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23 Feb

Government clarifications following Transport Committee oral evidence session of 7 February 2018

I was pleased to be invited to attend the Committee’s oral evidence session on 7 February, along with senior officials from my Department, to provide evidence to your inquiry into the revised draft Airports National Policy Statement (NPS).

Having now had an opportunity to review the transcript of the session, I wanted to write to you, both to thank you for the level of scrutiny that the Committee has given to our proposals, and to clarify some of the points made during our discussion. I would like to ensure that the evidence you have available for your deliberations is unambiguous and clear.

I have set out below some further context relating to: the Department’s approach to modelling air quality emissions; noise controls and enforcement; and domestic connectivity.

Modelling air quality emissions

I would like to clarify that the modelling of air quality emissions looks at two questions: compliance with air quality targets; and the monetisation of health impacts. Compliance with air quality limits assesses the impact of additional emissions from airport expansion on locations across London. On this basis we are confident that expansion would be capable of being delivered without impacting the UK’s compliance with air quality limit values.
The monetisation approach presented in the Updated Appraisal Report updates the sensitivity analysis undertaken by the Airports Commission. The DfT’s approach assessed the health impacts on populations living within 2km of the expanded airport using updated relationships between pollutant concentrations and mortality, published by Defra, and adjusted to take account of the higher demand projected in our updated demand forecasts.

The study area, which captures over 98% of additional emissions that could occur from expansion, was determined by the Airports Commission’s consultants to include those locations where expansion was expected to make a significant contribution to ambient pollution levels. Potential health impacts outside this area are not included. This was an unintended omission from the appraisal.

I am particularly grateful to you and colleagues on the Committee for drawing attention to the process of monetising the air quality impacts of expansion at Heathrow airport and how that differs from the assessment of compliance with air quality limits. We are continuing to review the large number of responses we received to the October consultation on the revised draft Airports NPS but this is not a point that has been raised by respondents to date. Following your helpful questions in this area, we have taken this opportunity to look at what the potential monetised impacts of emissions outside this study area could be.

Our finding is that including these additional costs makes no material difference to the economic case of any scheme, or to their relative position and, on that basis, there is no material impact on the preference for the Heathrow North West Runway scheme as set out in the revised draft NPS. We have written a note (Annex A) to provide you with a more detailed explanation that underpins this finding.

**Noise controls and enforcement**

Airspace modernisation will facilitate continuous descent operations, reduce the need for stacking and enable more efficient aircraft operations in and around an airport. These changes should have a positive impact on noise experienced in surrounding communities. The CAA is responsible for deciding whether such airspace changes are in accordance with noise policy, but it does not have a regulatory role for aviation noise. Airports are responsible for enforcing noise penalties under the Civil Aviation Act 1982.

As such, airspace modernisation is not a mechanism to change enforcement regimes or noise controls. However, we will be asking the newly-created Independent Commission on Civil Aviation Noise (ICCAN), as part of its work, to monitor and quality-assure airports’ noise measurements, and to produce a review of the current enforcement regime and noise controls, which could
include proposals for tighter rules in future, including around approach angles and how aircraft operate around the airport.

**Domestic connectivity**

As set out in the revised draft Airports NPS, the government sees potential expansion at Heathrow Airport as an opportunity to not only protect and strengthen the frequency of existing domestic routes, but to secure new domestic routes to the benefit of passengers and businesses across the UK. We would expect a significant number of these flights to be commercially viable, as many are today; or secured through support from the airport operator as set out in the revised draft Airports NPS or through the application of Public Service Obligations (PSOs) by the government, which will be considered as part of the Aviation Strategy. We would expect this to account for around 15% of slots made available from the possible expansion of Heathrow Airport. We will reserve slots when required to do so.

Under current EU regulations, UK Crown Dependencies do not currently qualify for PSOs and are not included in the list of indicative domestic routes set out in the revised draft Airports NPS. We would expect flights to the UK Crown Dependencies to be included in the 15% of additional slots provided by any new runway that will be used for domestic flights, and will consider the connectivity between a potentially expanded Heathrow Airport and Crown Dependencies as part of the Aviation Strategy.

I hope this information clarifies and provides further context to the evidence my officials and I provided to the Committee.

