A Second Runway for Gatwick

Response to Airports Commission Air Quality Consultation

29 May 2015

Airports Commission: London Gatwick 225

YOUR LONDON AIRPORT
Gatwick

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Executive Summary

Air quality is one of the fundamental determinants of quality of life and at Gatwick we take proactive steps to reduce air pollutant levels on and around the airport.

Previous attempts to add a third runway at Heathrow have failed. Experience has shown that projected improvements in air quality conditions have been over-optimistic, mainly because anticipated improvements in vehicle emissions have not materialised in practice.

It would be unlawful for Government to approve any scheme unless it can be demonstrated convincingly that legal limits will not be exceeded, and that the scheme will not cause a delay in compliance with legal limits. The test applied by the Commission's consultants, Jacobs, to determine compliance with legal limits (i.e. if limits are exceeded to a greater extent elsewhere within a zone or agglomeration, then there is no delay to compliance) is incorrect as a matter of law and should be disregarded.

The Commission's air quality assessment supports the case for runway expansion at Gatwick but not at Heathrow since it demonstrates that:

- Gatwick is in an area already well within the legal limits for air quality and a second runway at Gatwick would not cause any exceedances of these limits;
- the area around Heathrow is one of the most polluted parts of the UK where legal limits are and have been exceeded for many years. Both Heathrow schemes would make local air quality worse than if they did not proceed, and would delay compliance with the legal limits;
- To permit a Heathrow scheme to come forward would thus be unlawful.

Analysis undertaken for Gatwick (summarised in Appendix 1) confirms that Heathrow Airport Limited's scheme would not only cause continued breaches of the Limit Values, but would also lead to breaches of the Air Quality Objective in the area around Heathrow.

Jacobs' assessment of the Heathrow schemes understates the extent of breaches of limits:

- the assessment methodology adopted has serious weaknesses and omissions, including the absence of an assessment of the construction impacts or the air quality implications of diverting the A4 in the Heathrow Airport Limited scheme. This means that its results are unreliable;
- a number of key assumptions in respect of Heathrow are excessively optimistic, and downside sensitivities have not been adequately examined.

A recent Supreme Court ruling has brought a renewed focus to air quality issues. This ruling requires the UK Government to produce, by the end of 2015, an updated Air Quality Plan to ensure that the air quality Limit Value is met as soon as possible. A Heathrow scheme could not reliably be recommended before such a Plan is available and its implications properly assessed.

In contrast with the air quality challenges at Heathrow, Jacobs' assessments confirm that the Gatwick scheme does not need to await the outcome of the new Air Quality Plan as it will not result in any breach of air quality limits.

On the basis of the evidence currently available:

- a Commission recommendation of either of the Heathrow options would be unreliable;
- it would be unlawful for the Government to offer policy support to either of the Heathrow options;
- it would furthermore be unlawful for either of the Heathrow options to be constructed or come into operation.

These problems could be overcome only if:

- substantial further work is carried out in order to remedy the weaknesses in the Commission's current air quality assessment;
- the impacts and feasibility of the mitigation measures proposed by Heathrow are fully and thoroughly assessed;
- the implications for a Heathrow scheme of the Government's new Air Quality Plan (and vice versa) are fully understood; and
- the outcome of further analysis demonstrated that a third runway at Heathrow could be constructed and operated without causing any re-exceedance or prolonging the period of non-compliance.

Assuming that the Commission will not wish to extend its activities (probably until at least early 2016) to carry out this further work based upon the implications of the Air Quality Plan, any Commission recommendation to Government in favour of a Heathrow scheme would need to be caveated in the light of the above.

Government support for any such recommendation would carry clear legal risks unless and until the necessary further work has been completed and found to provide reliable evidence that a Heathrow scheme can proceed in accordance with the relevant legal duties relating to air quality.

It is difficult to know how long this additional Heathrow work would take. It is clear that it could not be completed before the end of 2015. It seems likely that the European Commission would not be in a position to approve a new Air Quality Plan until around 2017. Further litigation could extend the timescales beyond that.

No such problems exist in relation to the Gatwick scheme.

Executive Summary

Why air quality is important and what Gatwick is doing

a) At Gatwick we take proactive steps to reduce air pollutant levels on and around the airport wherever practicable to do so. Unlike Heathrow, we consulted on the options for developing Gatwick during 2014. That consultation included information on the air quality implications of another runway. We are committed to maintaining our current excellent performance of zero breaches of air quality limits, which the Commission's assessment confirms will continue to be the case even with a second runway.

b) In our May 2014 submission to the Commission we highlighted the work we do today through our Decade of Change programme, and we highlighted the following commitments to ensure that we continue to reduce air pollutant levels:

- We will improve operational practices such as encouraging adoption of aircraft taxiing with less than all engines running, (we have already participated with British Airways in their programme of reduced engine taxiing for inbound and outbound Airbus aircraft (A319, A320 and A321) with consequent reductions in emissions).
- The realignment of the A23 and other local roads has been designed to cut congestion and delays, and will reduce unnecessary car movements and therefore improve air quality including gases and particulates. NO_2, PM_{10} and $PM_{2.5}$ particulate levels will be well within EU and UK Limit Values and Air Quality Objective levels.
- Airport Collaborative Decision Making will give more precision in aircraft operation, less taxiing and less holding, resulting in greater fuel efficiency.
- We are deploying a systematic approach to reducing emissions to air throughout construction, facilitated through the Sustainable Construction Strategy and working in close cooperation with our contractors. This includes identifying and incentivising the use of a low emission construction fleet.
- We will update the Air Quality Management Plan for the airport, including the employment of additional air quality monitoring stations.
- We will employ low Nitrogen Oxide (NO_x) boilers (with significant improvement in respect of NO_x emission per kWhr).
- We will continue to promote the use of fixed electrical ground power on all stands and investigate and support research into provision of preconditioned air on stands.
- Working with our airlines and operators, we are seeking to accelerate the deployment of hybrid/ electric /bio-fuels vehicles not just for staff use but also for wider operations within Gatwick and will support and incentivise their use by passengers.

c) This approach demonstrates clearly that Gatwick, together with our industry partners, continues to make significant progress in improving the air quality performance of our operations and that although, as a result of its location, Gatwick does not breach and will not breach legal air quality limits, work to further improve air quality performance will continue.

Previous attempts to add a third runway at Heathrow have failed

d) Air quality around Heathrow has long been recognised as being poor. Following the 2003 White Paper “The Future of Air Transport”, the then Government postponed a third runway at Heathrow for environmental reasons, with particular reference to issues relating to air quality.

e) When announcing its support for a third runway in 2009, Government committed to undertake the necessary supporting actions to achieve compliance with Limit Values around Heathrow by 2015. If political support for a third runway at Heathrow had been maintained, the scheme would have subsequently been found to be illegal on air quality grounds and would not have been able to be constructed or brought into use.

f) Legal limits at Heathrow continue to be exceeded, and in some locations air quality has actually deteriorated. Past experience highlights that forecasts of air quality improvement must be treated with caution, and that appropriate downside sensitivities must be undertaken to assess the risk that forecast improvements would not materialise in real world conditions.

g) Air quality issues are not just matters to be considered in a technical assessment; they will also become significant issues to be examined in detail during the planning process and could lead to restrictions being applied to any scheme which risks breaching the legal limits.

h) The development of a new runway will be a project of national and international importance for the future of the UK. The Commission should only recommend to Government an option which clearly conforms to air quality regulations and that can in fact be delivered.

The legal imperatives are clear

i) In order to protect human health, a requirement exists in UK law under which the Government has a duty to ensure compliance with legal air quality Limit Values for NO_2. The recent ruling of the Supreme Court has made clear that the Government is obliged to ensure that these requirements are met as soon as possible.

j) Any recommendation to Government in favour of a short listed scheme could be accepted only if it can be demonstrated, convincingly, that the legal limits will not be exceeded and that the timetable for compliance with the legal limits will not be delayed compared to the position if the scheme did not come forward. Importantly, this applies to the construction phase as well as during operation.

The Commission's assessment supports the case for runway expansion at Gatwick

k) We agree with the Commission's conclusion that a second runway at Gatwick would not cause any breach or delay to compliance with the legal limits.

l) The Commission's assessment of the Heathrow schemes demonstrates that they would both add to the already significant exceedances of the air quality Limit Values in the Heathrow Area which are expected to continue over the period to 2030 and beyond.

m) Jacobs' assessment of the Gatwick scheme rightly concludes that a second runway at Gatwick would not cause any breach of - or delay to - compliance with the legal limits.

n) This means that, unlike at Heathrow, air quality considerations would not prevent the new runway at Gatwick from being constructed or coming into operation. This is a critical point for the Commission and Government to consider when assessing the relative deliverability of the Gatwick and Heathrow schemes.

The Heathrow area does not meet air quality requirements

o) Jacobs' assessment of the Heathrow schemes concludes that, at the very least, development of a third Heathrow runway would cause delays to achieving compliance, thus failing the legal test.

p) The Commission has considered whether it would be possible for mitigation measures to overcome the legal impediments to the Heathrow schemes. This part of the Jacobs' analysis is inadequate and is insufficiently robust to be relied upon by the Commission.

q) This is because the work undertaken to date has not established that significant reductions in emissions can be achieved through mitigation measures in close proximity to the airport, or at the relevant receptor locations where national compliance is assessed. The Commission cannot reliably conclude that mitigation measures are available that would allow either Heathrow scheme to come forward in compliance with the UK's air quality duties.

Independent analysis further reinforces the scale of the air quality problem in the Heathrow area

r) We commissioned assessments from our consultants Arup (attached as Appendices 1 - 6) to assess the operational and construction effects of the Heathrow North West Runway scheme.

s) The consultants' operational phase assessments show that there are locations (in West Drayton, Harmondsworth, Harlington, Heston and Hounslow), where nitrogen dioxide concentrations would exceed the relevant air quality standard with the operation of a third runway at Heathrow.

t) The consultants' construction phase assessments demonstrate that increased emissions caused by construction related traffic and traffic diversions during the construction period for the project mean that the Heathrow scheme could not be constructed without breaching the UK's air quality duties.

u) These assessments make clear that both Heathrow schemes would, at a minimum, delay the date for achieving compliance with the Limit Values in locations in the Heathrow area. Indeed, this work suggests that the exceedances of the limits and the prospect of delays to achieving compliance would be much greater than those identified by the Commission.

Errors in Jacobs' assessment methodology result in understatement in the level of exceedences in the Heathrow area

v) We are concerned that Jacobs' assessment contains a number of weaknesses and omissions which should be rectified. We address the following points in more detail in Sections 3, 4 and 5 of this response:

- **Incorrect interpretation by Jacobs of the 'legal test'** for compliance with Limit Values. The interpretation that a greater exceedance within the same zone renders Heathrow as compliant is wrong in law and has no foundation when considered against the stated objectives of the legislation (see Section 3).
- **Not assessing all plausible worst case scenarios for air quality**, e.g. not assessing the 2025 opening year for the Heathrow North West Runway scheme (the date that promoters of that scheme are proposing).
- **Not assessing impacts during construction**, even though there is every prospect that, for the Heathrow schemes, traffic disruption and re-routing over a period of at least five years will cause Limit Value breaches and delays to achievement of Limit Values in parts of west London.
- **Not assessing all components of the Heathrow NWR scheme**, including the realignment of the A4 Bath Road, placing the M25 into tunnels, and relocating a major third party Energy from Waste Incinerator to a location to the south of the airport as proposed by Heathrow Airport Limited.
- **Using overly-optimistic forecast improvements to background air quality conditions**, when experience shows that such forecasts cannot properly be relied

upon and should therefore be treated with caution, and when appropriate sensitivity tests have not been undertaken to understand the impacts of such improvements failing to materialise.

- **Not carrying out a robust assessment of mitigation measures**. Until such an assessment is completed, there is no basis on which to conclude that the mitigation measures being considered could enable either of the Heathrow schemes to meet air quality requirements.
- **Using a deficient model verification process** results in the impacts being understated by up to 15% at Heathrow, and overstated by up to 18% at Gatwick.

w) In aggregate, the consequence of these errors and omissions is that that the results for the Heathrow schemes have been understated, and are not reliable. This means that compliance with the Limit Value has not been robustly demonstrated. Nor has it been robustly demonstrated that the construction and/or operation of either Heathrow scheme would not delay the date of compliance with the Limit Value compared to the position if either scheme did not come forward.

x) These shortcomings mean that the results of Jacobs' assessment in respect of the Heathrow schemes cannot be used as a basis for concluding that a Heathrow scheme will be able to come forward without breach of the UK's air quality duties.

Heathrow problems are further compounded by the need for Government to produce an Air Quality Plan by the end of 2015

y) The obligation imposed by the Supreme Court for the Government to produce a new Air Quality Plan by the end of this year means that any recommendation in favour of a Heathrow scheme would have to be reviewed again once the effects of that Air Quality Plan are evaluated.

z) Any proposal which relied upon a new Air Quality Plan creating sufficient "head room" below Limit Values in order for a third runway scheme to come forward without a breach arising must be treated with extreme caution, since the scope and ambition of that Plan remains unclear. A substantial risk remains that the construction and operation of either Heathrow scheme will turn out to be unlawful.

Our conclusions

- In the event that the Commission decides to recommend the Gatwick scheme, such a recommendation could be made in the knowledge that the UK's duties in relation to air quality will be met. There is no significant risk of this scheme causing any exceedance of Limit Values.
- In relation to the Heathrow schemes, there are currently multiple exceedances of Limit Values, and on the evidence that is currently available (from Jacobs, DEFRA and Arup) such exceedances are expected to continue until 2030 at least. On that basis, the following conclusions can be drawn:
    - A Commission recommendation of either of the Heathrow options would be unreliable;
    - It would be unlawful for the Government to offer policy support to either of the Heathrow options;
    - It would be furthermore unlawful for either of the Heathrow options to be constructed or come into operation;
- These problems could be overcome only if:
    - substantial further work is carried out in order to remedy the weaknesses in the Commission's current air quality assessment;
    - the impacts and feasibility of the mitigation measures proposed by Heathrow are fully and thoroughly assessed;
    - the implications for a Heathrow scheme of the Government's new Air Quality Plan (and vice versa) are fully understood; and
    - the outcome of further analysis demonstrated that a third runway at Heathrow could be constructed and operated without causing any re-exceedance or prolonging the period of non-compliance.
- Assuming that the Commission will not wish to extend its activities (probably until at least early 2016) to carry out this further work based upon the implications of the Air Quality Plan, any Commission recommendation to Government in favour of a Heathrow scheme would need to be caveated in the light of the above.
- Government support for any such recommendation would carry clear legal risks unless and until the necessary further work has been completed and found to provide reliable evidence that a Heathrow scheme can proceed in accordance with the relevant legal duties relating to air quality.
- It is difficult to know how long this additional Heathrow work would take. It is clear that it could not be completed before the end of 2015. It seems likely that the European Commission would not be in a position to approve a new Air Quality Plan until around 2017. Further litigation could extend the timescales beyond that.
- No such problems exist in relation to the Gatwick scheme.

Section 1: Introduction

1.1 In order to protect human health, the Government has a duty under EU and UK law to ensure compliance with air quality Limit Values for Nitrogen Dioxide (NO_2) and other pollutants as soon as possible.

