Gatwick Airport Limited

Technical Report in response to Airports Commission Consultation

Air Quality – Road Traffic Modelling

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Executive Summary

This report provides review and comment on the road traffic modelling and surface access issues presented in the report prepared by the Airports Commission’s consultant (Jacobs), entitled Module 6: Air Quality - Local Assessment: Detailed Emissions Inventory and Dispersion Modelling. It builds on previous responses to the Commission from both Gatwick and Arup as part of the wider consultation on the shortlisted runway schemes in November 2014. Where necessary, it raises issues of consistency as well as highlighting omissions which have not still been rectified.

The report by the Commission’s consultant was issued on 8th May 2015 as part of the Commission’s consultation on the air quality impacts of the shortlisted options for a new runway in the South East.

Key issues raised by this review of the road traffic modelling approach and findings presented by the Commission’s consultant are as follows:

- The Commission’s consultant states that its road traffic modelling is unable to differentiate between emissions generated by airport and non-airport related traffic. This means that the impact of airport-related traffic on air quality cannot be robustly determined and therefore the road traffic modelling is not fit for purpose.

- The Commission’s consultant has used a strategic highways model for a local assessment of emissions. This type of model cannot account appropriately for congestion and delay, conditions which lead to higher emissions and impact on air quality. The need for local microsimulation modelling to effectively model air quality impacts was raised by Gatwick and Arup during the Commission’s previous consultation of November 2014.\(^1\)

- The Commission’s consultant overstates the impact of road traffic on emissions for Gatwick with a second runway and understates the impact of road traffic on emissions for Heathrow with a third runway, both for the North West Runway and Extended Northern Runway schemes:
  - The Commission’s consultant has selected inconsistent assessment areas without evidence for why different areas have been chosen. For example, there is no explanation as to why the area for Gatwick is 78% larger than that chosen for Heathrow. In addition, major routes (particularly the M4) and major conurbations west of the M25 but close to Heathrow such as Slough, Maidenhead and Windsor are excluded from the road traffic modelling for Heathrow which is a significant omission.
  - The Commission’s consultant casts doubt on the achievability of the public transport mode share targets of all three runway schemes, contradicting previous analysis presented by the Commission and its consultant in November 2014. By treating the Gatwick and Heathrow scheme proposals for rail enhancements as equal and by failing to differentiate between the actual need for a congestion charge (not required at Gatwick but required at Heathrow), the Commission’s

\(^1\) p.82, Section 4.5, Roads in the Vicinity of the Airport, Arup - Technical Report in response to Airports Commission Consultation: Surface Access, 29th January 2015
consultant ignores the differences between the rail mode share assumptions for Gatwick and Heathrow, creates a misleading view about congestion charging at Gatwick and underplays the risks and uncertainties around congestion charging and public transport mode share targets at Heathrow. Most of these issues were detailed in Arup’s response to the November 2014 consultation. However, discussion on a potential congestion charge at Gatwick is new and contradicts previous analysis by the Commission’s consultant.

- Key contributors such as air cargo and therefore road freight traffic on the roads do not appear to have been included which is important because freight traffic, in particular HGVs, generate higher emissions of harmful pollutants, including NOx, when compared to cars. Heathrow is a major traffic generator for cargo and freight traffic on the M25 and M4, including HGVs. As part of the wider consultation in November 2014, Gatwick and Arup requested airport-related freight and cargo to be included in the Commission’s appraisal in accordance with the Commission’s Surface Access Appraisal Objective 2.

- For an unmitigated network at Heathrow (i.e. the network assuming no changes or improvements), the Commission’s consultant note that the emissions on the A4 Bath Road exceed Marylebone Road in central London, which is the road with the worst air quality in the country. However, the Commission’s consultant then excludes the realigned section of the A4 Bath Road from further analysis because it has been modified as part of the Heathrow North West Runway scheme. Exclusion of realigned roads in the Commission’s assessment means that it does not fully consider future air quality related to each scheme.

- Tunnels create worse conditions for air quality with concentrations of pollutants at tunnel portals. The Gatwick Runway 2 (R2) reference road network does not include any tunnels whereas both Heathrow schemes require tunnelling of the M25 and in the case of the North West Runway also the A4. Indeed, with regard to the M25 tunnel proposition, the Heathrow Hub proposal states “no standing traffic should occur in tunnel due to congestion as the tunnel would have to be closed to maintain acceptable air quality”.

- The Commission’s consultant has not included construction impacts which underestimates the benefits to air quality of the relatively straightforward delivery of Gatwick's highway capacity as opposed to

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2 p.34, Section 3.3 Committed Rail Investment and p.76, Section 4.4 Highway Demand Management, Arup - Technical Report in response to Airports Commission Consultation: Surface Access, 29th January 2015
3 p.87, Section 4.6 Freight, Arup - Technical Report in response to Airports Commission Consultation: Surface Access, 29th January 2015
4 In February 2015, Defra released NO2 projections for the 50 roads in the UK with the highest NO2 levels up to 2030. A501 Marylebone Road in London has the highest NO2 levels, followed by the A4. http://www.airqualitynews.com/2015/02/20/heathrow-expansion-bid-suffers-air-pollution-blow/
5 p.11, 3.2, Heathrow Hub Ltd Heathrow Expansion, Updated scheme design - Surface Access Development Strategy submitted to the Airports Commission, June 2014
6 Highway capacity for the Gatwick R2 scheme is largely delivered by Smart Motorways on the M23. The scheme does require doubling capacity of the M23 Junction 9 through grade separation
complex construction for Heathrow, which will require traffic management and cause major disruption, with a consequent increase in congestion, delay and road traffic emissions.

