

# Airspace Change Proposal – Runway 15

**Post Implementation Review** 

## Introduction

Birmingham Airport Limited (BAL) is required to commence the process of a Post Implementation Review (PIR). This is required to commence one year after implementation of the Airspace Change for the introduction of new Standard Instrument Departure routes (SIDs) from Runway 15, which the CAA approved on 6<sup>th</sup> April 2016.

The purpose of the PIR is to assess and validate the success of an airspace arrangement and to identify any operational issues, review whether the airspace change has delivered the expected impacts and benefits, and in the light of that assessment to consider whether it may be necessary to bring about any subsequent refinements to the subject airspace and the ATC patterns and procedures within it.

The PIR process requires the change sponsor to gather the data necessary for the CAA to carry out the review. On 7<sup>th</sup> April 2017 the CAA set out its information requirements to BAL and these are the subject of this report.

## **PIR Requirements**

The CAA has considered what specific data the CAA needs in order to carry out this PIR and this is identified below:

- 1. Provide an update on the progress made on the following:
- a) Investigating further possibilities for noise reduction including the potential implementation of a 3.2° glide slope to runway 33 (and runway 15) which could potentially take aircraft closer to the height they were on approach prior to the runway extension over the communities of Balsall Common and Balsall Street East.
- b) Reviewing the airport's Noise Abatement Procedures to identify and implement the most appropriate procedure to minimise the noise impact on the community of Barston and also other communities impacted by departing aircraft from both runway 15 and runway 33
- 2. Traffic Numbers

Traffic numbers since 2012, broken down each year as follows:

- Total movements
- Total departures
- Total departures from R15 (all SIDs)
- Total departures from R15 (using the southbound SIDs)
- 3. Fleet Mix

An annual summary of fleet mix of aircraft using the airport from 2012.

### 4. Analysis of feedback

Analysis and summary of complaints/feedback during the 12-month post-implementation period. Breakdown by:

- Number of separate complaints/feedback
- Number of individual correspondents (based on email address or postal address)
- Themes of feedback
- Location based on postcode where possible

A geographical representation of the complaints/feedback should also be provided, illustrating the respective volume of complaints by location.

### 5. Operational Diagrams

- a) Operational diagrams that illustrate the pre-implementation traffic patterns (i.e. pre-trial, using the previous conventional SIDs) and compare them with the post-implementation traffic patterns. As far as possible, pre-implementation and post-implementation sample periods should be comparable in terms of dates and flight numbers. The diagrams should reflect representative periods, e.g. June, September, December, March, or one week from each month.
- b) Diagrams should be in a similar format to those presented as part of the original airspace change proposal, so that direct comparisons can be made.
- Traffic patterns up to 7000ft should be portrayed.
- Track dispersion diagrams that illustrate the radar tracks one set that show tracks up to 4000ft and a second set to show tracks from 4000ft to 7000ft.
- Track density diagrams ("heat plots") that illustrate the concentration of traffic patterns.

#### 6. Raw Data

Raw radar data (RAD file format) for June-September 2016.

The CAA also needs to see feedback from the regular operators concerning flyability of the SIDs. We therefore ask that you provide feedback from the members of the FLOPSC and/or any other appropriate fora.

Please could you provide us with details of your stakeholder feedback collection mechanisms and also a link to your consultation portal or website, if used.

After the CAA completes the PIR assessment, we will publish our conclusions on our website. Therefore please ensure that all diagrams you provide are labelled appropriately with periods of traffic samples and numbers of flights, as well, of course, with any detail which is appropriate to explain the diagram.

Should you consider that any data should not be published due to commercial sensitivity, please provide an additional redacted copy that you are content to be published for our consideration.

#### PIR Submission deadline:

Submission deadline: July 7<sup>th</sup> 2017

## 1. Update on conditions attached to the decision

### Condition 2 Investigate 3.2 degree glide scope

BAL has become an active member of Sustainable Aviation's Operations Improvement Working Group and Noise Working Group. Steeper approaches and specifically the 3.2 degree glide scope trial at London Heathrow (LHR) is a key topic for both groups and BAL remains actively engaged. BAL understands that a further trial is being carried out at LHR this summer and has committed to reviewing the results and assessing whether or not it is feasible to implement at Birmingham.

### **Condition 3 Review Noise Abatement Procedures**

BAL commissioned a study into Noise Abatement Departure Procedures (NADP) in order to understand if their use could bring a benefit to neighbouring communities. In summary, we reviewed the two noise abatement departure procedures developed by ICAO known as NADP-1 and NADP-2 which bring differing benefits to communities surrounding the Airport. NADP-1 brings a benefit to communities close in to an airport whilst NADP-2 brings a benefit to communities further out.

The investigation at Birmingham found that approximately 85% of all departures currently use the NADP-2 procedure. The study showed that NADP-2 brings benefits to those communities further from the Airport and NADP-1 brings benefits closer in. Due to the substantial urban conurbations that lie directly at the end of runway 33, the study revealed that the use of NADP-1 could bring a substantial benefit to communities closer to the Airport where noise levels are higher. The study found that the use of NADP-1 could reduce the number of people within the 57dB(A) contour by circa 5,900 people (25%). However, it should be noted that this decrease in affected population is entirely related to those communities to the north of airfield (i.e. Kitts Green and Tile Hill) when aircraft depart from runway 33.

When considering departures from runway 15, the introduction of NADP-1 would actually bring a modest dis-benefit to the community of Barston, which is specifically referenced in the CAA decision document. It would however deliver some benefit to the communities of Hampton-in-Arden and Bickenhill which are located closer to the runway end.

BAL presented these results to the Airspace Change Stakeholder Forum on 15th February 2017. The Group agreed that it would be appropriate to develop a methodology to trial both procedures and measure the noise impact using the Airport's portable noise monitoring equipment. BAL has agreed to develop a methodology which will be presented to a future meeting, and we will be engaging with the Environmental Research Consultancy Department (ERDC) at the CAA.

### **Condition 4 Redesign Northbound SIDs**

Following the identification performance issues with the turbo-prop aircraft (specifically Dash 8 aircraft) flying the northbound turn, as an interim measure BAL published a redesigned Conventional Northbound (Option 4) SID which became operational 26 May 2016.

To develop this interim solution (pending the full redesign of the RNAV 1 SID) we have worked positively with Flybe and the Prestwick Centre to move the majority of the Dash 8 fleet on to the conventional SID. This has led to a significant improvement for the communities of Barston and Balsall Common.

BAL has employed NATS to redesign the RNAV-1 procedure and now has a finalised design that is currently undergoing flight validation. The design was presented to the Airspace Change Stakeholder Forum on 15th February 2017 and the design output was positively received. The next stage will be to engage with the CAA for the implementation of this SID.

### Additional noise measures - Noise Preferential Routes (NPRs)

In addition to the conditions set out in the decision document, BAL voluntarily undertook a trial of raising the ceiling of all NPRs to 4,000 feet in July 2016. The trial found that by raising the ceiling for aircraft on a southbound departure from runway 15 (including COWLY, CPT, DTY, WCO SIDs) a reduction in the overflight of Balsall Common was observed. Therefore the NPR ceiling for southbound departures from runway 15 has been raised to 4,000 feet.

# 2. Update on traffic numbers and route utilisation since 2012

Traffic numbers and route utilisation has been exported from Birmingham Airports Noise and Track-keeping System (ANOMS 8). The results from this have been broken down to show by year since 2012 to show the total number of movements, total movements (arrivals and departures), total departures. Total departures from runway 15 using all SIDs, Total departures from runway 15 using the southbound SIDs.

Traffic broken down by year - total number of movements

Year	Total number of
	movements
2012	87,920
2013	89,165
2014	92,261
2015	94,942
2016	107,513

Traffic broken down by year - total number of departures

Year	Total number of	
	movements	
2012	43,937	
2013	44,233	
2014	45,979	
2015	47,205	
2016	53,504	

Traffic broken down by year - total number of departures from runway 15

Year	Total number of
	movements
2012	16,979
2013	16,908
2014	19,124
2015	19,710
2016	22,358

Traffic broken down by year - total number of departures from runway 15 using southbound SIDs

Year	Total number of
	movements
2012	11,480
2013	11,333
2014	12,910
2015	13,507
2016	15,677

## 3. Annual summary of fleet mix since 2012

On the following pages there is a detailed breakdown of fleet mix by year since 2012. The aircraft types have been exported from Birmingham Airports Noise and Track-keeping System (ANOMS 8).

