



Evaluating the case for expansion of Bristol Airport

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1. Executive summary

NEF Consulting (NEF) was asked to review the socio-economic case for the proposed expansion of passenger capacity at Bristol airport. The consultancy team's work concentrated on the Economic Impact Assessment (the Assessment),ⁱ the Independent Review of that Assessment (the Review),ⁱⁱ and the Response from Bristol Airport to Comments Received (the Response)ⁱⁱⁱ Reference was also made to the Environmental Impact Assessment.^{iv} In each instance, NEF identified and assessed the stated methods, datasets and assumptions.

In this report we raise key questions for policymakers and those seeking to assess the viability of expanding Bristol Airport. In particular these questions address the modelling results presented in the Assessment and the Review on the topic of wider economic impacts, with concerns highlighted in the areas of both productivity and tourism impacts. We also assessed the proposals in the light of the recent commitment by the UK Government to accept a recommendation made by the Committee on Climate Change (CCC) that the UK Government adopt a target of net-zero greenhouse gas emissions by 2050.

Bristol Airport expansion is 'out of sync' with national demand forecasts

The future of UK aviation in relation to passenger demand, flights and carbon emissions is forecast in the Department for Transport's (DfT) aviation sector model. No expansion of Bristol Airport is currently factored into this model, hence as a minimum, the proposed expansion should be reviewed by central government.

The outputs of the DfT model are at odds with the business case produced by Bristol Airport Limited for the Assessment. The economic modelling in the Assessment is based upon anticipated passenger demand of 12 million by 2026, whereas the DfT model estimates that there will be demand from only 8.5 million passengers in 2030. Notably, the expansion of Heathrow Airport (now approved) is factored into the DfT projection and reduces passenger demand at Bristol Airport by 1.0 million passengers in 2030. Neither with, nor without, Heathrow expansion does passenger demand at Bristol exceed the airport's current capacity of 10 million before 2030. While the DfT acknowledges that their model is optimized for national level analysis, Bristol Airport Limited does not provide sufficient explanation to support their significantly more ambitious projections.

Compatibility of the proposed expansion with a net-zero commitment

Following the Government's net-zero announcement it is almost certain that the UK Government will take steps to reduce growth in passenger demand. The DfT aviation sector model projects national growth in passenger demand of around 90% between 2005 and 2050. It is on the basis of this demand growth rate that DfT estimates that passenger demand at Bristol Airport will be 8.5 million by 2030.

In their '*Net Zero*' report, the CCC estimates that, even with extensive roll-out of multiple forms of carbon mitigation in the aviation sector, demand should grow by no more than 60%

between 2005 and 2050. This 30% discrepancy in passenger growth between DfT projections and the CCC modelling for net zero will almost certainly require the application of some form of carbon tax, or other regulatory mechanism to curtail demand. While we cannot be sure of the full extent of the impact the regulatory mechanism will have on passenger demand at Bristol Airport, the logical conclusion is that growth would fall. Any such reduction is not factored in to the 8.5 million passenger projection from the DfT (nor in to the projections of even greater demand, rising to 12 million, produced by York Aviation in the Assessment).

Regional economic benefits of the proposed expansion

If, as the evidence above strongly suggests, demand growth does not exceed the current capacity of 10 million passengers or the DfT projection of 8.5 million passengers over the long-term, there is likely to be no economic benefit in the proposed expansion. Even if passenger demand does align with the modelling in the Assessment, reaching 12 million passengers in 2026, NEF has identified multiple reasons to believe that the original business case overstates significantly the likely regional economic benefits of the scheme.

The primary area of concern relates to the issue of ‘displacement’. A critical question for decision makers to query in any business case, is whether the proposal creates entirely new value, or simply moves value from one place to another. The Assessment estimates that by the year 2026 the expansion of Bristol Airport will be producing £190 million per year of newly created productivity to businesses in the South West and South Wales region. An assumption of *zero displacement* was applied to this value in the original Assessment. This assumption significantly boosted the figures presented in the Assessment in favour of expansion. Claiming zero displacement is extremely ambitious in a context where all other airports in the South West and South Wales region have significant spare capacity. It seems more likely that a significant proportion of this value would be displaced from Cardiff or Exeter airports, and not newly created.

