Airspace Change Proposal – Runway 33

Post Implementation Review

Submission 25th June 2021 – v2

Contents

Introduction

Birmingham Airport Limited (BAL) is required to commence a Post Implementation Review (PIR) of the Airspace Change for the introduction of new Standard Instrument Departure routes (SIDs) from Runway 33, which were approved by the Civil Aviation Authority (CAA) on 22nd February 2019.

The purpose of the PIR is to assess and validate the success of an airspace arrangement. This involves the identification of any operational issues and reviewing whether the airspace change has delivered the expected impacts and benefits. In light of that assessment, the review should consider whether it may be necessary to bring about any subsequent refinements to the subject airspace and to the Air Traffic Control (ATC) patterns and procedures within it.

The PIR process requires the change sponsor, (BAL) to gather the data necessary for the CAA to carry out the review.

Normally, the PIR process would examine data for a 1-year period following the implementation of the new procedures, which in this case was on 23rd May 2019. However, Birmingham has, in line with other UK Airports, experienced a substantial reduction in traffic due to COVID-19 and was further impacted by the collapse of Flybe on 5th March 2019, which resulted in an additional reduction in traffic using the airport. Notwithstanding these factors, BAL has been collecting data on a continuous basis since the implementation of the change and has a robust data set from 26 May 2019 to 5 March 2020 i.e. a period of 9 months, which it believes is sufficient to carry out an assessment of the change and to enable the CAA to consider whether the anticipated impact and benefits of the change have been delivered.

The CAA states in its guidance “Where an ACP has been implemented and more than 9 months PIR data collection has been achieved up to the 27th February 2020, the CAA may decide it has sufficient data to conduct the PIR review. Where a change sponsor considers that they have such data, they should contact the CAA Airspace Regulation team to determine if this data is sufficient for the PIR review to take place”.

Importantly, BAL’s 9-month data set includes the peak summer period, enabling it to produce LAeq noise contours for the summer period, which can be compared with the data set provided for the consultation process. The CAA agreed with this assessment and on 4th May 2020 set out its information requirements to BAL, which are the subject of this report.

PIR Requirements

1. An overview of whether the proposal has met the intended objectives of the ACP.

2. Details of the volume of traffic utilising the new SIDs, broken down by procedure – this should include commentary on any significant meteorological impacts, as well as changes to the fleet mix, if applicable.

3. All feedback received from airspace users (whether directly or through other forums).

4. Collated stakeholder observations (enquiry/complaint data) – any location/area from where more than 10 individuals have made enquiries/complaints must be plotted on separate maps/charts displaying a representative sample of:

    - aircraft track data plots; and
    - traffic density plots;
    - The plots should include a typical days-worth of movements from the last month of each standard calendar quarter (March, June, September, December) from each of the years directly preceding and following implementation of the airspace change proposal. The plots should also detail the new NPR centrelines and swathes;

5. Any safety-related reports generated as a result of the implementation of the new procedures or other safety-related issues identified.

6. Any issues identified with the publication of the procedures and any associated information in the UK AIP.

7. Updated LAeq contours to allow direct comparison with those used within the ACP (contour figures, area exposed, population counts, household counts and noise sensitive receptors).

8. Updated night-time SEL footprints to allow direct comparison with those used within the ACP (contour figures, area exposed, population counts, household counts and noise sensitive receptors).

9. A statement regarding track performance on the NPRs.

10. Updated fuel burn and CO_2 impacts on an annual basis and per flight basis.

11. A confirmation statement that the local air quality and tranquillity assessment conclusions remain valid (if this is the case).

12. A statement on movement numbers compared with the forecasts underpinning the ACP assessments.

13. In accordance with the condition specified in the decision, a specific examination of the impact on both Castle Bromwich and Curdworth in relation to the information detailed above, compared with the anticipated impact described in the consultation and the final proposal.

An overview of whether the proposal has met the intended objectives of the ACP

The changes to the flightpaths at Birmingham Airport were driven by the CAA's Airspace Modernisation Strategy (AMS), formerly known as the Future Airspace Strategy (FAS). Specifically, there were two elements of airspace modernisation which BAL considered.

