy between the South or South East and the rest of the UK. The majority of these comments related to suggested measures to increase or safeguard regional connectivity, an issue looked at in detail in the Strategic Fit section of this report.

2.4.7 The Commission's terms of reference require it to consider the connectivity requirements of the whole of the UK. Accordingly, in the materials put to consultation economic impacts were modelled across the whole economy. For example, the outputs of the S-CGE modelling work contained assessments of the impact of the expansion options in the UK regions, both in terms of GDP and other economic indicators. This work was contained in the report *Strategic Fit: Updated GDP/GVA Impacts*. Since consultation the outputs of the S-CGE model have been refreshed, and can be found in the updated version of this report. In addition, assessment of national economic impacts can be located in the new report *Economy: Updated Transport Economic Efficiency Impacts Assessment*.

2.4.8 The consultation analysis also considered the impact of expansion on air connectivity to the UK regions from London and the South East, and the strategic benefits that could be associated with this connectivity. And, as discussed in the Strategic Fit section of this report, work has been carried out since consultation (and in response to *Discussion Paper 06: Utilisation of the UK's Existing Capacity*) to consider measures to stimulate or safeguard regional connectivity. The Commission therefore believes it has adequately considered this topic in its analysis.

Revisions to the value of freight

2.4.9 Some respondents argued that the impacts of freight had not been fully recognised in the analysis, leading to an underestimation of the economic benefits of expansion at (in particular) Heathrow. This point was also made in relation to the *Business Case*, which respondents argued undervalued the importance of freight. A number of freight operators responded emphasising their appetite to expand their operations at Heathrow.

2.4.10 In response to this the analysis on freight impacts has been reviewed. Furthermore, an effort has been made to assimilate all of the analysis on freight, from the various sections of the Commission's work, into a complete narrative within the Strategic Case. This analysis includes the outputs of discussions with freight operators in a stakeholder information-gathering exercise, and the findings of a consultancy report on the drivers of freight traffic. Whilst the latest discussions on freight synthesise the

totality of the work done in this area, the assessment of the impact of freight traffic on the overall economy has not changed since consultation.

2.4.11 The Commission believes that the economic impacts of freight traffic have now been adequately considered in its appraisal.

Estimations of economy impacts submitted by consultation respondents

2.4.12 A number of organisations submitted or referenced studies of the potential economic impact of the expansion options, airport expansion in general, or similar large infrastructure projects. These reports and their findings have been reviewed and used to inform the Commission's work where appropriate. In many cases, however, the different approaches and assumptions used in these analyses made them of limited relevance to the national economic modelling undertaken by the Commission.

2.5 Local Economy Impacts

Objective	<p>To promote employment and economic growth in the local area and surrounding region; and</p> <p>To produce positive outcomes for local communities and the local economy from any surface access that may be required to support the proposal.</p>
-----------	--

Demand for new housing and amenities in local areas, and the ability of local authorities to meet demand

- 2.5.1** Many respondents, including a number of local authorities in proximity to the short-listed sites, raised concerns about the estimates of demand for new housing and amenities put forward in the analysis. Typically these respondents argued that it would be difficult or very difficult to accommodate this level of new housing, given either the shortage of land available on which to build, or the current failure of local authorities to meet their housing targets. A number of respondents stated that the assessment should have identified where new housing could be built.
- 2.5.2** Equally, some respondents noted that a number of local authority areas already had a housing shortfall, which additional housing demand could exacerbate. And concerns were raised that simplistic and misleading conclusions had been drawn about the ability of local authorities to accommodate new housing growth.
- 2.5.3** Across both areas, a number of local authorities and other respondents stressed that the ranges for estimated new housing stock were unhelpfully wide.
- 2.5.4** In the consultation these issues were considered in the report *Local Economy Impacts: Assessment*, which concluded that any new housing and amenities would typically be provided in a phased manner, with production spread over future decades and a wide geographical area, making these needs manageable for local authorities – although it was acknowledged that this would be easier in some authorities than others.
- 2.5.5** In response to the consultation comments a review of this work has been undertaken, led by members of the Commission’s Expert Advisory Panel, setting the initial analysis against general trends in population increases and housing pressures in the wider London and South East region. The output of this work is

that the assessment of additional land that would be necessary to meet theoretical maximum demand for housing has been revised downwards. This is due to the likelihood of population densities in the affected areas increasing to a level closer to that found in other local authorities in London and the South East (and other global cities), and a wider assessment of the numbers of local authorities that will provide employees to work on the airport site. A similar revision has been made in relation to amenities, which are forecast to absorb the growth in population more readily than previously predicted, without undue recourse to new facilities. In addition, the review also notes that the anticipated future population growth in London is forecast to increase housing pressure and density regardless of airport expansion, and that the new housing requirements generated by expansion will be commensurate with this forecast trend.

2.5.6 In response to respondents' comments the Commission has also clarified that its analysis demonstrates a theoretical, maximum demand for housing resulting from growth in employment. Actual demand is likely to be lower, due to local labour market flexibility, reductions in current levels of unemployment and surface transport links that enable workers to commute over wide areas.

2.5.7 Post-consultation the ranges of theoretical maximum demand for housing have also been consolidated and presented as a single estimate, in line with the Commission's treatment of its five demand scenarios, discussed in the Strategic Fit section of this report.

2.5.8 The Commission has incorporated this latest analysis – which is set out in the new report *Local Economy: Impacts Assessment Post Consultation Update* into its evidence base. In accordance with the latest analysis on the likelihood of increased housing density, and as with the analysis initially put to consultation, the Commission has not sought to identify specific locations for new housing, as this analysis should instead be taken forward by local authorities with appropriate levels of consultation. The Commission sets out in its *Final Report* recommendations to support local and regional authorities in this task.

Local labour markets

2.5.9 Some respondents to the consultation commented on the assumptions made on the sizes and behaviours of local labour forces. In relation to Gatwick, a common argument raised was that the Commission had underestimated the size of the local labour markets (particularly by overestimating the amount of unemployment in the local authorities surrounding the airport), and had therefore failed to account for a likely influx of labour from areas beyond the Gatwick area needed to make up this shortage.

- 2.5.10** Other respondents, including scheme promoters, argued that the Commission's assessment of labour available in the Heathrow area under-estimated the distances employees would be willing to travel to access jobs at the site, arguing that much of the future demand for jobs would be met by workers in London Boroughs some distance from the airport. This effect would, in turn, reduce the demand for additional housing in the vicinity of the airport, as discussed above. A number of individual respondents supporting Heathrow expansion commented that the new employment opportunities should be taken up by local people.
- 2.5.11** In response to the comments made in consultation the Commission has reviewed and updated its analysis on the sizes and behaviours of local labour markets, including the use of alternative unemployment figures as a sensitivity, and amended its assessment for each scheme. The latest analysis produces a revised assessment on the distance that future employees will be willing to travel to access work at the expanded sites, and the numbers of local authorities that will provide employees to work at the airport site. Further to this review, the Commission confirms its judgement that the impact of new jobs at both short-listed sites could be absorbed into the surrounding local authorities relatively easily, and without causing undue pressure. Moreover, the new jobs will be a valuable employment opportunity, given the forecast population increases around the short-listed sites.
- 2.5.12** As with the estimates on housing density, the ranges of new jobs required presented for each scheme have been narrowed, in line with the Commission's treatment of its five demand scenarios. The updated local labour market analysis can be found in the new report *Local Economy: Impacts Assessment Post Consultation Update*.
- 2.5.13** The Commission's *Final Report* notes that airport expansion will support thousands of new jobs, and recommends that Heathrow Airport Ltd should work with local authorities and schools to ensure local people, including young people, are able to benefit from this opportunity, and that the airport should support the London Living Wage.

Impact on heritage businesses and business relocation

- 2.5.14** The impact of expansion on businesses in the local community was raised, with specific concerns at Gatwick that the loss of tranquillity will cause heritage businesses – such as Hever Castle – to suffer from reduced visitor numbers, and therefore a loss of revenue and employment. Across the schemes there were also concerns raised that businesses forced to relocate will not relocate in the surrounding area, causing a loss of jobs.

2.5.15 At the point of consultation the assessment noted the potential for future flight paths to cause noise pollution and visual blight at Hever Castle and other heritage businesses, and the potential for future airspace design to mitigate these impacts. These issues are considered in the Place section of this report.

2.5.16 On the wider issue of business relocation, the Commission considered this at the point of consultation, and noted that business developments close to both sites will necessarily be demolished or may be constrained in the future as a result of expansion. However, opportunities exist to support employment in key development areas further from the airport boundaries, as identified in local plans and the London Plan. No evidence was put forward in consultation that altered this analysis, and therefore no further work has been done in this area.

Economic impacts of Surface Access

2.5.17 Some respondents commented that the Commission had not considered the economic impacts of new surface access schemes, such as Southern Rail Access to Heathrow or the Heathrow Hub station. Similarly, it was noted that some costs associated with surface access, such as the costs of increased congestion, did not feature in the Commission's economic appraisal.

2.5.18 The appraisal has not considered the additional benefits that may be derived from surface access investments associated with the short-listed options. These would need to be considered by the Government on a case by case basis. Accordingly, the Commission has not monetised the economic impacts of the additional surface access schemes, though some assessment of the likely impacts has been made in the non-monetised sections of the Economic Cases of each short-listed option, including quantified benefits such as journey time savings and reductions in congestion. The Commission considers that it has taken an adequate approach to this aspect of its assessment.

2.6 Surface Access

Objectives	<p>To maximise the number of passengers and workforce accessing the airport via sustainable modes of transport;</p> <p>To accommodate the needs of other users of transport networks, such as commuters, intercity travellers and freight; and</p> <p>To enable access to the airport from a wide catchment area.</p>
------------	--

Assessing surface access post 2030

- 2.6.1** A number of respondents argued that the appraisals of surface access impacts and costs were insufficiently detailed for the periods after 2030, and that surface access scenarios, including future infrastructure developments, should have been considered to 2040, or the point at which the airports would have been operating at full capacity.
- 2.6.2** An explanation as to why detailed surface access appraisals were not undertaken beyond 2030 was set out at consultation in the document *Process Overview*, located in *Additional airport capacity: surface access analysis*. The view taken was that there was insufficient certainty to make a meaningful judgement on infrastructure interventions required to meet background demand beyond 2040, due to uncertainty about future passenger demand and the necessary scale of interventions, and because few infrastructure designs have been established that could be used as models. Rather than undertaking detailed modelling of post 2030 surface access scenarios, a narrative assessment of post 2040 impacts was provided. Further to reviewing consultation responses the Commission continues to believe that this approach remains appropriate, and has therefore undertaken no further work in this area.

Capability of projects forecast to meet background demand growth also meeting future surface access demand

- 2.6.3** A number of responses from the general public expressed the view that the appraisal had underestimated the increase in road traffic and public transport demand that would result from expansion. And some respondents argued that the Commission's analysis should not have assumed that future surface transport

schemes built to satisfy background demand growth could also support airport expansion. This view was often supported by a further argument: that the costs of the transport schemes earmarked in the Commission's 'Extended Baseline' should have been added to the costs of the various runway schemes, and that therefore the actual surface access costs for the schemes should have been assessed as significantly higher.