In stark contradiction of the assumption made in the Assessment in relation to regional productivity benefits, the Assessment assumes *total displacement* of carbon costs, with the claim that all new flights at Bristol Airport would otherwise have left from another airport. This decision once again boosted the case in favour of expansion, as it meant that the Assessment did not have to include the social costs of carbon in its cost-benefit ratio. It is our view that this contradiction completely undermines the credibility of the Assessment. If the decision were referred to the DfT it is likely that some, or all, of the productivity benefits claimed would be disregarded (as has been the case in comparable airport assessments), and that carbon costs would be incurred.

We identified further issues with the regional economic benefits claimed by the Assessment in regard to tourism impacts. Our review has concluded that while the methodology used was suitable, the Assessment may have used a benchmark value that represents tourism spend across the whole of the UK, rather than using the available benchmarks for regions being considered. As tourist spending patterns vary considerably across the UK this would have led to an overestimate of the scheme’s positive impact on tourism by over a third. Until such a time as the calculations in the Assessment are made more transparent, and the values used justified, tourism benefits should be assumed to be overstated.

Looking at all of these factors, we estimate that the following adjustments should be made to York Aviation's proposed 2026 values when considering the wider economic impact assessment:

- North Somerset – Reduce by £20 million, from £90 million to £70 million.
- The West of England – Reduce by £100 million, from £210 million to £110 million.
- The South West region and South Wales – Reduce by £280 million, from £390 million to £110 million.

In considering these new, significantly lower values as a whole, together with the critical mistakes and inconsistencies in the business case (highlighted below and in the council's review), and the urgency of the global climate crisis, NEF regards the business case for expansion of Bristol Airport to be a poor proposition.

Recommendations for policy makers:

- The application from Bristol Airport Limited for permission to expand capacity to 12 million passengers should be rejected due to critical inconsistencies in the application documents highlighted herein and by the Council's own review.
- Any future applications should clearly address the case for expansion in a demand-constrained world, consistent with meeting a national net-zero greenhouse gas emissions target of 2050.
- Any future applications should adequately address and justify an appropriate approach to displacement which does not overstate the wider economic impacts of the scheme.
- Any future applications should be forwarded to the UK Government for appraisal by the DfT to ensure consistency with national aviation sector planning and guidance and climate change targets

2. Background

The proposed expansion of passenger capacity at Bristol Airport has been supported by an Economic Impact Assessment (the Assessment),¹ an Independent Review of that Assessment (the Review),² the Response to Comments Received (the Response)³ and an environmental impact assessment.⁴ This paper considers all of these documents and also analyses national documentation relating to aviation, including modelling produced by the Department for Transport (DfT).

The Assessment considers the current (baseline) economic impact through a two-component framework:

- **Economic footprint:** a classic analysis of employment and 'value added', looking at Bristol Airport's direct employment, the supply chain effect, and 'induced' spending (spending that occurs as a result of higher wages).

- **Wider economic benefits:** this includes an analysis of potential productivity gains that result from business travel or freight movement, and an analysis of the relationship between passenger numbers and inbound tourists.

Throughout the analysis, the Assessment uses three key study areas, corresponding to the immediate area of the airport, the surrounding counties, and a wider regional area. Given that aviation is often considered to be national-level infrastructure, it may have been useful to have incorporated a specific, national-level study area; however, the choice not to do so is justified within the assessment on the grounds that the majority (94%) of passengers departing from the airport live in or originate from the South West region and South Wales.

The study areas are:

- North Somerset.
- The West of England - including North Somerset, Bristol, Bath, North East Somerset, and South Gloucestershire.
- The South West region and South Wales

3. Climate change impacts

The consideration of proposals to expand Bristol Airport takes place in the context of a national policy landscape that is evolving rapidly with regard to climate change and greenhouse gas emissions. Developments have taken place since the production of both the Assessment and the Review which have important implications for the expansion proposals.

On 2 May 2019 the Committee on Climate Change (CCC) published its report, *Net Zero – The UK's contribution to stopping global warming*. In it, the CCC recommended a new UK-wide emissions reduction target of net zero by 2050. The CCC set out detailed information on many policy changes and sectoral emission reductions that would be necessary to meet this goal. On 12 June 2019 the UK Government moved secondary legislation that would introduce a target for net-zero greenhouse gas emissions, effectively accepting the CCC recommendation. The implications of enshrining this new target into law are profound for the proposals to expand Bristol Airport.