Firstly, flightpaths at Birmingham were based on a system known as 'VHF Omni Directional Radio Range' (VOR). This enables aircraft to fix their position and stay on course by receiving radio signals transmitted by a network of fixed ground radio beacons. This technology has been in use for decades but is being superseded by more accurate satellite-based navigation. Consequently, there were plans for some of the radio beacons, which are owned and operated by NATS, the UK's main air service navigation provider, to be withdrawn from service from 2018. Therefore, new flightpaths were required to align to the latest technology standard RNAV (Precision based Navigation).

Secondly, as part of the Future Airspace Strategy, there were plans to redesign UK airspace to the north of Birmingham in a project known as the Prestwick Lower Airspace Systemisation (PLAS). BAL's contribution to ensuring the success of this project was to design new flightpaths for aircraft departing Birmingham for destinations to the north that would fit with the requirements of the PLAS project.

Although the COVID-19 pandemic has resulted in some delay in the progression of the AMS and the VOR withdrawal programme, the change remains appropriate as this work has been remobilised following the announcement of £5.5 million of Government funding in March 2021. Therefore, BAL believes the proposal has met the intended objectives of the ACP since its SIDs no longer rely on VORs and are now compatible with the original high-level plans for the PLAS project.

Volume of traffic utilising the new SIDs, broken down by procedure – this should include commentary on any significant MET impacts, as well as changes to the fleet mix, if applicable

Traffic numbers and route utilisation has been exported from Birmingham Airport's Noise and Track-keeping System (ANOMS 8) for the period 23rd May 2019 to 5th March 2020.

Traffic broken down by procedure between the period: 23rd May 2019 up until 5th March 2020

SID name during consultation	SID name post consultation	Total number of movements
MOSUN	UMLUX1	557
BIMBA	LUVUM1	5539
SOUTHBOUND	ADMEX1	9239
	UNGAP1	5582

(Changes in the fleet mix are covered within section 12).

All feedback received from airspace users (whether directly or through other forums)

No feedback has been received from airspace users.

Collated Stakeholder Feedback

During the post-implementation period 23rd May 2019 to 5th March 2020 (inclusive), a total of 1773 noise complaints were received. The CAA requested that areas that have generated complaints from more than 10 individuals should be highlighted and that collated stakeholder observations should also be plotted on separate maps displaying a representative sample of:

- aircraft track data plots; and
- traffic density plots;
- The plots should include a typical days-worth of movements from the last month of each standard calendar quarter (March, June, September, December) from each of the years directly preceding and following implementation of the airspace change proposal. The plots should also detail the new NPR centrelines and swathes;

These charts can be found in Appendix A.

Areas with 10 or more individuals complaining	**No of people**	**No of events**
Balsall Common	15	61
Castle Bromwich	17	289
Sheldon	10	23

Balsall Common and Sheldon were unaffected by this ACP. Therefore, the only area of relevance to the ACP is Castle Bromwich, whose population at the time of the 2011 census was recorded as 11,217. During the PIR period, complaints from 17 individuals living in Castle Bromwich were received. 88% of these complaints came from 2 individuals.

In addition to managing complaints, BAL also engaged with communities proactively via various forums and a summary of this engagement is provided below.

<u>Castle Bromwich</u>
Meetings were held with the Castle Bromwich Airport Forum (CBAF) on 5th July 2019 and 20th January 2020. At the latter meeting, BAL presented the preliminary findings of its noise studies at a location in Castle Bromwich which had been identified in conjunction with CBAF. The impact of the pandemic has precluded further meetings, but BAL contacted CBAF on 5th May 2021 to advise that the PIR process is underway and to suggest a meeting would be beneficial to resume dialogue. The group has advised it will respond following internal discussions.

<u>Curdworth</u>
BAL received complaints from a resident of Curdworth and contacted Cudworth Parish Council to understand the extent to which it had received complaints from other residents. Anecdotally, it was suggested that several residents had concerns. In response, BAL issued a Curdworth-specific document in its 'Focus On' series, which explain aircraft operations in detail for particular localities. The document is posted on the airport website and stakeholders were

advised that it was available in October 2020. BAL also made an offer to present 'virtually' at a meeting of Curdworth Parish Council and agreed to the option of providing public access and to take questions. The Council felt a 'virtual' presentation of this sort would exclude members of the community without access to technology and suggested that it would prefer a public meeting. To date this has not proved possible owing to Covid restrictions. BAL also requested the Council might collate questions coming from concerned residents to enable it to identify and respond to the major concerns (at a time of reduced staff resource) more efficiently. The Council did not feel it had the capacity to undertake this.