Aircraft	Total number of movements				
Type	2012	2013	2014	2015	2016
A306	9	12	4	2	0
A310	17	35	178	26	14
A318	1395	1156	77	95	62
A319	1491	3532	4760	3828	5076
A320	6379	7093	5500	7372	11897
A321	4608	4716	6821	9392	9342
A330	1	0	0	0	1
A332	7	15	52	29	154
A333	30	5	4	3	9
A342	0	0	2	4	0
A343	0	20	48		1
A388	0	0	0	0	547
A400	0	0	0	0	4
A3ST	0	2	0	0	0
AC90	4	2	0	0	0
AN12	184	16	58	80	21
AN26	42	60	52	178	147
AN72	0	0	0	2	2
ASTR	2	3	14	10	12
AT43	42	629	941	46	9
AT45	0	0	0	2	0
AT72	2557	724	563	198	523
AT73	59	295	0	0	0
AT75	162	1255	356	118	642
AT76		618	1970	2761	3278
ATP	70	75	58	59	71
ATR7	1	0	0	0	0
B190	5	2	4	0	0
B350	35	42	32	41	31
B461	6	3	3	6	0
B462	154	144	157	172	179

B463	2	0	0	2	2
B712	7	22	118	8	0
B733	4337	802	555	237	272
B734	413	103	64	141	291
B735	288	510	144	80	53
B736	49	265	12	11	4
B737	1590	1356	1247	1865	1044
B738	9881	12392	11914	12888	16427
B739	165	144	341	414	218
B744	2	2	0	0	5
B752	8051	7231	7099	5285	5591
B753	0	0	0	6	4
B757	0	0	0	0	1
B762	15	17	12	16	18
B763	398	426	293	59	97
B772	266	215	193	156	237
B773	3	210	2	0	201
B77L		6	4	40	32
B77W	1534	1562	1532	1817	1607
B787	0	0	0	1	0
B788	0	171	626	1248	1914
BCS1	0	0	0	0	27
BE10	0	1	0	0	6
BE20	140	149	199	307	335
BE30	2	9	8	2	2
BE36	0	2	2	0	2
BE40	8	14	22	27	37
BE58	1	2	0	0	0
BE99	12	0	0	0	0
BE9L	51	71	46	22	37
BN2P	0	0	3	0	0
BN2T	17	28	9	65	38
C130	36	5	2	0	1
C160	6	2	0	0	4
C17	36	10	12	13	6
C182	0	0	0	1	0
C208	0	0	3	2	3
C25A	51	87	70	99	86
C25B	25	22	52	30	43
C25C	12	6	5	27	8
C295	2	4	2	3	4
C303	1	0	0	0	0
C30J	3	0	2	4	5
C310	2	0	1	1	42
C402	0	0	0	0	10
C404	0	0	0	0	1
C340	1	0	0	4	0
C421	0	1	2	1	4
C425	0	4	10	16	14

C441	13	13	16	11	12
C500	19	44	10	2	12
C501	0	6	0	0	0
C510	61	102	227	389	535
C525	62	55	59	64	32
C550	336	334	156	115	45
C551	0	0	0	1	4
C55B	0	0	0	1	38
C560	11	30	18	9	9
C56X	401	504	192	263	271
C650	0	8	10	2	8
C680	23	24	36	14	28
C750	6	0	2	9	13
CL30	17	24	70	48	35
CL35	0	0	0	0	8
CL60	31	19	18	26	62
CN35	2	0	1	0	0
CRJ1	214	0	0	0	0
CRJ2	21	32	10	7	11
CRJ7	194	15	5	0	0
CRJ9	2762	3042	2795	2597	2329
CRJX	413	0	0	0	0
D228	73	177	37	76	68
D328	156	6	5	2	0
DA42	16	20	9	2	12
DC10	0	0	13	0	0
DH8	1	0	0	2	0
DH8C	2	2	0	0	0
DH8D	12310	12193	18836	16850	22115
DHC6	4	8	7	13	6
E110	2	0	0	0	0
E120	282	326	213	307	346
E135	80	19	201	135	0
E145	161	1087	458	82	53
E170	3169	6034	11411	12787	9818
E190	13095	11983	5213	4546	4223
E195	1	0	1	1	0
E35L	0	0	0	20	16
E500	0	0	0	1	0
E50P	87	47	49	60	36
E550	0	0	0	0	124
E55P	19	16	25	90	124
F100 F27	1344	906	1117	958	672
F2TH	16 58	30	0 39	0 86	0 61
F406	41	56	46	60	89
F50	337	12	19	360	184
F70	207	293	340	194	421
F900	4	293	16	18	9
1 300	4	۷4	10	10	3

	_	_	_	_	
FA10	6	0	0	2	0
FA20	6	4	0	2	0
FA50	8	81	60	30	20
FA7X	4	18	29	33	36
G150	6	10	7	1	4
G280	0	0	0	2	0
GA7		1	1	0	0
GALX	5	0	0	8	4
GL5T	6	0	6	5	26
GLEX	16	26	21	20	30
GLF4	6	6	8	8	38
GLF5	27	20	8	15	35
GLF6	0	0	2	5	19
H25B	167	97	51	62	114
H25C	2	4	0	0	0
HA4T	4	2	2	8	8
HDJT	0	0	0	0	22
IL76	0	0	0	2	0
ISLA	0	0	1	0	0
J328	4	6	2	8	8
JS32	2	2	424	100	
JS41	1021	978	388	716	392
L101	11	11	1	0	0
L188	1	0	0	0	0
LJ31	2	6	6	8	6
LJ35	49	58	56	70	313
LJ40	15	0	1	3	41
L410	0	0	0	2	0
LJ45	24	43	41	40	56
LJ55	7	6	12	22	15
LJ60	21	12	13	14	8
LJ75	0	0	0	0	2
LR35	0	0	0	0	1
M20P	0	0	0	2	0
MD11	0	1	0	0	0
MD82	244	142	0	4	
MD83	0	2	0	157	2
MD87	52	0	0	0	0
MU2	8	4	0	10	2
MU30	1	0	0	0	0
P180	24	26	24	14	40
P28A	0	0	0	1	0
P28R	0	0	0	0	1
P46T	8	9	7	11	4
P68	1	0	0	0	0
PA27	1	0	2	0	0
PA31	89	105	35	12	14
PA34	3	2	0	1	1
PA46	0	0	0	2	1
			L	l	

PAY1	4	0	2	2	
PAY2	3	0	2		1
PAY3	20	18	21	36	6
PAY4	1	0	2	0	0
PC12	55	59	58	48	46
PRM1	18	8	17	10	4
R721	4	0	0	0	0
RJ1H	1377	973	519	1440	1814
RJ70	0	0	0	2	0
RJ85	385	184	341	140	107
S92	1	0	0	0	0
SB20	8	6	16	12	8
SF34	773	13	63	206	114
SH36	26	22	6	19	174
SR22	0	3	1	0	0
SU95	0	0	0	0	17
SW2	4	1	2	2	0
SW3	73	103	93	78	25
SW4	351	537	289	387	318
T154	0	0	0	4	2
TBM7	5	0	6	2	2
TBM8	2	0	1	2	2
TBM9	0	0	0	0	21
TEX2	0	0	0	6	0
TOBA	1	0	0	0	0

<sup>\*</sup>Please note that data above is only available where an aircraft types is registered in ANOMS. Aircraft types are registered for over 98% of all operations

## 4. Analysis of feedback

During the 12<sup>th</sup> month post-implementation period 6<sup>th</sup> April 2016 to 6<sup>th</sup> April 2017 (inclusive) 716 complaints were received, with 1127 events reported. The number of events received is greater than the total number of complaints as in one complaint there maybe multiple disturbances (events) reported. There were 266 individual correspondents.

All complaints and feedback were received through Birmingham Airports dedicated Customer Relations Management (CRM) system. The form used for complaint submission can be found at the following link:

https://birminghamairport.custhelp.com/app/complaints/aircraftnoise/p/94

The themes of the feedback received can be found summarised in the table below with the most common theme being Noise.

Theme of feedback	Total	Percentage
Noise	523	46.4
Off Track Aircraft	280	24.8
Low Flying Aircraft	264	23.4
Ground Noise	44	3.9
Other	14	1.2
Helicopter	2	0.2

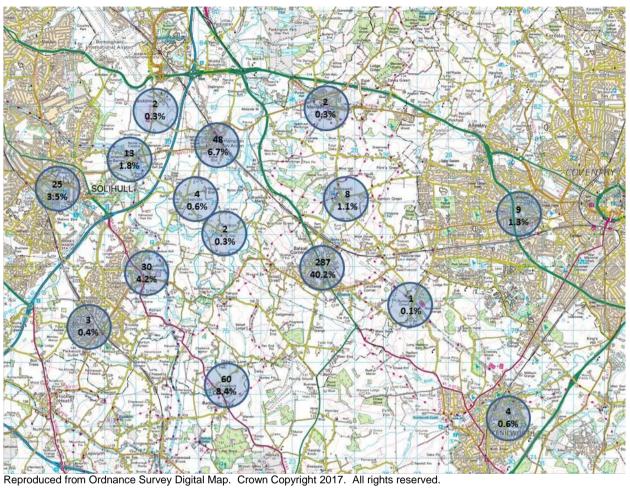
The number of complaints received by location can be seen summarised in the table on the next page. Following the table there is also a visual representation in the following image of complaints received from those communities located closest to where the changes took place. It can be seen that that the area from which the majority of complaints were received is Balsall Common which accounted for 287 (40.1%) of all complaints. It should however be noted that of these 287 complaints, 60% (169) were received from one individual.

