Farnborough Airport

Airspace Change Proposal

Appendix F

Fuel/CO_2, Local Air Quality

Fuel and CO_2 calculation method

Air Quality Management Areas in the vicinity

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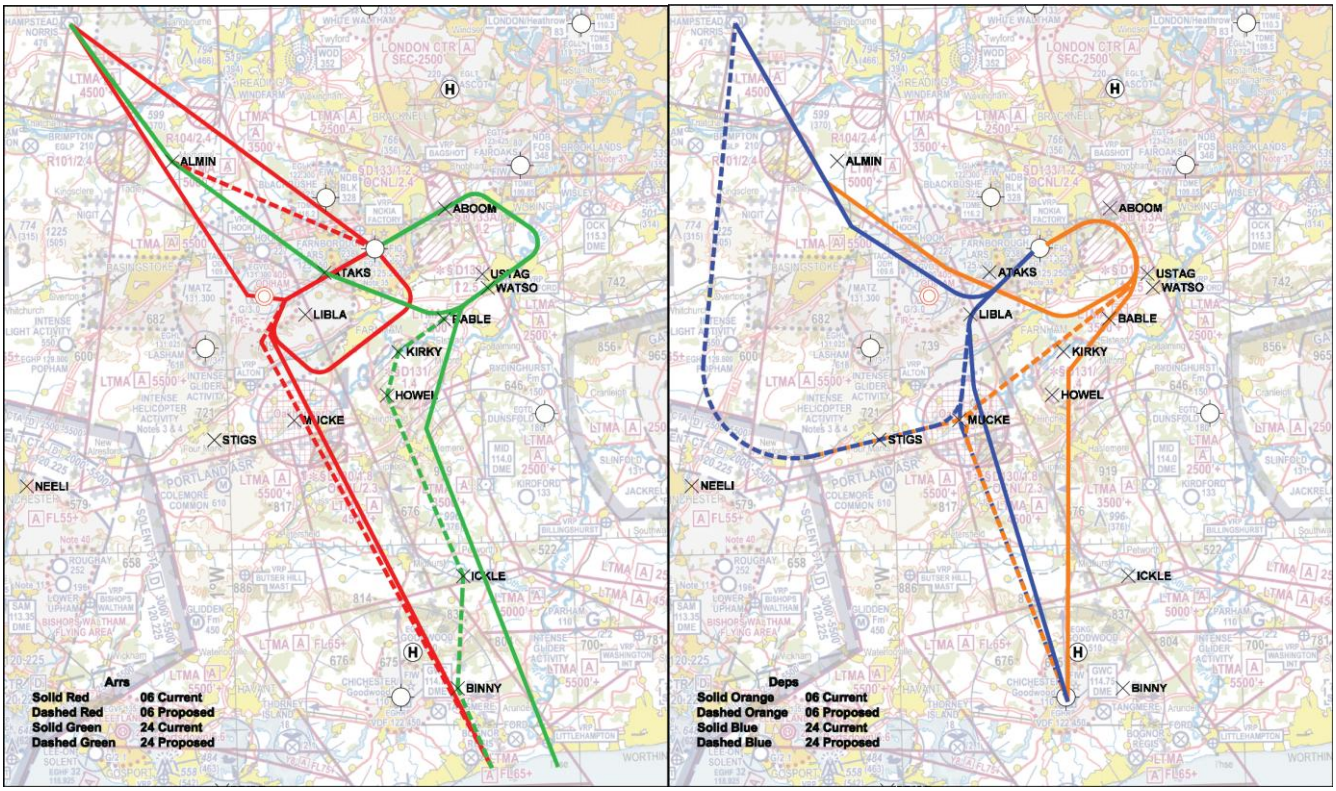
1. Fuel/CO_2 calculation method

Difference in typical track length

1.1. Typical tracks for arrivals and departures were selected, based on expert opinion and radar track plot data.

1.2. This was done for current typical tracks, and typical tracks based on the originally-consulted-upon routes.

1.3. The modified routes post-consultation are similar in length to the originals, so the original calculation stands as a reasonable analysis. This is described here.



Typical tracks

(Above left) Arrivals current/proposed Departures current/proposed (Above right)

1.4. The lengths of these tracks was compared between the runway and equivalent common airborne points.

Cruise altitude fuel use

1.5. The difference in lengths between current and proposed tracks is a measure of how much earlier or later a flight would reach cruise altitude.

1.6. The cruise altitude would be longer (more fuel efficient) or shorter (less so) for the same overall route, based on the efficiency of the arrival or departure.

1.7. In this proposal, most of the proposed arrival/departure tracks would be longer than current, making the cruise leg of the flight shorter, leading to a fuel/CO_2 disbenefit.

Forecast numbers of flights

1.8. The forecast numbers of flights were the "most typical" for 2015 (27,000pa) and 2019 (32,000pa) respectively.

Representative aircraft types and proportions

1.9. Eurocontrol BADA performance data and the NATS KERMIT fuel burn model was used to calculate kg fuel burn per nm in the cruise, for representative aircraft types.

1.10. Typically more than 75% of Farnborough flights are exec jets, but we used 75% as our base case, with 10% larger jets (B738/A320/BAe146) and 15% turboprops (BE200, PC12 etc) in order to provide a conservative figure.

1.11. We assumed a representative execjet type was an amalgamation of C550, F900 and Gulstream 4.

1.12. We assumed a representative large jet type was an amalgamation of B738, A321 and B462.

1.13. We assumed a representative turboprop type was an amalgamation of PA31, DH8D and SB20.

Final calculation

1.14. The excel sheet embedded in this PDF (see Attachments pane) provides all the calculation steps.

1.15. The calculations take account of the proportion of traffic using both runways (80% westerly, 20% easterly typically at Farnborough) because the track lengths are different depending on the runway in use.