2.6.4 The Extended Baseline published at consultation allowed for a consistent comparison across the three schemes of the future surface access interventions likely to be necessary to meet background traffic demand in 2030. In most cases background demand growth is by far the largest driver of the need for the Extended Baseline scheme. Traffic attributed solely to the airport expansion is usually a marginal addition to the background demand (typically adding additional traffic in the low single figure percentages) and can be accommodated within the terms of the original scheme. There are, however, a number of instances where in the face of expansion a scheme within the Extended Baseline is insufficient in itself to meet forecast traffic levels. Where this is the case the Commission has acknowledged this in its analysis. These acknowledgements can be found within the scheme specific reports – *Additional airport capacity: surface access analysis* – published at consultation.

2.6.5 As for the costs of Extended Baseline schemes, the consultation documents emphasised that none of these schemes have political or funding security, and that specific factors may lead to Government or delivery bodies making different choices in respect of surface transport investment. For these reasons the costs of the scheme were not factored into the analysis. However, the Commission acknowledges that some Extended Baseline projects are important to the effective delivery of the chosen scheme, and notes that if the chosen runway scheme is to be delivered the Government and other parties will need to identify funding proposals shortly after deciding to take forward a runway recommendation. Further commentary on this is provided in the *Final Report*.

Additional surface access projects missing from the Commission's analysis

2.6.6 A number of respondents identified prospective surface access projects that they thought could obviate the need for a new runway (such as improved rail links to London), or which could enhance the runway schemes but which did not appear in the Commission's Extended Baseline or the proposed surface access packages for schemes. For instance, a number of local government stakeholders

in the vicinity of Gatwick Airport made submissions suggesting that improvements to the North Downs Line would be required to support airport expansion. And some respondents supported the idea of HS2 serving Heathrow directly. Other stakeholders identified local road or junction alterations that they thought could improve traffic flow in the vicinity of the airport.

2.6.7 Many of the schemes put forward by respondents had already been investigated as part of the Commission's work on surface access ahead of the *Interim Report*. All proposed schemes were found to have either poor business cases or tangential links to airport expansion. For instance, the costs associated with upgrading the North Downs Line were estimated to be very high for limited additional benefit; and even in the event of upgrading capacity on the line, it was found that constraints on the Brighton Main Line would act as a limiting factor on how many trains could be run over the North Downs Line into Gatwick. Similarly, the Commission has not found a strong business case for extending a HS2 spur into Heathrow and does not believe it is required to support the expansion of the airport.

2.6.8 In other cases the comments received, particularly those pertaining to the layout of local roads, were too detailed to inform the Commission's appraisals, and would be more suitable for submission at any future planning procedures. However, an analysis of these submissions that could be useful to inform those planning procedures has been produced.

2.6.9 After reviewing consultation comments the Commission has not amended the Extended Baseline published for consultation.

More detailed analysis of specific local and strategic roads

2.6.10 A number of consultation responses, particularly those from local government bodies, said that it would be useful to have more detailed analysis of the impacts of expansion on specific roads, typically those roads which are already prone to congestion. Some of these respondents argued that the lack of this modelling highlighted that the assessment did not cover a broad enough area, or was insufficiently detailed. Equally, a number of responses noted that the road traffic impacts of associated developments, such as hotels and housing for airport workers, had not been adequately considered by the Commission.

2.6.11 The Commission has found local authorities' detailed knowledge of their road networks particularly useful for identifying roads of specific interest, or roads that would be particularly susceptible to congestion, and has undertaken further work on local road modelling to build upon these insights.

- 2.6.12** In order to improve its analysis of road traffic impacts, traffic flows needed to be modelled to a higher level of detail than was the case at the point of consultation, via a process called dynamic network modelling. The Commission's consultants have undertaken this analysis, building a large dynamic model based upon data provided by Transport for London and local authorities, and have used this to re-run much of the analysis that was done ahead of consultation. This work provides more detail of the impacts of schemes on specific sections of the road network, and allows for greater interrogation of the road model. In particular, this work highlighted differences in terms of road congestion impacts between the Heathrow Airport Northwest Runway and Extended Northern Runway schemes (identifying more 'rat-running' impacts associated with the latter).
- 2.6.13** The outputs of the dynamic network modelling have been incorporated into the evidence base, and have also been used as an input into the Commission's additional air quality analysis. The results of this work can be found in the new reports *Surface Access: Dynamic Modelling Reports* and *Surface Access: Local and Strategic Roads Modelling Study*.

Further analysis on the impact of runway schemes on levels of road freight

- 2.6.14** A number of responses requested further work on the impacts of the short-listed schemes on levels of road freight on specific sections of the network. These responses made the point that levels of road freight can have significant impacts upon the quality of life of surrounding communities.
- 2.6.15** Further to consultation more analysis has been undertaken on this issue. Using the fresh analysis made possible by the dynamic network modelling, discussed above, it has been possible to reconsider the freight analysis initially put out to consultation. This work has highlighted a number of specific roads in the vicinity of all three proposals where levels of road freight would be expected to noticeably increase. When freight is assumed to increase in proportion to passenger movements (which was the central assumption modelled), these road freight impacts are more pronounced at Heathrow than at Gatwick, though very large increases in freight volumes at Gatwick (for example, in the event of an alliance relocating to the airport) could have more significant effects. In broad terms, however, the analysis demonstrates that the overall contribution to levels of road congestion as a result of increased freight movements is marginal. The results of this work are set out in full in the new report *Surface Access: Freight Impacts Study*, and have been incorporated into each scheme's evidence base.

Further analysis of the potential for demand management measures to drive public transport mode-shift at Heathrow

- 2.6.16** Heathrow Airport Ltd's Updated Scheme Design (submitted to the Commission in May 2014) stated that in order to hit its surface access mode share targets, it may be necessary to employ certain demand management measures, including a road vehicle access charge (although its submission did not contain a definitive proposal for any such charge). The Commission's analysis put out to consultation noted the various options to manage demand, but did not incorporate any access charge or other form of demand management into the traffic modelling. A number of consultation responses, including that from Heathrow Airport Ltd, said that more consideration should be given to this.
- 2.6.17** In response to these comments a series of sensitivity tests have been applied to the road model to test the impacts of various levels of access charge (£10, £20, £30 and £40) on mode shift. In addition, an assessment has been undertaken of the potential to use other forms of demand management measures, via a literature review of domestic and international comparators. This further work shows that access charges and other forms of demand management have the potential to drive significant passenger mode-shift. In addition, modelling has been undertaken to consider the effectiveness of measures to cause the mode-shift of employees working at the airport, and how these measures might be combined with those relating to passenger mode-shift.
- 2.6.18** Together these pieces of analysis suggest that a combination of a set access charge of £20 and a variety of positive and negative employee travel interventions (such as extension of free travel zones, or removal of employee parking spaces) could lead to a scenario where sufficient mode shift occurs such that expansion at Heathrow does not result in an increase in motor vehicles on the surrounding roads. The analysis also highlights that access charges are most effective if they manage background demand (and are therefore controlled by local authorities or another overarching body) rather than just airport access (where they are controlled by the airport alone).
- 2.6.19** The full results of this analysis are contained in the new reports *Air Quality: Local Assessment – Surface Access*, *Demand Management Literature Review* and *Surface Access: Demand Management Study*, and the Commission's recommendations on demand management are set out in the *Final Report* and the report *Consideration of Air Quality Consultation Responses*.

Further analysis of the resilience of surface access links to the short-listed airports

- 2.6.20** A number of responses to the consultation highlighted the importance of resilience in surface access links. The reports prepared for consultation contained some narrative on the resilience of the Brighton Main Line in relation to Gatwick, but in light of the responses on this issue, a more detailed review of the resilience of surface access links to both Heathrow and Gatwick has been undertaken. Further information on this review can be found in the new report *Surface Access: Resilience Study*.
- 2.6.21** In terms of rail links, the results of the additional work confirm that all railway lines serving the short-listed airports are prone to unexpected disruption, and that Heathrow's greater number of links provides it with good overall resilience to any disruption requiring the closure of one of those links. Gatwick, meanwhile, is highly dependent upon the Brighton Main Line, with few or no credible diversionary options depending on the specific nature and location of the disruption.
- 2.6.22** On the roads, the picture is more nuanced. While Heathrow again benefits from a greater number of major road links, overall levels of congestion are higher around Heathrow (mostly due to background traffic), so the impacts of relatively minor single-lane closures can be severe. On the other hand, the analysis suggests that a major incident closing all lanes of a single major road would be less disruptive to the airport than an incident requiring the closure of the M23 would be to Gatwick.
- 2.6.23** The Commission has incorporated this analysis into its evidence base.

Comments on the Heathrow Hub Ltd's 'Hub Station' concept

- 2.6.24** In the *Interim Report* the Commission announced its intention to consider the 'hub station' concept, put forward by Heathrow Hub Ltd, independently from the two Heathrow expansion options. A number of responses commented on the proposal, with the majority of these responses expressing concerns. Some local authorities noted that the proposal does not align with their own transport strategies and could have adverse consequences for their constituents by degrading access either to the airport or to Central London when compared to the Western Rail Access proposal. There were concerns that the station could act as a trip generator in its own right, with adverse consequences for congestion and air pollution. Several airline responses noted the costs of the scheme and indicated that they did not believe it would be an appropriate use of aeronautical revenues to fund it.

2.6.25 The Commission considered these responses as part of its review of the hub station concept, prior to its decision to recommend that the concept is not taken forward as part of a Heathrow expansion scheme.

2.7 Noise

Objective	To minimise and where possible reduce noise impacts.
-----------	---

Noise complaints

- 2.7.1** A very large number of respondents submitted comments expressing concerns about increased levels of noise, stating that the noise from overflight seriously impacted quality of life or was detrimental to health, and argued that one or more of the short-listed options should be rejected on these grounds.
- 2.7.2** The Commission has noted the strong concerns expressed, and has considered them carefully as part of its decision-making process and in its final recommendations. These include the recommendation that Heathrow Airport should not be allowed to expand without appropriate conditions being put in place in respect of its noise impacts and a fairer balance being struck between the needs of the airport's customers and its local community. Specifically, the Commission argues that a 'noise envelope' should be agreed and Heathrow must be legally bound to stay within these limits.

Definitive airspace designs

- 2.7.3** A large number of respondents argued that final (as opposed to indicative) flight path designs should have been published as part of the consultation, to allow respondents to make an informed decision on the future noise and overflight implications of the different options.
- 2.7.4** This topic is dealt with in the Operational Efficiency section of this report.

Social, health and environmental impacts of noise

- 2.7.5** A common argument put forward was that the health, social and environmental impacts of aviation noise were inadequately represented in the assessment. Often these comments were expressed in general terms, but specific issues raised were that the environmental and health implications of planes flying below 7,000 feet were not adequately captured in the assessment, and that the noise monetisation methodology used in the Commission's economic case was inadequate for calculating and capturing its high social and environmental 'costs'.

- 2.7.6** Further to consultation a review of the health and social impacts of noise was conducted by a member of the Expert Advisory Panel, which considered the negative impacts of aviation noise, such as sleep disturbance, or adverse effects on children's education. The report highlighted that the health effects of environmental noise are diverse, serious and – because of widespread exposure – prevalent; that evidence is increasing to support preventative measures such as insulation, or better policy guidelines; and that efforts to reduce noise exposure should have the effect of reducing annoyance, improving learning environments for children, and lowering the prevalence of cardiovascular risk factors and cardiovascular disease. The full analysis is published in the report *Noise: Aircraft Noise Effects on Health*. The Commission incorporated these findings into its evidence base, and considered them in making its final recommendations.
- 2.7.7** Further comments on how health impacts were assessed across the appraisal are dealt with in the Quality of Life section of this report.
- 2.7.8** In respect to the comments received on monetisation, noise was monetised in the *Noise Assessment* report in line with World Health Organisation and Environmental Research and Consultancy Department (a branch of the CAA) guidelines, as well as the latest recommended practice published by the Department for Environment, Food and Rural Affairs. The Commission has used an appropriate and up to date methodology as the basis of its analysis. The health, social and environmental impacts of planes flying below 7,000 feet were considered in the presentation of noise contours and the assessments of tranquillity impacts, and therefore the Commission has done no further work in this area.