1.2 The only basis upon which a new runway scheme could be allowed to proceed is if it is demonstrated that, both during construction and with the forecast level of operations, air quality limits will be met and, further, that compliance with these limits would not otherwise be delayed by construction or operation of the scheme. In other words, it must be demonstrated that the date upon which compliance with Limit Values will be achieved in any particular location with a new runway scheme being constructed and/or operated will be the same as would be the case if no runway scheme were to come forward.

1.3 Given this legal position it is imperative that the assessment of such important issues is reliable and complete in order for the Commission to make a robust recommendation, and in order for Government to be properly informed. This is particularly important in view of the fact that past predictions of future air quality improvement at Heathrow have proven to be significantly over optimistic.

1.4 It would be a serious setback for UK aviation, and the UK as a whole, if a scheme were to be recommended by the Commission which subsequently could not be taken forward because to do so would breach the UK's legal duties in relation to air quality. It is the responsibility of the Commission and of Government to ensure that this does not happen.

1.5 Therefore we welcome this opportunity to respond to the Commission's consultation on the findings of its air quality assessment.

1.6 We have undertaken a detailed and extensive review of the material published by the Commission in the short period of time that has been available for responses. In the light of the central importance of the air quality issue, we reserve our position with regard to the adequacy of the opportunity to comment. We will review carefully the treatment given to this issue by the Commission in making its final recommendations, as inadequate analysis could render the Commission's recommendations unreliable.

1.7 The remainder of this response is structured as follows:

- Background, including past estimates of Heathrow air quality improvement (Section 2)
- The legal and policy position, including relevant legislation and the test for compliance (Section 3)
- Comments on the assessment methodology – including omissions which are a matter of serious concern (Section 4)
- Comments on assessment assumptions (Section 5)
- Comments on the Commission's findings in respect of the Heathrow and Gatwick schemes (Sections 6 and 7)
- Responses to the Commission's questions (Section 8)
- Conclusions (Section 9)

Section 2: Background

Key Points

- The UK is currently in breach of legally binding air quality limits and is under a duty to ensure that NO_2 limits are met as soon as possible.
- Air quality around Heathrow has been poor for a considerable period of time and remains so.
- Previous estimates of air quality improvement around Heathrow have been overly optimistic and have not been realised in practice. Any assumptions made relating to air quality improvement must thus be founded upon reliable evidence and subject to adequate sensitivity analysis.
- The Commission must ensure that air quality is fully assessed for all aspects of the schemes, in the construction phase as well as in operation.
- Lessons can and should be learnt from past experience where the evidence shows there is a need for greater caution with regard to the assumptions concerning improvements in background concentrations.

The UK is currently in breach of legally binding air quality limits

2.1 Air quality is subject to legal 'Limit Values' for certain pollutants. It is a legal requirement that the Government must not act in a way which will cause breaches of these Limit Values or delay their achievement. Responsibility for compliance with air quality Limit Values rests with the Government.

2.2 It follows that the only basis upon which any new runway scheme can lawfully be allowed is if it can be demonstrated convincingly that, throughout the construction period, and once in operation, air quality Limit Values would be met and/or compliance with them would not otherwise be delayed.

2.3 The UK is currently in breach of these legal requirements, and in 2011 legal proceedings were launched against the UK Government for its failure to cut excessive levels of nitrogen dioxide (NO2), the main pre-cursor for ground-level ozone causing major respiratory problems and which can lead to premature death.

2.4 In April 2015, following an earlier ruling that the Government was in breach of the Air Quality Directive, the UK Supreme Court made a mandatory order that "the Government must prepare and consult on new Air Quality Plans for submission to the European Commission... no later than December 31 2015". Such Air Quality Plans have to set out the measures to be adopted to ensure that air quality Limit Values are met as soon as possible.

2.5 Due to the legal obligation to adopt measures in order to meet the Limit Values as soon as possible, it is reasonable to assume that the actions in the Plans will seek to achieve

compliance in the Heathrow area earlier than has been predicted to date. However, the actions to be adopted in the Air Quality Plan are currently unknown. Further, the date on which that Air Quality Plan will achieve compliance with the Limit Value is not currently known. Accordingly, given the scale of current exceedances of Limit Values in the Heathrow area, there is no evidence to show that levels will improve at a rate sufficient to provide the "head room" below the Limit Value that would enable construction and operation of a third runway at Heathrow within the Commission's 2030 timeframe. Only after the Plan has been completed, evaluated, and progress on it established, could that be known.

2.6 At present, however, there is very strong evidence that expansion of Heathrow cannot be achieved without breach of Limit Values for the foreseeable future and almost certainly into the 2030s. Further, there is very strong evidence that expansion of Heathrow would delay the date of compliance with the Limit Value compared to the position if Heathrow was not expanded. These issues arise primarily as a result of Heathrow's location and would affect any major development in the Heathrow area.

Air quality around Heathrow is poor, and the evidence suggests a future runway development at Heathrow would delay compliance with air quality limits

2.7 Air quality around Heathrow has long been recognised as being poor. The area around Heathrow stands out within Greater London as having particularly high concentrations of NO_2, with several locations in the area continuing to exceed the annual average standard by approaching 50% (evidenced for example by the 'London Hillingdon' monitor which recorded an annual average of 57 µg/m^3 in 2014, as shown in Figure 2.1 on the following page, with the corresponding data for Gatwick shown in Figure 2.2).

FIGURE 2.1: ANNUAL MEAN NO_2 CONCENTRATIONS AROUND HEATHROW (2008-2014) (SOURCE: LB HILLINGDON AIR QUALITY ACTION PLAN PROGRESS REPORT (2014) AND HEATHROW AIRWATCH REPORT OF LATEST DATA TRENDS AND INFORMATION AT HEATHROW (2014))

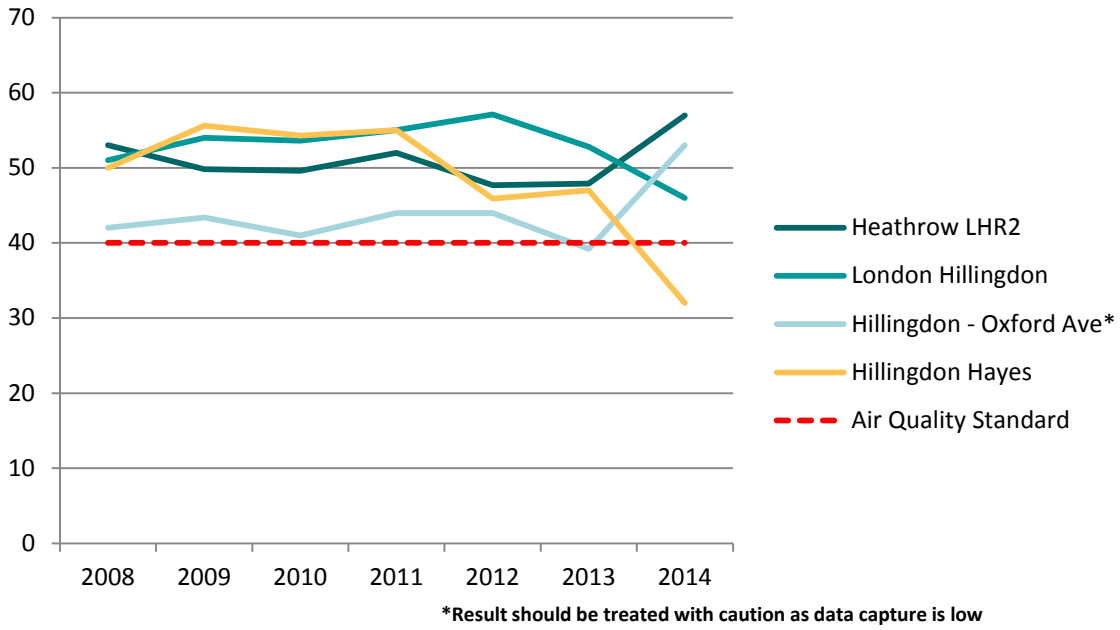
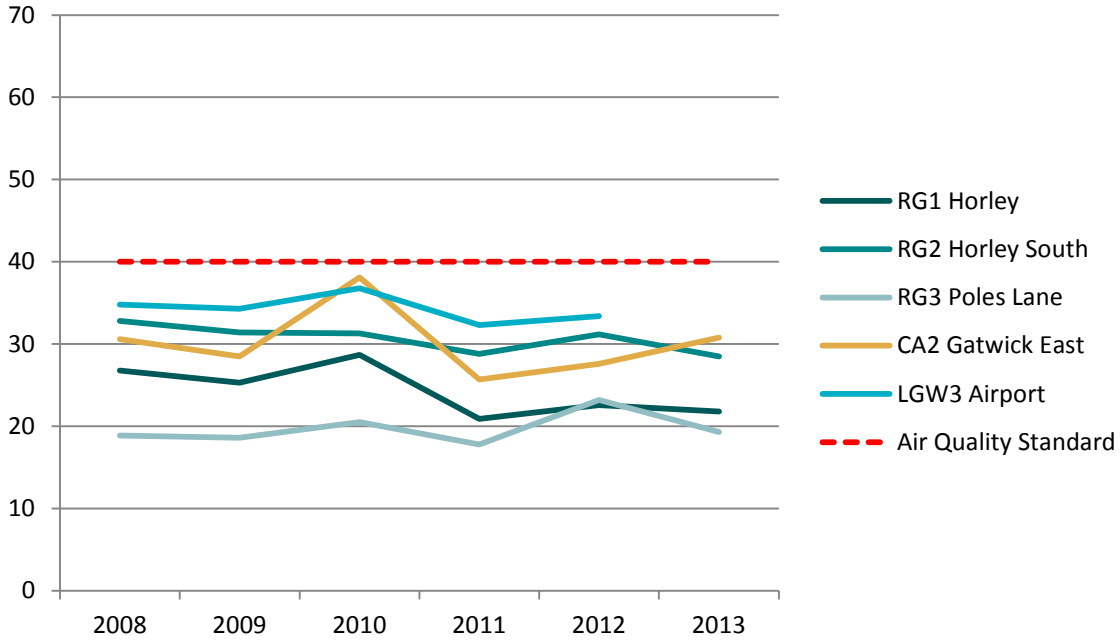
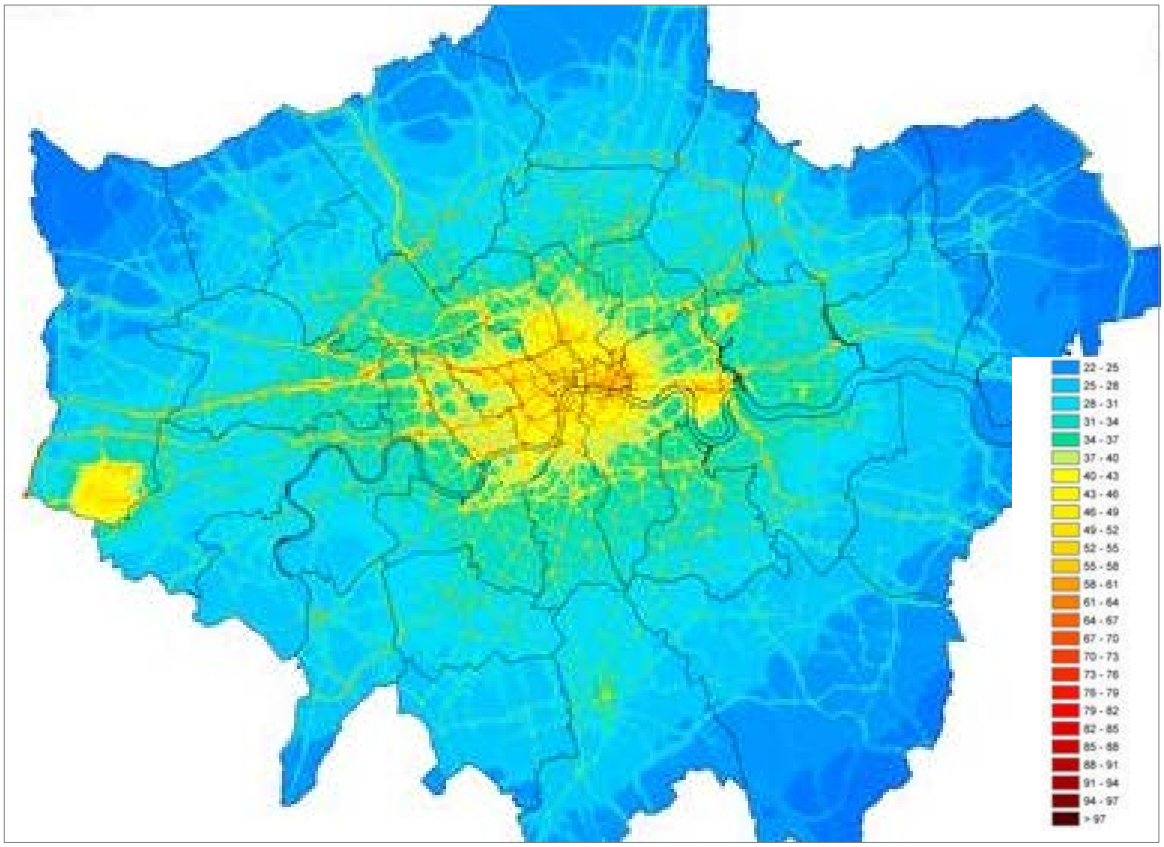


FIGURE 2.2: ANNUAL MEAN NO_2 CONCENTRATIONS AROUND GATWICK (2008-2013) (SOURCE: LONDON AIR QUALITY NETWORK AND SUSSEX AIR QUALITY PARTNERSHIP)



2.8 This 'London Hillingdon' figure is 17 µg/m^3 above the 40 µg/m^3 legal Limit Value. Indeed, the area around Heathrow was modelled separately from the rest of Greater London in the previous draft Air Quality Plan produced by DEFRA, reflecting the seriousness of the air quality problems there (see Figure 2.3 below, which illustrates the elevated concentrations of NO_2 around Heathrow and along the routes into central London from the west).

FIGURE 2.3: MODELLED ANNUAL MEAN NO_2 CONCENTRATIONS IN 2015 (SOURCE: GREATER LONDON AUTHORITY AND TRANSPORT FOR LONDON)



2.9 Given that Limit Values in some locations near to Heathrow are currently significantly in excess of legal limits today, there is evidence to suggest that expansion of aviation activity there, and the inevitable consequential attraction of more surface traffic to an already congested and polluted area, will result in air quality limits not being met and to a delay in the date of their attainment.

2.10 In the absence of a new Air Quality Plan there is evidence to suggest that the development of a third Heathrow runway would delay compliance with the Limit Value compared to the position if a Heathrow scheme did not take place.

2.11 Analysis of the impact of construction upon air quality, undertaken on behalf of Gatwick, further demonstrates increased emissions caused by traffic disruption during the construction period, which is likely to extend over a period in excess of five years, and would also delay compliance with the Limit Value compared to the position if that construction did not occur.

Government's 2003 conclusions about Heathrow

2.12 Following the December 2003 White Paper "The Future of Air Transport", the then Government postponed a third runway at Heathrow for environmental reasons, with particular reference to issues relating to NO_2.