- The Commission’s consultant raises air quality as an issue at Hazelwick Roundabout in Crawley though air quality remains within EU limits. The Commission should seek to understand from its consultant why Hazelwick Roundabout which carries very little Gatwick traffic (less than 3% with R2 in 2040) has been identified as an air quality issue related to Gatwick’s R2 scheme.

At this late stage in the evaluation of all three runway schemes, the Commission must take into account the above issues when considering the air quality implications of road traffic. Many of these issues were raised by Gatwick and Arup as part of the last consultation of November 2014 and have still not been taken into account. Otherwise the Commission’s decision on road traffic-related air quality when comparing Gatwick and the two Heathrow schemes will be incomplete and will not be evidence-based or fit for purpose.

as well as realignment of the A23. The intention is to build as much as possible offline before connecting to the current road and highway network to minimise disruption.
1 Introduction

This report provides review and comment on road traffic modelling and surface access issues presented in the report prepared by the Airports Commission’s consultant, Jacobs, entitled Module 6: Air Quality - Local Assessment: Detailed Emissions Inventory and Dispersion Modelling, issued on 8th May 2015 as part of the Commission’s consultation on the air quality impacts of the shortlisted options for a new runway in the South East.

This report builds on previous responses to the Commission from both Gatwick Airport and Arup as part of the wider consultation on the shortlisted runway schemes in November 2014. Where necessary, it raises issues of consistency as well as highlighting omissions which have not still been rectified.

1.1 Gatwick Airport’s Runway 2 (R2) Airport Surface Access Strategy (ASAS)

Gatwick Airport’s Runway 2 (R2) Airport Surface Access Strategy (ASAS) was provided to the Airports Commission in May 2014 along with technical analysis undertaken by Arup and documented in A Second Runway for Gatwick, Appendix A6 Surface Access.

Specifically the aforementioned documents demonstrate how Gatwick meets the three Airports Commission appraisal objectives:

- Objective 1 – to maximise the number of passengers and workforce accessing the airport via sustainable modes of transport.
- Objective 2 – to accommodate the needs of other users of transport networks, such as commuters, intercity travellers and freight.
- Objective 3 – to enable access to the airport from a wide catchment area.

As part of achieving Objective 2, Arup developed an R2 reference road network comprising road infrastructure improvements from the Airport out to and including Junction 9 of the M23, to help deliver growth for both background traffic and airport traffic, including airport-related freight movements. This network was tested extensively using local roads modelling and microsimulation and showed free-flowing conditions on roads in the vicinity of the airport. The Gatwick R2 network can be considered to be optimised in terms of reducing delay and congestion and therefore reducing unnecessary road traffic emissions which negatively impact on air quality.

All of the road traffic microsimulation forecasts out to 2050 have been used to inform air quality modelling of the Gatwick scheme.

Both the air quality and traffic microsimulation modelling have been available to the Commission and its consultant since May 2014.
1.2 The importance of accurate road traffic modelling

As raised in Section 2 of Gatwick’s R2 ASAS of May 2014\(^7\) and Gatwick’s response to the Airports Commission consultation of November 2014, Gatwick has always recognised surface access, especially road traffic, as an important input to dependent appraisal modules in the Commission’s criteria including air quality, carbon and surface noise as well as feeding into local economy, place, community and quality of life workstreams. Indeed, as part of the consultation in November 2014, Arup identified the lack of appropriate microsimulation of road traffic in the Commission consultant’s assessment and the impact that this would have.\(^8\)

This report reviews the degree to which this recommendation has been addressed in the road traffic modelling undertaken for this May 2015 consultation on air quality.

\(^7\) p.11, Section 2, GAL, A Second Runway for Gatwick – Appendix A6 Surface Access, May 2014

2 Review of the Commission’s road traffic modelling

2.1 Lack of differentiation between emissions associated with airport-related road traffic and general road traffic

Issue:

The road traffic modelling undertaken by the Commission’s consultant cannot distinguish between emissions from airport road traffic and non-airport road traffic. Indeed their report states that “apportionment of surface access emissions into airport and non-airport related categories was not possible as outputs of the traffic model for airport related traffic were in a format incompatible with those of the outputs for total traffic on the network. It has not been possible to attribute the proportion of impacts caused by changes in traffic emissions to airport-related surface access”.

Impact:

The weakness of this lack of differentiation in the road traffic modelling approach is that the Commission’s consultant cannot specifically identify emissions caused by airport traffic growth generated by the proposed runway schemes at Gatwick or Heathrow and therefore their effect on air quality. This is fundamental point for an assessment of the scheme proposals and critical to the validity of the air quality assessment.

Recommendation:

It is important that road traffic modelling undertaken for the Commission can differentiate between airport-related and non-airport-related impacts, otherwise the model results are not credible or fit for purpose.

At this late stage in the evaluation of all three runway schemes, the Commission must take into account the relative contribution of airport and non-airport traffic and the impact on meeting air quality emission limits, which is the fundamental purpose of this assessment.

2.2 Lack of microsimulation modelling

Issue:

The Commission’s consultant has used a strategic highways model to test the impact of road traffic on local air quality. However, strategic highways models are not typically used to test congestion and delay which are the main causes of increased road traffic emissions and a deterioration in air quality.

Indeed the Commission consultant notes that “reducing congestion has the potential to reduce emissions, which tend to increase as a result of stop-start driving. It is difficult to quantify how much the reduction would be without a

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9 p.151, Appendix C, Section C4, Jacobs, Module 6: Air Quality - Local Assessment: Detailed Emissions Inventory and Dispersion Modelling, 8th May 2015
detailed assessment, which could take the form of using instantaneous emissions with a microsimulation traffic model”.

By their own admission, the road traffic modelling undertaken by the consultant is not a “detailed assessment” of localised traffic impacts given that a microsimulation model has not been used.

**Impact:**

The impact of the Commission’s consultant’s approach is that emissions and air quality impacts associated with the two Heathrow schemes in particular cannot be properly understood.