Night flights

- 2.7.9** Responses to the consultation included views on both the negative and positive aspects of night flights at both sites. In many cases night flights were put forward as a reason why one or other option ought to be rejected, with similar volumes of responses relating to Gatwick and Heathrow. Many residents pointed out the adverse impacts of night flights, including detrimental health impacts, and stated that they wanted restrictions on them, including bans. Most respondents were not specific about when a restricted night flight period should be, but the majority of those that were suggested a six-hour ban from 00:00–06:00, while others suggested a longer eight-hour ban from 22:00–06:00.
- 2.7.10** The Commission also received responses from airlines and business groups pointing out the importance of night flights to their businesses and to the economy. These groups raised particular concerns on the impact on services to London from

the Far East (many of which currently arrive in the restricted night flight period). The freight sector stated that night flights are essential to operations of the express services sector.

2.7.11 Further to consultation the Commission has completed additional work on night flights. This included the following: analysis of the potential health impacts of night noise, comprising a review by a member of the Expert Advisory Panel (discussed above); further analysis by the CAA of how removing night flights would affect night noise contours and associated sleep disturbance impacts, utilising World Health Organisation approved methodologies; modelling the impact of displaced runway thresholds on the severity of night noise impacts; and an assessment of the current and potential future transport and connectivity benefits of night flights. These additional analyses – which are located in the *Final Report* and the reports *Noise: Local Assessment Addendum* and *Noise: Local Assessment Compendium* – considered impacts both within the ‘core’ six and a half hour night period as well as the wider eight hour period. Having carefully considered the arguments the Commission recommends that following construction of a third runway at Heathrow there should be a ban on all scheduled night flights between 23:30 and 06:00.

Criticism of assessment methodologies and assumptions

2.7.12 Some respondents criticised the way the noise assessments were set up, including the underlying assumptions used in the modelling. In particular a number of respondents argued that the assessments did not account for the existing background noise levels in areas within the noise contours, and that these background levels should be factored into the assessment.

2.7.13 A further line of comment was that assumptions on the relative quietness of future aircraft were inaccurate and overstated the likely improvements derived from future technology. Respondents argued that sensitivity modelling should be undertaken on these assumptions. Similarly, some respondents argued that the noise modelling did not capture the full range of potential noise impacts (for example, the noise from particular types of aircraft, or noise generated by landing gear deployment).

2.7.14 Finally, some respondents argued that the modelling undertaken by scheme promoters was inaccurate or misleading, and should not be used as a basis for decision-making.

2.7.15 The assessments set out at consultation did not quantify background noise levels. This was for two reasons: first, there is no established and respected procedure for assessing and combining background noise with aviation noise, and any such

assessment could rely upon spurious levels of detail. Second, as responses to *Discussion Paper 05: Aviation Noise* made clear, the significance of background noise to aviation noise is heavily disputed and relies upon subjective opinion: some parties argue that background noise and aviation noise ought to be considered additively; others that high levels of background noise should mask or reduce the significance of additional aviation noise. Given this, the Commission did not perceive there to be significant benefit in incorporating background noise levels into its assessment. The Commission did, however, conduct an assessment into noise impacts on areas of tranquillity, discussed below and, particularly, in the Place section of this document. Further to reviewing consultation comments the Commission remains satisfied with its approach, and has undertaken no further work on background noise levels.

2.7.16 The noise modelling put out to consultation was conducted by the noise forecasting unit (ERDC) at the CAA, using its ANCON model. This model is underpinned by verifiable recorded data which would capture all aspects of aviation noise, including things like the application of landing gear. All assumptions fed into the model were agreed by the CAA, and the assessment was undertaken independent of the scheme promoters and the assumptions used in their own noise modelling.

2.7.17 In relation to the composition of future fleets, post-consultation a sensitivity test was conducted on how different potential future fleet mixes could alter the numbers of people estimated to be affected by noise. The sensitivity found that fewer Generation 1 or 2 aircraft in 2040 would result in a small but noticeable change in the numbers of affected populations. For instance, if in 2040 there are no Generation 2 aircraft operating into either of the Heathrow options, there would be a 4% increase in the population adversely affected by noise compared to the central scenario assumptions; for the same situation at Gatwick there would be an 8% increase in population (though the total numbers of affected people would be significantly lower at Gatwick). This information is included in the new report *Noise: Local Assessment Compendium* and has been incorporated into the evidence base.

Noise metrics and conveying noise impacts

2.7.18 Noise metrics and noise measurements were areas of appraisal methodology which drew comment from respondents. Some praised the Commission for undertaking a specific assessment on tranquillity, and in using noise contours that were larger than the minimum Government requirement. A larger number of responses, however, expressed concerns over the metrics chosen for appraising noise impacts.

- 2.7.19** A number of respondents were critical of the use of the $57L_{Aeq}$ metric, which was described as outdated or not representative of the genuine noise impacts felt on the ground (because many people outside of the contour are irritated by noise). Accordingly, many respondents argued for noise impacts to be mapped to even lower decibel levels. Some respondents followed up these comments by suggesting that the Commission should be challenging the Government's policy on noise assessment to bring it in line with the more commonly used $55L_{den}$ noise contour in Europe. Another approach that received support was to measure noise impacts to levels consistent with the World Health Organisation guidelines on the detrimental impacts of noise.
- 2.7.20** A specific criticism of the L_{Aeq} metrics was that they calculate and display average noise levels, which is not representative of the way that people hear noise (it is heard, rather, as a series of high volume peaks). Relatedly, respondents also noted that an average contour does not differentiate between, say, a high frequency of low-volume flights and a lower frequency of high-volume flights, even though these scenarios impact the hearer differently. As a result of these complaints, a number of respondents argued that more should be done by the Commission to consider the different measures and impacts of noise, and how these measures could be conveyed to the public in a meaningful manner. Some respondents criticised the maps and diagrams in the assessments, stating that these were unclear.
- 2.7.21** The noise metrics used were set out by the Commission in its *Appraisal Framework*, which was the subject of a consultation in early 2014. The *Appraisal Framework* was itself informed by the Commission's call for evidence in *Discussion Paper 05: Aviation Noise*, which discussed the various metrics that could be used to assess noise impacts. This paper explored the different metrics on offer, identifying their various strengths and weaknesses, and acknowledged that all metrics have limitations.
- 2.7.22** To mitigate the limitations of the various metrics as far as possible, an extensive range of metrics was selected for use in the noise appraisal: rather than rely on L_{Aeq} metrics (which are mapped to $54L_{Aeq}$ (day) and $48L_{Aeq}$ (night) – lower than the Government minimum threshold), the 'Noise Scorecard' produced for each scheme also includes the European L_{den} contour and metrics which measure the frequency of overflight ('N' contours), rather than average noise levels. As discussed above, the World Health Organisation guidelines are factored into the assessment as an input into the noise monetisation methodology. However, it is not suitable to map aviation noise down to the lowest levels in this range, as they are sufficiently low as to be unlikely to be achieved in urban environments.

2.7.23 Further to reviewing consultation responses the Commission remains satisfied that it has undertaken a robust and comprehensive noise assessment, making use of the most credible metrics available.

Importance of respite

2.7.24 The importance of respite was stressed by many respondents in relation to all schemes, though it was raised more often in relation to the two Heathrow options. Some respondents saw scope for mitigating the noise impacts of the Heathrow and Gatwick options through enhanced respite arrangements. At Gatwick, many respondents suggested that a future noise respite scheme should be introduced (which the current proposals do not envisage). Respondents referring to Heathrow argued that more or longer respite schemes should be provided than at present. A number of respondents local to Heathrow expressed concern about losing the current eight hour respite period in operation at that airport, and this comment was raised most frequently in relation to the Heathrow Extended Northern Runway scheme (which cannot facilitate the same level of runway alternation as the Northwest Runway scheme).

2.7.25 The most common respite proposal put forward was to vary flight paths – or, as some respondents put it, move away from the concentration of flight paths – in order to disperse noise impacts down multiple noise corridors. This was suggested in relation to all three runway options. In making these comments, a large number of respondents referred to their negative experience of the flight trials undertaken as part of the Future Airspace Strategy programme in 2014, in which flight path corridors were narrowed in an attempt to minimise the total numbers of people affected by noise.

2.7.26 Further to consultation the Commission has analysed the impact of a respite scheme at Gatwick – operating the runways in segregated mode – to consider the feasibility of these arrangements, and any implications this would have on the potential airfield capacity of the scheme. The conclusions of this work were that operating the airfield in segregated mode could provide respite for the communities around Gatwick, but that this would substantially lower the capacity of the airfield and weaken the commercial case for investment.

2.7.27 The Commission's *Final Report* acknowledges the importance of respite to local communities and stresses the importance of securing this as part of the expansion. It notes that a third runway at Heathrow should support provision of more reliable periods of predictable respite, and that Heathrow Airport Ltd should work with local communities to determine how respite should best be provided.

Heathrow Extended Northern Runway flight paths

2.7.28 At consultation Heathrow Hub Ltd, the scheme promoter of the Heathrow Extended Northern Runway scheme, submitted analysis stating that the indicative flight paths for its scheme put out to consultation differed markedly from those put out for the Heathrow Northwest Runway scheme, and argued that optimising its flight paths to avoid populated areas could reduce the associated noise impacts. Other respondents to consultation commented on the adverse implications of the Heathrow Extended Northern Runway scheme flight paths, which at consultation were represented as stretching in a straight line due east of the airport, over densely populated sections of west London.

2.7.29 Further to these comments an optimised set of flight paths was produced for the Extended Northern Runway scheme, which comprised amalgamating the Extended Northern Runway flight paths with some of those drawn up for the Northwest Runway scheme. (It should be noted that these optimised flight paths are not the same as those submitted in response to consultation by Heathrow Hub Ltd, which it argued would reduce noise impacts even further.) The results of this modelling demonstrated that optimising the flight paths could substantially reduce the noise impacts associated with the Extended Northern Runway scheme, making them comparable to (and against some metrics lower than) those of the other Heathrow scheme. However, this would require the future flight paths for the Extended Northern Runway scheme to alter substantially from those currently operated at Heathrow (this was already true of the Northwest Runway scheme), thereby removing a previous benefit of the scheme highlighted by the scheme promoter: that the future flight paths would remain broadly the same as those currently in operation. A further finding of the work was that deep landings on the extended runway have the potential to significantly reduce noise impacts on westerly approaches and easterly departures by keeping aircraft higher for longer. The full report of this work can be found in report *Noise: Local Assessment Addendum*. The Commission incorporated this latest analysis into its evidence base, and used the new flight paths as the basis for its assessment of the Extended Northern Runway Scheme in its *Final Report*.