2.13 The 2003 White Paper stated:

"The most difficult issue confronting expansion of Heathrow concerns compliance with the mandatory air quality Limit Values for NO_2 that will apply from 2010 (as set down in EU Directive 1999/30/EC), and in particular the annual mean limit of 40 µg/m^3."

2.14 It went on to describe a wide range of possible measures to tackle emissions before stating that:

"Even with full implementation of this package of tough measures, and making aggressive assumptions about future developments in aircraft and motor vehicle technology, the evidence of our further work suggests that substantial areas around Heathrow, containing the homes of many hundreds or thousands of people, would be subject to exceedences of the mandatory air quality Limit Value. Such exceedences would not be acceptable, and would be against the law."

2.15 The White Paper further stated an expectation that:

"…within the 2015–2020 timescale, there would be a substantially better prospect of avoiding exceedences, in particular because it would allow more time to develop improved technologies, for both aircraft and road vehicles, to tighten standards, and to achieve widespread use of the improved technologies in road and aircraft fleets."

2.16 It is now clear that the forecast improvement has not materialised as envisaged. Current DEFRA forecasts indicate potential compliance some years after 2030, even in a two-runway scenario, some 10-15 years later than envisaged only a few years ago.

Basis for Government support in 2009

2.17 In his January 2009 statement to the House of Commons announcing Government support for a third runway at Heathrow, the then Secretary of State for Transport, Geoff Hoon, announced a commitment by Government to undertake the necessary supporting actions to achieve compliance with Limit Values around Heathrow by 2015. Government forecasts at the time predicted that Heathrow would be meeting the limits by 2020, even with airport expansion.

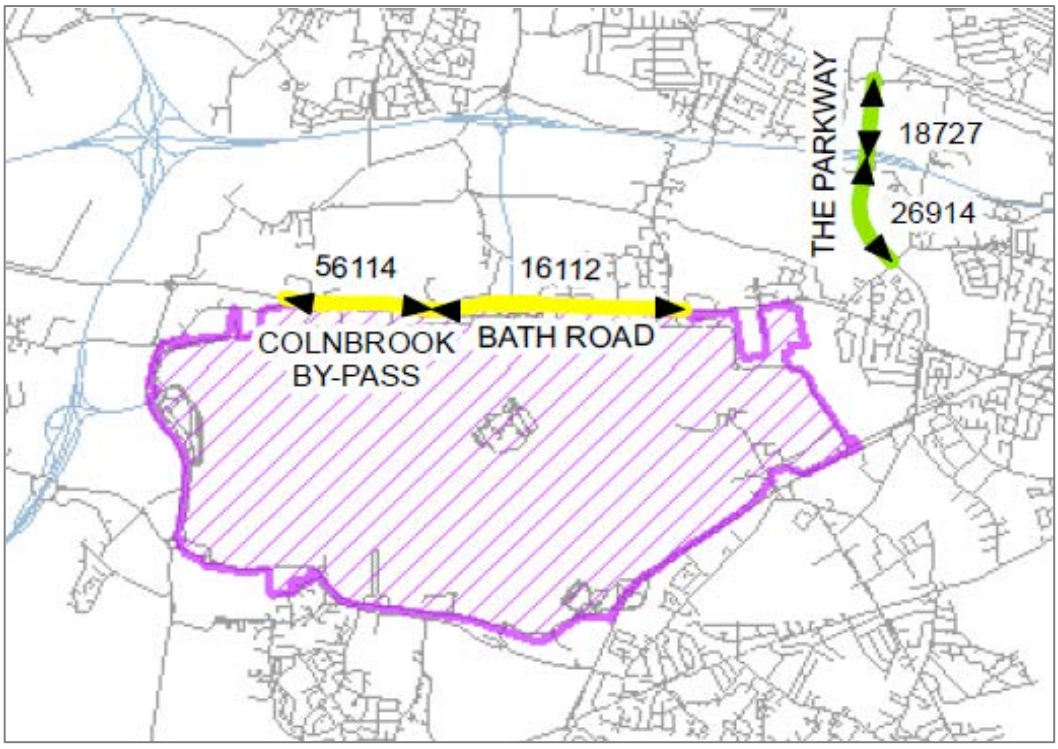
2.18 In order to safeguard the required performance, the Government specified that additional flights could be allowed only when the CAA was satisfied that air quality conditions had been met and that any additional capacity will not compromise the legal limits. The CAA was to be given a new statutory environmental duty to ensure that it acts in the interests of the environment and the necessary powers to take the action needed - or require others to take it - to come back into compliance. In the case of air quality the Environment Agency would act as the enforcement body, with appropriate guidance from Ministers.

Subsequent events

2.19 Following the 2010 General Election, the incoming coalition Government withdrew support for the Heathrow third runway. Had the previous political support for a third runway at Heathrow been maintained by the coalition Government, the scheme would have subsequently been found illegal on air quality grounds and would not have been able to proceed, for the reasons given above.

2.20 The latest evidence for the continuing exceedences of NO_2 Limit Values around Heathrow can be found in air quality monitoring and progress reports for the Heathrow area[1] and in data by DEFRA released on 17 February[2] 2015. The Hillingdon report demonstrates that Limit Values continue to be breached by a significant margin in multiple locations around Heathrow and that in some roadside locations, NO_2 concentrations have actually increased in recent years. The DEFRA data shows that two sections of the A4 at Heathrow will have the third and fourth highest nitrogen dioxide concentrations in the whole of the UK in 2030 if the airport maintains its current capacity of two runways i.e. even without the impact of additional traffic associated with an additional runway at Heathrow. The links that are predicted to continue to exceed the Limit Value in 2025 and 2030 are shown in Figure 2.4 below.

FIGURE 2.4: LOCATIONS AT HEATHROW (YELLOW) WHERE DEFRA POLLUTION CLIMATE MAPPING (PCM) PREDICTS AIR QUALITY STANDARDS CONCENTRATIONS WILL BE EXCEEDED IN 2025 AND 2030 AND WILL BE THE 3RD AND 4TH HIGHEST IN THE UK IN 2030.



[1] LB Hillingdon Air Quality Action Plan Progress Report 2014
[2] DEFRA Response to Request for Information: 50 Highest Modelled NO_2 Concentrations 17 February 2015

What lessons can be learned from past experience?

2.21 The previous assessment work undertaken by Government, both in the lead up to and after the 2003 White Paper, when put alongside current air quality monitoring data and the latest DEFRA predictions, is therefore highly relevant to the Commission's current consultation. The following points should be considered:

- It is clear that assumptions made about future improvements in vehicle emissions need to be approached with a considerable degree of caution, and that assumptions about the benefits of potential mitigation measures also need to be very carefully assessed and their wider implications properly understood.
- It is clear that, contrary to previous expectations, air quality continues to be a major problem in the Heathrow area and therefore a major issue confronting expansion of Heathrow in the foreseeable future. This is not the case at Gatwick.
- Given the risks involved and the implications for UK aviation and the future connectivity of the UK of an assessment by the Commission that is not robust, the work on air quality which the Commission undertakes needs to be rigorous such that if the Commission recommends a Heathrow scheme it is sure that that scheme can be brought forward and will not be blocked by breach of the UK's air quality duties.

2.22 In view of the need for rigorous assessment, and for thorough understanding of the uncertainties involved, we are extremely concerned that the assessment and conclusions produced by Jacobs are incomplete in a number of crucial respects, in terms of the methodology, the assumptions used, and an incorrect legal approach. We detail these concerns in the following sections.

Section 3: Legal and policy position

Key Points

- The legal test for scheme compliance with air quality Limit Values is clear – a scheme must not cause a breach of a Limit Value where otherwise there would be compliance and, where there is current non-compliance, a scheme must not extend the time by which a Limit Value would otherwise be attained in locations within a zone/agglomeration – i.e. a scheme can only be progressed if compliance will be achieved throughout each zone/agglomeration on the same date as would be the case if the scheme did not take place.
- Jacobs' interpretation of the legal test - that a scheme is permissible provided it does not have the effect of causing exceedance above the level of the maximum exceedance within the Greater London Agglomeration - is incorrect as a matter of law and should be disregarded.
- The Government should not place reliance on Jacobs' interpretation and might wish to take steps to satisfy itself on this point before accepting any Heathrow recommendation.
- The Supreme Court has ruled that an updated Air Quality Plan for Greater London should be prepared by the end of 2015 and it would not be safe to recommend a Heathrow scheme before the details of that plan are known and the implications of a Heathrow scheme on compliance are assessed.

Relevant Legislation

3.1 The 2008 Ambient Air Quality Directive (2008/50/EC) ("the 2008 Directive") sets legally binding limits for concentrations in outdoor air of major air pollutants that impact public health such as particulate matter (PM_{10} and $PM_{2.5}$) and nitrogen dioxide (NO_2). The UK has transposed the 2008 Directive into English law by means of the Air Quality Standards Regulations 2010 ("the 2010 Regulations").

3.2 The Objectives of the 2008 Directive include taking action to reduce pollution to levels that minimise harmful effects on human health. This is to be achieved through taking action to comply with air quality "Limit Values". In other words, it is a requirement of the 2008 Directive that Member States must take action to:

- ensure that air quality Limit Values are achieved as soon as possible; and
- ensure that, once achieved, air quality Limit Values are not exceeded again.

3.3 The Courts will approach questions of interpretation of the 2008 Directive and the 2010 Regulations with a view to achieving these Objectives.

The Air Quality Limit Values

3.4 The 2008 Directive defines a *"Limit Value"* as *"a level fixed on the basis of scientific knowledge, with the aim of avoiding, preventing or reducing harmful effects on human health and/or the environment as a whole, to be attained within a given period and not to be exceeded once attained."* The annual mean limit for NO_2 is currently set at 40 µg/m^3. The 2008 Directive goes on to require Member States to define *"zones"*, some of which are *"agglomerations"*. These are areas to which the Limit Values will apply.

3.5 There is a duty imposed by Article 13(1) upon Member States to ensure that the Limit Values for NO_2 and PM_{10} are met in all zones and agglomerations. The NO_2 Limit Value was to be met by 1st January 2010 with Member States being able to apply under Article 22 for a maximum extension until 1st January 2015.

3.6 The UK Government, in fact, made no application under Article 22 for extension in respect of Greater London where there were and are significant exceedances of NO_2 limits. Air Quality Plans in relation to Greater London and 15 other zones were submitted to the European Commission under Article 23, projecting compliance by 2025. The Greater London Air Quality Plan was rejected by the European Commission, and subsequent information published by the Government in July 2014 shows a deterioration in projections, with three zones now predicted not to be compliant by 2030 (Greater London Urban Area, West Midlands Urban Area and West Yorkshire Urban Area).

3.7 Article 23 imposes a general duty on member states to prepare Air Quality Plans for areas where the Limit Values are not met. By the second paragraph of article 23(1), in cases where the attainment deadline has already expired, Air Quality Plans are required to set out appropriate measures so that the exceedance period can be kept *"as short as possible".*

The UK Air Quality Objectives

3.8 The UK Air Quality Objectives for use by Local Authorities are prescribed within the Air Quality Regulations 2000 (HMSO,2000) and the Air Quality (Amendment) Regulations 2002 (HMSO, 2002). The Objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the Objective. DEFRA explains where these Objectives should apply in Local Air Quality Management Technical Guidance TG(09) (DEFRA, 2009). For annual mean objectives, relevant locations are the facades of residential properties, schools, hospitals, care homes, etc.

3.9 Unlike the Limit Values, the UK Air Quality Objectives are not legally binding.

Recent ruling of Supreme Court

3.10 Two UK Supreme Court judgements in R (ex p ClientEarth) v Secretary of State for Environment, Food and Rural Affairs (DEFRA) [2013] UKSC 25 and [2015] UKSC 28 have decided:

- the UK Government is in breach of Article 13
- to make a mandatory order requiring the UK Government to prepare new plans complying with article 23(1) by 31 December 2015
- The requirements to provide Air Quality Plans under Article 23 are subject to judicial review by the national court, which is able where necessary to impose such detailed requirements as are appropriate to secure effective compliance with air quality limits within a timescale which should be *"as short as possible"*.

3.11 The Court also noted with regards to the interpretation of the words *"as short as possible"* in Article 23(1), the judgments of the European court indicating that the scope for arguing "impossibility" on practical or economic grounds is very limited. The Court commented that if impossibility of compliance remains an issue in relation to the new Air Quality Plans, when they are published for consultation, it may call for resolution by the Court at an early stage to avoid further delay in the completion of compliant plans.

Legal Test

3.12 For a decision to approve a Heathrow scheme to be taken lawfully, it would have to be established that the Scheme could be constructed and operated on a basis that is consistent with the duties set out in the Directive and the 2010 Regulations, meaning it would need to be established that:

- to permit the construction and operation of the Heathrow Scheme would not cause a breach of the NO_2 Limit Value in locations where there is currently compliance; and
- in areas where currently there is not compliance, to permit the construction and operation of the Heathrow Scheme would not extend the time by which the NO_2 Limit Value would be otherwise be attained – in other words, it would have to be established that the date on which the Limit Value will be achieved would not be deferred if a Heathrow Scheme was to proceed.

3.13 In the Detailed Emissions Inventory and Dispersion Modelling Report of May 2015 by Jacobs, which forms the basis of the current consultation, it is stated in relation to the Heathrow NWR that:

"The Scheme would not cause any new exceedances of the annual mean NO_2 concentration at which the EU Limit Value is set. However, the incremental change associated with the unmitigated Heathrow NWR Scheme would cause the retained Bath Road (A4) sector PCM road link to have a marginally higher concentration in 2030 (48.7 $\mu g/m^3$) than the Maximum PCM Predicted Concentration in the Greater London Agglomeration (which is 48.6 $\mu g/m^3$ and occurs at Marylebone Road). The unmitigated Heathrow NWR Scheme would thus delay DEFRA in achieving compliance with the Limit

Value. Potential mitigation measures to offset this impact have been investigated (including those proposed by the Promoter). If some of these mitigation measures were incorporated, a reduction in NO_2 concentrations at the Bath Road PCM receptor could be achieved, which might be sufficient to avoid delaying compliance." (Executive Summary (iii))

3.14 In Table 5.16 of the report Jacobs state:

"A reduction of 0.1 µg/m^3 is required to prevent the scheme from causing a delay to compliance with the annual mean NO_2 EU LV."

3.15 Accordingly, Jacobs' position would appear to be that provided a Heathrow scheme does not increase exceedances near Heathrow above the level of the worst exceedance within the entire Greater London Agglomeration (which Jacobs have assumed will continue to be Marylebone Road), then there is no legal impediment to the Heathrow scheme, and it can proceed even if it causes increased exceedances and/or delays to compliance with Limit Values in the Heathrow area.

3.16 This is an entirely incorrect interpretation of the duties under the Air Quality Directive. It is wrong in law. It has no foundation when considered against the stated Objectives of the Directive and the wording of the primary duty contained in Article 13. It would have the perverse effect of allowing a Member State to let air quality deteriorate at locations within an agglomeration where the Limit Value is exceeded so long as there is a location elsewhere within that agglomeration which has a greater degree of breach. That is obviously contrary to the Objectives of the Air Quality Directive and the 2010 Regulations, which are to reduce ground level concentrations to below the Limit Value as soon as possible throughout each zone/agglomeration.