North Warwickshire

A meeting was held on 22nd January 2020 with residents of Nether Whitacre who had expressed concerns over perceived changes to aircraft tracks post implementation. In particular, residents reported disturbance from A380 operations. The meeting considered eight A380 operations in detail and concluded that each was operating within the revised NPR.

BAL has also been in correspondence with North Warwickshire MP, Craig Tracey, and has provided clarifications and track data as requested.

Any safety-related reports generated as a result of the implementation of the new procedures or other safety-related issues identified

Five Mandatory Occurrence Reports (MORs) have been filed due to a naming confusion between ADMEX/UMLUX SIDs, which resulted in aircraft flying the wrong SID. Birmingham Airport Air Traffic Limited's ANS ATC Pilot Brief has been updated to make pilots aware of the similarity of wording and sounding of ADMEX 1M and UMLUX 1M departures. Pilots are now required to double check the clearance issued by ATC against the filed flight plan. This will continue to be monitored and reviewed by BAL as traffic grows following the pandemic, if it continues to be a trend appropriate action will be taken.

Any issues identified with the publication of the procedures and any associated information in the UK AIP

No direct issues were experienced with the publication of procedures or any associated information in the UK AIP.

Updated LAeq contours to allow direct comparison with those used within the ACP (contour figures, area exposed, population counts, household counts and noise sensitive receptors)

At the time of consultation, BALs intention was that the proposed procedures would be in operation during 2018 and as such it commissioned and published forecast summer noise contours for this period. However, the procedures did not become effective until 23rd May 2019 and therefore the "actual" contours for summer 2019 are compared to the "proposed" contours published for 2018.

This comparison has shown that, despite there being slightly more aircraft (904 movements) in 2019 when compared to 2018 the size of the contours and the population affected is smaller than that forecast in each of the noise contour bands.

2019 $L_{Aeq, 16hr}$ day compared with 2018 $L_{Aeq, 16hr}$ day						
Contours Level dB(A)	2019			2018 (Proposed)		
	Area (km2)	Population	Households	Area (km2)	Population	Households
>54	**24.5**	**41,300**	**16,600**	27.9	47,700	19,900
>57	**14.0**	**20,600**	**8,300**	15.9	24,900	10,400
>60	**7.4**	**7,400**	**3,000**	8.6	9,300	4,000
>63	**3.9**	**1,900**	**800**	4.6	2,500	1,100
>66	**2.1**	**<100**	**<100**	2.6	200	100
>69	**1.2**	**0**	**0**	1.5	0	0
>72	**0.7**	**0**	**0**	0.9	0	0

Analysis has shown that the reasons for this are two-fold.

Firstly, at the time that the forecast contours were commissioned, Monarch Airlines was still active at Birmingham, operating a fleet of older generation A321 aircraft, which had a larger noise footprint. After Monarch's failure, this fleet was primarily replaced by airlines operating B737 NG aircraft, which are typically quieter than the A321.

Secondly, BAL is aware that the CAA's Environmental Research and Consultancy Department (ERCD) improved the modelling of the flight profiles of B737 aircraft when producing the 2019 contours. This improvement better reflects the de-rated thrust used for B738 departures at Birmingham, meaning that the contours become narrower around the runway when compared to those of previous years.

A comparison of the LAeq contours is contained within Appendix B.

Updated night-time SEL footprints to allow direct comparison with those used within the ACP (contour figures, area exposed, population counts, household counts and noise sensitive receptors)

SEL footprints have not been reproduced for this exercise. This is because the mean tracks very closely replicate the SID centrelines that were modelled as part of the original assessment and provided as part of the consultation exercise. Furthermore, the aircraft profiles flown following the implementation of the procedures are in line with that anticipated and for this reason we believe that the SEL contours produced remain valid.

In addition, due to changes in the fleet mix at Birmingham Airport since the SEL contours were produced, both the most frequently operated and the noisiest aircraft types have now changed. These changes are not linked to the airspace change but the result is that it is not possible to make a direct comparison with the SEL footprints used in the ACP due to this change in aircraft types.