Monitoring, enforcement and reduction of noise

2.7.30 A number of respondents wanted to see increased monitoring of noise by airports or other bodies, and enhanced arrangements for minimising noise impacts. These comments often related as much to improving current day operations as to improvements that could be put in place in the event of airport expansion. A

large number of respondents, stimulated by a campaign response associated with Gatwick, suggested setting up an independent body to enforce adherence to noise guidelines. Some respondents submitted detailed comments on the remit and responsibilities of such a body.

- 2.7.31** Large numbers of respondents also argued for and suggested ways to bring about noise reduction measures at airports. Some respondents focused on incentivising or requiring aircraft manufacturers to produce quieter planes, whereas others argued for implementing or enforcing operational procedures to reduce noise: greater use of continuous descent procedures was an approach suggested by multiple respondents.
- 2.7.32** In its *Interim Report* the Commission recommended the establishment of an Independent Aviation Noise Authority to provide expert and impartial advice about the noise impacts of aviation, and to facilitate the delivery of future improvements to airspace operations. Further to the comments submitted in consultation this recommendation has been updated and put forward again, with further details on the proposed role of this body being set out in the *Final Report*. In addition, the *Final Report* recommends that a 'noise envelope' for the airport should be established to ensure that daytime noise does not exceed current levels and an improvement in night noise is delivered.
- 2.7.33** With respect to the comments and suggestions on measures to reduce or limit noise, a number of these points were considered by the Commission as part of the short-term recommendations to make best use of existing capacity, tabled in the *Interim Report*. Alongside specific proposals to alleviate or redistribute noise impacts, such as early-morning smoothing, the recommendations also stressed the importance of the wider aviation industry, including airlines, airports and the CAA, working together to address noise impacts in the vicinity of airports.

Tranquillity assessment

- 2.7.34** Many respondents, particularly those referring to the Gatwick scheme, stated that the impacts on tranquillity and tranquil areas had not been adequately considered in the assessment.
- 2.7.35** This topic is dealt with in the Place section of this report.

2.8 Air Quality

Objective	To improve air quality consistent with EU standards and local planning policy requirements.
-----------	--

Dispersion modelling

- 2.8.1** Some respondents, including local authorities in the vicinity of the airports and scheme promoters, argued that the air quality assessment published at consultation was inadequate, and requested that the Commission undertake detailed dispersion modelling of air pollutant particles, based on the outputs of detailed local roads modelling. Respondents argued that this was needed in order to understand more fully potential air quality impacts on local communities, particularly with respect to potential health impacts.
- 2.8.2** In its *Consultation Document* the Commission acknowledged that whilst the high-level air quality modelling presented for consultation enabled a comparison to be made of the scale of impacts and risks associated with each option, its intention was to supplement this analysis with more detailed dispersion modelling. Consultation responses reinforced the view that this work – and the opportunity to comment on it – would be of value to a wide variety of respondents, particularly those in close proximity to the airports.
- 2.8.3** This supplementary dispersion modelling was completed and put out to consultation on 8 May in the report *Air Quality Local Assessment: Detailed Emissions Inventory and Dispersion Modelling*. The modelling provided further information on how the local and EU limit values could be affected by expansion of either Heathrow or Gatwick, and potential measures to mitigate these effects. Full details of the additional air quality consultation, including the Commission's conclusions in this area, are set out in the report *Consideration of Air Quality Consultation Responses* and the *Final Report*.

Breaches of air quality limits

- 2.8.4** Some respondents also highlighted the current high levels of air pollution near Heathrow, which in some places are in exceedance of EU and World Health Organisation air quality limits and guidelines (respectively), and suggested that these current conditions were not acceptable and needed mitigation irrespective of

any new runway. Suggested mitigations included setting up an independent body to monitor or enforce adherence to pollution guidelines, or impose penalties when these were breached; for airport operators to be tasked with funding and carrying out future pollution monitoring and mitigation; or for surface access interventions to encourage mode shift or suppress demand.

- 2.8.5** Other respondents focused on future impacts, arguing that Heathrow airport and its associated surface access were forecast to breach EU limit values on local roads, that not enough information had been provided about possible mitigations for these detrimental impacts, and that for these reasons the Heathrow expansion options should not be progressed.
- 2.8.6** The Commission highlighted current air quality impacts in the report *Air Quality: Baseline*, and noted that some monitoring links were forecast to register levels of pollution in excess of EU limit values. Since consultation further work on quantifying possible mitigation measures has been undertaken, and where quantification has not been possible qualitative comments have been made on the measures. In addition, as discussed in the Surface Access section of this report, more analysis has been undertaken on the feasibility and effectiveness of surface access demand management measures, including access charging, to reduce traffic flows.
- 2.8.7** Further to the additional consultation explained above, full details of air quality exceedances, potential measures to mitigate these and the Commission's conclusions in this area are set out in the report *Consideration of Air Quality Consultation Responses* and the *Final Report*.
- 2.8.8** The treatment of health impacts in the appraisal is discussed further in the Quality of Life section of this report.

Inadequate consideration given to construction phases and wildlife

- 2.8.9** A small number of responses argued that the air quality impacts of the construction phase of any development were not modelled or factored into the assessments, even though this phase of the work was likely to lead to a sharp rise in harmful pollutants. A second consideration voiced was that the impact of poor air quality on wildlife, habitats and vegetation was insufficiently factored into the assessments.
- 2.8.10** At the point of consultation no modelling was undertaken of the impacts of the construction phase on air quality. This is because any such analysis requires detailed construction plans which have not yet been produced for each of the schemes; in the absence of these details, any modelling undertaken would be forced to rely upon too many assumptions to be meaningful. In addition, the

impacts of short-term construction projects are not material to the long-term assessments underpinning the Commission's recommendations.

- 2.8.11** Further to reviewing consultation responses this view has not changed. However, in light of consultation responses the Commission has undertaken a high-level, qualitative assessment of the impacts of construction on air quality. This analysis can be found in the new report *Air Quality: Local Assessment – Detailed Emissions Inventory and Dispersion Modelling*, which was put out to the subsequent air quality consultation.
- 2.8.12** In relation to wildlife, habitats and vegetation, at consultation the report *Air Quality: National and Local Assessment* considered the impacts of forecast pollutants on designated sites in the vicinity of the schemes. Further to consultation this analysis has been deepened to consider the deposition rates of various nitrous oxides, the critical loads factors associated with the various habitats, and any associated impacts.
- 2.8.13** Again, both of these pieces of analysis are in the report *Air Quality: Local Assessment – Detailed Emissions Inventory and Dispersions Modelling* that was put to consultation, and the Commission's consideration of responses in this area is contained in the report *Consideration of Air Quality Consultation Responses*.

2.9 Biodiversity

Objective	To protect and maintain natural habitats and biodiversity.
-----------	---

Impacts of bird strike mitigation on local bird species

- 2.9.1** In the reservoirs close to Heathrow a number of bird populations, particularly gulls and Canada Geese, pose a potential bird strike risk if unmanaged. In the event of a third runway at Heathrow being constructed, measures would be put in place to reduce this risk, which could include netting on rivers and lakes or the use of lasers. Several respondents raised concerns that the impact of these mitigation measures may make the reservoirs less attractive to birds and reduce their value as a biodiversity asset. Some of the reservoirs and former gravel pits in the area form the South West London Waterbodies Special Protection Area and a Ramsar site.
- 2.9.2** At consultation the report *Biodiversity: Assessment* identified the potential significant risk that bird strike mitigation measures might pose to bird populations, and was clear that further detailed work on this subject will be required should a Heathrow scheme be taken forward. The report noted that at this stage in design and analysis necessary information – such as the precise flight paths of the birds and the height at which they fly – had not been assessed, and therefore the impact of the new runway operations and the capability to install effective bird strike mitigation that would respect the sensitive nature of the site have yet to be accurately estimated. Finally, the report stated that impacts on bird populations would be more fully assessed in any future Environmental Impact Assessment.
- 2.9.3** Nothing received at consultation has altered these conclusions, and therefore the Commission has done no further work in this area.

Inadequate consideration given to designated sites

- 2.9.4** Inadequate consideration of the impacts of airport expansion on biodiversity was a concern expressed by some respondents, particularly members of the Woodlands Trust but also many individuals. Respondents felt that inadequate consideration had been given to impacts on wildlife and their habitats, particularly woodlands and ancient woodlands. The majority of comments on the appraisal of biodiversity, both from campaigns and from organisations and individuals, were in relation to the Gatwick option.

- 2.9.5** Members of the Woodlands Trust particularly felt that the irreplaceable nature of ancient woodlands had not been adequately considered or reflected in the appraisal and that an 'irreplaceable' category should have been included in the qualitative assessment of biodiversity impacts.
- 2.9.6** At consultation the Commission looked at the effect of expansion on biodiversity as part of its analysis. The analysis was clear about where designated sites may be lost, partially lost or otherwise impacted, be that through the airport, a road, a railway or their associated pollutants. This analysis included a consideration of the loss of ancient woodland near Gatwick, and included a reference to the potential need to reduce the height of certain areas of such woodland to meet CAA obstacle clearance requirements. Where ancient woodland was to be lost, the report acknowledged that it could not be replaced in a like for like manner, but for the purposes of calculating compensatory habitat provision it was proposed that new woodland should be established at a ratio of 5:1 to the loss of ancient woodland.
- 2.9.7** The Commission's view is that the report put out to consultation adequately considered impacts on designated sites, and no additional work has been undertaken in this area.

2.10 Carbon

Objective	To minimise carbon emissions in airport construction and operation.
-----------	--

Meeting the UK's legislated carbon targets and the growth of regional airports

- 2.10.1** Comments from respondents on the carbon appraisal module mostly expressed concern that the Commission had not given adequate consideration to climate change in general, or to the overall ability to meet carbon targets. A smaller group of respondents argued that the Commission had over-estimated the carbon impacts of expansion, by not fully accounting for the likelihood of carbon leakage (where carbon restrictions in one country have limited effect, as they simply displace carbon generating activities overseas), or by under-estimating the carbon savings that would be achieved by future generations of aircraft.
- 2.10.2** Some respondents questioned how additional carbon emissions from aviation would affect other carbon generating activities in the UK given the Government's requirement to meet legally binding carbon targets. Other respondents particularly noted the impact that a carbon cap would have on UK regional airports, suggesting that with carbon emissions from aviation capped expansion at Heathrow or Gatwick would inhibit further growth at regional airports.
- 2.10.3** Discussion of how carbon-capped and carbon-traded appraisals have been amended since consultation is located in the Strategic Fit section of this report.
- 2.10.4** The Commission's remit is not to provide suggestions for climate change policy and it has used the Committee on Climate Change's (CCC) aviation planning assumption – that gross CO₂ emissions from UK aviation in 2050 should not exceed 2005 levels (37.5MtCO₂) – as a basis for its analysis. The Commission's assessment and recommendation therefore reflects the UK's legislated carbon targets. How the CCC's aviation planning assumption has informed the Commission's demand forecasting, carbon-traded and carbon-capped appraisals is explained in the Strategic Fit section above, as well as in *Strategic Fit: Letter to Lord Deben Chair of Committee on Climate Change* and the *Final Report*. No specific analysis has been undertaken on the ability of the UK to meet its overall carbon targets, or the carbon generation of other sectors of the economy.

Assumptions on the carbon intensity of future aircraft were taken from the DfT Aviation Model, an authoritative model that uses the latest Government and industry assumptions.