**Response for Gatwick:**

In contrast Gatwick has provided air quality modelling out to 2050 which has used road traffic modelling using microsimulation as one of its inputs. Both the air quality modelling and microsimulation have been available to the Commission since May 2014.

**Table 1** shows that the average delay per vehicle output from the Gatwick R2 microsimulation model in 2040 and 2050 with the proposed R2 road network. When including mitigation such as the realigned A23 and increased capacity at M23 Junction 9, the traffic modelling shows comparable delays to current levels of delay on the existing network, even allowing for increased airport-related freight traffic. These delay times are around 45 seconds for all scenarios indicating largely free-flow conditions which is a strong and positive message in terms of emissions and air quality. In addition, over time vehicles will become more efficient and cleaner, meaning lower levels of emissions when compared to today.

**Table 1: Average delay time per vehicle (in seconds) from VISSIM modelling**

<table>
<thead>
<tr>
<th>Year</th>
<th>2012 Delay (in seconds)</th>
<th>2040 Delay (in seconds)</th>
<th>2050 Delay (in seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM peak hour</td>
<td>Existing Network</td>
<td>R2 Road Network</td>
<td></td>
</tr>
<tr>
<td></td>
<td>42</td>
<td>40</td>
<td>47</td>
</tr>
<tr>
<td>PM peak hour</td>
<td>43</td>
<td>42</td>
<td>45</td>
</tr>
</tbody>
</table>

*Source: Local roads modelling using microsimulation,*

This microsimulation modelling has been available for review and testing by the Commission and the Commission’s consultant since May 2014.

**Recommendation:**

As The Commission’s consultant has not undertaken an appropriate level of road traffic modelling for this “detailed emissions” assessment. Therefore the Commission should recognise and take into account Gatwick’s microsimulation modelling in its decision making. This modelling has been carried out to 2050

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10 p.51, 4.6.3 Commentary on Promoter’s Mitigation, Jacobs, Module 6: Air Quality - Local Assessment: Detailed Emissions Inventory and Dispersion Modelling, 8th May 2015
11 National Atmospheric Emissions Inventory AEA, UK Emission Projections of Air Quality Pollutants to 2030, March 2012
assuming a high private vehicle mode share (as well as freight traffic) and which informs the air quality assessment presented by Gatwick to the Commission.

2.3 Differences in area analysed and highway network used

**Issue:**

As shown in **Figure 1**, the geographic area and network for assessing road traffic emissions generated by the Commission’s consultants is 78% larger for Gatwick than it is for Heathrow.

**Figure 1:** Traffic Model Simulation Area – Heathrow and Gatwick
The Commission’s consultant used a different scale in its representation of these areas which may not be immediately obvious and so Figure 1 shows the areas that have been assessed at the same scale. The simulation areas for the two airports as shown in the Commission’s consultant’s report are provided in Appendix A.

It can be seen from Figure 1 and Appendix A that the network used for Heathrow does not include all the areas that are likely to be impacted by airport-related road traffic. The model only includes West London but excludes all links west of the M25 including major roads and strategic highways, such as the A4, M4, M3 and M40, and affected towns, such as Slough, Maidenhead and Windsor. As a result this approach underestimates the impact of the Heathrow schemes.

By contrast, the area and road network used for the road traffic modelling of Gatwick is greater than for Heathrow which has the potential to overstate air quality and emissions impacts for Gatwick. In addition the area assumed for Gatwick contains 4.4 million people as compared to 3.3 million for Heathrow. This will have a direct impact on overall traffic, which as described in Section 2.1 cannot be distinguished from airport related traffic in the road traffic modelling undertaken by the Commission’s consultant and which will therefore overstate emissions for Gatwick.

The differences between the two simulation areas are summarised in Table 2.

<table>
<thead>
<tr>
<th>Area (km²)</th>
<th>Population (millions)</th>
<th>Distance North-South (km)</th>
<th>Distance East-West (km)</th>
<th>Distance around M25 (km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gatwick</td>
<td>1672</td>
<td>4.4</td>
<td>48</td>
<td>60</td>
</tr>
<tr>
<td>Heathrow</td>
<td>935</td>
<td>3.3</td>
<td>45</td>
<td>30</td>
</tr>
</tbody>
</table>

Impact:

The omission of key links and conurbations to the west means the impacts of Heathrow’s road traffic cannot be fully assessed. In its analysis for the wider November 2014 consultation, the Commission’s consultant has noted for Heathrow that “the management of congestion on the M25 and M4 will be a significant issue”. Road congestion increases emissions and therefore leads to a deterioration in air quality. Therefore to not include the M4 and other major roads outside the M25 more fully is a significant omission.

In addition, by including almost twice the length of M25 in the Gatwick assessment as well as a larger area of analysis, Gatwick’s impact is overstated when compared to Heathrow.

Recommendation:

The Commission’s consultant has not selected areas of analysis based on objective criteria and therefore the impact of the Gatwick and Heathrow schemes on emissions from road traffic have not been compared side-by-side in a fair and equal manner. The Commission should take this into account in its final evaluation of each runway scheme’s impact on road traffic and air quality.

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12 p.60, 3.79 Airports Commission, Consultation Document, November 2014
2.4 Mode share assumptions and congestion charge

Issue:
A high public transport mode share is important for any airport to achieve its air quality targets.

In this latest consultation, the Commission’s consultant states for all schemes that “the Promoter’s Air Quality Assessment sets out a vision for high public transport access, but it is not clear whether this is deliverable”. This contradicts statements made by the Commission and the Commission’s consultant as part of the wider consultation in November 2014.