A statement regarding track performance on the Noise Preferential Routes (NPRs)

Overall track-keeping performance during the period 23rd May 2019 to 5th March 2020 (inclusive) was 99.97%. As can be seen from the charts within Appendix A, the tracks are wholly contained within the NPRs. It can also be seen that the tracks very closely replicate the Standard Instrument Departure (SID) centrelines, as predicted at the time of the consultation. BAL concludes that the performance meets the objectives of the design criteria and the anticipated impact described in the consultation and the final proposal.

Updated fuel burn and CO_2 impacts on an annual basis and per flight basis

When BAL commissioned the CO_2 impacts assessment for the proposed procedures the methodology was based on the following:

- For each route (SID) aircraft types were grouped into categories with comparable fuel burn rates and the most frequently operated type within each group was modelled for analysis.
- Each aircraft type was modelled along the relevant route, conforming to the tracks and vertical restrictions as instructed by the SID plate.
- Where proposed routes did not join up with current routes at the end of the SID (either horizontally or vertically), both routes were extended such that a common end point could be achieved.
- No vertical restrictions were modelled beyond the end of the SID designs and where applicable, jet aircraft were assumed to cruise to Flight Level (FL) 370 and turboprops to FL250.
- Ratio of fuel burn to CO_2 was 3.18 kg of CO_2 to every 1 kilogram of fuel (1:3.18)

BAL believes that the assumptions used when the initial modelling was carried out were delivered through the airspace change and therefore there is no need to carry out further modelling. The reasoning for this is as follows.

<u>For each route (SID) aircraft types were grouped into categories with comparable fuel burn rates and the most frequently operated type within each group was modelled for analysis</u>

Whilst the definition used to determine the aircraft groups is not stated, all of the aircraft modelled (apart from the JS41 and E120) were still in operation at Birmingham Airport at the year of implementation (2019). Furthermore, the changes to the SIDs did not contribute to any changes in either fleet mix or the number of movements at the Airport. Therefore, BAL believes that the modelling remains valid and does not need to be recommissioned.

<u>Each aircraft type was modelled along the relevant route conforming to the tracks and vertical restrictions as instructed by the SID plate</u>

There were no further changes made to the SIDs vertical profile after the original modelling exercise was carried out. There was one minor change to the nominal SID centreline (on the southbound flightpath) which moved the centreline by approximately 0.4 km. This change can be seen in Appendix D. BAL believes that this will have no material impact on the assessment, particularly as there is a degree of dispersion on the turn and that the original assumptions therefore remain valid.

Where proposed routes did not join up with current routes at the end of the SID (either horizontally or vertically), both routes were extended such that a common end point could be achieved.

This remains unchanged and therefore BAL believes that this assumption is still valid.

No vertical restrictions were modelled beyond the end of the SID designs and where applicable, jet aircraft were assumed to cruise to Flight Level (FL) 370 and turboprops to FL250

This remains unchanged and therefore BAL believes that this assumption is still valid.

Ratio of fuel burn to CO_2 was 3.18 kg of CO_2 per every 1 kilogram of fuel (1:3.18)

This remains unchanged and therefore BAL believes that this assumption is still valid.

A confirmation statement that the local air quality and tranquillity assessment conclusions remain valid (if this is the case)

The original consultation document explained that in the early stages of an aircraft's departure from the Airport, the proposed flightpaths would precisely replicate the existing ones. The point at which any change occurred would be above 1000 feet in attitude. It is therefore assumed that there will be no change to local air quality as a result of the proposed changes to flightpaths.

There is a dedicated Air Quality Monitoring Station (AQMS) located on the airport. The AQMS consistently records pollution levels below legal limits and there has been no increase in recorded pollution events since the flightpath changes were implemented. All of the data from the AQMS is publicly available at the link below.

Birmingham Airport 2 Latest Data - Air Quality monitoring service (airqualityengland.co.uk)

The consultation document also stated that BAL did not believe that the proposed changes would have a significant effect on tranquillity or visual intrusion. Indeed, with the removal of the Whitegate flightpath, the airspace change removed two SSSIs and a National Nature Reserve from the beneath the flightpaths. This was achieved in accordance with expectations and could be argued as delivering a benefit.

BAL believes the statements above remain valid, since the mean tracks very closely replicate the SID centrelines that were modelled as part of the original assessment and provided as part of the consultation exercise.