3.17 Recital 1 and 9 as set out below make it clear that the Air Quality Directive is targeted at minimising the harmful effects of pollutants on human health and maintaining and improving good air quality.

3.18 Recital (1) states that there is a:

"…need to reduce pollution to levels which minimise harmful effects on human health, paying particular attention to sensitive populations, and the environment as a whole…"

3.19 Recital (9) states:

"Air quality status should be maintained where it is already good, or improved. Where the objectives for ambient air quality laid down in this Directive are not met, Member States should take action in order to comply with the Limit Values and critical levels, and where possible, to attain the target values and long-term objectives."

3.20 These Objectives are then enshrined in the primary duty contained in Article 13 which makes it clear that the obligation on Member States to ensure that Limit Values are not exceeded, applies "throughout their zones and agglomerations."

Government's updated Air Quality Plan

3.21 The Supreme Court recently ruled that the UK Government must, by the end of 2015, produce an updated Air Quality Plan relating to Greater London (which includes Heathrow) which must set out measures to achieve compliance with the Limit Value as soon as possible. It is clear that the measures required within the Plan will have to be significant and are likely to have wide ranging consequences.

3.22 It is likely that some or all of the mitigation identified by Heathrow as being associated with a third runway scheme will have to be included in the Plan in any event, and as such will form part of the baseline against which a third runway scheme is measured.

3.23 Further, should a Heathrow scheme be recommended, and it is subsequently found that baseline improvements in air quality against the Plan (in the period thereafter) are not as great as had been predicted, a further reassessment of the air quality impacts of the Heathrow scheme would then have to be undertaken and be able to demonstrate compliance with the UK's air quality duties before that scheme could come forward.

3.24 It might be proposed that conditions should be imposed upon the grant of any consent for a Heathrow scheme to ensure that additional capacity only came forward in a manner that did not breach the UK's air quality duties. For our part we cannot see how such a condition could be complied with nor how it would be enforceable given the large number of factors outside of the airport operator's control which affect the total level of ground concentrations in a particular location (e.g. weather conditions over a year). Even if such a condition could be imposed it would generate such significant uncertainty as to when or indeed if further capacity might come forward that we do not consider that the airport operator would be able to obtain funds to finance the project.

3.25 The combination of these circumstances clearly give rise to ongoing uncertainty and risk that during the preparation of any national policy, at any subsequent consenting stage, and even on or after commencement of operation of a third runway, the scheme would not be able to be progressed. This in effect would be a repeat of the situation following the announcement of Government support in 2009 on a basis that predicted improvements would materialise – when, in fact, those improvements did not happen.

3.26 In summary any proposal which relies upon a new Air Quality Plan creating sufficient "head room" below the Limit Value which would enable a third runway scheme to come forward must currently be treated with extreme caution since the content of that Plan remains unknown and because any improvements anticipated will remain uncertain for some years. The ability to obtain finance for a scheme which depended upon the results of such a radical Air Quality Plan being delivered must be highly questionable.

3.27 Until the Air Quality Plan is adopted, the baseline against which a Heathrow scheme must be assessed is unknown. Accordingly, a robust assessment of whether it would be lawful for a Heathrow scheme to be constructed and operated cannot be made prior to the adoption of the Air Quality Plan. The baseline for the assessment adopted by Jacobs does not assume that a compliant Air Quality Plan will be in place; they have therefore used a methodology from which compliance with the Directive cannot be assessed.

3.28 Even assuming that the Government is able to produce a draft Air Quality Plan, conduct public consultation upon it and produce a final draft for submission to the European

Commission by the 31st December 2015 as required by the Order of the Supreme Court, the European Commission will then have to consider the content of that Plan and whether it raises objection to it. That process may take up to a year. Subsequently, the Courts may be asked to review whether the measures contained in the Plan are such that the duty to attain limit values as soon as possible has been discharge. In the Client Earth litigation that Supreme Court acknowledged that it had the power to require the Secretary of State to take further action if this was required to make a Plan consistent with the duty to attain limit values as soon as possible. Further litigation as to the content of the Plan could add further uncertainty another year or so.

3.29 The result is that the final content of the Air Quality Plan is likely to remain uncertain for some years to come. That in turn means that the baseline against which the air quality implications of a Heathrow scheme must be assessed will also remain uncertain for some years to come.

3.30 Only once the baseline has been identified can an assessment be made as to whether a Heathrow scheme could be deliverable without breach of the UK's air quality duties. That further assessment can only begin at a point in time that is some years away. Thus the Government is unlikely to be able to be certain that a Heathrow scheme could be lawfully delivered for a considerable period of time to come.

Consideration of Mitigation Measures

3.31 Any assessment of the potential benefits of mitigation measures to overcome the legal impediments to the Heathrow schemes needs to be based upon a full and thorough assessment of the feasibility and potential benefits of any such measures.

3.32 Until such an assessment is undertaken, robust conclusions regarding the extent to which the Heathrow schemes might lawfully come forward could not be drawn. Jacobs has not undertaken any such assessment.

3.33 Many of the mitigation measures considered by Jacobs can, and should, be included in the baseline against which the impacts of the schemes are assessed. It is only those mitigation measures that cannot be introduced absent a Heathrow Scheme that should be taken into account when considering the potential impact of a Heathrow Scheme upon ground level concentrations of NO_2. This is because in order to comply with the legal duty to achieve the Limit Value as soon as possible, all other measures that could be taken now will have to be included in the Air Quality Plan.

3.34 It is also necessary to assess whether there may be any wider consequences, including potential dis-benefits, of introducing mitigation measures that are directly related to the development of a third runway. For example, the option suggested by Heathrow Airport Limited, of introducing an airport congestion charging scheme, would likely affect driver behaviour over a much wider area. Drivers choosing to re-route onto roads outside the charging zone in order to avoid payment of any charge would be likely to result in increased emissions in other areas, leading potentially to new breaches of the Limit Value or a delay in attaining the Limit Value in those areas, as has been seen for the Central London Congestion Charge Zone.

3.35 In summary, on the basis of the evidence before the Commission it cannot be robustly concluded that mitigation measures are available which will ensure that a Heathrow scheme can come forward without breach of the UK's air quality duties. Any Commission recommendation to Government in favour of a Heathrow scheme would need to establish that it would be lawful for a Heathrow scheme to be constructed and/or operated.

3.36 Any Government support for any Heathrow recommendation would carry clear legal risks unless and until the necessary further work has been completed and found to provide reliable evidence that the scheme can proceed in accordance with legal requirements on air quality.

The need to assess plausible worst case scenarios

3.37 Given the critical importance of ensuring a robust assessment, and the legal implications of it subsequently being found to have underestimated impacts, the Commission's modelling should follow a precautionary approach. It must therefore assess the plausible worst case scenarios in terms of air traffic and related surface access impacts and other underpinning assumptions. Such an analysis represents best practice for any scheme, let alone a scheme of national significance.

The need to assess construction impacts

3.38 An air quality assessment must consider the potential construction effects of short listed schemes on NO_x and particulates, because the legally binding UK limits referred to above do not distinguish between the operational and construction effects of developments and the legal test therefore applies equally to the construction and operational phases of any development.

National Networks Policy Statement

3.39 The National Networks National Policy Statement (NN NPS) was published in December 2014 and sets out the Government's policies on the development of nationally significant infrastructure projects on the national road and rail networks in England.

3.40 The NN NPS states that:

"The Secretary of State should refuse consent where, after taking into account mitigation, the air quality impacts of the scheme will:

- *result in a zone/agglomeration which is currently reported as being compliant with the Air Quality Directive becoming non-compliant; or*
- *affect the ability of a non-compliant area to achieve compliance within the most recent timescales reported to the European Commission at the time of the decision."*

3.41 It also states that that The Secretary of State must give air quality considerations substantial weight where, after taking into account mitigation, a project would lead to a significant air quality impact or lead to a deterioration in air quality in a zone/agglomeration:

3.42 This national policy position is in line with the legal position and would thus have to be reflected in any future Airports National Policy Statement.

3.43 No licence to build a third runway at Heathrow could legally be granted without a condition which limited (or even prevented) the use of any new capacity if legal limits continued to be exceeded.

Habitats Directive

3.44 The Commission's assessment rightly identifies the need to consider the impacts of the short listed schemes on habitats to which the European Habitats Directive and its related UK Regulations[3] apply.

3.45 However, in drawing its conclusions, the Commission appears to dismiss the implications of the Habitats Regulations, focussing instead on whether the European Air Quality Limit Value for the protection of ecosystems would be breached, by reference to the effects on critical levels for NO_x. It then disregards these impacts because the critical levels do not apply in certain locations that are affected.

3.46 The Habitats Regulations cannot be dealt with in this way or lightly dismissed. They require that approval may be granted for a project that is likely to have an adverse effect on a European designated habitat only if there are no alternative solutions, if there are Imperative Reasons of Overriding Public Interest (IROPI), and if compensatory measures are secured.

3.47 Whichever of the short listed schemes is recommended for approval, the requirements of the Regulations will therefore need to be applied at some time during any planning process. If, as the Commission's assessment of the Heathrow schemes shows, impacts of those schemes are likely to have significant impacts on relevant protected sites, this could well represent a further legal impediment to the approval of those schemes at that time.

3.48 While it might not be appropriate at this stage for the Airports Commission to undertake a full Habitats Regulations Assessment, nor would it be appropriate to take forward a recommendation that demonstrably leads to significant effects at a designated site or sites, without considering the viability of alternatives

[3] Conservation of Habitats and Species Regulations 2010 (the Habitats Regulations 2010)

A Gatwick Scheme recommendation will be fully compliant with the duties set out in the Directive and the 2010 Regulations

3.49 Jacobs' assessment confirms that the Gatwick scheme will comply with air quality Limit Values. The mitigation measures proposed by Gatwick will ensure that any increased concentrations of NO_2 are minimised and that the Gatwick scheme will meet the required standards with ample headroom.

3.50 Since the Limit Values are met at all times, the primary obligation contained in Article 13 of the 2008 Directive is met, there are no other breaches of the Directive and the Gatwick scheme can lawfully be permitted to proceed.

Section 4: Assessment methodology

Key Points

Fundamental weaknesses in the Jacobs assessment include:

- failure to assess the air quality impacts around the realigned A4 Bath Road;
- not assessing all plausible worst case scenarios for air quality, including not assessing a 2025 opening year;
- overly optimistic assumptions about improvements to background conditions;
- model verification overstates the air quality impact of Gatwick and understates that of Heathrow;
- failure to assess the construction impacts of the Heathrow schemes;
- failure to assess the impact of relocating the Energy from Waste incinerator in the NWR scheme;
- no proper assessment of the impacts or feasibility of the proposed mitigation measures, or of whether mitigation measures are likely to be included as baseline in the Government's Air Quality Plan in any event;
- failure to undertake appropriate sensitivity tests or to test more than one assessment year.

Failure to assess air quality impacts around the realigned A4 Bath Road

4.1 Jacobs has not assessed the air quality impacts around the realigned route of a section of the A4 Bath Road in the NWR scheme. This means that it is not possible to know at this stage whether there would be the same or even greater exceedances of the Limit Values for the realigned section of the Bath Road than those which have been reported for the non-realigned section.

4.2 The assessment of the western part of this road in the ENR scheme does, however, signal the importance of this section of the Bath Road for the air quality assessment, and there is no reason to assume that the effect on air quality of the NWR scheme would be of any less significance for the realigned section of the Bath Road in the NWR assessment. Indeed, if anything, the effects are likely to be greater because of the higher road traffic in the NWR forecasts and the higher emission concentrations at the portals where Heathrow would have to put the realigned A4 in tunnel. The western portal will also be close to the southern M25 tunnel portals. In these locations, and elsewhere, air quality will deteriorate even further.

4.3 Accurate modelling of local roads sensitive to high volumes of road traffic is essential for a credible air quality analysis. This is particularly the case given the recent information

released by DEFRA in February 2015 regarding the predictions of air quality along the A4 at Heathrow in 2030. For the Heathrow schemes this would include the A4, M4 and A30, which pass close to residential areas. It is very noticeable that the study area adopted for the Heathrow schemes in the Jacobs report extends only a very short distance to the west of the M25, and that the size of the Heathrow study area is markedly less than that for Gatwick. This point, which is not justified or explained in the Jacobs report, is considered further in Section 5 – Assumptions.

4.4 The approach to assessing road traffic for the A4 is crucial when drawing conclusions regarding a scheme's ability to meet air quality limits, since this is a location where limits are already breached and which are forecast to remain in breach for a considerable period of time to come. Jacobs' approach excludes roads that have been realigned on the grounds that the change is not reflected in DEFRA's PCM model. As Heathrow has to divert and tunnel the A4 Bath Road for the North West Runway option, this means there has been no full or proper assessment of the realigned section. Therefore, the Commission's assessment does not adequately consider future air quality on the A4 Bath Road for the North West Runway option.

4.5 The Commission should either urgently undertake the required work to assess the diverted A4 in the PCM model in order to confirm the impact of the NWR scheme on such a sensitive part of the road network, or else make clear in its recommendation to Government that this work has yet to be done. The Jacobs report should have logically assumed that there will be relevant public exposure along the new link, and not disregard this probable scenario.

4.6 Such an assessment would have to be completed before the Government could accept any recommendation in favour of the NWR scheme.

Not assessing all plausible scenarios for air quality, including not assessing the 2025 opening year

4.7 The analysis would be more robust if Jacobs had assessed more than a single year in accordance with standard practice. It is a significant weakness in the reliability of its analysis that it has not done so, as a single-year snapshot cannot give a full picture of the impacts of a scheme which is risking non-compliance.

4.8 It is normal practice in air quality assessments to assess the opening year of the development as this is usually when air quality is most critical, in view of the anticipated generalised reduction in emission rates per vehicle over time.

4.9 The 2030 assessment year selected for the study does not represent the worst of the plausible scenarios as promoters of all schemes have stated their schemes can be opened earlier (and in the case of Gatwick and NWR by 2025). Because emissions of pollutants and background concentrations are expected to reduce over time, the worst case plausible year for assessment purposes is likely to be the earliest possible opening year.

4.10 As a result, by adopting 2030 for assessment purposes, the Jacobs assessment has predicted lower pollutants concentrations for the baseline and lower impacts than would be the case had a 2025 opening year been adopted.

4.11 Gatwick has commissioned expert assessments of 2025 opening year for the Gatwick and Heathrow NWR schemes. The results are described in Sections 6 and 7 of this response. In summary these demonstrate:

- that the Gatwick scheme would comply with UK Limit Values in 2025; and
- the NWR scheme would cause exceedances of the Limit Values and delay compliance in 2025.

4.12 Gatwick also commissioned an assessment of the NWR scheme assuming it were to open in 2029. As with the Commission's assessment this also demonstrates that even if the opening year for the NWR scheme was delayed to 2029 there would still be exceedances.

Overly optimistic assumptions about improvements to background conditions

4.13 The Jacobs' assessments have been based solely on the emission factors and background concentrations reported by DEFRA. Past history, including the projections made in 2003 and 2009 when compared with actual performance in 'on the road' conditions, demonstrates that DEFRA's emissions forecasts have been over-optimistic. Yet no consideration appears to have been given to sensitivity analysis to evaluate how the results would change if more realistic assumptions were assumed, and to establish a likely range.