Bristol Airport expansion is not part of national planning on climate change

The Department for Transport Aviation models that were used to model the aviation sector's future emissions did not include provision for the expansion of Bristol Airport. As such, any additional flights created by the expansion would add to the sector's emissions total. Allowances have already been made for the aviation sector to considerably exceed zero greenhouse gas emissions in 2050; these will be reconciled through offsets in other sectors and countries. Further allowances would need to be made for Bristol Airport and would almost certainly be costly. The likely cost per tonne of CO₂ equivalents will be over £300 by 2050 based on CCC analysis (see page 28 of *Net Zero*).^v The current price to abate a tonne of carbon is £12.76 (central estimate).^{vi}

Passenger demand under a net-zero target

Current capacity and planning consent at Bristol airport allow for 10 million passengers per year. According to the Civil Aviation Authority around 8.7 million passengers moved through Bristol Airport in 2018. York Aviation's modelling, presented in the Assessment, suggests that an expanded Bristol Airport could reach its passenger capacity of 12 million by 2026; an increase of almost 40% in 8 years. This forecast is not in keeping with the DfT's own model, which estimates demand of 9.5 million by 2030 in the absence of Heathrow Airport expansion. Expansion of Heathrow Airport has been approved, in this scenario the DfT estimates passenger demand at Bristol Airport to be 8.5 million in 2030 (**Table 1**). This modelling suggests, even without the Heathrow expansion, that Bristol has a demand potential that will not exceed existing capacity until the 2040s, reaching 10.5 million by 2050; which is short of York's projections. Arguably, expansion of Bristol Airport is therefore not necessary and, according to DfT's projections, would result in significant under-utilisation if implemented before 2040.

Table 1: DfT Aviation forecasts in the absence and presence of expansion at Heathrow: passenger number forecast / modelled capacity

Scenario	Airport	2030	2040	2050
Without Heathrow expansion	Bristol	9,504,824 / 10,000,000	9,994,530 / 10,000,000	10,196,874 / 10,000,000
	Cardiff	819,293 / 8,000,000	1,131,908 / 8,000,000	2,983,913 / 8,000,000
	Exeter	653,401 / 4,000,000	965,555 / 4,000,000	3,063,204 / 4,000,000
	Newquay	496,627 / 1,000,000	546,371 / 1,000,000	518,375 / 1,000,000
With Heathrow expansion	Bristol	8,525,167 / 10,000,000	10,003,409 / 10,000,000	9,976,669 / 10,000,000
	Cardiff	795,318 / 8,000,000	968,560 / 8,000,000	2,095,572 / 8,000,000

However, even if we take the Assessment's forecasts as the more credible, the UK's commitment to net zero presents significant new issues. The more conservative DfT forecasts assume an almost 90% growth in demand for aviation above 2005 levels. The CCC report, 'Net Zero', suggests that the UK can achieve significant emissions reductions only if passenger demand is curtailed to 60% growth. Interventions in the sector, such as a carbon tax, will be needed to achieve this. Bearing in mind some variation between airports and regions, the likelihood is that future passenger demand will be lower than either the York Aviation or the DfT models. In this context the expanded capacity of Bristol Airport would be redundant.

4. Displacement of benefits

Understanding displacement

The findings of the NEF review of the three key business case documents focuses in particular on the issue of displacement. In economic and social impact accounting displacement refers to a situation where an intervention (in this case the expansion of an airport) moves ‘value’ or ‘outcomes’ from one location to another (as opposed to creating or removing value/outcomes). Whether new value is created or not can also be referred to as ‘additionality’. Failing to account for displacement can lead to over-claiming, typically with regard to the benefits created by a scheme. NEF have serious concerns that the business case for expansion of Bristol airport has failed to properly account for the displacement of value.

Does the proposed expansion create or displace value?

The key questions to consider when preparing a business case for airport expansion are: ‘How many of the additional flights and passengers that will move through an expanded Bristol airport will be newly created?’ versus ‘How many have been displaced from another airport?’ The airports that could lose a share of the growth of aviation passengers as a result of expansion of Bristol Airport include:

- Bournemouth, South West – approx. 113 km driving distance from Bristol Airport.
- Cardiff, Wales – approx. 96 km driving distance from Bristol Airport.
- Exeter, South West – approx. 105 km driving distance from Bristol Airport.
- Newquay, South West – approx. 236 km driving distance from Bristol Airport.