There are 11 entries recorded as 'no address'. This is where a complaint has been received but an address has not been provided.

Areas	Number of complaints	Percentage of total
Alderminster	1	0.1
Aldridge	7	1.0
Baddesley Clinton	1	0.1
Balsall common	287	40.1
Balsall Heath	1	0.1
Barnt Green	1	0.1
Barston	2	0.3
Berkswell	8	1.1
Bickenhill	2	0.3
Birmingham	34	4.7
Boldmere	1	0.1
Brookvale Village	1	0.1
Burton Green	1	0.1
Castle Bromwich	6	0.8
Castle Vale	1	0.1
catherine de barnes	13	1.8
Chadwick End	60	8.4
Claverdon	1	0.1
Coleshill	2	0.3
Corley	3	0.4
Coventry	9	1.3
Curdworth	12	1.7
Curdworth Birmingham	2	0.3
Dorridge	3	0.4
Eastcote	4	0.6
Elmdon Park	1	0.1
Erdington	4	0.6
Hall Green	2	0.3
Hampton In Arden	48	6.7
Harbourne	1	0.1
Hatton	2	0.3
Hatton Park	1	0.1
Henley in Arden	4	0.6
Hook Norton	1	0.1
Kenilworth	4	0.6
Kenilworth Rd	1	0.1
Kings Norton	1	0.1
Kitts Green	6	0.8
Knowle	30	4.2
Lea Hall	1	0.1
Lea Marston	1	0.1
Lea Village	1	0.1
Leamington Spa	4	0.6
Lydon Green	2	0.3
Marston Green	32	4.5
Maxstoke	1	0.1
Meriden	2	0.3
Minworth	2	0.3
No Address	11	1.5
Northfield	1	0.1
Norton Lindsey	4	0.6
Redditch	2	0.3
Royal Leamington Spa	1	0.1
Selly Oak	3	0.4
Shard end	6	0.8
Sheldon	1	0.1

Areas	Number of complaints	Percentage of total
Smethwick	1	0.1
Snitterfield	1	0.1
Solihull	25	3.5
Sparkbrook	1	0.1
St Albans	1	0.1
Stechford	3	0.4
Stoneleigh	1	0.1
Stourbridge	1	0.1
Sutton Coldfield	8	1.1
Tile Cross	1	0.1
Ullenhall	13	1.8
Walmley	1	0.1
Walsall	1	0.1
Warwick	10	1.4
Wellesbourne	1	0.1
Weston Under Wetherley	1	0.1
Wolverhampton	1	0.1
Yardley	1	0.1

## Map showing complaints by area received by those communities most affected by the changes made to the runway 15 departure SIDs

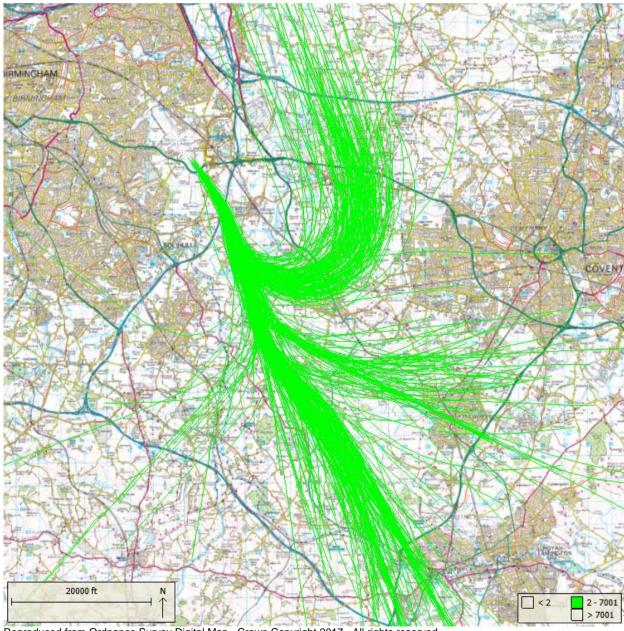


## 5. Operational diagrams

Operational diagrams can be found on the following pages for both pre-implementation and post-implementation for aircraft departing from runway 15. The track data relates to individual weeks in the months of June, September, December and March with weeks chosen that are most comparable in terms of number of movements.

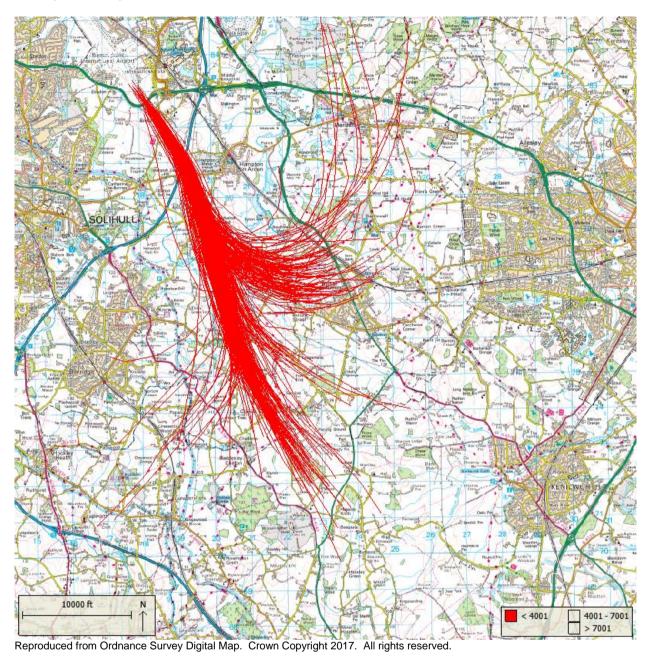
### **JUNE**

Traffic departing from runway 15 pre–implementation up to 7,000 feet. 15<sup>th</sup> – 21<sup>st</sup> June 2013 (inclusive), 435 movements.

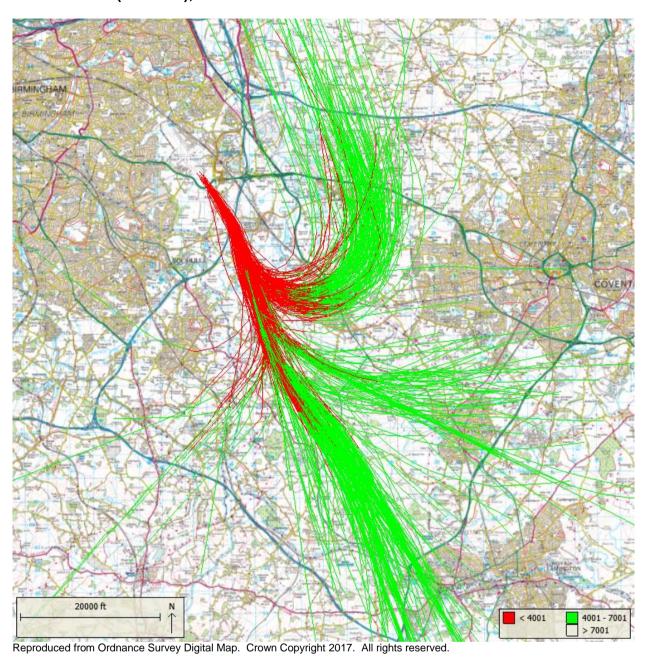


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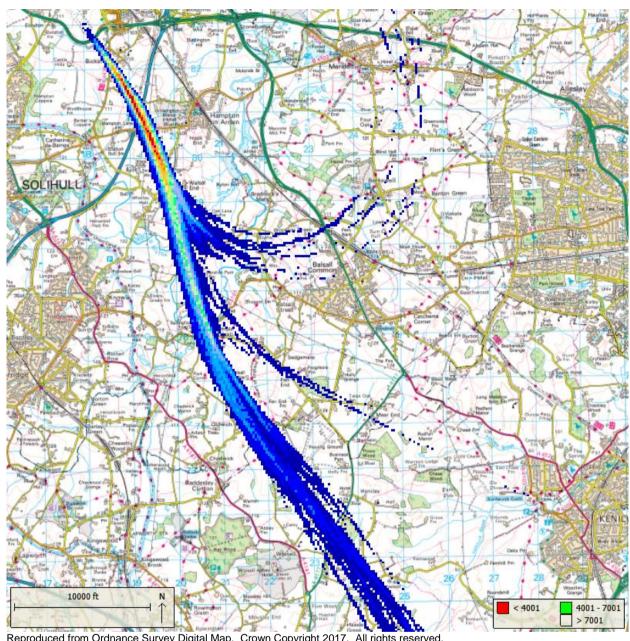
Traffic departing from runway 15 pre–implementation up to 4,000 feet.  $15^{th}$  –  $21^{st}$  June 2013 (inclusive), 435 movements.