4.14 Past Euro emission controls have not delivered predicted improvements in NO_x emissions. If improvements in emissions now are similarly not delivered then the improvements in background concentrations will also not occur when predicted in the modelling.

4.15 This risk is reflected, for instance, in advice from the Highways Agency (now Highways England) Interim Advice Note 170/12, which suggests an alternative method for assessment of future pollutant concentrations based around less optimistic assumptions. The Highways England (HE) approach reflects actual observed trends in monitored NO_2 concentrations. Any work on a major road undertaken by Highways England requires that studies are also carried out using this method. As the Heathrow NWR scheme proposes major highway works, the Highways England guidance is particularly applicable.

4.16 It is now normal practice in air quality assessments to consider less optimistic assumptions, either using the Highways England approach or by assuming that background concentrations and pollutant emission rates improve at a slower rate (or not at all)[4].

4.17 The fact that the Commission's assessment does not include such an analysis means that the risk of breaches or delays in compliance with Limit Values has not been adequately considered. This is a considerable weakness in the robustness of the assessment.

[4] Advice Note 170/12: Updated air quality advice on the assessment of future NO_x and NO_2 projections for users of DMRB Volume 11, Section 3, Part 1, Air Quality. (Highways Agency 2012)

Model verification overstates the air quality impact of Gatwick and understates that of Heathrow

4.18 The model verification process has derived an adjustment factor using a combination of Heathrow and Gatwick air quality monitoring data. To apply to Gatwick data an adjustment factor reflecting Heathrow monitoring data and to apply to Heathrow data an adjustment factor reflecting Gatwick monitoring data is clearly incorrect. DEFRA Technical Guidance Para 6.32 states *"The verification involves a comparison between predicted and measured concentration at one or more suitable **local** sites".*

TABLE 4.1: MODEL VERIFICATION: GATWICK MODELLED AND MEASURED COMPARISONS

Monitoring Site	Modelled	Measured	Modelling Error
Poles Lane	19.2	18.6	Measured value is 3.1% lower than modelled value
Horley South	36.6	31.4	Measured value is 14.2% lower than modelled value
Horley South	29.9	25.4	Measured value is 15.1% lower than modelled value
Gatwick LGW 3	40.4	34.3	Measured value is 15.1% lower than modelled value
Gatwick East	32.6	28.6	Measured value is 12.3% lower than modelled value

TABLE 4.2: MODEL VERIFICATION: HEATHROW MODELLED AND MEASURED COMPARISONS

Monitoring Site	Modelled	Measured	Modelling Error
London Hillingdon	49.1	54	Measured value 10% higher than modelled value
Oxford Avenue	37.3	43.8	Measured value 17.4% higher than modelled value
Heathrow LHR 2	44.7	49.8	Measured value 11.4% higher than modelled value

4.19 Critically, Jacobs' verification study indicates modelled concentrations of 40.4 µg/m^3 at Gatwick LGW3, where the local authority's published measured concentration was only 34.3 µg/m^3. In contrast, at London Hillingdon it predicts modelled concentrations of only 49.1 µg/m^3 where the local authority's published measured concentration was in fact 54 µg/m^3. As a result, the model predicted exceedances of the Limit Value for a site near Gatwick (LGW3) where monitoring shows that none exists, whereas at Heathrow the model under predicts by 9-15% at locations where monitoring shows the highest breaches.

4.20 The conclusions reached in the current assessment are therefore unreliable. They result in an overestimate of the impacts from Gatwick and understate the impacts at Heathrow.

Failure to assess construction impacts of the schemes

4.21 In our response to the Commission's draft appraisal methodology (2013), we emphasised our view that the Commission's air quality assessment must consider the potential construction effects of short listed schemes on NO_x and particulates. This is because the legally binding UK limits do not distinguish between the operational and construction effects of developments. We reiterated these points in our submissions to the Commission of 3rd December 2014 and 3 February 2015.

4.22 The assessment of construction effects upon air quality is particularly important in the case of the Heathrow schemes because of the major traffic disruption that will be caused through road closures over an extended period of time, within an area of London which is persistently in breach of air quality Limit Values.

4.23 However, Jacobs' assessment still does not assess the potential NO_2 impacts of short listed schemes on compliance with Limit Values during their construction period. We note that Jacobs has considered impacts from dust, but it considers that insufficient details are available to undertake any quantitative assessment with regard to NO_2 impact. Further, no assessment of the implications for ground level concentrations of particulates associated with construction activity has been undertaken.

4.24 We do not agree that it is not possible to undertake a quantitative assessment to evaluate the potential impacts and risks of the construction stage. Indeed, we have commissioned an assessment of the air quality impacts of construction for the Heathrow NWR scheme, assuming opening dates of 2025 and 2029. We summarise the findings in Section 6 and have attached the Arup construction assessments for Heathrow as Appendices 2 and 3.

4.25 The construction impact report concludes that, as a result of Heathrow construction, there is a significant risk that pollutant concentrations may increase in areas where there are existing concentrations of nitrogen dioxide above air quality Limit Values and where compliance with air quality Limit Values will be delayed.

4.26 Based on these assessments, construction of the Heathrow North West Runway would be unlawful.

4.27 The Commission should either carry out its own construction assessments, or must advise Government that it has not been able to verify that a Heathrow scheme could lawfully be constructed and, accordingly, that to support a Heathrow scheme involves the risk that such a scheme could not be built.

Failure to assess the impact of relocating Energy from Waste incinerator in the NWR scheme

4.28 We note that the Commission has not assessed the impact of relocating the Energy from Waste incinerator in the NWR scheme.

4.29 The requirement to relocate this major facility to a location south of the airport, as imposed by the NWR scheme, would without doubt have material effects on local air quality and human health from PM_{10}, $PM_{2.5}$, heavy metals, dioxins and furans. It would also compound risk of exceedances and cause delay to compliance with NO_2 limits.

No proper consideration of the impacts or feasibility of mitigation measures

4.30 Although Jacobs' assessment states that it has taken no account of potential mitigation measures other than 'mitigation by design' it identifies a range of potential measures for all three shortlisted schemes which are based on the promoter's submissions. It also identifies some additional mitigation measures not specifically highlighted by promoters which Jacobs consider might be implemented.

4.31 In the case of the Gatwick scheme, there are no predicted exceedances of the Limit Value or Air Quality Objective, and no risk that the development would delay DEFRA achieving compliance with the Limit Value in the relevant zone. Jacobs have not therefore attempted to quantify the potential benefits of mitigation measures.

4.32 For the Heathrow schemes, Jacobs makes an attempt to quantify the potential benefits. If the Commission is to rely on these measures in making its recommendation, it will need to undertake a much more detailed and thorough assessment of the benefits of the mitigation measures. This would need to include assessment of the feasibility and enforceability of measures identified and verification of any reduction in emissions that could arise. This would also need to be re-evaluated in the context of the Government's required Air Quality Plan.

4.33 As it stands, the assessment undertaken by Jacobs cannot properly be relied upon for the purpose of determining whether or not it would be lawful for either of the Heathrow schemes to come forward.

Failure to undertake appropriate 'sensitivity' tests

4.34 Jacobs have undertaken two sensitivity tests. One of these assumes even more optimistic NO_x emissions from Euro 6c vehicles than were assumed in its main assessment.

4.35 Given the concerns we have set out in this section, as well as the importance of the Commission's recommendation for the future of the UK, and the damage that would be caused to the UK's long term interests if the Commission was to recommend a scheme that was subsequently found could not be taken forward, it is a matter of significant concern that the Commission has not tested the scenarios of less optimistic improvements in background concentrations. This is required by Highways England in assessing any road schemes as a matter of course. Such an analysis represents normal best practice for any scheme, let alone a scheme of such national significance.

4.36 It is also a matter of serious concern that a test was not undertaken for higher Euro 6c emissions. This is a far more relevant test than the lower Euro 6c emissions sensitivity test that was carried out, because of the obvious fact that emissions reductions that were expected to arise from previous Euro vehicle standards have not materialised in real life to anything like the extent that was predicted in theory. Recent history has demonstrated that predictions of emissions reductions have consistently and significantly over-estimated the likely reduction in NO_2 ground level concentrations that will result. It is thus crucial when assessing the risks associated with air quality to undertake a sensitivity analysis that examines the implications of such over-estimation.

4.37 The absence of appropriate tests to examine the full range of possible impacts means that there has been no proper examination of the risk of higher exceedences or delayed compliance with Limit Values, associated with making a recommendation in favour of a Heathrow scheme. The consequences of such risks are significant given the severe damage that would be caused to the UK if a scheme is recommended which subsequently cannot be delivered due to conflict with the UK's air quality duties.

Section 5: Assumptions

Key Points

- Jacobs' air quality assessments of the Heathrow NWR and Heathrow ENR schemes are underpinned by air traffic and road traffic assumptions that have materially understated the likely impacts.
- There are also errors in the approach that Jacobs has taken to calculating background concentrations which further understate the effects of the Heathrow schemes and over-state Gatwick's.
- The risks to exceedance, and delay to attainment of, air quality Limit Values will therefore also be understated.
- These weaknesses present further reasons why, at present, the Commission cannot reliably recommend either Heathrow scheme and why the Government could not safely accept any such recommendation.

Air Traffic Assumptions

5.1 We have reviewed Jacobs' choice of air traffic forecasts assumed for the air quality local assessment.

5.2 The Commission's November 2014 Consultation Document (para 2.30) states that all the Commission's scenarios carry equal weight and none should be viewed as a 'central' scenario. Since all scenarios are viewed as being plausible, the air quality assessments should have been carried out either on all scenarios, or else on the 'worst case' plausible scenario for the impact being considered. Only in this way could a robust assessment be seen to have been undertaken.

5.3 The assessments were carried out based on 2030 traffic levels forecast in the November 2014 iteration of the Commission's traffic forecasts. For each capacity option, a single demand scenario was used as the basis of the assessment in the 'do minimum' and 'do something' options. The scenario choice was "based upon the Airport Commission's demand model that results in the greatest likely air quality impact consistent with the Promoters' preferred business model" (p. 24). The scenarios chosen were:

- Gatwick R2 Low-cost is King, Carbon Traded (LCiK, CT)
- Heathrow NWR Global Growth, Carbon Traded (GG, CT)
- Heathrow ENR Global Growth, Carbon Traded (GG, CT)

5.4 No evidence is presented in the report to explain the basis of the decision as to which scenario represented the greatest impact to air quality.

5.5 The Commission's chosen scenario for Gatwick (LCiK, CT) is the obvious choice for a worst case plausible scenario, since it attracts significantly more traffic than other scenarios. The Heathrow choice is not appropriate.

5.6 Based purely on numbers of air traffic movements, the more obvious worst case choice for Heathrow NWR would be LCiK, with 740,000 movements vs 723,000 in the scenario actually assessed, Global Growth Carbon Traded.

5.7 Surface access impacts will be dependent on the volumes of local traffic using the airport. For this, LCiK, CT again represents the worst case plausible scenario, with 7million additional local passengers (i.e. non-transfer passengers) in 2030 (91m), compared to the scenario chosen by Jacobs (84m)[5].

5.8 Jacobs' only stated justification for an assessment in 2030 is the availability of surface access data, which is not available for an earlier opening year of 2025. The selection of a 2030 assessment year has significant implications for the baseline ground level concentrations as we have explained earlier. 2030 is only truly representative if Jacobs has reached the view that no scheme would be operational until that date.

5.9 The Commission has to make an assessment using forecasts which provide a reliable basis for such assessment and, given the critical importance of reliable assessment, it is essential to model the plausible worst case scenarios in terms of air traffic and related surface access impacts. Jacobs does not appear to have done this for the Heathrow schemes and as a result its conclusions cannot be relied upon as being robust.

Road traffic assumptions

5.10 We attach in Appendix 9 a detailed review of the road assumptions made by Jacobs, and provide an overview of the key issues below.

5.11 The Jacobs report (Jacobs Appendix C4, p151) states that its modelling is unable to differentiate between emissions generated by airport and non-airport related traffic. This major weakness means that the impact of airport-related traffic on air quality cannot be robustly determined.

5.12 Jacobs has used a strategic highways model for a local assessment of emissions. This type of model cannot account appropriately for congestion and delay, meaning that these conditions, which lead to higher emissions and impact on air quality, have not been properly considered.

5.13 Jacobs has also overstated the impact of road traffic on emissions for Gatwick and understated the impact of Heathrow on people by:

- adopting a study area for Gatwick which is 78% larger than the area considered for Heathrow, leading to an assessment of effects on a smaller population for Heathrow than for Gatwick;
- excluding major routes (including the M4, the A4, the M40 and the M3) and major conurbations west of the M25 but close to Heathrow, such as Slough, Maidenhead and Windsor, from the traffic and air quality analysis for Heathrow;
- not reflecting the impact of increased freight traffic from the assessment;

[5] Airports Commission Consultation Traffic Forecasts - November 2014

- excluding the A4 Bath Road realignment and the proposed M25 tunnel portals close to residential properties from the Commission's assessment, with the result that it does not fully consider future air quality related to each scheme;
- excluding construction traffic and construction related diversions from the assessment throughout the construction period, even though these will cause major disruption around Heathrow, with a consequent increase in congestion, delay and road traffic emissions;
- including a number of unfunded and uncertain rail improvements, and assuming minimal effects on road traffic associated with the Heathrow NWR scheme, in spite of Jacobs' earlier conclusion that the increase in peak hour road trips would be over 2,000 and by extension even more in the Low Cost is King, Carbon Traded scenarios;
- failing to undertake a proper assessment of demand management measures at Heathrow, such as congestion charging.

Background concentrations

5.14 We have been unable to reproduce the data on background concentrations reported in the consultation document as Jacobs' approach does not follow recognised standard practice for an assessment of this nature. The methodology states that these have been taken from the DEFRA background maps with 'in square' contributions from motorways, trunk roads, primary 'A' roads and aircraft removed.

5.15 However, our calculations, using the same methodology as used by Jacobs, result in very different future background concentrations.

- For instance, at Gatwick receptor '2R-K' (Hazelwick Roundabout) Jacobs report that the NO_x background concentration is 35.4µg/m^3, however our calculation, using the same methodology, gives a background NO_x concentration at this point of 29µg/m^3.
- For Extended Northern Runway receptor 'ENR-N' the background concentration reported by Jacobs is 22.5µg/m^3. Following the same methodology, we calculate this concentration is 52.4µg/m^3.

5.16 Some of these differences may be explained by the way in which the background data has been processed, but this could not account for such a major underestimate of background concentrations around Heathrow.

5.17 Extrapolation may also account for some of the difference observed at Gatwick but this has resulted in a considerable overestimate of background concentrations, and is inconsistent with the local authority's own detailed assessment of the area which showed a NO_x concentration of 33.5µg/m^3 for the year 2011. Given the global expectation of continued reductions in future pollutant concentrations over time it seems inconceivable that background concentrations will have increased in this area, and consequently there appears to have been a significant overestimate of background NO_x concentrations at this location by Jacobs.

5.18 In summary therefore, it appears that background concentrations at Heathrow are significantly underestimated, whilst those at Gatwick are significantly overestimated.