- 2.10.5** If a carbon cap were to be introduced, a limited amount of carbon would be set aside for aviation use. (It should be noted that a sector-specific cap may be unlikely; the CCC suggests that a carbon-cap should be considered a proxy for a future carbon trading scheme, and that any such cap may not be the most efficient or effective way of reducing carbon.) Even in this context and with a new runway at either Heathrow or Gatwick, however, the Commission's forecasts still show significant growth in the regional airports sector over the period to 2050, with passenger numbers increasing by at least 70% over the level seen in 2011 in the *assessment of need* scenario.
- 2.10.6** In both the Commission's carbon-traded and carbon-capped forecasts growth rates in the regional sector are lower with expansion than without. This reflects both the ability of the expanded airport to accommodate demand which would otherwise 'spill' to airports outside London and the South East and, in the carbon-capped forecast, the need for the aviation sector as a whole to keep its emissions to a level consistent with the CCC's planning assumption by 2050. The effect is therefore stronger with a carbon cap in place. But the Commission's forecasts do not assume that any airport's growth – either in the South East or elsewhere – would necessarily be restricted to a particular level. On the basis that the allocation of emissions within the cap will be managed through price, as in the Commission's forecasts, then it will be consumer decisions which decide which airports grow and which airports don't.
- 2.10.7** If carbon emissions from aviation are held to a specific level, it becomes important for that 'carbon budget' to be used as efficiently as possible. To achieve this, capacity has to be available where demand is strongest. The Commission's forecasts indicate that this is likely to be in the South East of England, which is why higher growth rates are seen in this area as capacity is expanded. But even in the Commission's forecasts that does not prevent the regional airports from growing strongly (with the sector forecast to experience higher rates of growth than airports in the South East in the period to 2050 even with expansion). If higher levels of demand could be attracted by any airports outside the South East, as they compete with other UK airports, they could see more rapid growth still.

2.11 Water and Flood Risk

Objective	To protect the quality of surface and ground waters, use water resources efficiently and minimise flood risk.
-----------	--

Flood risk in areas surrounding the airport

- 2.11.1** A number of respondents were concerned that a new runway would increase the risk of flooding and surface water run-off in the surrounding area. Some respondents argued that this risk had not been adequately considered in the appraisal. These comments were made in relation to both airports.
- 2.11.2** This issue was considered at consultation in the report *Water and Flood Risk: Flood Risk Assessment*, which examined the likelihood of flooding in relation to each scheme, identified areas of particular flood risk and the potential mitigations that could be put in place to mitigate these risks. Further to consultation the conclusions of this work remain valid, and no further work has been undertaken in this area. The Commission believes that the topic has been adequately considered in its analysis.
- 2.11.3** The report notes that further detailed analysis of flood risk will be required for whichever scheme is taken forward. Given the early stage of scheme design it is not yet possible to see detailed airport masterplans, river diversion scheme designs, construction plans and mitigation measures such as flood storage areas. At this stage, therefore, it is not possible or appropriate to consider flood risk in relation to plans for individual waterways and their mitigations. A future Environmental Impact Assessment will require the development of these detailed designs, from which further analysis of flood risk will be possible. It is anticipated that the Environment Agency would be consulted in drawing up these plans.

Water quality and water capacity

- 2.11.4** Concerns were raised by a small number of respondents that following expansion the water quality in surrounding areas would not meet the requirements of the Water Framework Directive. Respondents also raised the risk of contaminants, for example de-icing fluids and engine oils, reaching the water supply.
- 2.11.5** Some respondents expressed concern that the capacity of local water networks and water utilities had not been fully considered, both in relation to the impact of expansion and the additional requirements generated by new supporting

infrastructure, particularly new houses. Other respondents submitted evidence pertaining to this assessment: the water company managing the area affected by the Gatwick proposal expressed satisfaction that there is enough spare capacity to cope with the extra needs from the proposed new infrastructure. And Heathrow Airport Ltd's response identified ways to use water more efficiently, such as rainwater harvesting.

- 2.11.6** At consultation the technical report *Water and Flood Risk: Water Quantity and Water Quality Assessment* considered this point. This report noted that in all schemes the creation of new runway capacity means that current water flows will have to be diverted, and that the remodelling of rivers and creation of new water courses could increase the risk of the water meeting contaminants, which would alter the biological and chemical quality of the water. High-level measures to mitigate these risks were also considered. The report also noted proposals to contain the run-off of contaminants such as oil and de-icing fluid at both airports and existing practices for doing so.
- 2.11.7** The level of work undertaken at consultation is appropriate for the current stage of scheme design and analysis. Ahead of work on detailed design and mitigations it is premature to judge the likely level of the water quality in the area around the scheme. A future Environmental Impact Assessment will assess this topic further and it is anticipated that the Environment Agency would be involved in this process.
- 2.11.8** At consultation this issue of water quantity was considered in the report *Water and Flood Risk: Water Quantity and Water Quality Assessment*. The report acknowledged that future water supply issues were more challenging at Heathrow than at Gatwick and suggested measures that might be taken to address the issue. The comments received at consultation – including responses from water companies local to each site – accorded with the analysis undertaken.
- 2.11.9** No further analysis has been undertaken; the Commission believes that this topic was adequately considered in its analysis.

2.12 Place

Objective	To minimise impacts on existing landscape character and heritage assets.
-----------	---

Visual and noise impact of flights on Areas of Outstanding Natural Beauty (AONB), heritage assets and other tranquil areas

- 2.12.1** A number of respondents, particularly local authorities and local interest groups, responded to the consultation with concerns about the impact of flights on these areas. There are two AONBs relatively close to Gatwick – the Surrey Hills and the High Weald – and the majority of comments were made in relation to these areas. Respondents commenting on Heathrow focused on the importance of not compromising existing outdoor and tranquil spaces with noise or visual blight.
- 2.12.2** Concern was also expressed over the impact of noise on heritage assets and in particular on those open to the public, such as Hever Castle (which was the most commonly mentioned attraction), or on historic conservation areas. Commentators on these topics also referred to impacts on the local tourism trade.
- 2.12.3** At consultation these issues were analysed in the report *Place: Assessment*. Impacts on AONBs, heritage assets and other tranquil areas were assessed by considering indicative flight paths, landscape and visual impact assessments, noise levels around airports and the Campaign to Protect Rural England’s tranquillity and dark skies mapping. It was not possible to measure precisely all impacts as this would require details of future flight paths, and the exact design of these will not be completed until a future Airspace Change Process and associated consultation has concluded (for more details see the Operational Efficiency section of this report). After reviewing consultation responses no further analysis has been undertaken in this area post consultation.
- 2.12.4** The Commission has noted the strong concerns of respondents that special locations close to the short-listed options are protected. In particular, respondents were clear about the contribution these locations make to an area’s distinctive ‘character’. These factors have been considered by the Commission in making its recommendations.

Development in the Green Belt and loss of heritage

2.12.5 A number of respondents argued that the runway schemes should not involve land take of Green Belt land or the demolition of conservation areas, or should be rejected on the grounds that they intend to do so. Particular concerns were raised about the Heathrow Northwest Runway scheme, which removes one designated conservation area (Longford village) and half of another (Harmondsworth) and has a significant impact on the setting of the remaining buildings. In relation to the Green Belt, respondents raised concerns that the initial runway developments would encourage further building projects, leading to years of ancillary development on the protected land.

2.12.6 The report *Place: Assessment* published at consultation noted the schemes' various impacts on Green Belt and designated heritage assets such as conservation areas. These assessments were accurate and have not been updated post consultation. The merits and demerits of auxiliary developments in the associated area would be for future local authorities to consider, and they would be required to take into account the status of conservation and protected areas when making their decision. The Commission has undertaken no further work in this area in response to consultation responses.

Damage to the character of local areas

2.12.7 Concerns were raised by local stakeholders at both scheme locations, but particularly near Gatwick, that the creation of an extra runway would destroy the existing sense of community and character in areas local to the airport. Often this predicted impact was attributed to towns accommodating new influxes of people, be they either displaced by the runway development, or looking for work at the airport. Some respondents near to Gatwick argued that the rural and tranquil character of the local area would be changed by the urbanisation associated with the development.

2.12.8 A related theme emerging through responses was that difficult to quantify impacts, such as impacts to an area's character and community cohesion, were not properly taken account of in the assessments.

2.12.9 At consultation the report *Place: Assessment* considered the specific And in the community assessment the report *Community Impact Assessment* noted that compensation measures could be of some benefit in retaining the distinctive character of local communities, and this view was also supported by some respondents to the consultation.

2.12.10 The Commission acknowledges that it is difficult, through desk-based appraisal, to capture the impacts of proposed changes to communities. The responses of local authorities and other community groups has been extremely helpful in developing understanding in this area, and informing the Commission's consideration.

2.12.11 In response to these concerns, the Commission has highlighted in the *Final Report* the need for airports to build on their existing commitments to support sustainable development of communities over several years. It has also recommended that a new Community Engagement Board with real influence over spending on compensation, community support and over the airport's operations should be established.

2.13 Quality of Life

Objective	To maintain and where possible improve the quality of life for local residents and the wider population.
-----------	---

Health assessment

2.13.1 Some respondents identified health impacts as an area where they believed more evaluation was required. These included certain factors that are detrimental to health – such as sleep disturbance or deprivation, stress and interactions with the built environment – and some groups whose health had not been sufficiently considered in the analysis, such as children or other vulnerable groups. Equally a number of respondents argued that public health disbenefits should have been monetised and incorporated into the analysis. These points were most frequently made in relation to the noise and air quality assessments. In the former, comments mainly related to sleep disturbance and deprivation caused by night flights, and higher blood pressure caused by the irritation of aviation noise; in the latter, comments related to the health damage associated with the pollutants NO_x and particulate matter. Some respondents argued that health impacts were sufficiently severe as to impact upon the human rights of those affected.

2.13.2 Impacts on health were considered in the Commission’s assessments in relation to a variety of factors, including noise, air quality and water, and where appropriate these impacts were monetised and fed into the microeconomic welfare appraisal. However, in response to comments received the Commission has recognised the need to draw the various health analyses from across the appraisal framework into one assessment, and identify areas where further work could be undertaken. This analysis can be reviewed in the new report *Quality of Life: Health and Equalities Assessment Review* as well as Annex A to the *Sustainability Assessment*. The assessment recognises that development at an airport will impact people’s health and wellbeing, both positively and negatively, explores the various health impacts that could occur from expansion and recognises that a substantial amount of possible mitigations could be factored into future detailed designs. Given the early stage of scheme design the Commission is content that the range of possible health impacts are appropriately accounted for in its assessments.

Assessing quality of life impacts

2.13.3 Whilst a number of respondents welcomed the assessment of quality of life impacts, there were some concerns expressed about the difficulty of comparing these qualitative impacts with other costs and benefits that might be more easily quantifiable. Relatedly, some respondents argued that there was no justification for the process of bundling quality of life impacts that was utilised in the assessments. A number of respondents argued that quality of life assessments were not given equal weighting with economic benefit appraisals, or asked whether the quality of life impacts could be monetised to allow like for like comparison. Finally, respondents argued that the quality of life assessments needed to be made less generic and more focused on the particular schemes.