Moreover the latest report by the Commission’s consultant describes congestion charging to deliver improved public transport mode share for all runway schemes. Whilst Heathrow’s promoters acknowledge that congestion charging will be required, Gatwick and Arup’s analysis showed that congestion charging is not required with Gatwick R2, even out to 2050. In addition, the Commission and the Commission’s consultant identified congestion charging as not being required at Gatwick with R2 in November 2014 and therefore this latest report contradicts previous analysis.

Impact:
By treating the Gatwick and Heathrow scheme proposals for rail enhancements as equal and by failing to differentiate between the actual need for a congestion charge, the Commission’s consultant ignores the differences between the rail mode share assumptions for Gatwick and Heathrow, creates a misleading view about congestion charging at Gatwick (which is not required) and fails to fully review the risks and uncertainties around congestion charging and public transport mode share targets at Heathrow. These issues were detailed in Arup’s response to the November 2014 consultation.

Committed Rail Investment

Gatwick is able to maximise access to the airport by rail, largely based on committed rail investment schemes which are being delivered or have been planned and have funding. The completion of the Thameslink Programme delivers significant capacity and improved access to the airport by rail from 2018 onwards. The Commission acknowledged the contribution of this scheme in its

13 Sections 4.6.3, 5.6.3 and 6.6.3, Jacobs, Module 6: Air Quality - Local Assessment: Detailed Emissions Inventory and Dispersion Modelling, 8th May 2015
14 p.43, 3.29, Airports Commission Consultation Document, 11th November 2014 describes an increase in public transport mode share to 54% by 2030 which is consistent with a further increase to 60% by 2040. Rail capacity for Gatwick is delivered predominantly by the Thameslink Programme after 2018, hence its inclusion in the Core Baseline by the Commission and its consultant. Over and above this, schemes in CP6 deliver additional capacity and are included in the Extended Baseline by the Commission and its consultant.
15 With M23 Smart Motorways included in the Gatwick analysis, Jacobs state that “no links on the road network would require capacity enhancements as a result of the second runway in 2030.” p7, Jacobs, Appraisal Framework Module 4. Surface Access: Gatwick Airport Second Runway, November 2014
16 p.34, Section 3.3 Committed Rail Investment and p.76, Section 4.4 Highway Demand Management, Arup - Technical Report in response to Airports Commission Consultation: Surface Access, 29th January 2015
Consultation Document issued on 11th November 2014 and through its inclusion of the Thameslink Programme in the Core Baseline for Gatwick.\textsuperscript{17} The Extended Baseline includes an improved Gatwick Station and capacity improvements in the period 2019 to 2024, known as rail industry Control Period 6 (CP6). The Commission notes for the CP6 schemes that these will “ensure that most sections of the line [have] sufficient capacity to satisfy both background demand and airport expansion in 2030 with additional traffic due to airport expansion accounting for only a marginal component of increased demand for use of the line”.\textsuperscript{18}

Heathrow benefits from the completion of Crossrail and its connection to central London, but requires investment within the airport to connect the scheme to the proposed new terminal and to Terminal 5 (at this stage, Crossrail is proposed to run to Terminal 4 at 4tph). However, both scheme promoters for Heathrow imply frequencies of up to 8tph\textsuperscript{19} on Crossrail into the future. These statements should have been challenged and tested by the Commission and its consultant otherwise these aspirational service frequencies, which are higher than frequencies published by Network Rail in its Long Term Planning Process\textsuperscript{20} will be considered on an equal footing with tested and achievable service patterns.

Aside from Crossrail, Heathrow’s ability to maximise access to the airport by public transport is dependent on investment on rail projects not yet fully planned or committed including Western Rail Access, Southern Rail Access and the HS2 spur:

- Network Rail’s October 2014 Western Route Study published as a draft for consultation notes that the most likely scheme to be built, Western Rail Access to Heathrow, is “subject to funding, a value for money assessment and agreement of acceptable terms with the aviation industry”.\textsuperscript{21}
- In the Business Case and Sustainability Assessments for both Heathrow runway schemes, the following reference is made to Southern Rail Access

\textsuperscript{17} “In respect of surface access, one of the most significant planned improvements will be to Thameslink services, beginning from 2018, which will eventually provide trains to London from the airport every 2½ minutes, with services divided between Victoria and London Bridge (and to further destinations north of London including Luton, Bedford, Cambridge and Peterborough). The interchange between these improved Thameslink services at Farringdon with the newly-opened Crossrail will benefit both City passengers and those travelling from Canary Wharf. It will also be of benefit to a wider collection of passengers travelling along the west-east axis of Crossrail”, p.17, Section 1.35, Airports Commission, Gatwick Airport Second Runway: Business Case and Sustainability Assessment.

\textsuperscript{18} p.78, 4.22 Airports Commission Consultation Document.

\textsuperscript{19} “As Heathrow grows, additional Crossrail trains serving Heathrow will provide higher frequency and more capacity. Network Rail has indicated that increasing the service to at least 6tph is possible, and we wish to explore opportunities for this to be expanded further to 8tph” p.212, 4.2.1.3, HAL, Taking Britain Further – Volume 1. “This scheme involves increasing the number of Crossrail trains to CTA/Terminal 5/Terminal 4 from central London to 6tph (potentially up to 8tph) from the currently planned 4tph… It is envisaged that two Crossrail trains will be extended to terminate at a new bay platform at Staines, further improving connectivity and reducing operational congestion at the Terminal 5 station” p.6 and 7, 2.1.4 and 2.1.6, Jacobs, Appraisal Framework Module 4. Surface Access: Heathrow Airport Hub Station Option, 28th October 2014.

\textsuperscript{20} Network Rail, Western Route Study, published as a draft for consultation document on 29th September 2014.