Section 6: Findings on the Heathrow Schemes

Key Points

- Jacobs concludes erroneously that there would be no predicted exceedances of the Air Quality Objective. In fact there would be exceedances of the Objective.
- In any event, more critically, Jacobs rightly recognises that there would be a breach of the legally binding Limit Value associated with the Heathrow schemes. Work that Gatwick has commissioned shows that this would be on a greater scale than Jacobs recognise and would extend the period of non-compliance. Nevertheless, the Jacobs results demonstrate that neither Heathrow scheme could lawfully be delivered.
- These factors, combined with the weaknesses and omissions outlined earlier, mean that the Commission cannot reliably recommend either of the Heathrow schemes and the Government could not safely accept such a recommendation.
- Our modelling of air quality during the construction phase suggests that construction of either of the Heathrow schemes would also lead to significant breach of the UK's air quality duties, yet Jacobs has not carried out any construction impact assessment of NO_2.
- Mitigation, including a proposed Congestion Charge, will not deliver compliance with the UK's air quality requirements for either of the Heathrow Schemes.
- The operation of either of the Heathrow Schemes would be unlawful even on Jacobs' assessment.

Operational effects

6.1 The Commission's report presents the results of potential health effects relating to air quality in four main ways:

- firstly it presents the results at selected receptors in Table 5.5;
- secondly, it presents the numbers of properties and populations at risk in Table 5.6;
- thirdly, it presents its assessment of National Compliance with the Limit Value for Air Quality in Table 5.7;
- finally it summarises the Total Health and Environmental Damage Costs, including European Environment Agency guidance on Value of a Life Year and Value of a Statistical Life.

6.2 The Commission's report uses one methodology to assess the effects at selected receptors, locally affected people and properties with respect to the Air Quality Objective, and a different methodology to assess compliance with the Limit Value.

6.3 The former method relies on a series of selected inputs, including choice of assessment scenarios, air and road traffic forecasts, emission factors for airport and road traffic, model

selection and choice of background air quality data. The latter method utilises DEFRA's Pollution Climate Mapping (PCM) model, used to assess national compliance with the Limit Value, and adds an increment calculated using the former method from air and surface sources, including road traffic.

6.4 The two methods produce different results – the former predicts no exceedances of local air quality Limit Values, whereas the latter method predicts ongoing breaches of the Limit Values in 2030 and beyond.

6.5 Both methods are important in evaluating the air quality impacts. The former has enabled Jacobs to assess populations affected by changes to concentrations to be identified across a range of concentration levels. However, the latter is much more significant in determining the lawfulness of the short listed schemes, because this is the measure that determines whether a scheme would lead to levels of concentrations that exceed the legal Limit Values which the UK is obliged to meet in the shortest possible time.

Predicted Concentrations at Health Based Receptors - Tables 5.5 and 6.5

6.6 Tables 5.5 and 6.5 report results for selected receptors. The preceding text states that the selected receptors *"are not necessarily intended to represent worst-case concentrations"* but rather receptors at which airport and road related NO_x contributions are important.

6.7 Without further information, it is impossible to understand: what is the importance of these receptors and how is this defined, why and how was each of these selected, what is the significance of these, and why are these results given prominence. What is clear is that the selection of the receptors has not been justified and that the analysis presented in these Tables does not present a full picture of the likely risks.

6.8 The methods selected to derive the results in Tables 5.5 and 6.5 rely on modelled background concentrations in 2030, derived from DEFRA maps, which past experience suggests is likely to prove optimistic. They also rely on an assumption that vehicle emission controls will deliver reductions in real world driving conditions in the future, in spite of clear evidence which demonstrates that this has not been achieved in real world driving conditions in the past. The results are highly dependent on these input assumptions which, in the light of previous experience, must be regarded as optimistic.

6.9 Even utilising the methods adopted for the Commission's report, we have been unable to reproduce the results reported in Tables 5.5 and 6.5. As an example, for receptor ENR-N the background concentration reported is 22.5µg/m^3. Following the same methodology as the Commission uses, we calculate a concentration of 52.4µg/m^3. Clearly a factor-of-two difference in the reported background concentration is of significant concern.

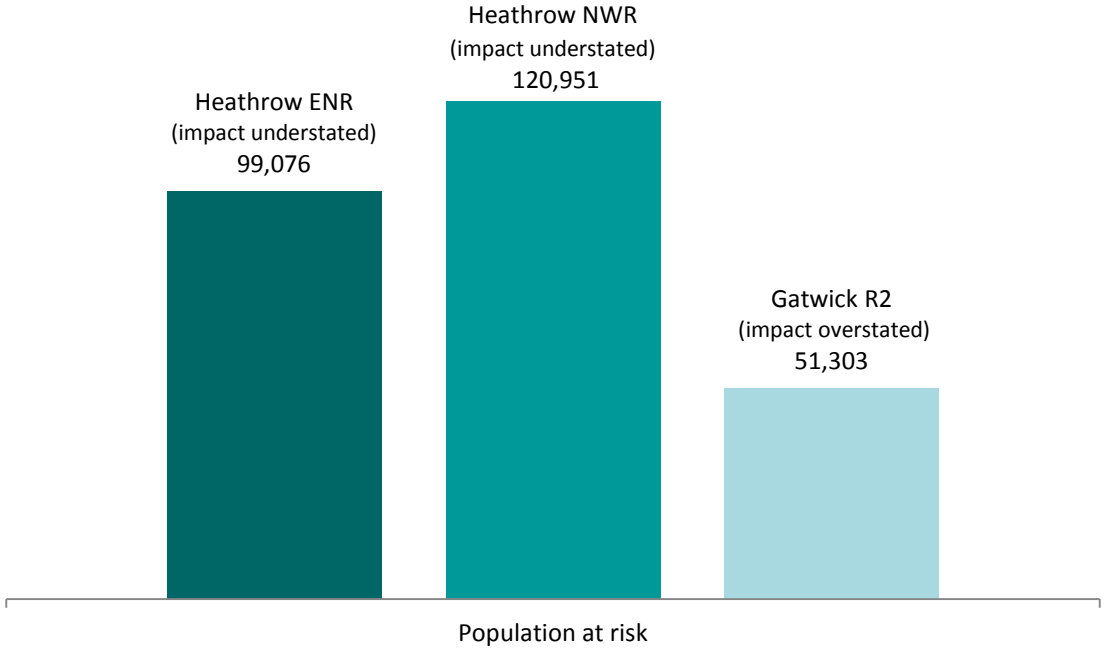
6.10 In its Executive Summary the Jacobs report states that '*There are no predicted exceedances of the air quality objective at any receptor location, in either the do-minimum situation or the Heathrow NWR/ENR scenarios*'. Arup has undertaken a wider, more thorough, technical analysis, assessing additional scenarios and undertaking sensitivity tests, which shows that there would be an exceedance of the Objectives. More critically, there would be a delay to the achievement of the legally binding Limit Values. On this basis alone, the Government could not safely accept a recommendation to give policy support to either Heathrow option, irrespective of the situation with regard to the air quality Objectives.

At Risk Properties and Populations – Tables 5.6 and 6.6

6.11 The report places significant emphasis on 'at risk' properties and populations. Paragraph 3.4 states that *"….a risk of exceedence has been taken to be any road link with a concentration of >32 µg/m^3."* It is unclear what the justification is for the selection of this as a threshold value. The relevant technical guidance refers to a threshold of 36 µg/m^3, which should also be considered.

6.12 Tables 5.6 and 6.6 show 120,951 people affected by a change in PM_{10} concentration of up to 2 µg/m^3 for Heathrow NWR, and 99,076 people similarly affected for Heathrow ENR (See Figure 6.1). These are very significant adverse effects for a very large number of people, for a pollutant to which population exposure should be minimised.

FIGURE 6.1: COMPARISON OF POPULATIONS AFFECTED BY CHANGE IN PM_{10} CONCENTRATION OF UP TO 2 µg/m^3 (SOURCE: JACOBS TABLES 4.6, 5.6, 6.6)



6.13 The results presented in Tables 5.6 and 6.6 and shown in Figure 6.1 are based on the same optimistic assumptions regarding future emission controls and future background concentrations that apply to Tables 5.5 and 6.5. The net result is that the absolute NO_2 concentrations are likely to have been significantly underestimated for both Heathrow NWR and Heathrow ENR schemes.

National Compliance – Tables 5.7 and 6.7

6.14 The assessment of National Compliance with air quality Limit Values follows a different, less optimistic, methodological approach than the results presented in the preceding sections (albeit that this assessment also underestimates impacts). The results show that neither Heathrow scheme complies with the air quality Limit Value for NO_2 in 2030, with breaches of up to 55.8 µg/m^3 for the Heathrow ENR scheme and up to 48.7 µg/m^3 for the Heathrow NWR scheme.

6.15 Critically (as we indicated earlier in Section 4), Jacobs' report states that it has not assessed the impact on compliance with the air quality Limit Value of the proposal to realign the A4 Bath Road, suggesting that this *'may be excluded due to lack of public exposure'*. Jacobs' report does not state how public exposure would be avoided, but in our view, short of tunnelling the route, it is difficult to conceive how this would be done, and therefore this key feature of the Heathrow NWR scheme should have been assessed.

6.16 Clearly a full assessment of National Compliance with the limit would be essential before any decision to recommend the Heathrow NWR scheme could be reached.

6.17 In the absence of any assessment of impacts along the realigned A4 Bath Road, the best indicator available is provided by the assessment of the non-realigned Bath Road in the ENR scheme, in Table 6.7, which shows a breach of the Limit Value, of up to 55.8 µg/m^3.

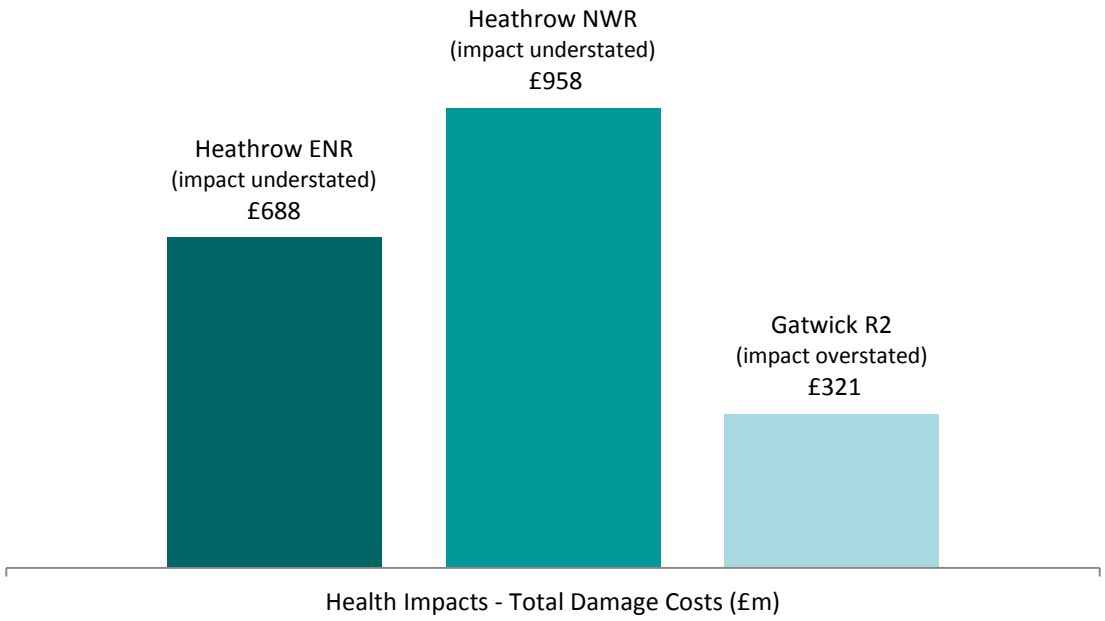
6.18 The Jacobs report comments on some mitigation measures suggested by the promoters, and identifies potential additional mitigation measures that are not proposed by the promoters, but does not report on the feasibility, enforceability or significance in terms of impacts, of any of the mitigation measures proposed. Notwithstanding this, the Jacobs report concludes that the application of every mitigation measure identified would be insufficient to achieve compliance along the non-realigned Bath Road in the ENR scheme and this would apply, by implication, to the re-aligned Bath Road in the NWR scheme.

6.19 The Jacobs assessment concludes that both of the Heathrow NWR and ENR schemes would delay compliance with the Limit Value in the London Agglomeration. The report makes a scientifically unsound assumption (Footnote 10, p21) that levels will reduce in future years in a uniform manner. Having regard to the mitigation measures proposed, even a cursory consideration confirms that levels will not reduce in a uniform manner across the agglomeration. Therefore it must be assumed that every predicted non-compliance presents a risk to achieving compliance.

Total Damage Costs

6.20 Based on the foregoing analysis, it is likely that the total damage costs in terms of health impacts and environmental damage have been underestimated for the Heathrow schemes. Nonetheless, using the approach adopted by the Commission report (Green Book Central Estimate), the total air quality damage costs for Heathrow NWR are £958 million and the total air quality damage costs for Heathrow ENR are £688 million over the 60 year appraisal period. This relates directly to the effects of the scheme on human health, and is double the cost of the Gatwick scheme for Heathrow ENR, and three times for the Heathrow NWR, as shown in Figure 6.2 on the following page.

FIGURE 6.2: COMPARISON OF TOTAL DAMAGE COSTS
(SOURCE: JACOBS TABLES 4.8, 5.8, 6.8)



Construction assessment of NWR

Heathrow NWR Construction Assessment – 2025 opening

6.21 The Commission has not carried out an assessment of construction air quality impacts at Heathrow. This is an important omission in view of the potential impacts of the extensive road construction programme, involving simultaneous construction and traffic management that will result in major re-distribution of traffic affecting parallel routes and risking new exceedances.

6.22 Gatwick commissioned independent experts Arup to carry out such an assessment for a 2025 opening, attached as Appendix 2 to this submission.

6.23 The assessment has been made by developing a programme of major construction activities, modelling traffic impacts on areas where significant changes in traffic flows have been identified as being likely, and by undertaking a detailed review of air quality conditions in West London.

6.24 This air quality assessment was based on a combination of DEFRA and Local Authority data identifying the areas where nitrogen dioxide concentrations were highest and are expected to remain above or close to limits in the future.

6.25 Eight study areas were selected for detailed assessment, and air quality modelling was undertaken using the DEFRA and Highways England standard approaches.

6.26 The assessment shows that Heathrow construction activities would cause very significant increases in nitrogen dioxide concentrations in a number of the selected study areas. In five of the study areas, concentrations of nitrogen dioxide are expected to remain above the Limit Values in 2025 even using DEFRA's optimistic approach for future emissions. Using the more pessimistic Highways England approach, emissions are predicted to be nearly double the relevant air quality standard in some locations and all study areas are expected to remain above the Limit Values in 2025.

Heathrow NWR Construction Assessment – 2029 opening

6.27 A further report from Arup (attached as Appendix 3 to this submission) assesses whether the risks would remain if construction was to be deferred (with NWR opening in 2029) when background air quality is expected to have improved. It also assumes a longer construction period, which reduces the cumulative impact of construction.

6.28 The methodology used was the same as with the 2025 assessment.

6.29 Overall, it was found that, even if construction was delayed, there would still be five locations where significant risks would remain even when assessed using optimistic (DEFRA) methodology, and all study areas would remain above Limit Values using the Highways England methodology. Therefore, the serious risk (identified in the earlier 2025 construction study) that the construction works for a third runway could not proceed without the UK being in breach of the European Directive would remain even if opening of the NWR was deferred to 2029 (see Figure 6.3 below).