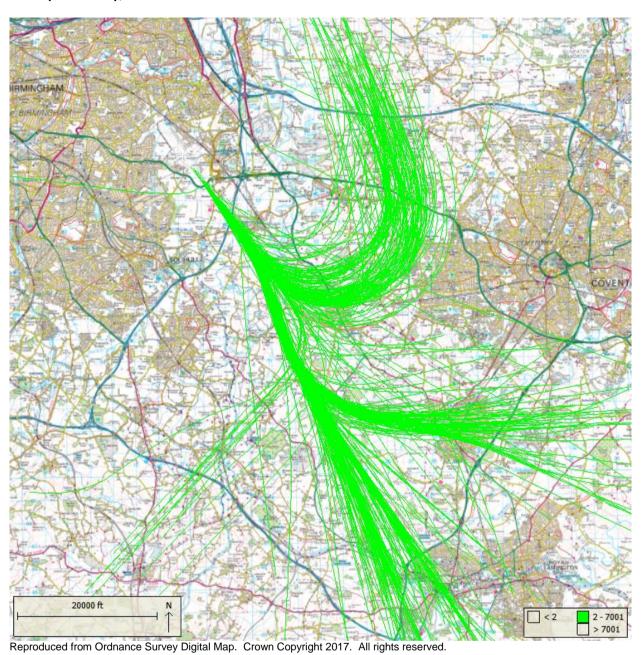
Traffic departing from runway 15 pre–implementation between 4,000 & 7,000 feet.  $15^{th}$  –  $21^{st}$  June 2013 (inclusive), 435 movements.



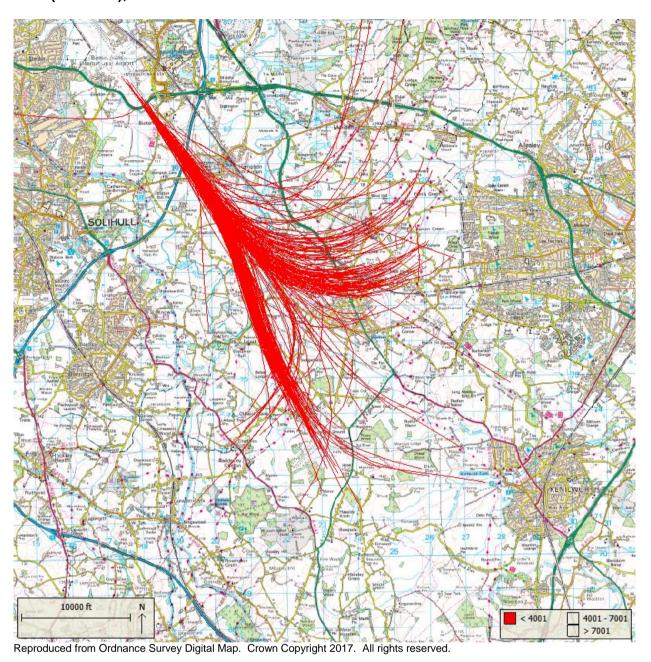
Track density for departing aircraft from runway 15 pre–implementation. 15<sup>th</sup> – 21<sup>st</sup> June 2013 (inclusive), 435 movements.



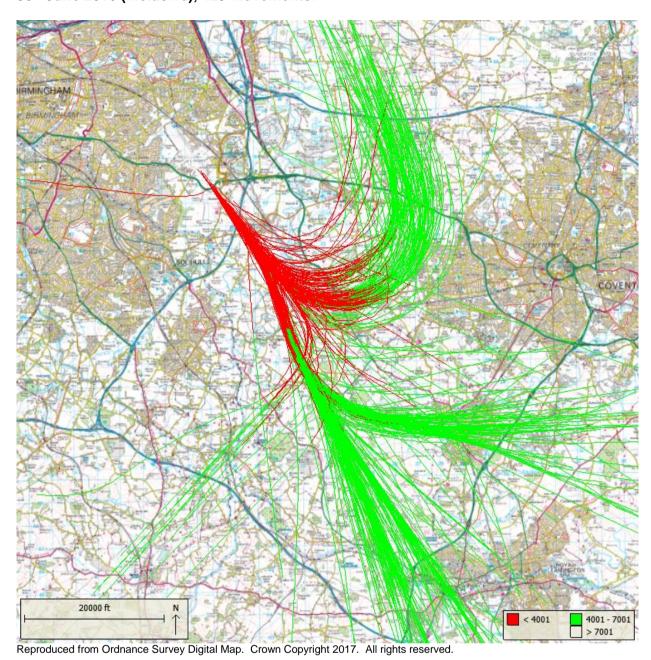
Traffic departing from runway 15 post–implementation up to 7,000 feet. 23<sup>rd</sup> – 30<sup>th</sup> June 2016 (inclusive), 429 movements.



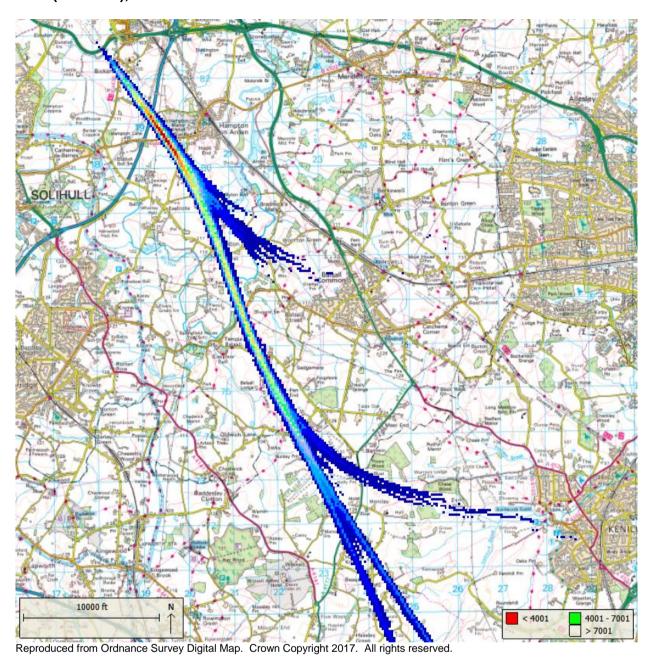
Traffic departing from runway 15 post–implementation up to 4,000 feet. 23<sup>rd</sup> – 30<sup>th</sup> June 2016 (inclusive), 429 movements.



Traffic departing from runway 15 post–implementation between 4,000 & 7,000 feet. 23<sup>rd</sup> – 30<sup>th</sup> June 2016 (inclusive), 429 movements.

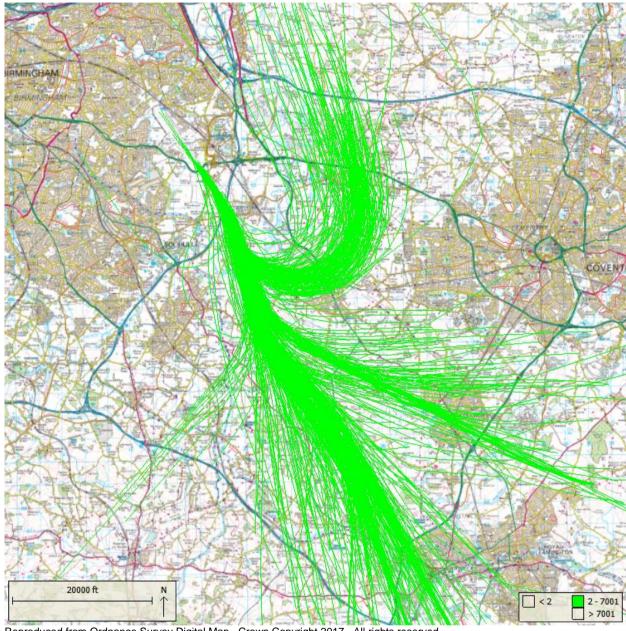


Track density for departing aircraft from runway 15 post–implementation. 23<sup>rd</sup> – 30<sup>th</sup> June 2016 (inclusive), 429 movements.