A statement on movement numbers compared with the forecasts underpinning the ACP assessments

When preparing the assessments for the ACP, forecast movements for the period coincidental with the production of noise contours were used i.e. 16th June to 15th September inclusive. Movements during this period were then forecast for 2018 (the planned year of introduction) and for 2023. The new flightpaths did not become effective until 2019 and it is therefore

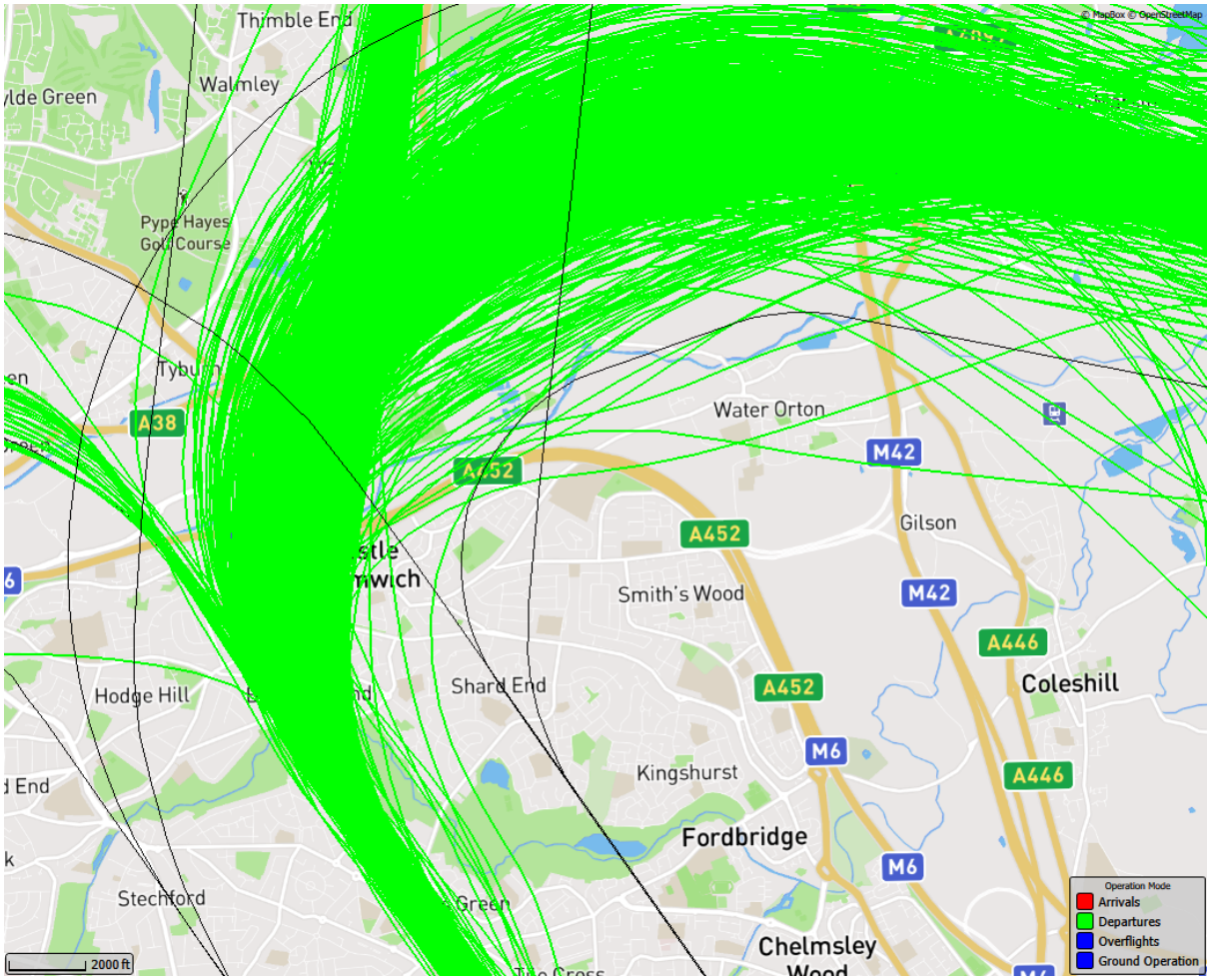
proposed that the most accurate comparison would be between the forecast data for 2018 and the actual data from 2019, the year of implementation.