FIGURE 6.3: OUTCOME OF CONSTRUCTION ASSESSMENTS OF HEATHROW NWR (SOURCE: ARUP)

Scenario assessed	Outcome	Legal test satisfied?
Construction assessment Heathrow NWR 2025 Opening Year	Predicted exceedence of Limit Value/Objective	✗
Construction assessment Heathrow NWR 2029 Opening Year	Predicted exceedence of Limit Value/Objective	✗

Operational assessment of NWR

6.30 Gatwick has commissioned an expert assessment of the air quality impacts of operation of the Heathrow NWR scheme in 2025 and 2029. These assessments have used both Heathrow Airport Limited's own air traffic forecasts and the Commission's 'Low Cost is King, Carbon Traded' forecasts. Reports of these assessments are attached as Appendices 4, 5 and 6. We have also provided Arup's operational assessment of Gatwick as Appendix 7.

6.31 These assessments provide a good understanding of the risks of the NWR scheme leading to breaches of, or delaying compliance with, health based air quality standards if it were to become operational in one of these years.

6.32 Study areas or "hot spots" were selected where existing pollutant concentrations are high and the operations of a new third runway could be expected to increase pollutant concentrations.

6.33 The results of the detailed air quality modelling show that there are locations in West Drayton, Harmondsworth, Harlington Hounslow and Heston, particularly close to the local road network, where nitrogen dioxide concentrations are predicted to exceed the relevant air quality standard with the operation of a third runway at Heathrow. In fact the only cases where local air quality standards would not exceed standards are the cases which assume Heathrow's own traffic forecasts for a 2025 or 2029 opening year (which are much lower than the Commission's) and where background levels improve in line with DEFRA's optimistic predictions for the future. All other assessments show that the effect of the NWR scheme would be to cause exceedences of and delay compliance with legally binding Limit Values and local air quality standards (see Figure 6.4 and Figure 6.5)..

6.34 Concentrations are predicted to be approximately 20% above the standards in 2025, with very little improvement by 2029.

6.35 Examination of the mitigation measures proposed by Heathrow indicates that most measures would be ineffective in reducing pollutant concentrations at receptors offsite.

FIGURE 6.4: OUTCOME OF OPERATIONAL ASSESSMENTS OF HEATHROW NWR (2025) (SOURCE: ARUP)

Scenario assessed	Outcome	Legal test satisfied?
OPERATIONAL ASSESSMENTS FOR 2025 OPENING		
HAL Growth Forecasts and DEFRA 2025 background concentrations	No predicted exceedence of Limit Value/Objective	
HAL Growth Forecasts and DEFRA 2017 background concentrations	Predicted exceedence of Limit Value/Objective	
Airports Commission Growth Forecasts and DEFRA 2025 background concentrations	Predicted exceedence of Limit Value/Objective	
Airports Commission Growth Forecasts and DEFRA 2017 background concentrations	Predicted exceedence of Limit Value/Objective	
Airports Commission Growth Forecasts and Highways England Methodology	Predicted exceedence of Limit Value/Objective	

FIGURE 6.5: OUTCOME OF OPERATIONAL ASSESSMENTS OF HEATHROW NWR (2029) (SOURCE: ARUP)

Scenario assessed	Outcome	Legal test satisfied?
OPERATIONAL ASSESSMENTS FOR 2029 OPENING		
HAL Growth Forecasts and DEFRA 2029 background concentrations	No predicted exceedence of Limit Value/Objective	
HAL Growth Forecasts and DEFRA 2021 background concentrations	Predicted exceedence of Limit Value/Objective	
HAL Growth Forecasts and DEFRA 2019 background concentrations	Predicted exceedence of Limit Value/Objective	
Airports Commission Growth Forecasts and DEFRA 2029 background concentrations	Predicted exceedence of Limit Value/Objective	
Airports Commission Growth Forecasts and DEFRA 2021 background concentrations	Predicted exceedence of Limit Value/Objective	
Airports Commission Growth Forecasts and DEFRA 2017 background concentrations	Predicted exceedence of Limit Value/Objective	
Airports Commission Growth Forecasts and Highways England Methodology	Predicted exceedence of Limit Value/Objective	

Mitigation

6.36 The Heathrow NWR proposal has set out a number of mitigation measures, which are considered in the Commission's report at Section 5.6.3. Of the eight measures for which Jacobs provides commentary, five relate purely to aircraft or airside emissions. Many of these are already included in Heathrow's Air Quality Action Plan and/or LB Hillingdon's Air Quality Action Plan (London Borough of Hillingdon Air Quality Acton Plan Progress Report 2014) These are no more than a continuation of good practice common to all airports and do not address the key local air quality issue for Heathrow, which is influenced mainly by road traffic. They are measures that could be expected to be included in the Air Quality Plan in any event and thus would form part of the baseline for assessment.

6.37 The most important obstacle for Heathrow relates to the future baseline concentrations of NO_2 at locations alongside the local road network. Until compliance is achieved at these locations, irrespective of the development of Heathrow, proposals for further expansion of the airport cannot be given consent if to do so would delay compliance. The recent judgement of the Supreme Court confirms that the UK must achieve compliance with the EU Limit Value for NO_2 '*as soon as possible*', which implies that any Air Quality Plan for the Heathrow area must demonstrate how this situation can be improved more effectively than is currently the case. Many of the measures that Heathrow is suggesting will be part of its proposed third runway scheme will inevitably be part of any such plan to achieve compliance at these roadside locations, irrespective of the proposal to increase the airport's capacity.

6.38 At locations where the annual mean NO_2 concentration is predicted to breach the limit for many years to come, the impact of the NWR scheme can be mitigated successfully only if road traffic emissions are substantially lower than for the do-minimum case.

6.39 A central feature of the NWR scheme is Heathrow Airport Limited's assumption that airport related road traffic can be constrained to 2013 levels, by ensuring a higher proportion of public transport access. A Congestion Charge is identified as an option if public transport measures do not achieve the required reductions in road traffic. As the Commission notes, with regard to the public transport share, '*it is not clear that this is deliverable'*, a point with which we concur.

6.40 The Jacobs report makes a number of other suggestions regarding mitigation, including a series of schemes that are only partially supported by the scheme promoter and several others that have not been considered in the promoter's proposal. Many of these appear to be either undeliverable or unenforceable, or both.

6.41 A thorough detailed assessment of mitigation is essential, particularly for the Heathrow schemes, which are both at serious risk of being unlawful. Such an assessment must identify which mitigation measures should be included in the baseline, must quantify the impacts of each mitigation, and must assess the feasibility and wider consequences (if any) of each measure. This work has not been undertaken and the assessment of the Heathrow schemes must be considered incomplete until it is done. In the absence of such an assessment, the analysis of mitigation provided in the current assessment does not provide a sound basis for concluding whether mitigation could be provided which would allow a Heathrow scheme to come forward on a basis that would be lawful.

Congestion Charge

6.42 Unlike at Gatwick, the promoters of both the Heathrow schemes acknowledge that a congestion charge may be necessary to manage traffic demand and to secure compliance with air quality standards and limits.

6.43 The promoters of the Heathrow Hub state that a congestion charge will be inevitable in the future.

6.44 For the North West Runway scheme, Heathrow Airport Limited has stated that a congestion charge may be required if its target of no net increase in road traffic compared to today is to be met.

6.45 Jacobs has cast serious doubt on the acceptability and desirability of a congestion charge at Heathrow in the following terms:

> *"Our view is that development and implementation of a congestion charge is likely to be highly contentious with far reaching implications for the perception of Heathrow as an international hub and commercial gateway."* (November 2014 Appraisal Framework Module 4. Surface Access: Heathrow Airport Hub Station Option page 12)

6.46 Jacobs disagrees with Heathrow Airport Limited's proposition that a third runway would not generate additional airport related vehicle trips.

6.47 Jacobs has already assessed Heathrow's surface access case[6] as resulting in 1,800 extra peak hour vehicle trips without introducing a congestion charge. Jacobs has also undertaken a sensitivity test for the Global Growth Carbon Traded scenario, which gives rise to more trips in the peak hour. However, as noted earlier in this submission, even this does not represent the plausible worst case for road traffic, which occurs in the Low Cost is King (LCiK) scenario with an additional 7mppa of non-transfer trips (as stated in the Commission's traffic scenarios). This would increase the estimate to approximately 3,000 extra road trips per peak hour generated by Heathrow expansion based on the Jacobs' approach.

6.48 Consequently, additional emissions from Heathrow Airport related trips would arise and would contribute to continued exceedences. Jacobs states that they have not considered the effect of a Congestion Charge.

6.49 In the absence of any published information from Heathrow or Jacobs, Gatwick has commissioned its own report that considers the impacts of a congestion charge in the context of addressing the air quality problems around Heathrow. A copy of the report is enclosed as Appendix 8.

6.50 This work assumes that a congestion charge would be imposed on airport passengers driving to the airport (but would not be imposed on other road users).

6.51 The work concludes that a congestion charge would need to be set at a very significant level if it is to have the desired effect of materially reducing traffic and reducing NO_2 concentrations to any material extent.

[6] (Appraisal Framework Module 4 - Surface Access: Heathrow Airport North West Runway, para 7.2.11, Jacobs, 2014)

6.52 On the M4 Spur, for example, ARUP estimate that a congestion charge on airport passengers car trips of up to £55 per vehicle per trip would be needed to reduce total traffic on the Spur Road by 20%.

6.53 But on the A4 Bath Road, where air quality problems are predicted to be most in excess of legal limits, a 20% reduction in total traffic would require a 61% reduction in airport passengers car trips. ARUP estimate that to achieve this reduction a passenger congestion charge in excess of £55 would be needed.

6.54 The report, further states that reductions in traffic on this scale would still only achieve a reduction in NO_2 concentrations of 0.5µg/m^3. So even if set at this level, a congestion charge would not be sufficient to achieve compliance with the Limit Values on the Bath Road link.

6.55 It is also important to point out that even if these reductions in traffic were possible through a congestion charge on airport passengers, there is every prospect that road space vacated by Heathrow passengers would be filled by other users, such that air quality would continue to exceed standards.

6.56 As it stands, no evidence has been provided by Heathrow or Jacobs to confirm whether or not a congestion charge could have the desired effect of avoiding air quality exceedances, nor is there any indication as to which road users or journey types would be affected.

6.57 Without any clarity on how the congestion charge might be implemented and what its effect on air quality might be, Jacobs and the Commission must conclude that both Heathrow schemes will lead to a delay to meeting Limit Values.

Effect on Habitats

6.58 While the Commission may be correct in concluding that air quality impacts on protected sites are not critical in terms of air quality regulations, the substantial adverse effects of the Heathrow schemes would eventually fall to be considered in detail relative to the Habitats Regulations.

6.59 The impacts of both Heathrow's schemes are assessed as giving rise to large increases in NO_x concentrations on the South West London Waterbodies RAMSAR and SPA sites. These impacts are therefore likely to be significant issues that would have to be satisfied by the Secretary of State alongside any DCO Examination or Hybrid Bill proceedings.

6.60 The risks that the Heathrow schemes may not eventually satisfy the Habitats Regulations, because of the available of an alternative option with no significant impacts (namely the Gatwick scheme) should be identified to the Government in the Commission's recommendations.

Section 7: Findings on the Gatwick Scheme

Key Points

- A recommendation in favour of the Gatwick scheme can be accepted by Government as complying with UK air quality legislation.
- Even so, inaccuracies in the Commission's assessment mean that both the number of properties impacted by the Gatwick scheme, and the risk of exceedance of the Air Quality Objective, has been overstated.
- The assessment findings do not adequately demonstrate or quantify Gatwick's significant advantages over the Heathrow Schemes in respect of air quality.

Operational effects

Predicted Concentrations at Health Based Receptors – (Table 4.5) are incorrect

7.1 We have highlighted earlier our concern that the method used to derive future emissions concentrations for 'selected receptors' at Heathrow is unduly optimistic. In the case of the predictions for Gatwick, however, we are concerned that the calculations presented in Table 4.5 are simply incorrect.

7.2 For instance, at receptor 2R-K, as we have noted in Section 4, the Commission reports a background NO_x concentration of 35.4µg/m^3. Following the same methodology as the Commission uses, we calculate a background NO_x concentration at this point of 29µg/m^3. Moreover, at this location, neither the airport NO_x contribution nor the airport road NO_x contribution is significant. It is unclear, therefore, why this receptor has even been considered.

Impacts of R2 on Hazelwick roundabout overstated

7.3 Gatwick strongly challenges the Commission's assessment of effects in the vicinity of Hazelwick Roundabout, including receptor 2R-K. In particular:

- The Commission's assessment is at odds with the assessment undertaken by Crawley Borough Council and Gatwick's own assessment.
- Gatwick's highway modelling, using the Highways England model, shows that Gatwick contributes less than 2% of total traffic at this junction in the peak hour in 2025 without a second runway and only 3% with a second runway. West Sussex County Council has corroborated that Gatwick contributes only a small percentage of traffic at this junction, even with a second runway. It is inconceivable that such a small change in traffic flow, even allowing for differences between peak and Annual Average Daily Traffic (AADT) flows, could lead to an incremental change in annual mean NO_2 concentration above Do-Minimum of 4.6 µg/m^3, an error to which the Commission has unfortunately given prominence in its Executive Summary.

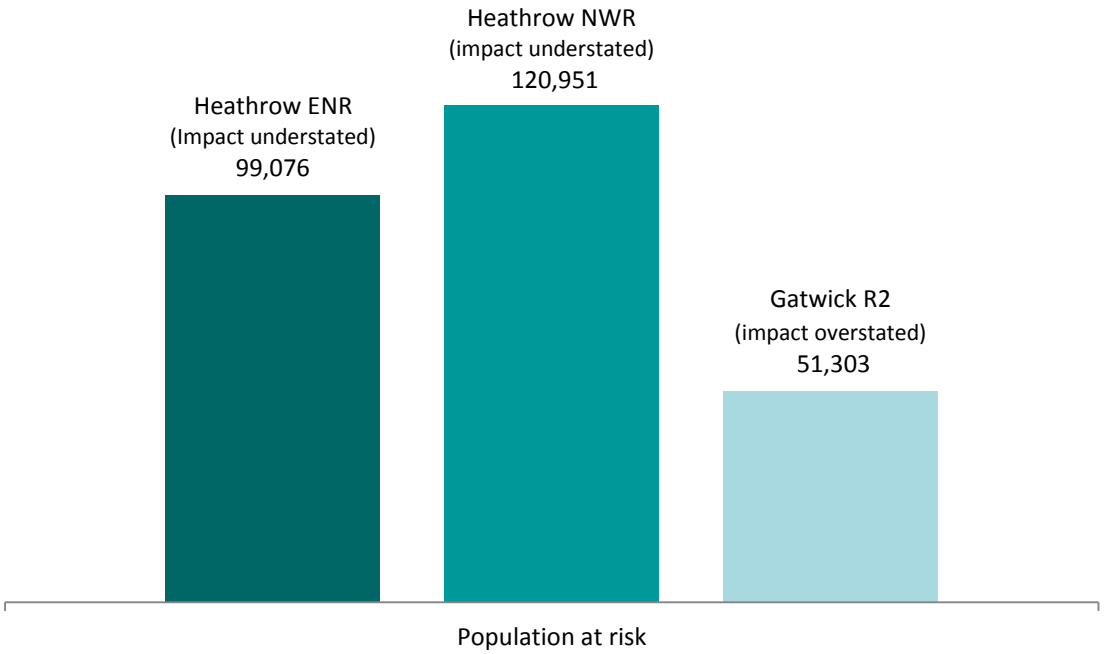
- We would mention also that the capacity of the roundabout at this junction is due to be increased soon as a result of another local permitted development and the Commission should confirm that this revised layout, which results in extra capacity and reduced congestion, has been modelled.