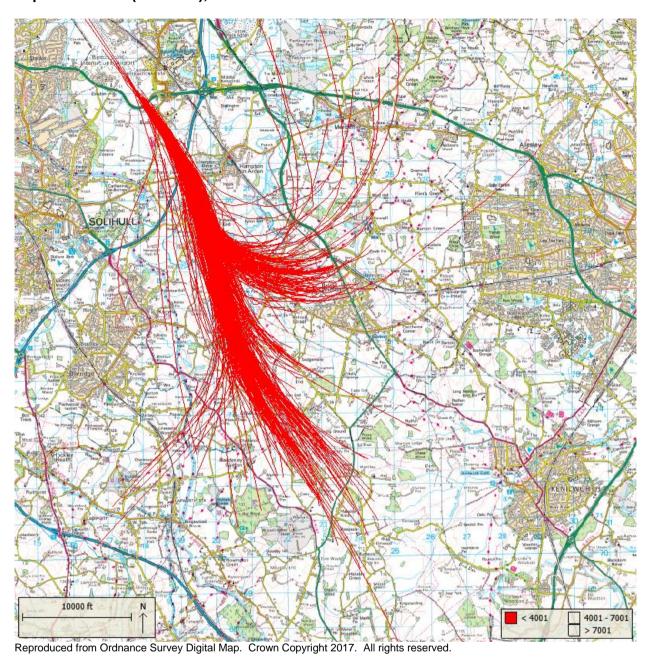


## **September**

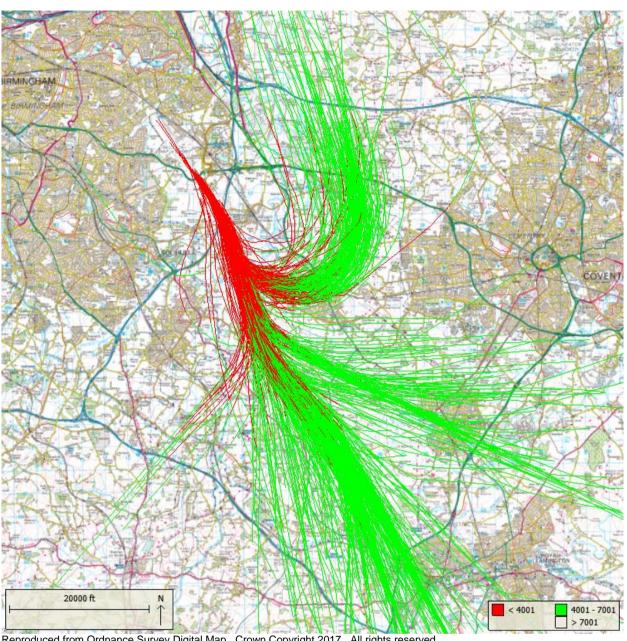
Traffic departing from runway 15 pre–implementation up to 7,000 feet.  $22^{nd}$  –  $28^{th}$  September 2013 (inclusive), 606 movements.



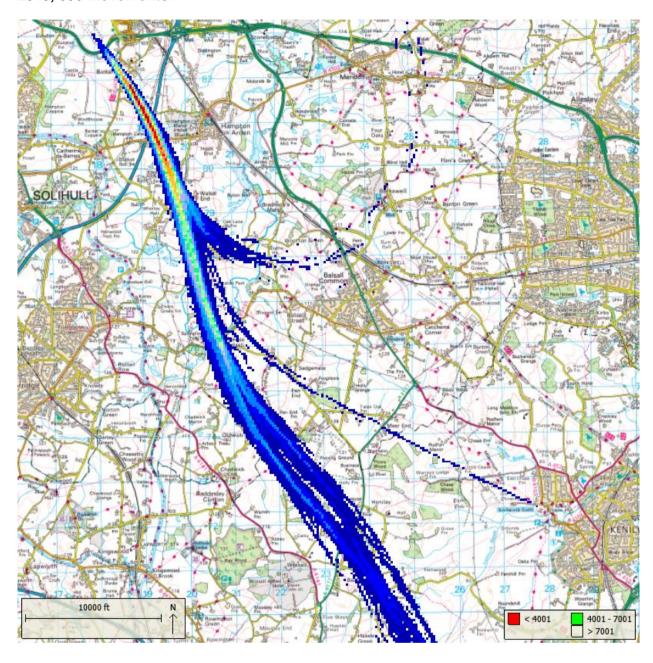
Traffic departing from runway 15 pre–implementation up to 4,000 feet.  $22^{nd}$  –  $28^{th}$  September 2013 (inclusive), 606 movements.



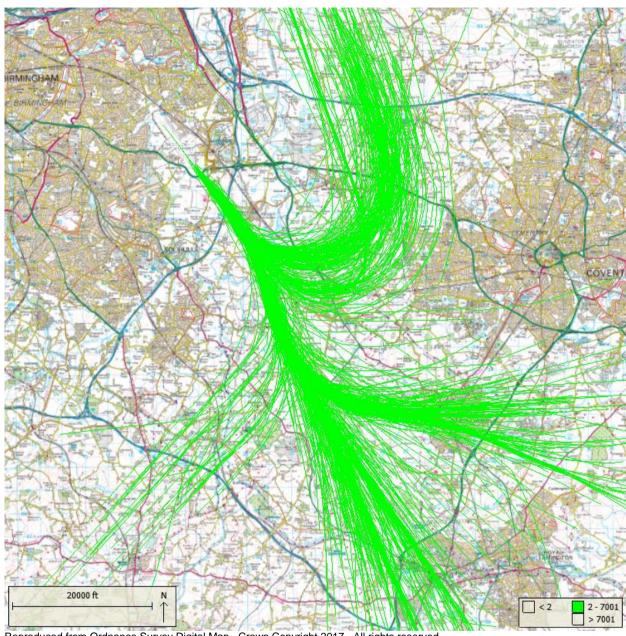
Traffic departing from runway 15 pre–implementation between 4,000 & 7,000 feet.  $22^{nd}$  –  $28^{th}$  September 2013 (inclusive), 606 movements.



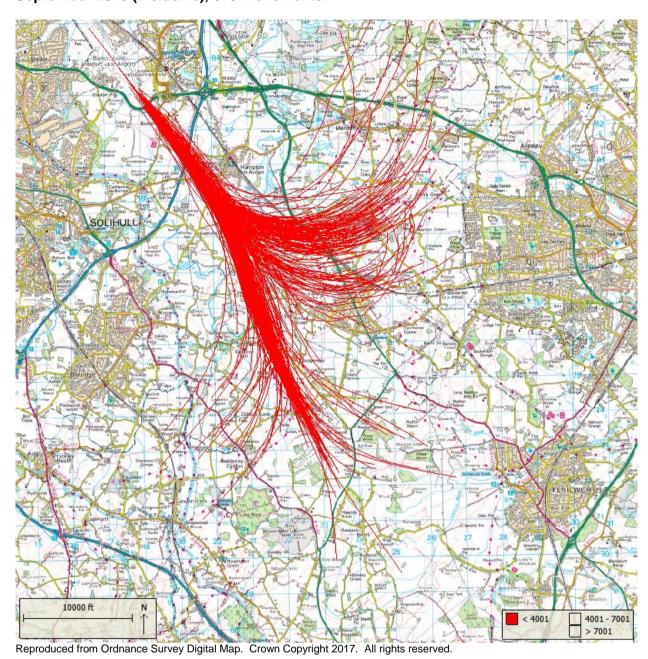
Track density for departing aircraft from runway 15 pre-implementation. September 2013, 606 movements.



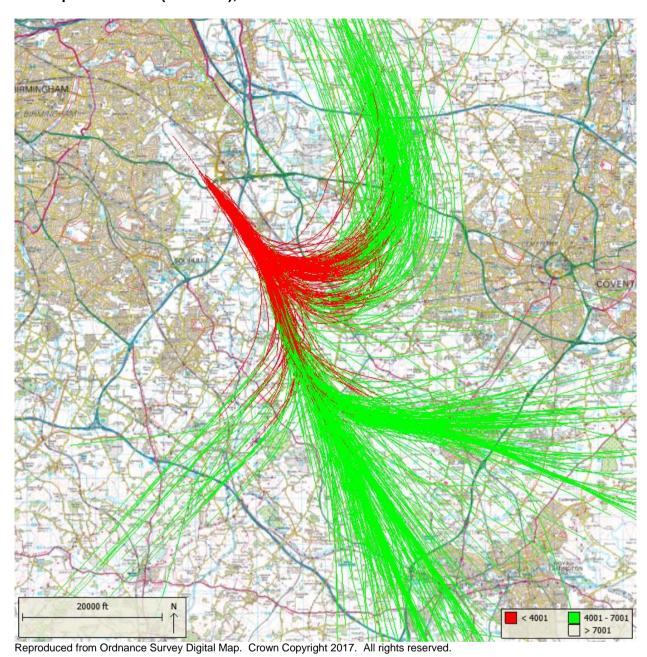
Traffic departing from runway 15 post–implementation up to 7,000 feet.  $22^{nd}$  –  $28^{th}$  September 2016 (inclusive), 673 movements.