2.13.4 The work on assessing quality of life impacts is innovative: this is the first UK infrastructure project assessment to consider these impacts in this manner, and to produce quantified evidence. While the most suitable available datasets and methodologies have been adopted, the Commission nevertheless recognises that there may be some limitations to its assessment, particularly given the novelty of the approach. For instance, the Commission acknowledges that the process of bundling impacts brings together both national and local impacts. Equally, the impacts on children have been difficult to capture due to limitations of the data available; the assessment data are drawn from a wide area, and are not exclusively focused on the short-listed sites. A prudent approach has therefore been adopted to integrating the work into other areas of the appraisal, and no monetisation of the identified impacts has been considered. Further to reviewing comments from respondents the Commission is satisfied with this approach, and has not amended its initial quality of life analysis, or the way this is considered in each scheme's *Business Case and Sustainability Assessment*.

2.13.5 Additional work has been undertaken, however, to understand the value of leisure travel on people's quality of life. This new analysis focuses upon leisure passengers and passengers visiting friends and relatives (the predominant users of airports in the UK), and comprises empirical analysis of how availability of leisure affects mental health and wellbeing, as well as a literature review of the same topic. The findings of this report are that access to leisure and holidaying overseas is associated with higher levels of life satisfaction, general health, mental health and happiness. The full analysis of this topic can be found in the new report *Quality of Life: Leisure Impacts Assessment*, and the conclusions have been incorporated into the evidence base.

Compensating for quality of life impacts

- 2.13.6** A number of respondents argued that the assessment should have considered possible compensatory measures – be they monetary or other – for detrimental impacts on the quality of life of people living near to the airports.
- 2.13.7** The Commission's consideration of compensation measures does recognise detrimental impacts on quality of life, and therefore no further work has been done in this area. Further details on compensation are given in the Community section of this report.

2.14 Community

Objectives	<p>To manage and reduce the effects of housing loss on local communities; and</p> <p>To reduce or avoid disproportionate impacts on any social group.</p>
------------	---

Damage to the character of local areas

2.14.1 Concerns were raised by local stakeholders at both scheme locations, but particularly near Gatwick, that the creation of an extra runway would destroy the existing sense of community and character in areas local to the airport. A related theme emerging through responses was that difficult to quantify impacts, such as impacts on community cohesion, were not properly taken account of in the assessments.

2.14.2 This topic is dealt with in the Place section of this report.

Loss of community facilities and infrastructure, including outdoor recreational space

2.14.3 For all the short-listed schemes respondents raised concerns that airport expansion would result in the loss of community facilities such as primary schools, nurseries and infrastructure necessary to support the local population. A number of respondents stressed the importance and high performance of, in particular, certain educational facilities, highlighting the crucial role these facilities played in the current community. The loss of Crawley Rugby Club was also raised by a number of respondents in the Gatwick area. A number of respondents argued that any replacement facilities ought to have greater capacity than current facilities, due to the increased population the expanded airport would bring to the area.

2.14.4 The loss of green space and outdoor recreational space, and the damage associated with this loss, was another key theme raised. Respondents mentioned a number of specific localities that would be lost or damaged by the developments, and either used these as reasons for rejecting a scheme, or urged that mitigation measures be put in place to compensate for the loss. Heathrow Airport Ltd's consultation response described its measures to mitigate lost recreational space by enhancing the Colne Valley Regional Park.

- 2.14.5** The loss of community facilities and associated mitigation measures were considered in the report *Community Impact Assessment in Additional airport capacity: community analysis*, and the report *Place: Assessment*. Where social infrastructure losses were predicted, scheme promoters identified measures to mitigate impacts and these mitigations were assessed in the analysis.
- 2.14.6** The consultation brought to light no community facilities with the potential to be lost that were not already considered as part of the assessment (although it is noted that due to increased journey times alternative facilities provided may not be perfect substitutes for some members of the community). The Commission has therefore done no further work on these assessments.

Mitigation and compensation proposals for residents by scheme promoters¹

- 2.14.7** A number of residents local to the proposed schemes expressed concerns about compensation for the impacts of expansion. Some respondents argued that the mitigation or compensation measures proposed for residents by scheme promoters were insufficient, with specific comments on the need to protect residents against the adverse effects of expansion and requests for compensatory measures to be put in place to address degradation of local residents' health and quality of life. Particular suggestions were the need to compensate against noise pollution, including insulation schemes, and compensation to cover the loss of housing and businesses.
- 2.14.8** In addition, a number of these commentators expressed concerns that the Commission had assumed that the measures proposed by scheme promoters were 'sufficient', without critiquing them in its analysis. The idea of a community forum to agree an approach to compensation and mitigation was also put forward, as was the use of Air Passenger Duty revenues to fund mitigation measures.
- 2.14.9** At the point of consultation the Commission had not assumed that the mitigation or compensation levels proposed by scheme promoters were sufficient. Further to the consultation more work has been undertaken to consider the levels of mitigation or compensation offered by scheme promoters, considering cross-sector and international comparators and the specific views raised by consultation respondents. This work was undertaken in conjunction with the Commission's

¹ Note, the theme of compensation was not treated in the 'Community' section of the *Appraisal Framework*. It has been summarised as a theme here because consultation respondents tended to refer to the issue in relation to the Community objectives.

Expert Advisory Panel, and builds on the analysis undertaken in *Discussion Paper 07: Delivery of new runway capacity*.

2.14.10 The Commission's final recommendations on compensation measures are included in the *Final Report*. They include a recommendation that the Government should introduce a new noise levy to ensure that airport users pay more to compensate local communities and to increase funds for insulation and other mitigation measures; that a Community Engagement Board should be created, with real influence over spending on compensation, noise insulation and community support; and that increased business rates revenue from airport expansion should be retained locally and distributed fairly across the affected areas. In relation to blight, the Commission recommends that Heathrow Airport Ltd should honour its commitment to compensate those who would lose their homes at full unblighted market value plus an additional 25% and reasonable costs, and it should make this offer available as soon as possible. Further recommendations are set out in the *Final Report*.

Equalities Assessment

2.14.11 The issue of equalities was raised in relation to both the community and quality of life appraisals. A number of respondents – including local authorities adjacent to the airports and both of the Heathrow scheme promoters – asked for a full Equalities Impacts Assessment to be completed to ascertain whether an additional runway would have a disproportionate or differential impact on groups of people with protected characteristics in local areas. Relatedly, a number of respondents argued that impacts on children had been insufficiently considered in the analysis. Gatwick Airport Ltd submitted to the Commission an Equalities Impacts Screening Exercise which concluded that no protected group would be impacted adversely by its proposals.

2.14.12 In response to these comments a review has been undertaken of the existing evidence base, and relevant information from consultation responses, to draw together the available evidence relevant to equalities issues in one document and to highlight, so far as possible, the potential equalities impacts of each of the three short-listed schemes. This work has been considered by the Commission as part of its decision-making process. The review identified several possible impacts on groups of people with protected characteristics for all of the schemes, but much of this detail remains at a high level of abstraction (necessarily so, given the limited level of detail in terms of equalities impacts at which the schemes have currently been developed), and it would not be appropriate to compare the differing scale of

these impacts between schemes at this stage. The equalities review is included in the new report *Equalities Impacts Report*, supported by the work undertaken in the report *Quality of Life: Health and Equalities Assessment Review*.

2.14.13 The equalities impact of the scheme would need to be revisited as it progresses through the detailed stages of development and planning permissions are sought. More detailed reviews of, for example, population data could uncover impacts not identified in the Commission's initial assessment.

2.15 Cost and Commercial Viability

Objective	<p>To be affordable and financeable, including any public expenditure that may be required and taking account of the needs of airport users; and</p> <p>To make efficient use of public funds, where they are required, and to ensure that the benefits of schemes clearly outweigh the costs, taking account of social, environmental and economic costs and benefits</p>
-----------	--

Review of costs

- 2.15.1** A number of respondents submitted comments challenging the cost estimates, either suggesting that they overestimated or underestimated the total funds required to deliver each project. Respondents claiming the costs were underestimated argued that costs additional to the main project, such as surface access or local community costs, including housing, were inadequately factored into the estimate. Another argument put forward was that costs of major projects often overrun original budgets, and that the scheme promoters' initial estimates should be treated with caution. In relation to overestimation of costs, a number of respondents, including the scheme promoters, thought that too much cost contingency had been applied through risk and optimism bias, that the consistent application of optimism bias between schemes was unwarranted, and suggested reviewing and reducing the cost estimates associated with these contingencies.
- 2.15.2** Another common sentiment expressed by respondents was that the Commission's costings were too closely aligned with those put forward by scheme promoters, and that more should have been done to critique and challenge these costings, or that a cost baseline should have been calculated that did not rely on scheme promoters' estimates. For their part, scheme promoters submitted updated cost estimates, reflecting changes to their schemes since they were submitted to the Commission in May 2014.
- 2.15.3** Finally some of these respondents, including a number of airlines, argued that more basic, less expensive versions of the schemes should have been considered, with simpler terminal and airfield designs, thereby reducing costs and making the new capacity more attractive to future passengers and airlines. Airlines in particular

argued that a more appropriate balance between scheme design and cost should be sought in future commercial negotiations.

2.15.4 Further to the consultation a review of cost estimates was undertaken, led by expert panellists and advisors. The review covered each of the issues raised. It took into account the latest cost estimates tabled by the scheme promoters and other respondents and (as before consultation) reviewed these against industry cost benchmarks. This resulted in a limited number of specific adjustments made to specific cost lines for each scheme. The risk and optimism bias assumptions presented to consultation were also revisited, with a consequential reduction (approximately 5%) in the risk and optimism bias allowance. The approach to the cost review and the specific cost updates are set out for each scheme in the report *Cost and Commercial Viability: Cost and Revenue Identification Update*.

2.15.5 In relation to the importance of including local community costs within the total delivery cost, the Commission's pre-consultation analysis (and as updated post consultation) included potential Section 106 or Community Infrastructure Levy costs that local authorities may use for local infrastructure, compensation for land purchase in excess of market value, and the compensation packages put forward by scheme promoters in relation to each scheme. Aside from clarifying this approach in its *Final Report* and associated documents (particularly Appendix C of the *Cost and Commercial Viability: Cost and Revenue Identification Update* report for each scheme), the scope of the cost assessment has not been amended, for the reasons set out below under 'Public funding'. Assessments of potential impacts on local economies, and the capability of local authorities to manage these impacts, are, however, included in the report *Local Economy: Impacts Assessment Post Consultation Update*, and several of the surface access reports.

2.15.6 A parallel review also considered amendments to scheme designs that could reduce overall scheme costs, and the impact of these changes on the commercial viability and financeability of the options. Key opportunities identified include a reduction in the terminal specification and the elimination of additional towers for the Heathrow schemes, and a possible reduction in land take for the Heathrow Northwest scheme of between 15% and 20% (although these changes could entail a trade-off with the passenger experience). The resultant potential savings identified are, at the top end of the range and including risk and optimism bias, up to approximately £0.2 billion for Gatwick (which had limited scope for savings given its current streamlined specification), £1.5 billion for the Extended Northern Runway scheme and £2.4 billion for the Northwest Runway scheme. The full review of how scheme designs might be changed, and how these changes may affect the

passenger experience, is set out in the new report *Operational Efficiency: Phasing and Facilities Review* with the resulting cost reduction set out in the new report *Cost and Commercial Viability: Reduced Scope Scenarios Costs*. The impact on aero charges and financing requirements is set out in the new report *Cost and Commercial Viability: Additional Sensitivities*.