7.4 On the basis of the above, we have grave concerns about errors contained within the Commission's air quality assessment for Gatwick, upon which it may base its recommendation.

At Risk Properties and Populations – Tables 4.6

7.5 Table 4.6 shows 51,303 people affected by an increase in PM_{10} concentration of up to 2 $\mu g/m^3$, which is approximately half the comparable number of people similarly affected by Heathrow ENR, and much less than half the number of people similarly affected for Heathrow NWR (see Figure 7.1). This demonstrates that exposure is much lower in the Gatwick area than the Heathrow area for a pollutant for which population exposure should be minimised.

FIGURE 7.1: COMPARISON OF POPULATIONS AFFECTED BY CHANGE IN PM_{10} CONCENTRATION OF UP TO 2 $\mu g/m^3$ (SOURCE: JACOBS TABLES 4.6, 5.6, 6.6)



7.6 As a result of the model verification process used it is likely that the results presented in Table 4.6 and shown in Figure 7.1 have been overestimated for the Gatwick proposal and underestimated for Heathrow.

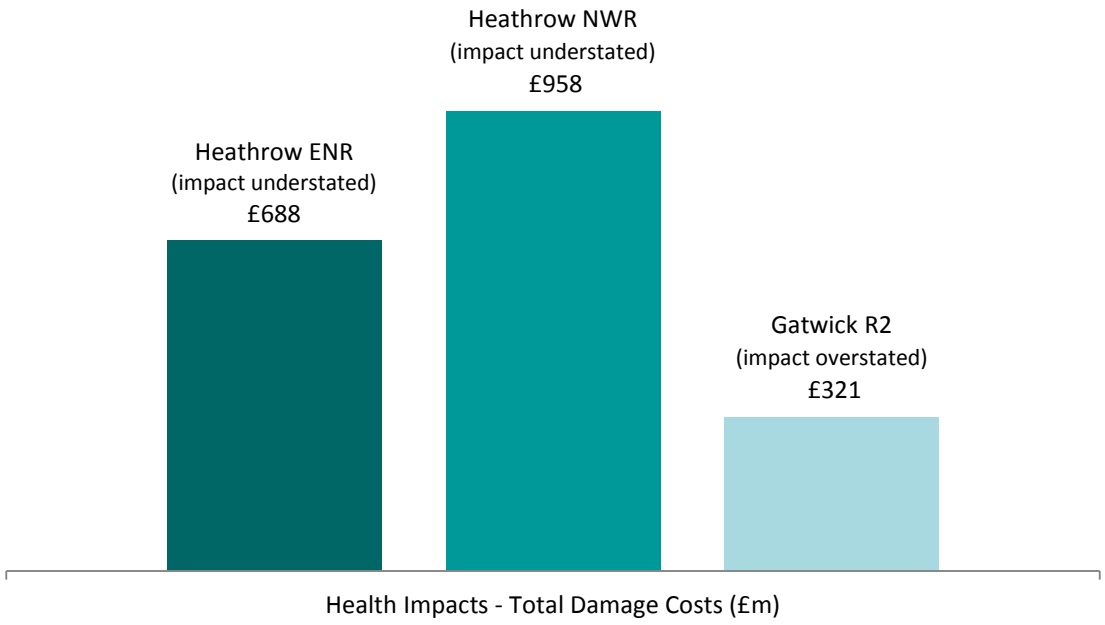
National Compliance – Table 4.7

7.7 The assessment of National Compliance with air quality Limit Values shows that the Gatwick scheme complies with the air quality Limit Values in 2030, with no exceedances.

Total Damage Costs – Table 4.8

7.8 Based on the foregoing analysis, the total damage costs in terms of health impacts and environmental damage are likely to have been overestimated for the Gatwick scheme. Using the approach adopted by the Commission report (Green Book Central Estimate), the total health related air quality damage cost for Gatwick is £321 million, which is half the equivalent damage cost for Heathrow ENR and one third of the equivalent damage cost of Heathrow NWR, as shown in Figure 7.2.

FIGURE 7.2: COMPARISON OF TOTAL DAMAGE COSTS
(SOURCE: JACOBS TABLES 4.8, 5.8, 6.8)



Monitoring site east of Gatwick

7.9 The Commission's Local Assessment (page 39) states that measured annual mean concentrations of NO_2 have generally been well within the Air Quality Objective, although a marginal exceedance (41.1 µg.m^{-3}) of the Air Quality Objective is said to have been recorded at the Gatwick East (CR1) site in 2014. The Commission is correct in stating that concentrations of NO_2 are generally well within the Air Quality Objective in the area. The data referred to as having been recorded at Gatwick East has not been ratified, is wholly at odds with long term trends at this site, and cannot be relied upon.

Mitigation

7.10 The Commission acknowledged in its November 2014 consultation, that there was sufficient road capacity to accommodate growth in road traffic from an expanded Gatwick Airport, through investment in the M25 and M23. At Heathrow however, the Commission concluded that in order to provide sufficient road capacity and to achieve compliance with the air quality limits, a congestion charge scheme was required.

7.11 A number of mitigation measures proposed by Gatwick in its submissions to the Commission have not been assessed. Had they been assessed the results would show that the adoption of these measures will mean that the headroom between ground level concentrations and the Limit Values will be even greater than the Commission has identified.

7.12 This would in turn affect the conclusions that Jacobs has reached in relation to the impacts of the Gatwick scheme on the number of at risk properties, population likely to be affected and total damage costs of health impacts related to air quality.

Effect on habitats

7.13 The Commission indicates that the effects on habitats of the Gatwick proposal are much lower than those predicted for Heathrow schemes. When applying the Habitats Regulations in any future DCO Examination or Hybrid Bill proceedings, there is therefore no material risk that the Gatwick scheme would not satisfy the regulatory requirements.

Section 8: Response to the Commission's questions

8.1 For the Commission's convenience, short form answers to the Commission consultation questions are given below. These should be read within the context of the remainder of the response to the consultation.

Q1: Conclusions in respect of the three short listed options

8.2 In our February 2015 response to the Commission's National Consultation we stated that the Consultation Document supports our view that Gatwick is the best overall choice for the site of new runway capacity in the South East for a number of reasons.

8.3 The consultation on the detailed Air Quality assessment not only reinforces this view in terms of the superior environmental performance of the Gatwick scheme over the Heathrow schemes, but more importantly demonstrates that the Gatwick scheme is the only viable scheme for expansion which clearly meets the UK legal limits on air quality.

8.4 Gatwick is therefore the only scheme on which a favourable recommendation can be accepted by Government at this time.

Q5: Comments on how the Commission has carried out its appraisal

8.5 For the reasons set out in the preceding sections, we have a number of very significant concerns about the way in which the assessment has been undertaken by Jacobs, and we have identified a number of fundamental weaknesses and omissions in the assessment. The overall effect of these weaknesses and omissions is to understate the air quality impacts of the Heathrow schemes and overstate the impacts of the Gatwick scheme.

8.6 Even so, the assessments confirm that the Gatwick scheme will meet the air quality standards and Limit Values in all circumstances.

8.7 The assessment of the Heathrow schemes is based on an optimistic approach that is not robust: an assessment based on a 2030 opening year; lower passenger and air traffic throughput than the Commission itself considers may occur; one that is based on assumed improvements to background conditions that recent history shows cannot be relied upon to materialise to the extent assumed; one that has omitted to assess key elements of the NWR scheme masterplan; and one that has failed to assess impacts during construction. Even on this basis, the assessment shows that both Heathrow schemes would at the very least cause delays to achieving compliance compared to the position if a Heathrow scheme did not come forward and would be unlawful.

8.8 Jacobs' assessment identifies a series of potential mitigation measures for the Heathrow schemes. Many will be included in the Air Quality Plan in any event and so will form part of the baseline for assessment. Some are not supported by Heathrow Airport Limited. Some are not feasible or enforceable. Many are unlikely to make any significant improvement in air quality at critical locations. No detailed appraisal has been undertaken as to the likely

reduction in concentrations that would be achieved in close proximity to the airport including at the critical locations. The Commission cannot safely rely on these mitigation measures in order to conclude that it will be lawful to construct and operate either Heathrow scheme.

8.9 The Government's forthcoming Air Quality Plan will, as required by the Supreme Court, put in place measures to achieve the Limit Value as soon as possible. Nevertheless it is not possible to know at this stage how quickly such improvements would occur, nor therefore what impact a third runway would have upon the timeframe for complying with standards that the plan will bring about. However, given the scale of current exceedances of air quality limits around Heathrow, it seems highly unlikely a Heathrow scheme could be constructed and operated without breach of the UK's obligation to meet the Limit Value as soon as possible.

8.10 There would be considerable damage to the UK if a scheme were recommended by the Commission which subsequently could not be brought forward due to air quality constraints. It has not been demonstrated that it will be lawful to construct and operate either of the Heathrow schemes. The Commission cannot safely recommend either Heathrow scheme.

Q6: Comments on the Commission's sustainability assessments

8.11 The Commission previously rated the Heathrow schemes as 'Significantly Adverse' and the Gatwick schemes as 'Adverse to Neutral'.

8.12 The detailed assessments of the Heathrow schemes show much greater adverse effects on air quality than the Gatwick scheme in terms of properties affected and when measured in terms of Total Damage Costs. The results of the assessment as it stands can only reinforce the earlier findings that Heathrow schemes are 'Significantly Adverse'. Indeed, the position is so adverse that it has not been established that either Heathrow scheme could lawfully be bought forward even on the basis of the current assessments of the Heathrow schemes, which are highly over-optimistic.

8.13 The Gatwick scheme gives rise to adverse impacts but these are limited, localised, and significantly lower than the equivalent findings for the Heathrow schemes, both in respect of human health and effects on habitats. Importantly there is no risk that the Gatwick scheme will cause any breaches of Limit Values or lead to delay in compliance with limits. In terms of Total Damage Costs the impacts of Gatwick scheme are one third of Heathrow NWR and a half of Heathrow ENR.

8.14 The critical point remains the fact that based on the current assessments, the Heathrow schemes cannot be lawfully progressed.

Q7: Comments on the Commission's business cases, including methodology and results

8.15 We provided an extensive response to the Commission's business case analysis in its February 2015 submission. Our comments can be found there in our answers to question 7 and our response to the Financial and Commercial cases can be found in our response to

Module 13. The comments that we set out below serve to reinforce points that we have made previously.

8.16 In summary, in their current form, the assessments confirm that the Gatwick scheme will meet the air quality requirements in all circumstances, but they do not support any such conclusion in respect of either of the Heathrow schemes.

8.17 On the evidence available both in relation to the work undertaken for the Commission and that undertaken by Gatwick, only Gatwick can meet the legal limit with certainty and only Gatwick could therefore be expected to be delivered in the timescale that the Commission has identified in its assessment of need. Conversely, neither of the Heathrow Schemes would meet the legal test for compliance with air quality Limit Values during construction and operation. The Heathrow schemes would therefore not deliver the benefits ascribed to them in the Commission's earlier analysis of business cases because they cannot lawfully come forward.

8.18 In our February 2015 submission we commented on the limitations of the Commission's risk assessment in a variety of different respects. It is now evident that the Commission should also take into account the risk that neither of the Heathrow options will be able to deliver the traffic and economic benefits projected, because of non-compliance with the air quality Limit Values and the consequential:

- inability to obtain policy support or to secure permission through the planning process (Development Consent Order or a Hybrid Bill);
- limitations that would have to be imposed through construction, further extending the construction programme and cost of either of the Heathrow schemes, which already present a high degree of risk in terms of overall cost and limited opportunity to phase; and
- restrictions that would have to be applied to the operation if an unduly optimistic view on air quality is taken earlier in its development, with the resultant adverse impact on levels of traffic, the airport charges that must be levied, and the increased stresses this would place on the ability to finance such a project.

8.19 We commented in February 2015 about the differences in the likely Economic Regulatory regimes at Heathrow and Gatwick and we expressed Gatwick's willingness to accept the majority of the risks associated with the project. We also noted the different approach for Heathrow where these risks are largely borne by the passenger and airline users. If the Commission were to recommend Heathrow and the Government were to accept that recommendation, not only is it highly likely that the long term interests of the UK would be damaged but the additional costs incurred (which could be very substantial) would be borne by the users.

8.20 There are additional financial risks to the Government in relation to any public transport schemes that are developed for the purpose of supporting a Heathrow option. No such risks are associated with a Gatwick option.

8.21 As it stands, particularly in relation to air quality risks, the Commission's business case assessment of the Heathrow schemes is not sufficiently robust to serve as a basis for a sound recommendation.

Section 9: Conclusions

9.1 In the event that the Commission decides to recommend the Gatwick scheme, such a recommendation could be made with confidence that the UK's legal requirements in relation to air quality will be met, as there is no significant risk of this scheme causing exceedance of Limit Values.

9.2 In relation to the Heathrow schemes, where there are currently multiple exceedances of Limit Values, on the evidence that is currently available (from Jacobs, DEFRA and Arup) such exceedances are expected to continue until 2030 at least.

9.3 On that basis, the following conclusions can be drawn:

- A Commission recommendation of either of the Heathrow options would be unreliable;
- It would be unlawful for the Government to support in policy either of the Heathrow options;
- It would be unlawful for either of the Heathrow options to be constructed or come into operation;

9.4 These problems could be overcome only if:

- substantial further work is carried out in order to remedy the weaknesses in the Commission's current air quality assessment;
- the impacts and feasibility of the mitigation measures proposed by Heathrow are fully and thoroughly assessed;
- the implications for a Heathrow scheme of the Government's new Air Quality Plan (and vice versa) are fully understood; and
- The outcome of further analysis demonstrated that a third runway at Heathrow could be constructed and operated without causing any re-exceedance or prolonging the period of non-compliance.

9.5 Assuming that the Commission will not wish to extend its activities (probably until at least early 2016) to carry out this further work based upon the implications of the Air Quality Plan, any Commission recommendation to Government in favour of a Heathrow scheme would need to be caveated in the light of the above.

9.6 Government support for any such recommendation would carry clear legal risks unless and until the necessary further work has been completed and found to provide reliable evidence that a Heathrow scheme can proceed in accordance with the relevant legal duties relating to air quality.

9.7 It is difficult to know how long this additional Heathrow work would take. It is clear that it could not be completed before the end of 2015. It seems likely that the European Commission would not be in a position to approve a new Air Quality Plan until around 2017. Further litigation could extend the timescales beyond that.

9.8 No such problems exist in relation to the Gatwick scheme.