\textsuperscript{21} p.27, 02 Baseline, Network Rail Western Route Study Draft for Consultation, October 2014
“The Commission notes that with no design on the table, and considering the opposition to the previous Airtrack scheme, the delivery of this scheme must be considered to be subject to its own risks and uncertainties”.\footnote{22} Southern Rail Access is therefore not included in either of the Baselines. However, despite this statement, Heathrow benefits from the capacity and connectivity provided by Southern Rail Access in the Commission’s analysis.

- The Commission also assumes HS2 to be part of its Core Baseline of schemes, despite its Phase 1 Bill not having received Royal Assent. Moreover, the HS2 Spur to Heathrow is included in the Extended Baseline by the Commission despite its consultant, Jacobs, stating “it is difficult to envisage the provision of a spur from HS2 to Heathrow will either have a material impact on passenger numbers at Heathrow”.\footnote{23}

It can be seen from Figure 2 that Heathrow’s mode share assumptions include almost a 5% shift associated with Crossrail frequency increase, Western Rail Access, Southern Rail Access and the HS2 Spur, with another 5% mode share is assumed to be delivered by a congestion charge.

**Figure 2: Heathrow North West Runway – Mode Share Assumptions**

![Figure 2: Heathrow North West Runway – Mode Share Assumptions](image)

Source: Heathrow Airport ‘Taking Britain Further’ Volume 1, page 235 Figure 4.22

Rather than casting doubt on each runway schemes’ ability to achieve high public transport mode share, the Commission’s consultant should have specifically tested the implications of certain rail schemes and the congestion charge not being delivered. These scenarios would lead to increased road traffic and increased emissions and therefore a deterioration in air quality.

**Congestion Charge**

Whilst both Heathrow schemes’ promoters identify the need for demand management or congestion charging, Gatwick does not require a congestion charge to support delivery of a second runway. For this latest consultation, the Commission’s consultants make misleading references to the impact of a congestion charge at Gatwick. However, as already stated Gatwick’s second runway proposals do not require a congestion charge and the Commission has

\footnote{22} p.79, 4.22 Airports Commission, Heathrow Airport North West Runway: Business Case and Sustainability Assessment

already recognised this as part of its November 2014 consultation – “investment on the M23 and M25 is also forecast to provide sufficient capacity to accommodate growth in road traffic from the expanded [Gatwick] airport”.\(^\text{24}\)

In its promoter documents, ‘Taking Britain Further’, Heathrow proposes that highway demand management\(^\text{25}\), and specifically road congestion charging, is required by 2040 to reduce vehicle journeys to the airport in future. It claims that a significant proportion of public transport mode share in 2040 is attributable to the congestion charge. Heathrow Hub proposal acknowledges “a cordon charge, providing “the stick” for encouraging greater use of public transport to access the airport”\(^\text{26}\) at Heathrow.

The Commission’s consultant recognises that both Heathrow schemes require some form of congestion charge and indeed identify that this has been analysed, stating that “an assessment on demand management measures in reducing car use at Heathrow Airport has been carried out for Appraisal Framework Module 4 (Jacobs 2015)”.\(^\text{27}\) However, this study has not been published by the Commission or been presented as part of any public consultation.

**Recommendation:**

The Commission’s consultant has not completed a fair and balanced assessment of future rail services to each airport and this creates a misleading view of the position with regard to rail capacity and access at each airport. As a result the consultant understates the strong rail capacity case for Gatwick Airport when compared to the risk and uncertainty of delivering rail improvements for the two Heathrow runway schemes. The Commission should take this into account in its final evaluation of each runway scheme’s impact on road traffic and air quality.

The Commission should ask its consultant to remove any references to congestion charging at Gatwick.

Moreover it is recommended that the Commission thoroughly examine the two Heathrow schemes’ demand management and congestion charge proposals. This should include the charge assumed, the operational details of how the charge would be applied and administered, the impact on mode share, the wider impacts on traffic on local roads and the knock-on impact on air quality. It should also examine proposals for implementation. If the Commission does not do this, the impact the Heathrow schemes’ congestion charging proposals and their impact on air quality will not be fairly and objectively compared to Gatwick where no such demand management is proposed.

\(^{24}\) p.43, 3.28, Airports Commission Consultation Document, 11\(^{\text{th}}\) November 2014

\(^{25}\) “We believe there is a case for introducing a new congestion charge zone to further reduce vehicle journeys to Heathrow” p.27, HAL, Taking Britain Further, Volume 1.

\(^{26}\) p.vi and p.48, Heathrow Hub Limited, Heathrow Expansion - Updated scheme design - Surface Access, June 2014

\(^{27}\) p.56, 4.6, Jacobs, *Module 6: Air Quality - Local Assessment: Detailed Emissions Inventory and Dispersion Modelling*, May 2015
2.5 Freight

Issue:
As part of the wider consultation in November 2014, the Commission’s consultant stated that it had not undertaken analysis of airport-related road freight traffic, despite this being explicitly raised in the Commission’s own surface access Appraisal Objective 2 – “to accommodate the needs of other users of transport networks, such as commuters, intercity travellers and freight”. This important because freight traffic, in particular HGVs, generate higher emissions of harmful pollutants, such as NOx, when compared to cars.

Impact:
None of the three runway schemes can be fully assessed in terms of air quality without an assessment of airport-related road freight traffic. Indeed the Commission’s consultant noted in November 2014 in all of its airport case documents that “A surface access freight impact assessment is therefore required as part of a future phase of work in order to address the element of Objective 2 related to freight”. As far as Gatwick is aware, no such freight assessment has been undertaken.

The impact of this omission is likely to underestimate the impact of the growth in airport-related freight traffic at Heathrow. Heathrow estimate 12,500 vehicles per day through servicing, deliveries and cargo operations, with a potential 60% increase in trips by 2040, equivalent to approximately an additional 8,000 vehicle movements a day. Heathrow is proposing a strategy to limit vehicles movements to similar levels to today, though no details are provided on this strategy. The lack of detail provided and the lack of an objective assessment by the Commission’s consultant means there is significant uncertainty as to how much airport-related freight traffic, including HGVs, there will be on strategic highways around Heathrow in the future.