The number of movements in the forecast year (30,630) are broadly comparable with the actual number of movements in 2019 (31,534). There has however been a change in aircraft types operating at Birmingham, most notably following the collapse of Monarch Airlines. Monarch Airlines operated a fleet of older A320 series aircraft. Many of the routes they operated were taken on by airlines primarily operating B737 NG aircraft, which have a comparatively smaller noise footprint. This is reflected in the table in Appendix C which shows that in 2018, there were forecast to be 5,110 A320/A321 aircraft movements, but in 2019 there were actually just 2,625. By way of comparison, in 2018 it was forecast that there would be 7,211 B737-800 series aircraft operating whereas in reality, 2019 saw 9,837 movements by aircraft type of this type.

In accordance with the condition specified in the decision, a specific examination of the impact on both Castle Bromwich and Curdworth in relation to the information detailed above, compared with the anticipated impact described in the consultation and the final proposal.

Castle Bromwich

The Castle Bromwich Ward lies partially within the NPRs as proposed within the consultation and close to the centrelines of the SIDs a fact which was highlighted and explained during the consultation. Aircraft have performed within the NPR as anticipated, as can be seen in the image on the following page, which displays tracks between 1st to 8th September 2019.

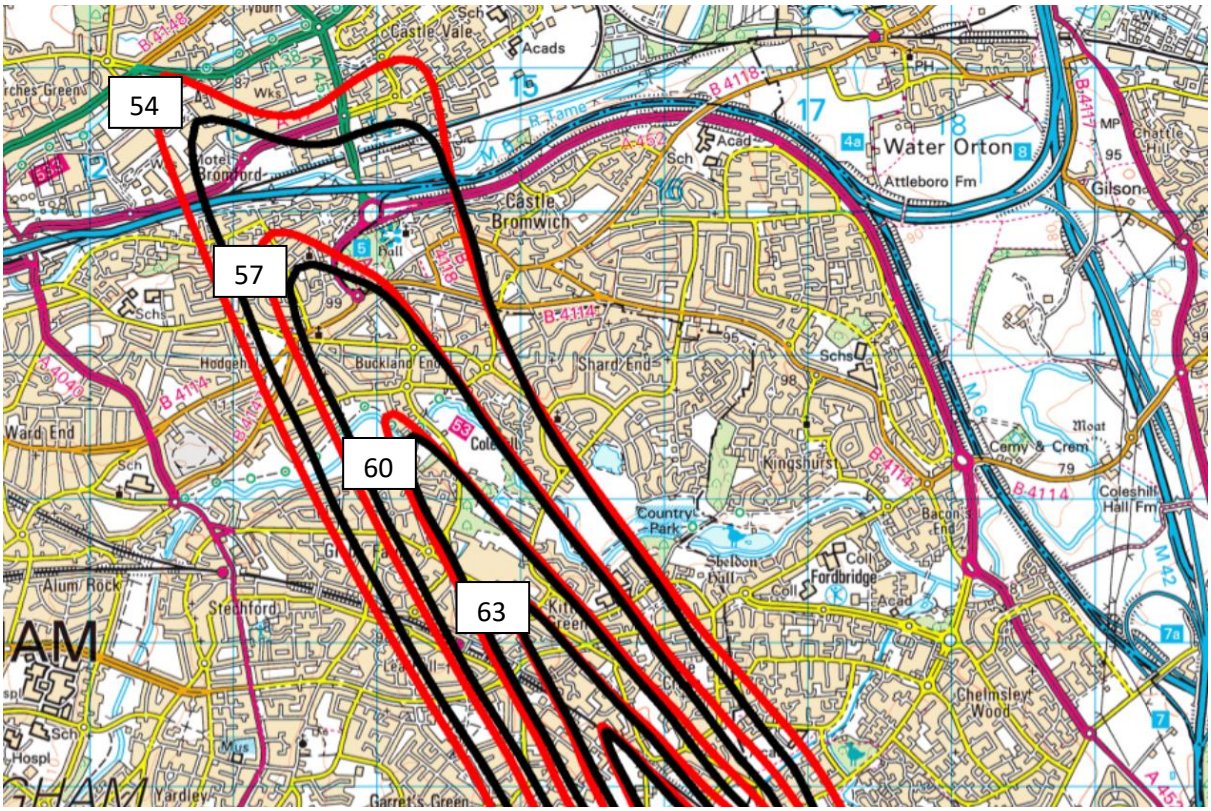


Key:

= Noise Preferential Route

= Aircraft Track

Furthermore, when comparing the predicted noise footprint in 2018 to actual noise footprint from 2019, it can be seen that the two closely align. BAL therefore believes the noise impact in Castle Bromwich is in line with that consulted upon. This alignment can be seen in the image below.