There is a very strong argument that the majority of the value ascribed to Bristol Airport’s expansion (a net present value of £1.38 billion between 2018 and 2028 – see Table 5.4 of the Assessment) is displaced from these airports and is not newly created value. The reason for this, as shown in **Table 1**, is that all of the other airports located within the defined boundary (South West and South Wales) have a significant amount of excess capacity. Indeed, based on the DfT’s modelling neither Cardiff, nor Exeter, nor Newquay airport will reach their maximum capacity at any point during the model period up to 2050. Logically, if there was to be significant unmet demand for greater airport capacity in the region it could be met by additional flights departing from these airports.

Reflecting this finding, and of critical importance, the cost-benefit analysis presented in the Assessment assumes *total displacement* in terms of the carbon emissions created by additional flights from Bristol Airport. That is, expanding Bristol airport will add no new flights to the national total. Specifically the Assessment states:

... in line with our assumption that airlines will simply redeploy capacity elsewhere, we have not assumed any additional carbon costs from flights associated with the expansion. The carbon emissions associated with the majority of the two million additional passengers may not be incurred at Bristol Airport if it cannot expand but they will still be incurred elsewhere.

The Assessment (page 58)

This assumption of total displacement has a very significant positive effect on the scheme’s cost-benefit ratio. For comparison, NEF has calculated the social cost of the carbon emissions

(net present value from 2018 to 2050) of the proposed scheme assuming that no displacement is applied. Using the carbon emissions present in the Environment Statement⁴ (environmental impact assessment) and the CCC's best-case-scenario for future fuel efficiency improvements, this equates to a net present value of around -£406 million and an average cost of £24 million per year over the period. This would reduce the net present value of the scheme presented in the Assessment by 26%.^{vii}

As well as applying to carbon emissions, displacement applies to the wider economic benefits generated. In the Assessment this is referred to as "factor displacement". In direct contradiction of their earlier decision to apply total displacement to the carbon cost, the business case applies zero displacement to the economic benefits. In this regard the Response states:

Product displacement effects have been considered and are felt to be very limited within the study areas.

The Response (Page 8)

The effect of this decision is to accrue all of the induced economic benefits in the South West and South Wales regions as new value. Given that the figures in **Table 1** show considerable spare capacity in neighbouring airports, this is not remotely credible. When, in the Response, York Aviation applies more reasonable displacement values of 25%, 50%, and 75% to North Somerset, the West of England, and the South West and South Wales respectively, the benefits diminish significantly. Specifically the economic value to the South West and South Wales drops from £380 million per year to £100 million per year.

It is notable that the decision to apply zero displacement to the wider economic benefits in the Assessment was at odds with the Government's Transport Assessment Guidance (TAG), which states:^{viii}

When estimating the complete extent of additionality, scheme promoters should consider a large enough geographical area to capture fully the behavioural responses of households and firms at the national level. With respect to supply-side effects of non-transport factors of production, the default assumption is 100% displacement; this applies for all types of economic modelling. The onus is on the scheme promoter to present credible evidence that the particular transport investment will affect a non-transport factor of production. If the scheme promoter is unable to present credible evidence of additionality, the particular economic impacts will be considered displaced from elsewhere...

TAG (page 4)

5. Tourism impacts

Challenges understanding how tourism impacts are derived

In the consideration of tourism, the Assessment first considers inbound tourism. The number of visitors to the different study areas who travel via Bristol Airport has been combined with visitor spend data from VisitBritain. It is initially unclear as to how the former data were obtained, though it is later clarified that this was CAA Passenger Survey data. However, it remains unclear what averages have been used – the VisitBritain data can be disaggregated, but not down to the North Somerset level. A too-broad average (such as the whole UK) may overstate the level of spend. The Response seems to indicate that the average national-level visitor spend has been applied at each study area level. As an example of the potential for this to affect the outputs, the total UK average spend per visit for those on holiday was £682 in 2018. The same value for the South West in 2018 was approximately one-third lower, at £459. Looking at the totals in Table 4.4 of the Assessment, this would mean that the annual GVA impact and jobs created by expansion of the airport for the largest study area are significantly overstated. While the lack of transparency makes it difficult to verify these numbers, we would recommend that for decision-making purposes, tourism benefits are considered to be at least one-third lower than presented in the Assessment.

Following this analysis, the Assessment moves on to consider the impact of outbound tourism. Generally, the discussion of this topic is robust and, while it understates any negative effects of outbound tourism, the Response correctly points out that the UK Government has made a judgement that outbound tourism is of sufficiently little negative consequence to not be considered when making plans to boost inbound tourism. In the further information supplied it is also interesting to note that, of the major regional airports, Bristol Airport has the highest distance-travelled by foreign inbound passengers. This is likely to indicate that many visitors using Bristol Airport are travelling to further afield than the local study areas. This underscores the importance of taking proper account of displacement. Table 2, from the Response, is reproduced here.