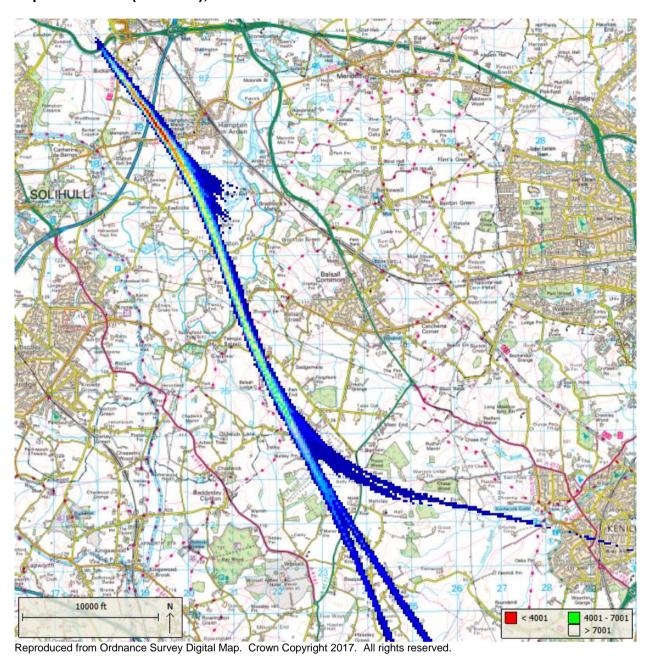
Traffic departing from runway 15 post–implementation up to 4,000 feet.  $22^{nd} - 28^{th}$  September 2016 (inclusive), 673 movements.



Traffic departing from runway 15 post–implementation between 4,000 & 7,000 feet. 22<sup>nd</sup> – 28<sup>th</sup> September 2016 (inclusive), 673 movements.

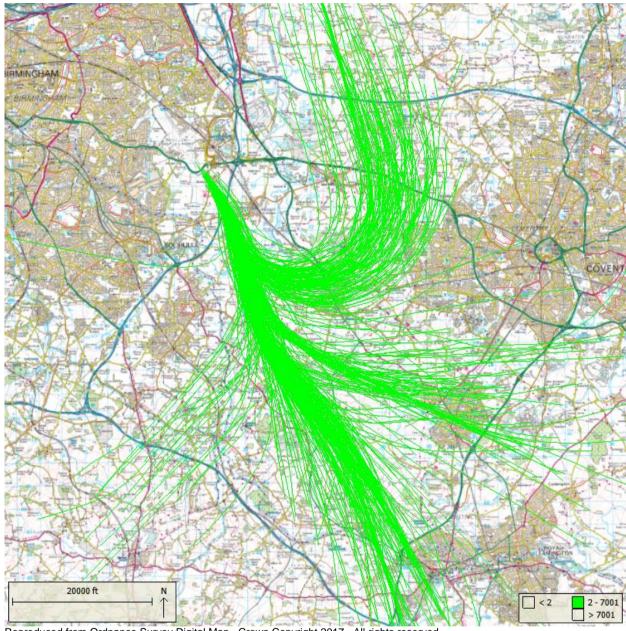


Track density for departing aircraft from runway 15 post–implementation.  $22^{nd}$  –  $28^{th}$  September 2016 (inclusive), 673 movements.

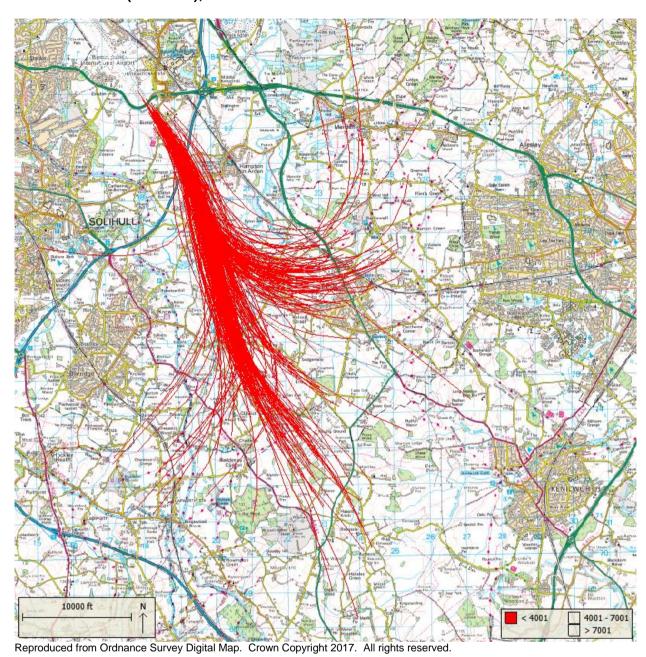


## **December**

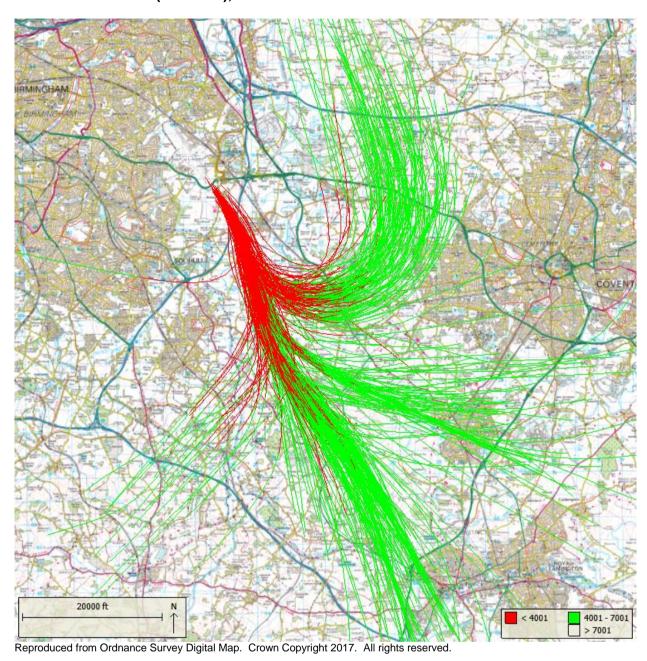
Traffic departing from runway 15 pre–implementation up to 7,000 feet.  $22^{nd}$  –  $28^{th}$  December 2013 (inclusive), 437 movements.



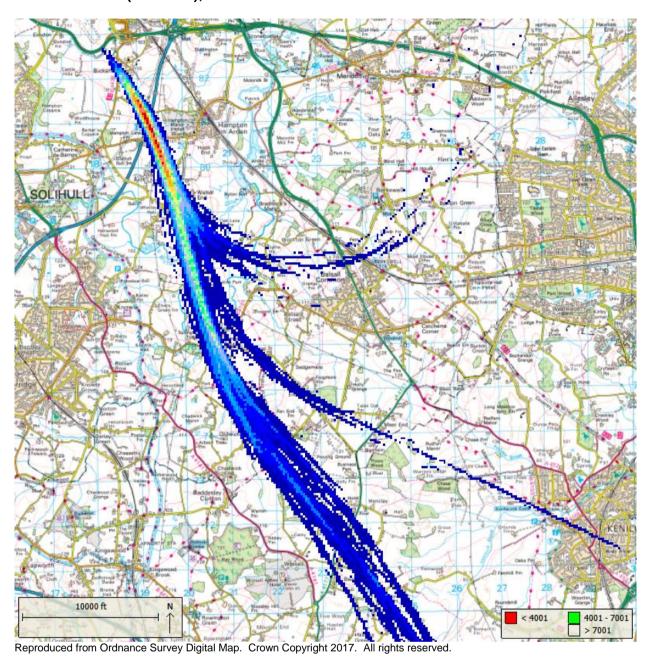
Traffic departing from runway 15 pre–implementation up to 4,000 feet.  $22^{nd} - 28^{th}$  December 2013 (inclusive), 437 movements.



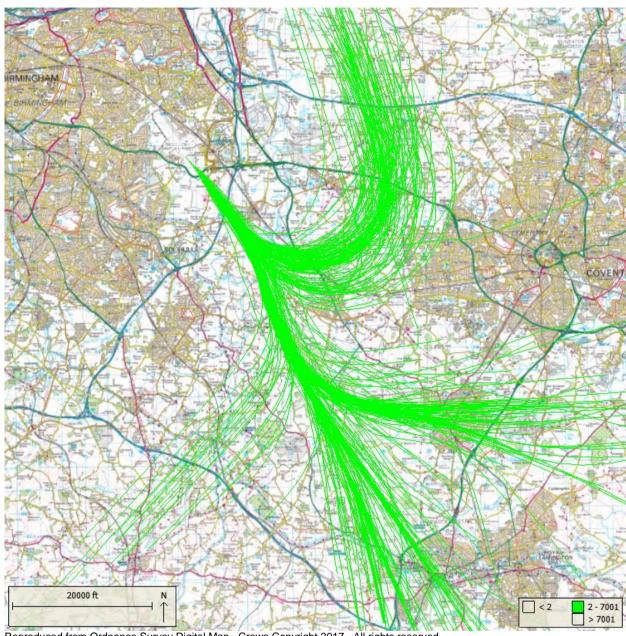
Traffic departing from runway 15 pre–implementation between 4,000 & 7,000 feet.  $22^{nd}$  –  $28^{th}$  December 2013 (inclusive), 437 movements.