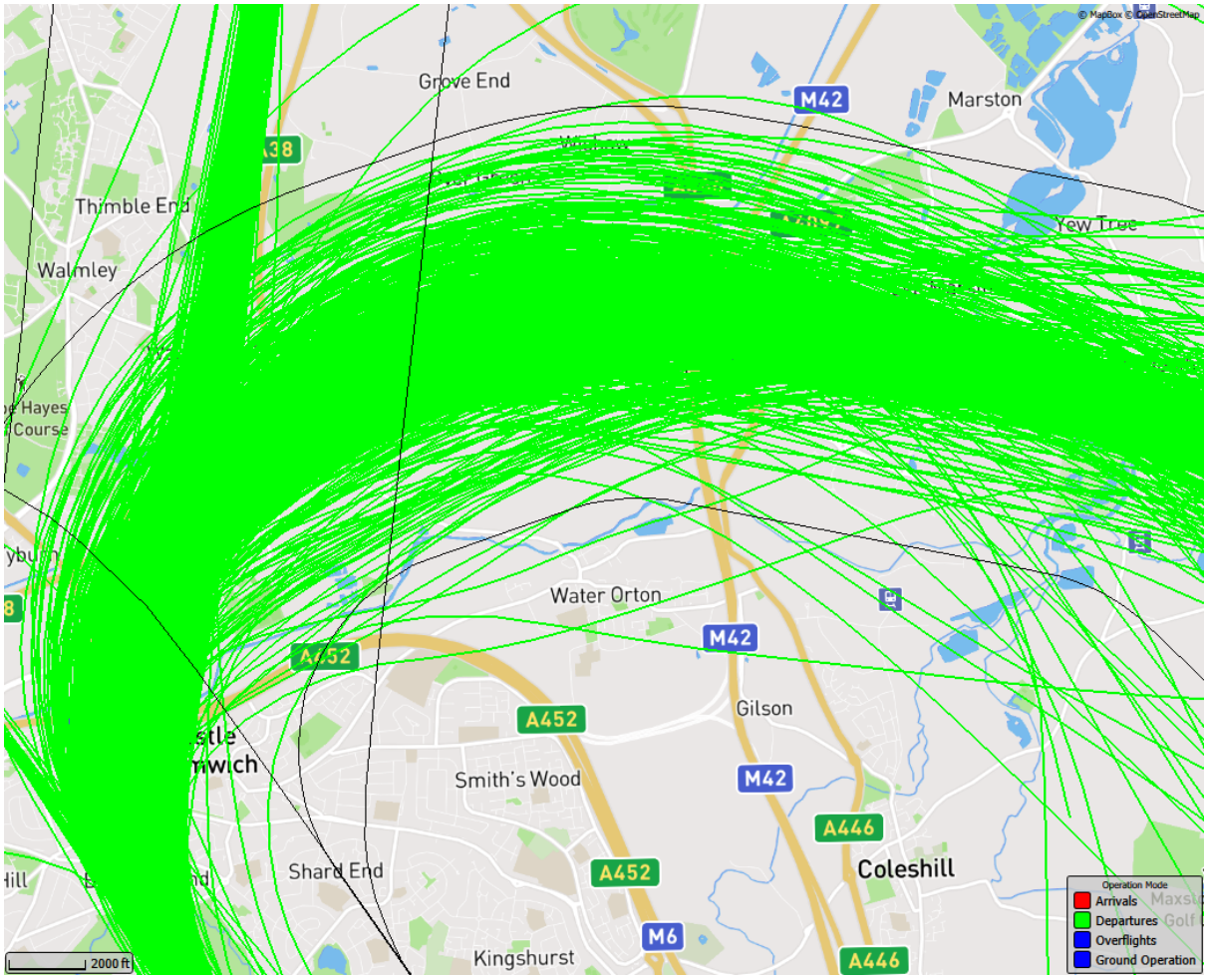
Key:

= 2018 forecast noise contour

= 2019 actual noise contour

Curdworth

The community of Curdworth lies within the NPRs as proposed within the consultation a fact which was highlighted and explained during the consultation. Aircraft have operated within the NPR as anticipated. This is shown in the image below.