[Signature]

Rt Hon Chris Grayling MP
SECRETARY OF STATE FOR TRANSPORT
Air quality monetisation: Airports Commission & DfT Approach

Scope

This note sets out the approaches taken to monetise air quality impacts arising from airport expansion, following questions from the Transport Committee. It finds that in updating the analysis to use an Impact Pathway Approach, there was an unintended omission in health impacts. However, this impact is not expected to be material to the economic case.

This omission does not affect the Department for Transport's analysis of whether airport expansion can be consistent with air quality legislation and limit values\(^1\), as this assessed compliance across all links where unmitigated airport-related traffic could be higher.

The Airports Commission's (AC) Approach to monetisation

The AC commissioned consultants Jacobs to undertake air quality modelling, supported by expert advice. The first step of the analysis was to define an appropriate study area. This was determined by the AC taking into consideration where most of the additional emissions would occur (around the airport) and the distance over which those emissions would make a discernible contribution to concentrations.

Because the contribution of airside emissions falls off strongly with distance, a 2 km wide belt around the expanded airport was selected as the “Principal Study Area” (area).

The analysis identified airside and surface access as the sources of additional emissions arising from expansion. Emissions from the airside – airport operations, flights below a given altitude etc. – led to changes in concentrations within the area. Emissions from surface access were found to contribute to changes within the area, but also arose outside the area from unmitigated additional passenger trips.

The modelling showed that airside emissions made up 98% of all emissions. The principal study area therefore captures virtually all additional emissions from expansion (including a proportion of the remaining 2% which arose from journeys going into the area).

The air quality modelling provided the AC with:

- Changes in pollutant concentrations within the 2 km study area
- Changes in emissions (tonnes) by source, both within and outside the 2 km area

Monetising within 2 km study area

In their central case the AC used a “damage cost approach” to monetise additional emissions from expansion. Defra’s values for the damage costs of pollutants (NO\(_x\), PM\(_{10}\)) were applied to the estimates of the increase in emissions identified by the AC’s modelling (expressed in tonnes).\(^2\) This approach (of monetising changes in emissions) is known as the “damage cost approach”. The estimates produced by this approach and used by the AC are presented in Table 1 below.

\(^1\) [https://www.gov.uk/government/publications/airport-expansion-further-updated-air-quality-re-analysis](https://www.gov.uk/government/publications/airport-expansion-further-updated-air-quality-re-analysis)

Table 1: Airports Commission Air Quality Impacts – damage cost approach

<table>
<thead>
<tr>
<th>Airport Scheme</th>
<th>PM$_{10}$ (£m)</th>
<th>NO$_x$ (£m)</th>
<th>Total (£m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heathrow Northwest Runway</td>
<td>863</td>
<td>94</td>
<td>958</td>
</tr>
<tr>
<td>Heathrow Extended Runway</td>
<td>619</td>
<td>70</td>
<td>688</td>
</tr>
<tr>
<td>Gatwick 2nd Runway</td>
<td>247</td>
<td>74</td>
<td>321</td>
</tr>
</tbody>
</table>

This is a very straightforward approach which makes no distinction between the sources of the emissions, and therefore the proximity of the emissions to affected populations. The AC also therefore ran a sensitivity analysis using the Impact Pathway Approach (IPA), which uses dispersion modelling to estimate the extent to which local communities are exposed to changes in air pollutant concentrations.

The AC applied the IPA to the 2 km study area. At the time, while Defra guidance$^3$ recommended applying the IPA when damage costs were expected to exceed £50million, because of uncertainties in the evidence base linking changes in concentrations to health impacts, Defra recommended only presenting these values as a sensitivity.

Monetising outside 2 km study area

Impacts outside the 2 km study area arise from surface access emissions. To determine what these are, the analysis made use of traffic modelling to identify which links would experience a noticeable increase in unmitigated traffic with expansion. The boundary of these links created a “traffic simulation area”. The emissions from journeys within this area could then be estimated.

The AC monetised both airside and surface access emissions directly by applying the damage cost approach described above.