Table 2: Average distance travelled by short-haul international passengers at major UK regional airports (miles) reproduced from the Response.ⁱⁱ

Airport	UK outbound	Foreign inbound
Birmingham	38	27
Bristol	54	47
Edinburgh	36	22
East Midlands	40	35
Glasgow	39	27
Leeds Bradford	27	22
Liverpool	38	25
Manchester	46	36
Newcastle	33	21
Weighted average	42	31

6. Further commentary on wider economic impacts

Diverging from standard practice on productivity impacts

The Assessment's modelling of the wider economic impacts of the proposed scheme focuses on its impact on business productivity in the region. As discussed above NEF has significant concerns regarding the misapplication of displacement in this process. In addition, we offer here some commentary on the specific approach used to quantify productivity impacts. It is notable that, as shown in Table 3, some major recent airport expansion schemes have not been able ultimately to include an estimate of productivity impact in their final appraisal due to uncertainty around the modelling process.

The process used in the Assessment to calculate the business productivity impacts of the proposed expansion is based on an approach developed by Oxford Economics for TfL as part of the Airports Commission process. The approach first assumes a relationship between national air travel and national productivity and then, using a Generalised Travel Cost model,^{ix} estimates the number of business journeys that occur only due to the existence of the airport. However, it is notable that, while developed for the Airports Commission, this was not the method used ultimately to evaluate productivity improvements.^x The chosen method was a complex Spatial Computable General Equilibrium (S-CGE) model. Nor was it used in the DfT's subsequent review and updated appraisal,^{xi} which instead use the UK Government's recommended *conventional appraisal* approaches of assessing:

- Change in business output in imperfectly competitive markets.
- Change in tax impact from relocation of workers.
- Change in increase in tax-take resulting from labour market impacts ('tax wedge').
- Change in increased productivity arising from more trade (which was separated into impacts on imports and exports).

The Generalised Travel Cost process used by York Aviation accords with standard practice for such analysis, which can be seen when a fuller description is presented in the Response. However, the results presented hinge upon deviation from the standard practice, through a transformation applied using the Oxford Economics relationship. As such, the approach used does not fit the DfT's Transport Appraisal Guidance. Not following this guidance prevents comparison with similar schemes and also, in this case, allows for the overstatement of impact, due to not considering the theoretical underpinnings of how a transport investment might lead to productivity improvements.

Table 3 places the claimed passenger additionality and productivity benefits in the context of other DfT standard calculations. These other, much larger, schemes claim between £0 and £3 billion in wider economic benefits during a 60-year appraisal period. However, the much smaller Bristol Airport scheme is claimed to deliver almost £1 billion of Wider Economic Impact during one-sixth of this time-frame.

Further to this, the results as presented, do not take account of the potential for land-use change^{xii} that would distort the traditional 'rule of half' assumption. The concept, which the Review questions, appears to be misunderstood in the Response: the answer to the query on

land-use change references land use within the development site, rather than throughout the study area. Land-use change has the potential to alter demand for travel within the study area; it would have been appropriate for the model used to have been clarified as assuming a fixed area of land usage.

Table 3: Comparisons of airport expansions^{xiii}

	Bristol Airport expansion - the Assessment	London Gatwick Airport expansion (DfT 2017)	London Heathrow Airport expansion (NW) (DfT 2017)
Additional passengers at airport	Scaling to 2 million by 2026	+13 million (2030), +24 million (2040), +47 million (2050)	+46 million (2030), +46 million (2040), +43 million (2050)
Additional passengers at national level	Scaling to 2 million by 2026 (implicit in the Wider impact calculations)	+2.2 million (2030), +8.4 million (2040), +20.8 million (2050)	+26.6 million (2030), +31.5 million (2040), +31.3 million (2050)
Wider Economic impacts			
Productivity	£883 million between 2018 and 2028	Not included in appraisal due to uncertainty	Not included in appraisal due to uncertainty
Business output	Not calculated	£1.2 billion, 2024 to 2084	£1.4 billion, 2024 to 2084
Tax wedge	Not calculated	−£1.1 to 0.1 billion, 2024 to 2084	£0.5 to 0.1 billion, 2024 to 2084
Total	£0.9 billion between 2018 and 2028	−£0.1 to 1.3 billion, 2024 to 2084	£1.8 to 3.1 billion, 2024 to 2084

7. Total effect on the results

Presented in Table 4 are the results from the Assessment, as split across study areas and impact types.