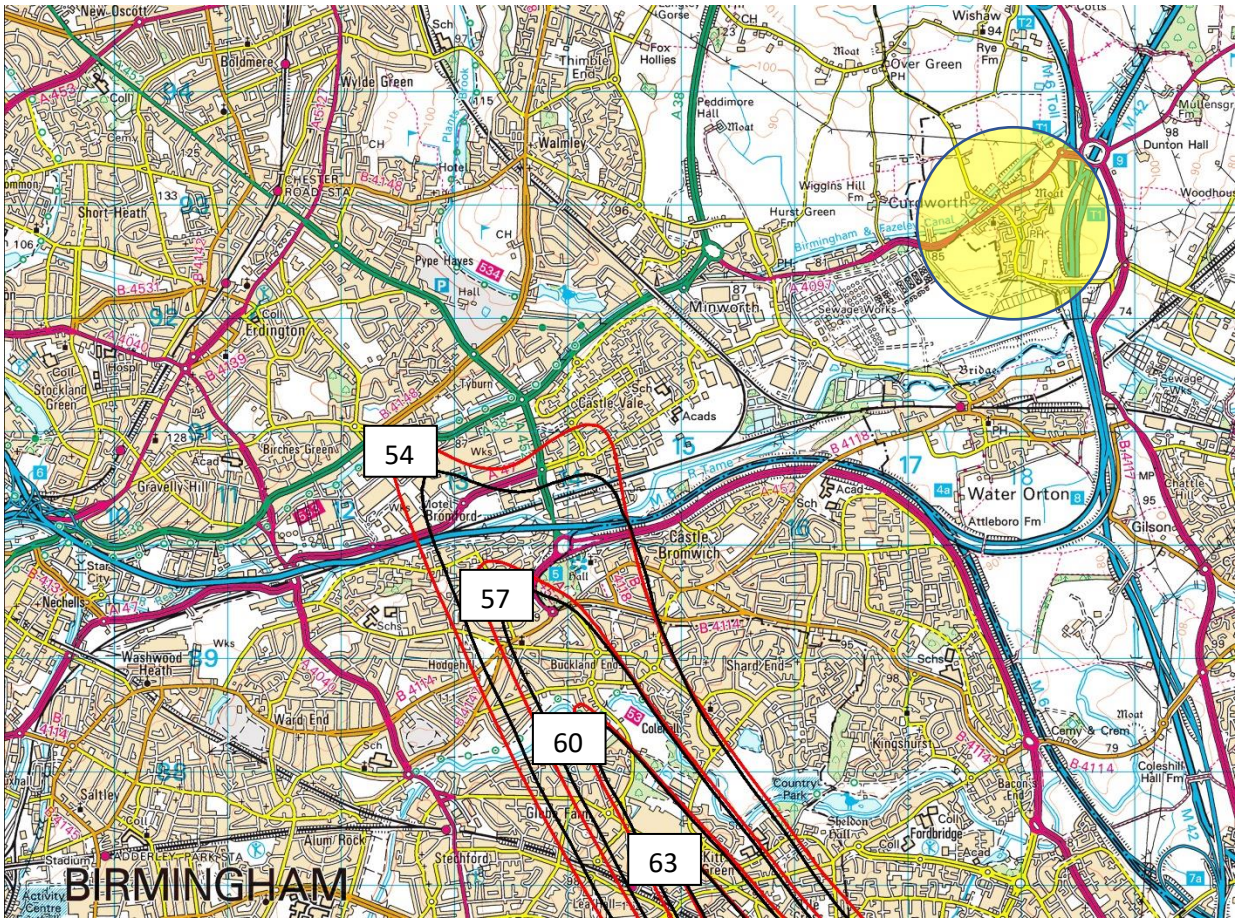


Key:

= Noise Preferential Route

= Aircraft Track

Curdworth is situated outside of the noise contour boundaries and therefore it is not possible to compare the modelled noise impact in the same way as it has been for Castle Bromwich. However, for completeness the location of Curdworth in relation to the noise contours is shown below.



Key:

= 2018 forecast noise contour

= 2019 actual noise contour

Appendix A – Track and density images

Appendix B – Noise contour comparison

Appendix C – Fleet mix

Appendix D – Minor change to nominal SID centreline