As part of its wider consultation, the Commission’s consultant stated that “Heathrow has good access to the M25, M4 and M40, but the high levels of congestion forecast on these routes may limit the effectiveness of the airport’s road links”. Accordingly it is fundamental to the air quality assessment to be able to estimate the impact of HGVs experiencing congestion, delay and therefore generating emissions.

By contrast, for Gatwick, as shown by the Commission’s consultant’s own analysis, M23 Smart Motorways provides capacity for background growth and airport-related traffic out to 2030. Indeed, Arup’s analysis for Gatwick’s R2 ASAS demonstrates sufficient capacity out to 2050 even with a conservative road vehicle mode share, including freight traffic. This means that air quality emissions have been minimised.

Recommendation:
The Commission should challenge its consultant to advise on and take account of the likely surface access freight impacts for all three runway schemes and the

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29 p.224, 4.2.6 Heathrow Airport Limited, Taking Britain Further, Volume 1.
impact of these on air quality, even if road traffic modelling of these cannot be completed in time. Otherwise the significant difference in the scale of road freight operations proposed at each airport cannot be objectively assessed in terms of air quality impacts.

2.6 Lack of inclusion of realigned roads

Issue:
Assuming no changes to the road network at Heathrow by 2030, the Commission’s consultant notes that the emissions on the A4 Bath Road will exceed Marylebone Road in central London, which is the road with the worst air quality in the country.\(^{31}\)

However, the Commission’s consultant then states that, in its approach, realigned roads as part of scheme proposals are excluded from the analysis. Accordingly the A4 Bath Road is excluded from further analysis because it has been realigned as part of the Heathrow North West Runway scheme. The A23 for Gatwick is also excluded as it has been realigned in the Gatwick scheme. It is noted that though no exceedances are shown for the A23 in any of the Commission’s consultant’s road traffic modelling.

Impact:
By excluding the A4 once it has been realigned in the North West Runway, the Commission’s assessment does not fully consider future air quality exceedances at Heathrow on the A4 Bath Road caused by road traffic increases into the future. This is an important omission given the current exceedances experienced for this road.

The A4 is not realigned in the Heathrow Extended Northern Runway scheme and it is noted that the Commission’s consultant states “the incremental change associated with the unmitigated Heathrow ENR would cause the Bath Road (A4) sector PCM road links to have a higher concentration in 2030 (55.8 μg/m\(^3\)) than the Maximum PCM Predicted Concentration in the Greater London Agglomeration (which is 48.6 μg/m\(^3\)). The unmitigated Heathrow ENR Scheme would thus delay Defra in achieving compliance with the Limit Value”.\(^{32}\)

Whilst the Commission’s consultants are consistent and exclude the realigned A23 at Gatwick from its analysis, this road has been planned to pass through airport land with Gatwick R2 and will therefore no longer impact on local residents. In addition, the alignment is planned to be free-flowing with a reduced number of junctions when compared to today which will have benefits for air quality.

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\(^{31}\) “The A4 Bath Road at Heathrow shows exceedances with the NWR scheme assuming no realignment or mitigation to the road network. The Commission’s consultant identifies that “the unmitigated Heathrow NWR would cause the retained Bath Road (A4) sector PCM road link to have a marginally higher concentration in 2030 (48.7 μg/m\(^3\)) than the Maximum PCM Predicted Concentration in the Greater London Agglomeration (which is 48.6 μg/m\(^3\) and occurs at Marylebone Road) identified in the current Defra compliance assessment”, p.iii, Executive Summary, Jacobs, Module 6: Air Quality - Local Assessment: Detailed Emissions Inventory and Dispersion Modelling, May 2015

\(^{32}\) p.104, 6.7, Jacobs, Module 6: Air Quality - Local Assessment: Detailed Emissions Inventory and Dispersion Modelling, May 2015
**Recommendation:**

The Commission should take into account realigned roads in its final evaluation of the road traffic modelling and air quality analysis otherwise the Commission’s assessment cannot be considered fair and objective.

### 2.7 Road tunnels in Heathrow design

**Issue:**

Whilst the Gatwick scheme does not have any roads in tunnels, the Heathrow scheme requires both the M25 and A4 Bath Road in tunnel. Roads in tunnels lead to higher concentrations of pollutants caused by emissions at tunnel portals. However, the Commission’s consultant’s road traffic modelling has not attempted to evaluate the impact of these road tunnels on concentrations of NOx, NO$_2$ and particulates around Heathrow.

**Figure 3** shows orange arrows pointing into the four tunnel portals for the M25 and A4 Bath Road for the Heathrow North West Runway scheme. The Extended Northern Runway scheme is not shown as the community of Poyle would need to make way for the new runway. In addition, the Commission’s consultant has identified exceedance on the A4 Bath Road for this scheme.

**Figure 3:** Road tunnel portals – Heathrow North West Runway scheme

The Commission’s consultant states that “roads with canyon-like features can increase concentrations of pollutants within the canyon environment”. The report then goes on to describe that the modelling could have represented canyon effects “but this feature was not applied as it was considered impractical to implement consistently across the extent of the Study Areas incremental change associated with Heathrow NWR”. The effect of the M25 and the A4 Bath Road being in tunnel have therefore not been assessed.

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Impact

The impact of this is that the air quality impacts of Heathrow on communities in the vicinity of the tunnel portals, such as Poyle, Harmondsworth and potentially West Drayton have not been fully assessed.