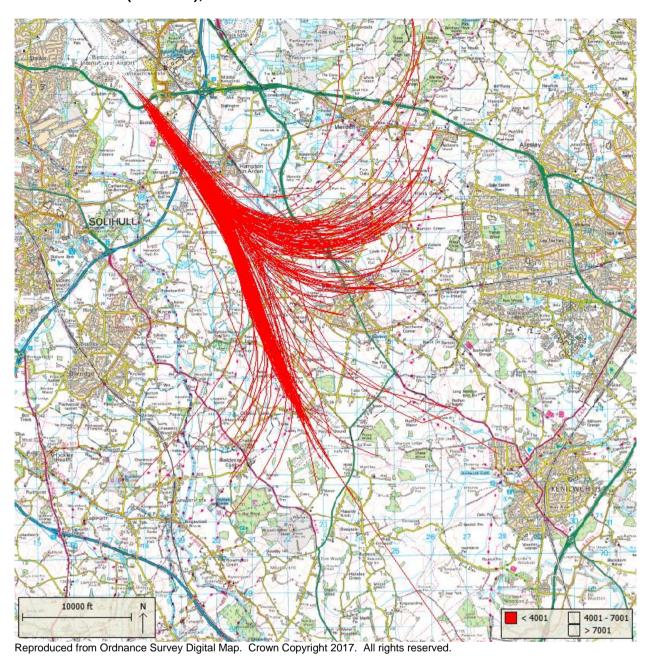
Track density for departing aircraft from runway 15 pre–implementation. 22<sup>nd</sup> – 28<sup>th</sup> December 2013 (inclusive), 437 movements.



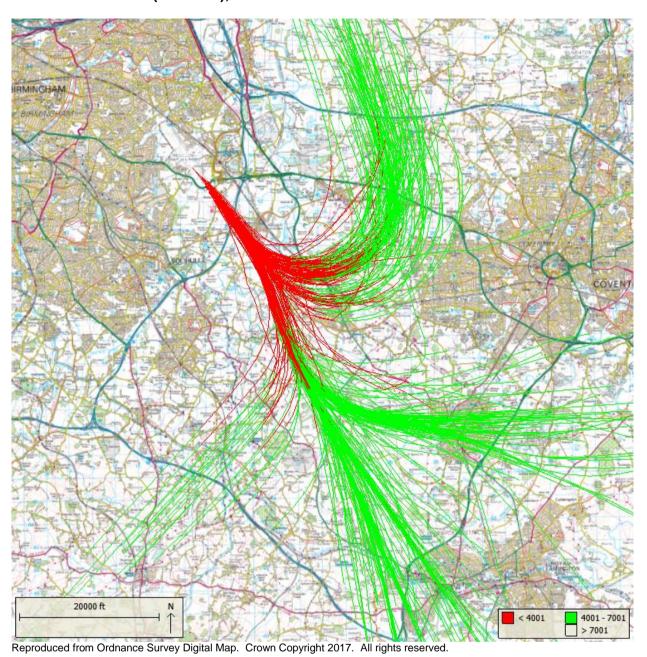
Traffic departing from runway 15 post–implementation up to 7,000 feet.  $22^{nd} - 28^{th}$  December 2016 (inclusive), 365 movements.



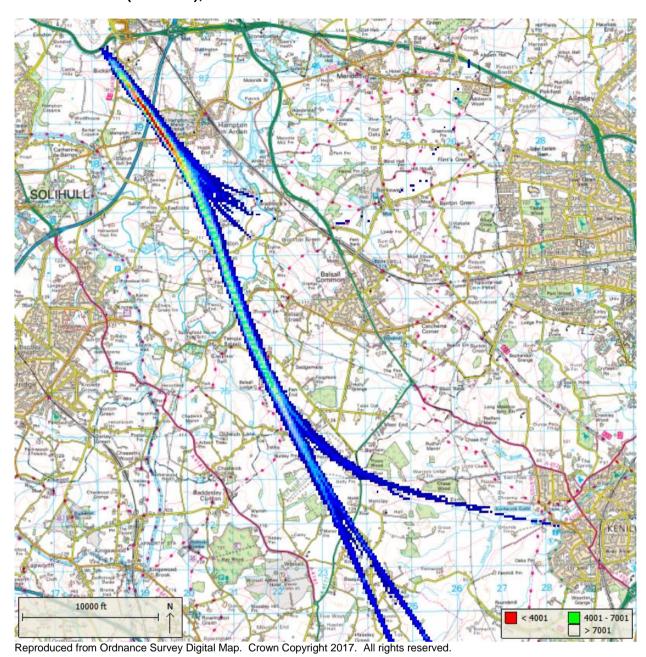
Traffic departing from runway 15 post–implementation up to 4,000 feet.  $22^{nd} - 28^{th}$  December 2016 (inclusive), 365 movements.



Traffic departing from runway 15 post–implementation between 4,000 & 7,000 feet. 22<sup>nd</sup> – 28<sup>th</sup> December 2016 (inclusive), 365 movements.

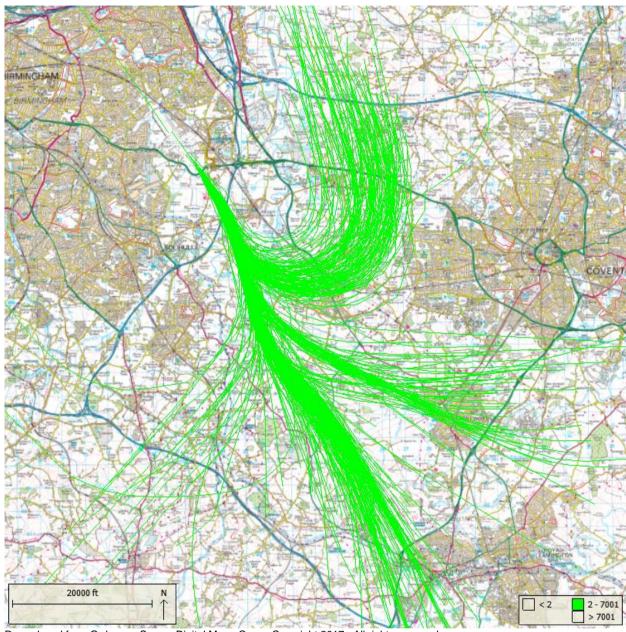


Track density for departing aircraft from runway 15 post–implementation.  $22^{nd} - 28^{th}$  December 2016 (inclusive), 365 movements.

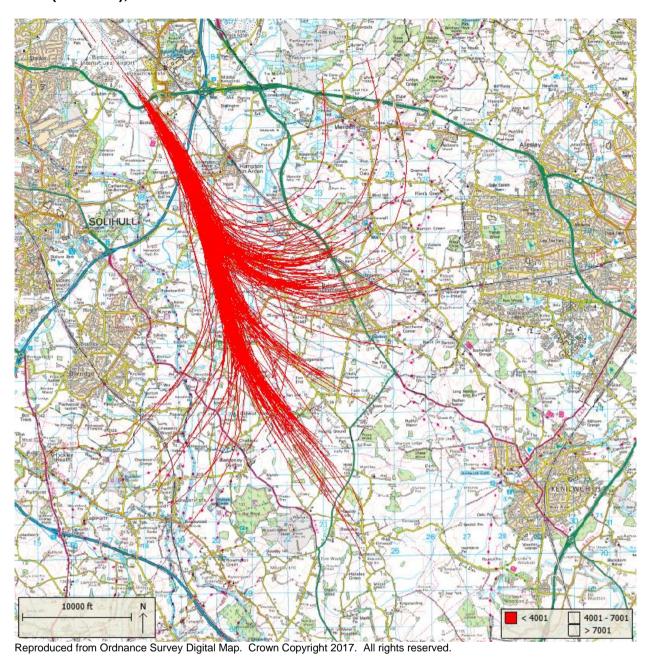


## March

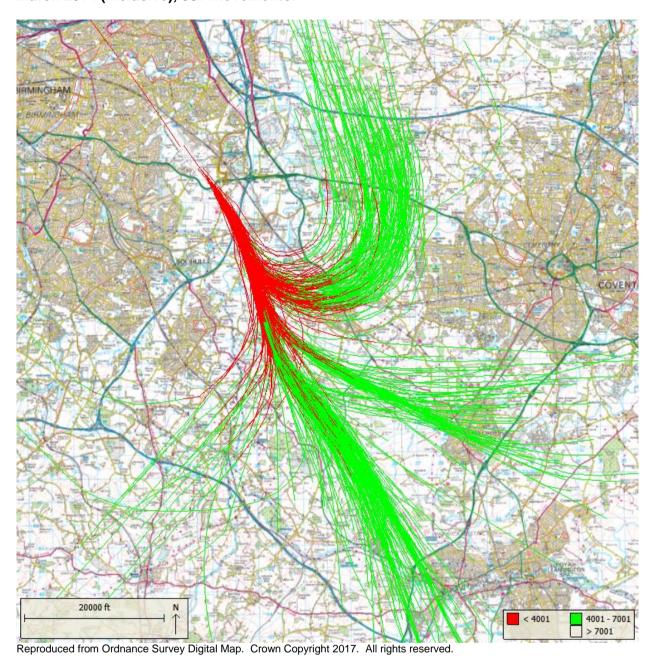
Traffic departing from runway 15 pre–implementation up to 7,000 feet. 1st – 7th March 2014 (inclusive), 387 movements.