Table 4: Reproduction of the Economic Impact of Bristol Airport in 2026 – Impact of the 12 mppa (million passengers per annum) Planning Consent from the Assessment¹

		Direct	Indirect and Induced	Economic Footprint	Productivity	Tourism	Wider Impacts	Grand Total
North Somerset	GVA (£m)	£50	£20	£70	£20	£0	£20	£90
	Jobs	275	250	525	125	0	125	650
	FTEs	250	200	450	100	0	100	550
West of England	GVA (£m)	£70	£40	£110	£70	£30	£100	£210
	Jobs	575	625	1,200	525	325	850	2,050
	FTEs	525	525	1,050	400	275	675	1,725
South West and South Wales	GVA (£m)	£70	£70	£140	£190	£190	£250	£390
	Jobs	800	1,325	2,125	1,875	1,875	3,025	5,150
	FTEs	700	1,050	1,750	1,475	1,475	1,375	4,125

Table 5 represents the results, presented in the same format as Table 4, with the factors identified in this review accounted for, where possible. This includes: adjusting the Tourism Impact to account for the lower spend for tourists in the South West; assuming a high level of displacement for the Indirect and Induced impact in the South West and South Wales study area; and assuming total displacement for the productivity gain, in line with the DfT's Guidance.

Table 5: Adjusted Table 5.3, in line with the notes made in this review

		Direct	Indirect and Induced	Economic Footprint	Productivity	Tourism	Wider Impacts	Grand Total
North Somerset	GVA (£m)	£50	£20	£70	£0	£0	£0	£70
	Jobs	275	250	525	0	0	0	525
	FTEs	250	200	450	0	0	0	450
West of England	GVA (£m)	£70	£20	£90	£0	£20	£20	£110
	Jobs	575	325	900	0	215	215	1,115
	FTEs	525	275	800	0	180	180	980
South West and South Wales	GVA (£m)	£70	£0	£70	£0	£40	£40	£110
	Jobs	800	0	800	0	760	760	1,560
	FTEs	700	0	700	0	600	600	1,300

- i 'Development of Bristol Airport to Accommodate 12 Million Passengers Per Annum'. Economic Impact Assessment, November 2018, York Aviation on behalf of Bristol Airport Limited.
- ii Review of Economic Impact Assessment - For Bristol Airport Expansion Project, February 2019, Jacobs on behalf of North Somerset Council.
- iii 'Development of Bristol Airport to Accommodate 12 Million Passengers Per Annum: Economic Impact Assessment'. Response to Comments Received, March 2019, York Aviation on behalf of Bristol Airport Limited.
- iv 'Development of Bristol Airport to Accommodate 12 Million Passengers Per Annum: Environmental Statement', December 2018. Wood Environment & Infrastructure Solutions UK Limited, on behalf of Bristol Airport Limited.
- v Committee on Climate Change. 2019. *Net Zero – the UK's contribution to stopping global warming*.
- vi Department for Transport. Traded Carbon Prices. Available at: <https://www.gov.uk/government/collections/carbon-valuation—2#update-to-traded-carbon-values:-2018> [accessed 18/06/2019]
- vii We have utilised the higher estimate of the BEIS carbon prices for policy appraisal. This is appropriate given the imminent increase in carbon prices due to the government's upcoming commitment to net-zero greenhouse gas emissions. See: <https://www.gov.uk/government/collections/carbon-valuation—2>
- viii TAG Unit A2.1 'Wider Economic Impacts Appraisal. Transport Analysis Guidance (TAG)'. May 2018. Department for Transport.
- ix Economic models that predict travel demand behaviours through assigned value to people's time, and deriving the total economic cost of different journey options.
- x 'Airports Commission 1. Strategic Fit: GDP/GVA Impacts', June 2015, PwC on behalf of the Airports Commission.
- xi Updated Appraisal Report: Airport Capacity in the South East, October 2017, DfT.
- xii Changes to land-use within the whole study area that occur as a result of the investment; for example, a housing developer increasing the density of local housing, or from the relocation of a business into a new area.
- xiii 'Updated Appraisal Report: Airport Capacity in the South East', October 2017, DfT.