1.16. The calculations take account of the proportions 75% Exec Jet / 10% Large Jet / 15% Turboprop described in para 1.10, where these are representative types.

1.17. The summary for this ACP is that more fuel would be used using this combination of conservative assumptions, where some tracks are longer.

Calculation	2015 most likely forecast	2019 most likely forecast
Total tonnes fuel	450	534
Total tonnes CO_2	1,432	1,697
Total cost of fuel assuming £400/tonne	£180,144	£213,504

2. Air Quality Management Areas

2.1. Excerpt from Feedback Report Part B page B9 paras 6.21-6.24:

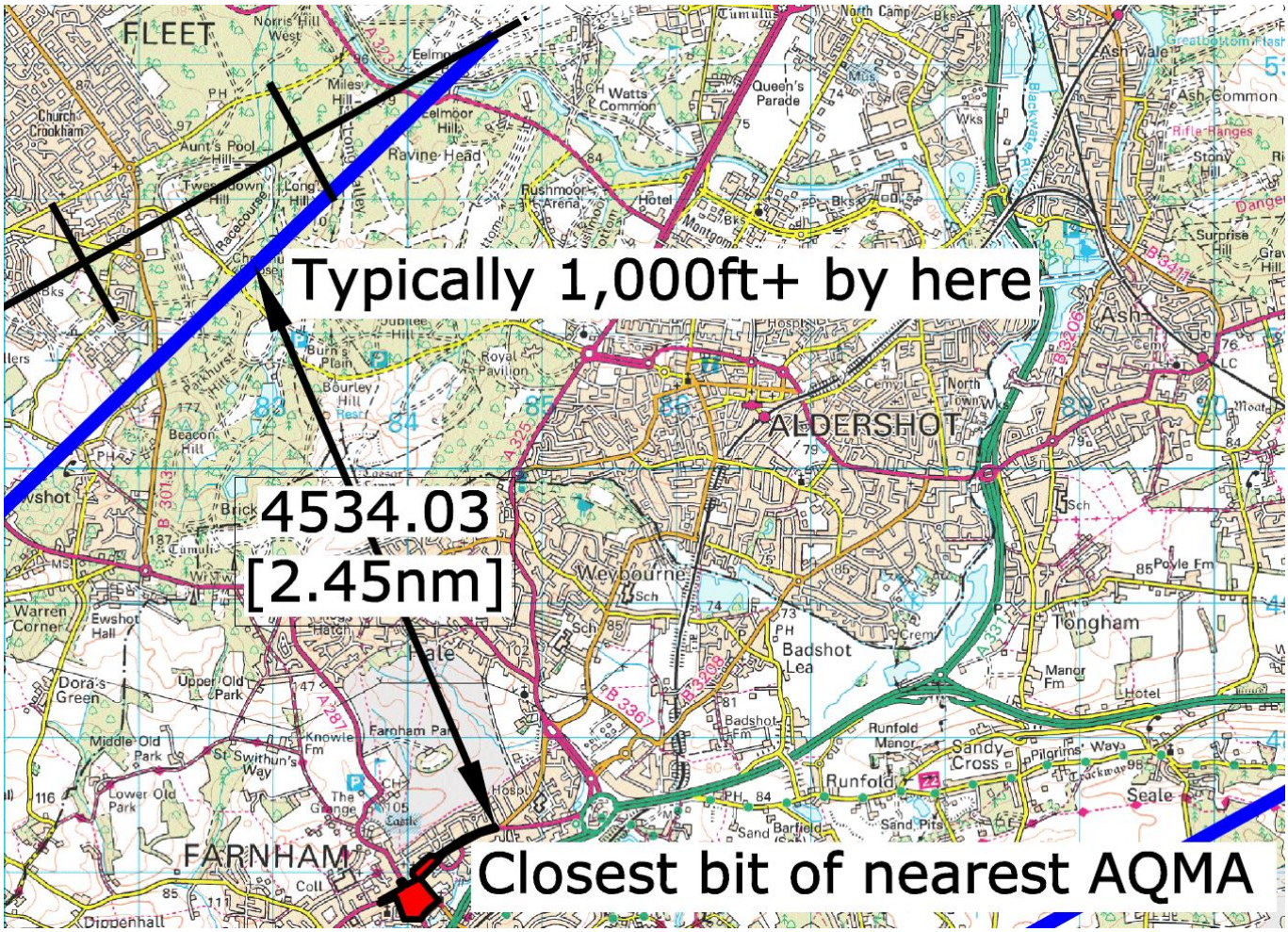
6.21 Government guidance on airspace change (Ref 1) states that, due to the effects of mixing and dispersion, emissions from aircraft above 1,000ft are unlikely to have a significant impact on local air quality.

6.22 The only change below 1,000ft in our proposal is the immediate left turn after take-off from Runway 24.

6.23 That turn, which is designed to occur when the aircraft passes 750ft, is specifically to turn away from the populated area of Church Crookham and towards the unpopulated Army training ground. Aircraft may well reach or exceed that altitude within the boundary of the airport itself.

6.24. We consider that this turn away from populated areas, combined with the altitude of the change, would have no noticeable impact on local air quality. There are no air quality management areas (AQMAs) in the vicinity of the airport that could be affected by this proposal.

2.2. The nearest AQMA is in Farnham, 2.4nm from the 1,000ft altitude point. Most aircraft are expected to exceed 1,000ft sooner than this point.



End of report