2.15.7 Finally, the Commission continues to believe that appropriately scrutinised and reviewed costings put forward by scheme promoters remain an appropriate starting point for the cost analysis, as these benefit from site-specific knowledge and better reflect the commercial approach that each airport operator might be expected to take in practice. It also believes that the final designs and costs will be best established through the regulator's and airlines' constructive engagement process or similar fora.

Public funding

2.15.8 One concern frequently expressed by respondents was that high levels of public funding would be required to fund the schemes or their associated surface access or local infrastructure. Numerous respondents stated that the costs of the infrastructure necessary to support communities local to the development – such as social housing, schools, hospitals and transport improvements – would fall to the UK taxpayer.

2.15.9 Some respondents argued that the airport operator should pay for all or some of these costs, and that no costs should fall to the public sector. In contrast other parties, including airlines and the scheme promoters, argued that public funding should be utilised to support necessary surface access or local infrastructure improvements, stating that the new capacity would operate in the public good, and that this should be reflected in the sources of funding. Equally, some parties queried whether any contributions from the Government towards surface access costs would fall within EU State aid rules. (State aids are considered in the report *Cost and Commercial Viability: Additional Analysis*.)

2.15.10 The responses received to consultation highlighted the range of views on this topic. Prior to consultation no assumption was made regarding who should pay for surface access and local infrastructure enhancements, but a range of options, including public sector financing, were considered. Since consultation analysis has been carried out to assess whether, should the funding contribution be provided through the airport operator, the schemes would still be commercially viable and financeable (see the updated report *Cost and Commercial Viability: Funding and Financing Update*). This analysis suggests that for each scheme the airport should

be able to take on all of the surface access costs, subject to the regulatory regime. The Commission continues to believe that the final allocation of funding is, however, for future negotiation between the Government and the airport owner.

Availability of private finance

2.15.11 Some consultation respondents queried whether sufficient private finance could be sourced to fund the expansion options, particularly the more expensive Heathrow options. A number of respondents compared the scale of required investment with that delivered in other national and international infrastructure schemes, and went on to argue one or more of the following: that debt and equity markets may have insufficient liquidity to fully fund a scheme of that scale; that the terms of future regulatory settlements will need to be defined in such a manner as to stimulate and encourage the levels of private capital necessary to fund the deal; or that the Government would need to play a role in underwriting investment, so as to mitigate unreasonably high levels of commercial risk. A number of respondents who pursued these arguments urged closer liaison with financial markets to understand better their appetite for investment. Other respondents criticised another source of providing upfront capital, pre-funding, with airlines in particular warning that this solution could suppress demand for the facility, preventing any new capacity from being fully utilised.

2.15.12 Further to consultation market soundings and additional research were undertaken with market participants, the scheme promoters and the shareholders of Heathrow Airport Ltd and Gatwick Airport Ltd, in order to hear the views of private financiers on funding the short-listed options, and on the roles that the regulator, the Government and the wider industry could play. On this basis the Commission considers that each of the schemes is investable and that there would be sufficient market capacity to finance them, though it was noted by funders that a stable long-term regulatory framework was a material consideration for investors (a point also made by some respondents). Finally, there was a level of assurance provided from participants, including credit rating agencies, that the modelling approach undertaken by the Commission's advisers and the assumptions used were generally appropriate for the analysis. An updated assessment of the availability of private finance in relation to the short-listed options is contained in the new report *Cost and Commercial Viability: Sources of Finance*.

2.15.13 The Commission has also discussed the schemes with the European Investment Bank and considered how the UK Guarantee Scheme might be of relevance if

extended. Whilst neither is considered necessary to ensure financability, each might contribute to increasing sources of liquidity.

2.15.14 In relation to pre-funding, the financing approach modelled at the point of consultation allowed for a level of pre-funding. It was noted, however, that a range of funding scenarios is plausible (including scenarios without pre-funding) and that any pre-funding regime would need to be established with the regulator (which has published a draft policy on economic regulation, including discussion around pre-funding options).

Commission's approach

2.15.15 There were a number of comments made both in support of and opposition to the approach to the Regulated Asset Base (RAB) used in the financial modelling (the Commission utilised a cashflow, rather than RAB-based, approach). Some of these comments were based on a misunderstanding of the modelling approach as described in the consultation report *Cost and Commercial: Financial Modelling Inputs*. The approach has been reiterated and clearly set out in the most recent suite of documents.

2.15.16 Further points were made concerning the depreciation rate used in relation to the RAB. These comments were considered and adjustments were made to the modelling accordingly. These changes are reflected in the outputs of the updated report *Cost and Commercial Viability: Funding and Financing Update*.

2.15.17 A number of comments were made on the need for a regulatory approach that provides a balanced approach to risk, encourages efficiency and is stable. The Commission endorses those views and considers its approach to be consistent with them.

Impacts of aero charge increases on the commercial viability of the schemes

2.15.18 Some respondents also made the point that the Commission's demand modelling did not capture the impact of fluctuations in aero charges; this point is addressed under the Strategic Fit section of this report.

2.15.19 Many respondents focused upon the personal costs that they thought they might need to bear in relation to the different expansion options, considering rises in flight, public transport and parking costs, and how these might negatively impact demand.

2.15.20 A specific concern, emphasised by a pro-Heathrow campaign and several airlines, was the impact that increased landing charges would have on low-cost carriers at Gatwick. A number of respondents argued that the estimated rise in aero charges at Gatwick would benefit its low-cost competitors, particularly Luton and Stansted, who could be expected to eat into Gatwick's low-cost market share and jeopardise the revenue streams necessary to fund the new infrastructure in the early years of the scheme. Some respondents pointed out the analysis published by Moody's credit rating agency, the published views of which accord with this argument.

2.15.21 Gatwick Airport Ltd's consultation response contained a proposal to mitigate this risk, stating that the airport would cap aero charges at £15 in return for a 30 year 'contract' with Government. Further to this contract, Gatwick notes that it would bear the long-term risks related to traffic levels, market pricing, construction and operating costs.

2.15.22 Prior to consultation the commercial risks associated with funding the three short-listed proposals were considered at length, including an assessment of the aero charge impact on consumers, and the various delivery approaches which may mitigate demand risks. Further to consultation this work has been updated to include the latest considerations of private financing, including pre-funding and market liquidity, discussed above. In summary, as discussed in the Strategic Fit section of this report, given relevant capacity constraints in the South East and the ability of airlines to structure ticket prices to minimise impact on demand, consumers are unlikely to experience a significant or unaffordable pass through of cost. The latest assessment of the commercial viability of each option can be found in the updated report *Cost and Commercial Viability: Funding and Financing Update* with the view of potential funders being set out in the new report *Cost and Commercial Viability: Sources of Finance*.

2.15.23 Gatwick Airport Ltd's contract with Government would be a matter for the Government, the regulator and the airport to negotiate, and therefore the Commission has not given a definitive view on this proposal. It has however examined the proposed terms of the contract – including the flexibilities associated with the stated £15 price limit – and considered whether these affect the commercial viability of the Gatwick Second Runway scheme. The Commission's judgement is that the contract does not significantly alter its assessment that the Gatwick scheme is investable, and that there would be sufficient market capacity to finance it.

2.16 Operational Efficiency

Objectives	<p>To ensure individual airport and airports system efficiency;</p> <p>To build flexibility into scheme designs;</p> <p>To meet present industry safety and security standards; and</p> <p>To maintain and where possible enhance current safety performance with a view to future changes and potential improvements in standards.</p>
------------	---

Definitive airspace designs

- 2.16.1** A large number of respondents argued that final flight path designs should have been published as part of the consultation, to allow respondents to make an informed decision on the future noise and overflight implications of the different options.
- 2.16.2** The consultation documents were clear that the flight paths produced for consultation were for indicative purposes, and should not necessarily be interpreted as representative of the location of future flight paths. This is because creating and agreeing airspace plans for any new runways would require significant development and public consultation via an Airspace Change Process, which cannot occur at this stage in the design process: detailed flight path designs could only be produced once all aspects of the airfield design had been finalised – the schemes are not yet at this point. Also, it is highly possible that careful consideration of mitigation options, as well as the impacts of new technologies, could lead in the future to significant changes to the indicative designs. For these reasons the Commission has not adapted its approach from that articulated at the point of consultation.

Amendments to indicative flight paths

- 2.16.3** A high number of respondents argued for changes to the published flight paths. Often these changes suggested areas where overflight should be avoided, such as areas of tranquillity. Some responses requested that current flight paths should be maintained, while others argued that they should be reconfigured. The Heathrow Extended Northern Runway scheme received the highest number of comments

and suggested improvements. There was also particular concern over the impact of flight paths narrowing, and of the policy of concentrating flight paths and aviation noise over as narrow a band as possible, with several respondents commenting on their negative experience of this occurring during recent flight trials at both airports.

2.16.4 As discussed above, the flight paths published at consultation were produced for indicative purposes only. Therefore the majority of these comments were too detailed to be incorporated into the current airspace analysis. Many of these comments would be suitable for future consultations on airspace design, which will be required in the years prior to any new runway becoming operational.

2.16.5 However, other respondents questioned some of the central premises of the indicative flight paths. These comments were more relevant to the current stage of airspace analysis. For instance, a number of stakeholders argued that rather than operating in mixed mode, the Gatwick proposal should offer periods of respite in a manner similar to Heathrow currently. And some commentators on the Extended Northern Runway scheme, including the scheme promoters, suggested a fundamental departure from the concept of straight arrival approaches, advocating a series of curved and off-set approaches, again with the intention of providing greater periods of respite. These comments, and the supplementary work done since consultation to address them, are set out in the Noise section of this report.

2.16.6 The Commission is content that its modelled flight paths are credible and based on sensible assumptions that reflect the current stage of scheme design.

Risk of air accidents over densely populated areas, particularly at Heathrow

2.16.7 Many respondents raised concerns about the risk of planes arriving at or departing from Heathrow crashing in densely populated areas, often stating that there is an unacceptable level of risk of this occurrence in relation to a Heathrow expansion scheme. This point was also made in relation to the Gatwick scheme, but less frequently. Some respondents argued that a separate 'Safety' module ought to have formed part of the Commission's assessment.

2.16.8 In response to these comments a more definitive review of this topic has been undertaken by the Health and Safety Laboratory, which was asked to conduct an analysis of the risk of incidences occurring. The analysis stressed the infrequency of such events occurring, indicating that changes to the background crash rate between 2013 and 2050 are minimal, regardless of whether expansion takes place at the airports. The analysis also concluded that the maximum airfield crash rate at Heathrow

is now lower than the rate presented as part of the Terminal 5 planning inquiry. The full findings of this work are set out in the new report *Operational Efficiency: Ground Risk Analysis*, which has been incorporated into the evidence base.

- 2.16.9** The Commission is content that the issue of safety was thoroughly covered in the Operational Efficiency and Operational Risk modules, and did not require a module of its own.

Airfield capacity estimates

- 2.16.10** Some of the consultation respondents argued that the Commission's Air Transport Movement estimations for each scheme were either too high or too low. Sometimes these commentators also claimed that the analysis had underestimated or overestimated the ability of the airfield in question to function efficiently, or suggested specific airfield improvements to consider, such as end-around taxiways.

- 2.16.11** These challenges have been used to inform a review by the Commission's advisors of the original capacity estimates. Typically it was found that those respondents alleging alternative capacity figures were applying different sets of assumptions on configuration of fleet-mix, respite, resilience or risks to airfield operation, and that when these assumptions were equalised the capacity impacts were more aligned with those put forward in the consultation.