Indeed it should be noted that the Heathrow Hub proposal states “no standing traffic should occur in tunnel due to congestion as the tunnel would have to be closed to maintain acceptable air quality”.\(^{34}\) Given that there is regularly congestion on this section of the M25, owing to the proximity to Junction 15, it is difficult to see how standing traffic in the tunnels can be avoided.

Recommendation:

The road traffic modelling of Heathrow’s impact on air quality with additional runway capacity is understated as roads in tunnels and in cut have not been assessed. The Commission should ask its consultant to advise on these impacts and take them into account when making its recommendation.

### 2.8 Construction impacts

**Issue:**

Construction and widening of strategic highways can cause deterioration in air quality, both through particulate matter generated by construction and also increased emissions caused by congestion as traffic is re-routed and delayed. The Commission’s consultant states that “air quality impacts associated with the construction of the proposed schemes have not been included in the detailed assessment”.\(^{35}\)

**Impact:**

The relative ease of delivering highway capacity for Gatwick has not been highlighted by the Commission’s consultant. The greater disruption, congestion and therefore deterioration in air quality associated with construction of highway improvements at Heathrow has not been assessed.

Gatwick’s highway capacity will be delivered by the M23 Smart Motorway project. Expanding the use of the Smart Motorways projects is a core part of the Department for Transport’s Roads Investment Strategy following its implementation in a number of locations in the UK, such as on the M42. Accordingly the construction requirements associated with turning the motorway hard shoulder into an additional running lane are known and have been resolved on other parts of the network. The Gatwick R2 scheme does require doubling capacity of the M23 Junction 9 through grade separation as well as realignment of the A23. Here the intention is to build as much as possible offline before connecting to the current road and highway network to minimise disruption. Therefore the implementation of road and highway enhancement at Gatwick will be relatively straight-forward and therefore delays, congestion and the resulting impact on air quality emissions can be minimised.

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\(^{34}\) p.11, 3.2, Heathrow Hub Ltd Heathrow Expansion, Updated scheme design - Surface Access Development Strategy submitted to the Airports Commission, June 2014

\(^{35}\) e.g. p.36, 3.14, Appendix C4, Jacobs, Module 6: Air Quality - Local Assessment: Detailed Emissions Inventory and Dispersion Modelling, May 2015
By contrast, for Heathrow, the Commission’s consultant identifies the need for widening of the M4, widening the M25 and also putting the M25 and A4 in tunnel.\textsuperscript{36} The Commission’s consultant states that “during construction, significant delays are expected on routes with interventions that require lane closures. These include upgrade to existing junctions, construction of new tunnels linking existing roads and construction of new junctions”.\textsuperscript{37} It is noted that according to both the promoter and the Commission’s assessments, these construction impacts will be felt over several years prior to scheme opening. As part of the November 2014 consultation, the Commission’s consultant produced a Table 15 in both Heathrow assessments which showed the intervention and the expected severity of impact on reliability of the road network during construction. This is reproduced in Figure 4 below.

**Figure 4: List of interventions and likely impact level – Heathrow schemes**

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tunnelling the M25</td>
<td>Moderate</td>
</tr>
<tr>
<td>M4 J2 to J3 widening</td>
<td>Severe</td>
</tr>
<tr>
<td>M4 J4 to J4a widening</td>
<td>Severe</td>
</tr>
<tr>
<td>Constructing a system of collector-distributor roads</td>
<td>Moderate</td>
</tr>
<tr>
<td>Construct a new Southern Road Tunnel access</td>
<td>Moderate</td>
</tr>
<tr>
<td>Implementation of a new one-way access arrangement</td>
<td>Minimal</td>
</tr>
<tr>
<td>Realigning the A4 to the north of airport</td>
<td>Severe</td>
</tr>
<tr>
<td>Replace sections of the A3044</td>
<td>Severe</td>
</tr>
<tr>
<td>Remove the existing Western Perimeter Road</td>
<td>Minimal</td>
</tr>
<tr>
<td>Grade separate the roundabout</td>
<td>Severe</td>
</tr>
<tr>
<td>Construct new junction on the Southern Perimeter Road</td>
<td>Severe</td>
</tr>
</tbody>
</table>

*Source:* p.54, Table 15, Airports Commission Consultation Document, November 2014

It can be seen that for M4 works, road traffic impacts during construction are anticipated to be “severe”. M25 tunnelling impacts are only expected to be “moderate” but what this means for congestion and queue traffic is not quantified (though is potential for traffic disruption to be “severe”).

The Commission acknowledges that any widening of the M4 is a “major engineering project”.\textsuperscript{38} Widening the M4 eastbound towards Junction 2 will have a major impact on the network given that the current motorway is a two lane elevated structure along much of the London-end of the M4 as it approaches Chiswick. To widen this structure is complex and could require temporary closure of the M4 or this eastern section being put in tunnel. Both approaches would cause major disruption, congestion and potential exceedances of air quality thresholds, including impacts on other radial routes such as the A40, itself already congested.

\textsuperscript{36} p.54, Airports Commission Consultation Document, 11th November 2014  
\textsuperscript{38} p.80, 4.26, Airports Commission, Heathrow Airport North West Runway: Business Case and Sustainability Assessment, November 2014.
Recommendation:

The Commission should challenge its consultant to advise on likely construction impacts for all three runway schemes, even if road traffic modelling of these cannot be completed in time. Otherwise the significant difference in the relative ease of delivering Gatwick’s future highway capacity and the greater disruption, congestion and therefore deterioration in air quality associated with construction of highway improvements at Heathrow cannot be compared objectively.

2.9 Specific road traffic modelling at Hazelwick Roundabout, Gatwick

Issue:

Whilst the Commission’s consultant notes that the Gatwick R2 scheme “would not cause any exceedences of the annual mean NO\textsubscript{2} concentration at which the EU Limit Value is set, and would not delay Defra in achieving compliance in the relevant zone”,\textsuperscript{39} its modelling shows NO\textsubscript{2} concentrations of between 35 and 40 μg/m\textsuperscript{3} at a number of locations around Hazelwick Roundabout, as shown in Figure 5.