The Department’s Approach to monetisation

In October 2017, the Department published its Updated Appraisal Report which presented an updated analysis of the impacts of expansion, taking account of the latest aviation passenger demand forecasts. This included updated monetisation of air quality impacts, taking into account revisions to Defra’s guidance.

Monetising within 2 km study area

The approach taken to monetising impacts within the 2 km study area is based on two principal considerations:

1. updates to Defra guidance;
2. the appropriateness of applying a damage cost approach in the case of aviation.

On the first point, Defra updated its guidance (2015) to reflect the latest advice from COMEAP (Committee on Medical Effects of Air Pollution), taking account of evidence from

the World Health Organisation (WHO) on the health impacts from air pollutants. This provided more certainty on the relationship between changes in concentrations and health impacts, allowing these changes to be valued directly using the IPA, which now became "the central recommended approach to value ambient concentrations of air pollutants for a range of health and environmental outcomes."

On the second point, and as explained above, a damage cost approach makes no distinction between the sources of the emissions. It makes assumptions about the proximity of the emissions to affected populations: specifically, they are high because they assume emissions occur along roads where people live, and therefore lead to a significant degree of exposure. For this reason, it is especially likely to lead to a significant overestimate in the case of airport expansion.

In the case of airport expansion however, over 98% of emissions come from the airfield. This is some distance away from where people live, and emissions will disperse, reducing concentrations experienced by local populations. This effect is not taken into account if damage costs are used: simply applying a damage cost to all additional emissions from expansion would therefore lead to a significant and misleading overestimate.

The Department's approach was therefore to use the IPA by updating the sensitivity analysis undertaken by the AC. This made use of the air quality modelling undertaken for the AC which estimated, within the 2 km study area, the changes in concentrations arising from increased airside and surface access emissions, covering over 98% of additional emissions. These changes were then valued using updated relationships between pollutant concentrations and mortality, published by Defra, and adjusted to take account of the higher demand projected in our updated demand forecasts.

Table 2 below shows the values this approach estimated and which were presented in the Updated Appraisal Report.

Table 2: Department for Transport Air Quality costs – Impact Pathway Approach

<table>
<thead>
<tr>
<th>Airport Scheme</th>
<th>Total (£m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heathrow Northwest Runway</td>
<td>145</td>
</tr>
<tr>
<td>Heathrow Extended Runway</td>
<td>108</td>
</tr>
<tr>
<td>Gatwick 2nd Runway</td>
<td>46</td>
</tr>
</tbody>
</table>

That these values are much lower than those reported in Table 1 goes some way to demonstrate how, in the case of airside emissions, the damage cost approach is a very blunt tool, leading to significant overestimates.

There are two important assumptions underpinning these estimates which make this approach conservative:

1. The factor applied to account for double-counting of NOx and PM10
2. The scaling factor applied for updated passenger forecasts

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ANNEX A

On the first point, when both NO\textsubscript{x} and PM\textsubscript{10} are valued separately the resulting costs will overestimate the true amount because it is not possible to accurately disentangle the health impacts of each pollutant. In the Department’s updated IPA a factor of 0.16 was applied to adjust for this risk of double-counting. This is a much lower figure than the 25%-55% figure used in the analysis underpinning Defra’s National Air Quality Plan.\textsuperscript{5}

The analysis also needed to take account of the updated passenger forecasts. It did this by applying a scaling factor of 1.48. This was to create a worse-case view, and was far in excess of the scaling factor of 1.1 based on additional flights. The analysis also uses the high passenger demand scenarios which further exaggerates the impact.

Taking a more central view of these assumptions would lead to values that are between 30% - 60% lower than shown in Table 2.

**Monetising outside 2 km study area**

Given the Transport Committee’s concerns about recent updates to NO\textsubscript{x} damage costs, this section looks at the potential scale of damage costs outside of the 2 km study area. Damage costs outside of the 2 km study area were not assessed in the October 2017 Updated Appraisal Report. This was an unintended omission from the appraisal, but it makes no material difference to the economic case.

As noted above, these emissions arise from unmitigated additional passenger trips to and from the expanded airport. The AC’s analysis found that only 2% of emissions were attributable to surface access. A proportion of these will occur within the study area,\textsuperscript{6} but we can use the surface access proportion as a rough proxy for the size of emissions outside the study area (recognising that this will double-count some emissions).