- 2.16.12** Further to this review, contained within *Operational Efficiency: Phasing and Facilities Review*, the Commission is content that its capacity estimates are credible and based upon justifiable and consistent assumptions and scheme promoters' own plans in relation to respite.

2.17 Operational Risk

Objective	To enhance individual airport and airports system resilience.
-----------	--

Whole airport system resilience

- 2.17.1** Some respondents argued that the distribution of runways between Heathrow or Gatwick would lead to more or less whole system resilience in the event of major incidents (including bird strike, which was raised by a group of stakeholders in the Heathrow area) or security breaches, with respondents split over which expansion option provided the most resilient solution. A number of these respondents said that the appraisal had not given adequate consideration to the risks associated with major disruptive events.
- 2.17.2** The analysis put forward at consultation stated that all of the short-listed schemes appeared unlikely to change the likelihood or severity of the key risks that could impact the operations of the airport, and that the additional capacity could also enhance the airport's ability to provide resilience and recovery in the event of some risks. Further to the review of consultation responses this analysis remains unchanged. No additional work has therefore been undertaken in this area.

2.18 Delivery

Objectives	<p>To have the equivalent overall capacity of one new runway operational by 2030; and</p> <p>To actively engage local groups in scheme progression, design and management.</p>
------------	--

Lack of trust in scheme promoters

- 2.18.1** Some respondents expressed concerns that the scheme promoters would not fulfil promises made to local communities, including promises made on noise mitigation and compensation measures. Specifically, a prominent concern in relation to Heathrow was that Heathrow Airport Ltd would seek to build a fourth runway if and when a third runway was operational. In relation to Gatwick, a number of respondents argued that insufficient analysis had been undertaken into the trustworthiness and business practices of the owners of Gatwick Airport Ltd, and that the owners may seek to sell the asset prior to beginning any expansion work.
- 2.18.2** Similar sentiments had been raised with the Commission previously, particularly in response to *Discussion Paper 05: Aviation Noise* and *Discussion Paper 07: Delivery of new runway capacity*. To address these concerns the Commission has examined what measures could be used to restore and build trust between residents and the named airports, including what legal reassurances – such as Section 106 planning restrictions – could be put in place for residents, or guarantees placed in a National Policy Statement or Parliamentary Bill. Details of the conclusions drawn can be found in the *Final Report*. They include a recommendation that Heathrow Airport Ltd should be legally bound to deliver on the promises that it makes to local communities, with clear independent monitoring of performance against commitments and appropriate means of redress, and that the Government should make the firmest commitment it can to rule out any ‘fourth runway’ at Heathrow.
- 2.18.3** As set out above, the Commission has also proposed the creation of a Community Engagement Board, to ensure that local communities are more empowered to hold the airport to account.
- 2.18.4** Specifically in relation to a lack of trust on noise and flight path issues, the *Interim Report* recommended the establishment of an Independent Aviation Noise Authority which should be independent of the CAA and play a role in airspace planning

processes and community advocacy. Respondents to the consultation generally supported the establishment of this body, but also wanted more definition on what role it could play. The Commission has further developed these proposals in the *Final Report*.

Complexity of engineering works delaying delivery

- 2.18.5** Several respondents expressed doubts over the timescales of delivery in relation to the complexity of the engineering projects being undertaken. Respondents most commonly referred to the difficulty of building over the M25 in the Heathrow Extended Northern Runway and Northwest Runway schemes. A further issue raised repeatedly in relation to the Northwest Runway scheme was the difficulty in relocating the energy from waste facility due to be demolished by the expansion, with some respondents focusing on the difficulty in achieving planning consent for the facility at another site. A general concern raised in relation to the Heathrow schemes was that the complexity of the works, and the number of inter-related projects and relocations, would delay the timescale for achieving development consent.
- 2.18.6** In relation to the Gatwick scheme there were concerns raised that inadequate consideration had been given to the timescales required for surface access improvements.
- 2.18.7** Despite these tabled concerns, no evidence was submitted that has caused the initial project management timescales to be amended. The initial forecasts for runway and surface access opening dates are still considered satisfactory, and no alteration has been made to the estimated risk of delivery stated at the point of consultation.
- 2.18.8** With regard to the energy from waste plant, the planning and construction of such a facility is a substantial exercise in its own right, whose timescales are not substantially shorter than the delivery of new runway infrastructure. The process of planning and provision of an alternative facility would, therefore, need to begin soon after a decision to proceed with airport expansion. The Commission has noted that the scheme promoter has begun discussions with the owners of the facility. This is a positive step, as this issue would require rapid resolution in the event of a decision to move forward with this scheme.

2.19 Late responses to consultation

- 2.19.1** The consultation closed at midnight on 3 February 2015. Any responses received after that date and before midnight on 6 February 2015 were classified as on-time, and were coded and analysed alongside the main body of responses.
- 2.19.2** After 6 February approximately 750 late responses to the consultation were received. These responses have been reviewed by the Commission. In most cases no new points of substance were raised in the late responses which had not been raised in earlier consultation responses. In some cases late responses contained new points of substance, and the Commission has incorporated these into its analysis where possible.
- 2.19.3** The vast majority of late responses were campaign responses demonstrating support for expansion of Heathrow.
- 2.19.4** A further 90 or so responses were short communications received from individual members of the public. Typically these responses expressed concern about the potential noise impacts of expansion, or complained about current noise levels and flight path practices at Heathrow (and to a lesser extent Gatwick) Airport. Further comments were received on the ownership of the short-listed airports, air quality impacts of expansion and projected or current levels of congestion on local road networks.
- 2.19.5** Approximately 20 substantive, technical communications were submitted as late responses, including some responses from scheme promoters, airlines and the All Party Parliamentary Group on Heathrow. These responses addressed a range of topics, including: the economic impact of expanding Heathrow on the national economy, the economic value of night flights, the importance of airports other than the short-listed airports, the air quality impacts of expansion, analysis of surface access improvements, issues pertaining to the deliverability of the schemes (including achieving planning consent), proposals for enhancing regional connectivity, and redevelopment plans for areas adjacent to the airports. A number of these points were raised in response to another consultee's response, which had been made public by that party.
- 2.19.6** In addition to the above late responses, further to consultation the Commission did on occasion table questions to consultees, following up on points of interest within their responses. This supplementary information and the conclusions drawn from it are summarised in this document or the *Final Report* and its associated documents.

Annex A:

Reports in the Commission's evidence base that have been updated or created since consultation

Appraisal Module	Publication Title
1. Strategic Fit	1. Strategic Fit: Updated Forecasts
	1. Strategic Fit: Review of Airports Commission's Forecasts and Scenarios
	1. Strategic Fit: Review of Consultation Submissions – Airline and Airport Competition Impacts
	1. Strategic Fit: Airline Responses to Airport Capacity Expansion – Additional Estimates of Competition Benefits
	1. Strategic Fit: Scarcity Rents and Airport Charges
	1. Strategic Fit: On the Mechanisms that can Potentially Influence Connectivity Outcomes in the UK
	1. Strategic Fit: Updated GDP/GVA Impacts
	1. Strategic Fit: Expert panellist review of alternative forecasting model
	1. Strategic Fit: Expert panellist review of the Airports Commission's forecasting model in relation to the alternative model provided in consultation
	1. Strategic Fit: Smaller airport passenger numbers
	1. Strategic Fit: Letter to Lord Deben Chair of Committee on Climate Change
2. Economy Impacts	2. Economy: Updated Transport Economic Efficiency Impacts Assessment
	2. Economy: Updated Delay Impacts Assessment and Methodology
	2. Economy: Wider Economic Impacts Assessment
	2. Economy: Expert Panelist Wider Economic Impacts Review
	2. Economy: Carbon Policy Sensitivity
	2. Economy: Carbon Policy Sensitivity – Appendix 3 (Cost Review)
3. Local Economy Impacts	3. Local Economy: Impacts Assessment Post Consultation Update
	3. Local Economy: Expert Panelist Review

Appraisal Module	Publication Title
4. Surface Access	4. Surface Access: Heathrow Hub Station Analysis Compendium
	4. Surface Access: Freight Impacts Study
	4. Surface Access: Dynamic Modelling Report – Gatwick Airport Second Runway
	4. Surface Access: Dynamic Modelling Supplementary Figures – Gatwick Airport Second Runway
	4. Surface Access: Dynamic Modelling Report – Heathrow Airport Extended Northern Runway
	4. Surface Access: Dynamic Modelling Supplementary Figures – Heathrow Airport Extended Northern Runway
	4. Surface Access: Dynamic Modelling Report – Heathrow Airport North West Runway
	4. Surface Access: Dynamic Modelling Supplementary Figures – Heathrow Airport North West Runway
	4. Surface Access: Resilience Study
	4. Surface Access: Demand Management Study
	4. Surface Access: Local and Strategic Roads Modelling Study – Gatwick Second Runway
	4. Surface Access: Local and Strategic Roads Modelling Study – Heathrow Airport Extended Northern Runway
	4. Surface Access: Local and Strategic Roads Modelling Study – Heathrow Airport North West Runway
	5. Noise
5. Noise: Aircraft Noise Effects on Health	
5. Noise: Local Assessment Compendium of ANCON Modelling Results	
6. Air Quality	6. Air Quality: Local Assessment – Detailed Emissions Inventory and Dispersion Modelling
	6. Air Quality: Local Assessment – Detailed Emissions Inventory and Dispersion Modelling Figures Appendix
	6. Air Quality: Local Assessment – Detailed Emissions Inventory and Dispersion Modelling Data Appendix
	6. Air Quality: Local Assessment – Surface Access Demand Management Literature Review
	6. Air Quality: Local Assessment Spatial Maps
8. Carbon	8. Carbon: Further Assessment
11. Quality of Life	11. Quality of Life: Health and Equalities Assessment Review

Appraisal Module	Publication Title
13. Cost and Commercial Viability	13. Cost and Commercial Viability: Literature Review Update
	13. Cost and Commercial Viability: Cost and Revenue Identification Update Gatwick Airport Second Runway
	13. Cost and Commercial Viability: Updated Cost and Revenue Identification Heathrow Airport Extended Northern Runway
	13. Cost and Commercial Viability: Cost and Revenue Identification Update Heathrow Airport North West Runway
	13. Cost and Commercial Viability: Financial Modelling Input Costs Update
	13. Cost and Commercial Viability: Funding and Financing Update
	13. Cost and Commercial Viability: Additional Sensitivities
	13. Cost and Commercial Viability: Sources of Finance
	13. Cost and Commercial Viability: Reduced Scope Scenarios Costs
	13. Cost and Commercial Viability: Additional Analysis
14. Operational Efficiency	14. Operational Efficiency: Ground Risk Analysis
	14. Operational Efficiency: Fast Time Airspace Simulation
	14. Operational Efficiency: Phasing and Facilities Review
Other Reports and Documents	Airports Commission: Final Report
	Heathrow Northwest Runway scheme Business Case and Sustainability Assessment
	Updated Glossary of Terms
	Consideration of Consultation Responses (this document)
	Annex B: Analysis of the Airports Commission's Consultation Responses
	Annex B: Analysis of the Airports Commission's Consultation Responses – Associated Appendices
	Consideration of Air Quality Consultation Responses
Substantive and technical responses received to consultations (folder)	

Contact Information

Website: www.gov.uk/government/organisations/airports-commission

Email: airports.enquiries@airports.gsi.gov.uk