Figure 5: Gatwick 2R Predicted Annual Mean NO\textsubscript{2} Concentrations (μg/m\textsuperscript{3}) - 2030

\textsuperscript{39}p.11, Executive Summary, Jacobs, Module 6: Air Quality, Local Assessment - Detailed Emissions Inventory and Dispersion Modelling, May 2015
**Impact:**

The impact of this is that the Commission’s consultant raises apparent air quality concerns caused by traffic at a location which is not major junction for airport-related traffic.

Gatwick Airport has continued to test the implications of R2 with stakeholders including West Sussex County Council (WSCC) and has developed further road traffic modelling and testing of junctions further away from the Airport, including Hazelwick Roundabout.

For Hazelwick Roundabout, airport-related flows make up only 1.9% of traffic in 2025 with a single runway. By 2040 with a second runway, the proportion of Gatwick Airport traffic increases by only 1% to 2.9% indicating that Gatwick’s contribution to demand at this roundabout is minimal. This has been corroborated by analysis undertaken by consultation with WSCC. Accordingly for the Commission’s analysis to show air quality issues here owing to a second runway is surprising and likely relates to errors in the road traffic and potentially the air quality modelling approach.

Moreover, it is noted for this junction that the Forge Wood Development, also known as the North East Sector development, proposes enhancements to junction capacity which are unlikely to have been included in the road traffic modelling undertaken by the Commission’s consultant.

**Recommendation:**

The Commission should seek to understand why Hazelwick Roundabout which carries very little Gatwick traffic has been identified as an air quality issue related to Gatwick’s R2 scheme.
3 Recommendations for the Airports Commission

At this late stage in the evaluation of all three runway schemes, the Commission must take into account the following issues when considering the air quality implications of road traffic. Many of these issues were raised by Gatwick and Arup as part of the last consultation of November 2014 and have still not been taken into account. Otherwise the Commission’s decision on road traffic-related air quality when comparing Gatwick and the two Heathrow schemes will be incomplete and will not be evidence-based.

- It is important that road traffic modelling undertaken for the Commission can differentiate between airport-related and non-airport-related impacts. The Commission must take into account the relative contribution of airport and non-airport traffic and the impact on meeting air quality emission limits, which is the fundamental purpose of this assessment.

- Given that the Commission’s consultant has not undertaken an appropriate level of road traffic modelling for this “detailed emissions” assessment, the Commission should recognise and take into account Gatwick’s microsimulation modelling which has been carried out to 2050 assuming a high private vehicle mode share (as well as freight traffic) and which informs the air quality assessment presented by Gatwick to the Commission.

- The Commission’s consultant has not selected areas of analysis based on objective criteria and therefore the impact of the Gatwick and Heathrow schemes on emissions from road traffic have not been compared side-by-side in a fair and equal manner. The Commission should take this into account in its final evaluation of each runway scheme’s impact on road traffic and air quality.

- The Commission’s consultant has not completed a fair and balanced assessment of future rail services to each airport and this creates a misleading view of the position with regard to rail capacity and access at each airport. As a result the consultant understates the strong rail capacity case for Gatwick Airport when compared to the risk and uncertainty of delivering rail improvements for the two Heathrow runway schemes. The Commission should take this into account in its final evaluation of each runway scheme’s impact on road traffic and air quality.

The Commission should ask its consultant to remove any references to congestion charging at Gatwick. This is not required.

Moreover it is recommended that the Commission thoroughly examine the two Heathrow schemes’ demand management and congestion charge proposals. This should include the charge assumed, the operational details of how the charge would be applied and administered, the impact on mode share, the wider impacts on traffic on local roads and the knock-on impact on air quality. It should also examine proposals for implementation. If the Commission does not do this, the impact the Heathrow schemes’ congestion charging proposals and their impact on air quality will not be fairly and objectively compared to Gatwick where no such demand management is proposed.
• The Commission should challenge its consultant to advise on likely surface access freight impacts for all three runway schemes and the impact of these on air quality, even if road traffic modelling of these cannot be completed in time. Otherwise the significant difference in the scale of road freight operations proposed at each airport cannot be objectively assessed in terms of air quality impacts.

• The Commission should take into account realigned roads in its final evaluation of the road traffic modelling and air quality analysis otherwise the Commission’s assessment cannot be considered fair and objective.

• The road traffic modelling of Heathrow’s impact on air quality with additional runway capacity is understated as roads in tunnels and in cut have not been assessed. The Commission should ask its consultant to advise on these impacts and take them into account when making its recommendation.

• The Commission should challenge its consultant to advise on likely construction impacts for all three runway schemes, even if road traffic modelling of these cannot be completed in time. Otherwise the significant difference in the relative ease of delivering Gatwick’s future highway capacity and the greater disruption, congestion and therefore deterioration in air quality associated with construction of highway improvements at Heathrow cannot be compared.

• The Commission should seek to understand why Hazelwick roundabout which carries very little Gatwick traffic has been flagged as an air quality issue related to Gatwick’s R2 scheme.

The Commission should take these issues into account in its final evaluation of each runway scheme’s impact on road traffic and air quality.
Appendix A

Areas analysed by the Commission's Consultant
A1 Areas analysed by the Commission's Consultant

Figure 6: Traffic Model Simulation Area – Heathrow

Figure 7: Traffic Model Simulation Area – Gatwick
Source: Figure 4.3, Traffic Simulation Area – Gatwick 2R, Jacobs, Module 6: Air Quality - Local Assessment: Detailed Emissions Inventory and Dispersion Modelling – Figures Appendix, May 2015