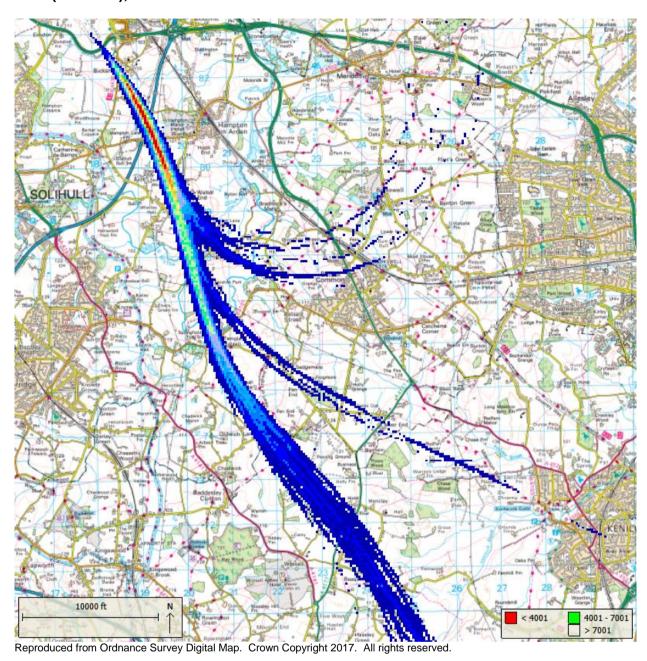
Traffic departing from runway 15 pre–implementation up to 4,000 feet.  $1^{st}$  –  $7^{th}$  March 2014 (inclusive), 387 movements.



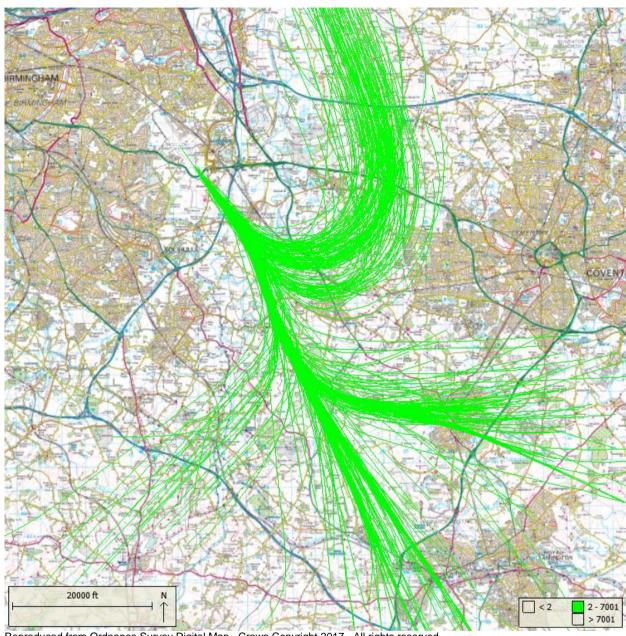
Traffic departing from runway 15 pre–implementation between 4,000 & 7,000 feet.  $1^{st}$  –  $7^{th}$  March 2014 (inclusive), 387 movements.



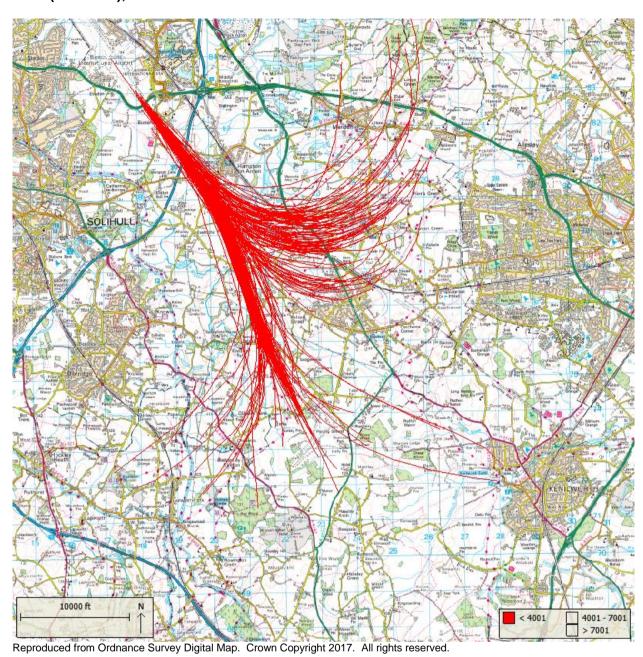
Track density for departing aircraft from runway 15 pre–implementation.  $1^{st}$  –  $7^{th}$  March 2014 (inclusive), 387 movements.



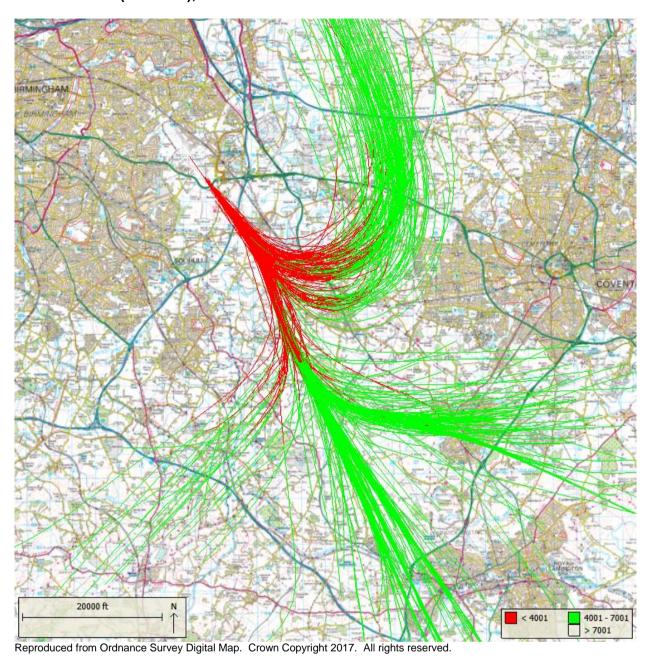
Traffic departing from runway 15 post–implementation up to 7,000 feet.  $1^{st}$  –  $7^{th}$  March 2017 (inclusive), 408 movements.



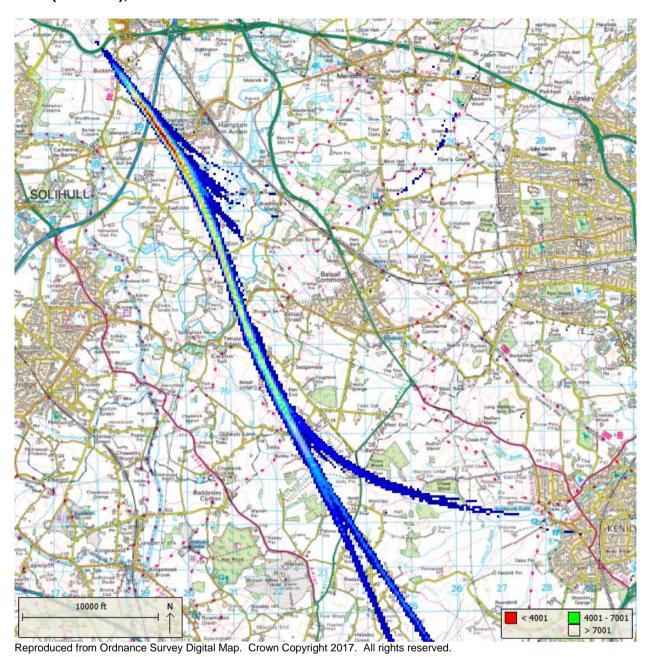
Traffic departing from runway 15 post–implementation up to 4,000 feet.  $1^{st}$  –  $7^{th}$  March 2017 (inclusive), 408 movements.



Traffic departing from runway 15 post–implementation between 4,000 & 7,000 feet.  $1^{st}$  –  $7^{th}$  March 2017 (inclusive), 408 movements.



Track density for departing aircraft from runway 15 post–implementation.  $1^{st}$  –  $7^{th}$  March 2017 (inclusive), 408 movements.



## 6. Raw Radar Data

Radar data provided the period June to September (inclusive) 2016 in .ltbaa format. File transferred via dropbox due to large file size.

## Feedback from regular operators

BAL sought feedback from its regular operators through Birmingham Airports Flight Safety Committee. Operators overall were happy with the performance of the SIDs with the only query raised relating to the 210kt speed restriction which is applicable for some distance on the 2Y (southbound) SIDs.

BAL consulted its procedure designers with regards to this who advised that due to the waypoint locations a 210kt speed restriction was necessary. This was fed back to the Flight Safety Committee at the meeting held on 8<sup>th</sup> December 2016 who were content with the response and the action was closed.