Whereas the IPA is Defra’s preferred approach, in the specific case of monetising roadside emissions it is reasonable to apply a damage cost approach. This is because the damage cost values themselves have been derived by applying an IPA to specific locations. For example, Defra publish damage cost values for transport emissions in Outer London which have been estimated by modelling the impact of emissions in this area on local air concentrations, and estimating health impacts by taking account of local populations. As we are trying to value the impact of emissions occurring on specific roads, applying the appropriate damage cost value will provide a good estimate of their impact.

To estimate these values, we can apply scaling factors to the AC’s original estimates to take account of Defra’s latest damage costs, and the Department’s latest passenger forecasts. The scaling factors are derived by dividing Defra’s latest damage by the damage costs used by the AC; and applying the demand scaling factors set out in air quality re-analysis.\textsuperscript{7}

The AC’s damage costs can be derived by applying the surface access share of emissions to the AC’s original damage cost estimates. This gives figures for Heathrow Northwest Runway and Gatwick Second Runway for NO\textsubscript{x} damages of £2m and £1m respectively, and for PM\textsubscript{10}, the figures are £45m and £18m respectively (over the 60 years, 2014

\textsuperscript{6} Tables 4.3, 5.3 and 6.3 in the Jacobs report outline the changes in emissions by source and pollutant
\textsuperscript{7} https://www.gov.uk/government/publications/airport-expansion-further-updated-air-quality-re-analysis
prices). Combined, these give figures of £46m at Heathrow NW and £19m at Gatwick (all figures are rounded so sums may differ).

Defra’s updated damage costs can be found here:


Defra’s latest guidance presents a number of different damage costs, which vary by area, whether NOx and PM10 are both valued, and uncertainty in health impacts. To reflect this uncertainty we estimate a range for both NOx and PM10: for the Heathrow schemes, by using low and high values for Outer London (which corresponds to the traffic simulation area identified by Jacobs for the AC); for the Gatwick scheme, by using low and high values and the “transport average” values.

In doing so, we have deliberately included higher values for damage costs to provide a worst-case view of their likely scale, with which to test materiality.

Scaling factors are then applied to take account of the change in trips implied by the updated passenger forecasts. For Gatwick this figure is 0.76; for Heathrow Northwest Runway, 1.17; and for Heathrow Extended Runway, 1.09. Multiplying these values together gives the estimates set out in Table 3.

Table 3: Illustration of damage costs for emissions outside the principal study area

<table>
<thead>
<tr>
<th>Airport Scheme</th>
<th>PM10 (£m)</th>
<th>NOx (£m)</th>
<th>Total (£m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heathrow Northwest Runway</td>
<td>139 - 202</td>
<td>58 – 233</td>
<td>198 - 435</td>
</tr>
<tr>
<td>Heathrow Extended Runway</td>
<td>188 - 273</td>
<td>52 – 209</td>
<td>241 – 483</td>
</tr>
<tr>
<td>Gatwick 2nd Runway</td>
<td>11 - 17</td>
<td>7 – 28</td>
<td>18 – 44</td>
</tr>
</tbody>
</table>

It is important to note that these figures are likely to be an overestimate because: they are based on high demand scenarios; they double-count emissions already captured by the IPA within the principal study area; they do not take account of any mitigation measures to reduce additional traffic.

These figures can then be placed within the context of the economic case. Heathrow Northwest Runway and Gatwick Second Runway deliver benefits of around £75bn, upper net benefits of £3.3bn and £2.4bn, and net social benefits of £17.5bn and £9.3bn respectively. Even if the highest damage costs were included, they would not have a material effect on the economic case of either scheme, both of which are still able to deliver positive economic benefits, nor on the relative pace at which each scheme can deliver those benefits.

Even though the figures for the Heathrow schemes are an order of magnitude greater than at Gatwick, they do not vary their relative position assessed using economic case metrics.

In addition, the economic case only includes those impacts that can be monetised, and the additional values presented here do not affect the wider strategic merits of each scheme. They do not therefore impact on the rationale underpinning the preference for the Heathrow Northwest Runway set out in the draft NPS.