Department for Transport

Night Flying Restrictions at Heathrow, Gatwick and Stansted Stage 1 Consultation Annexes

January 2013

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Annex A: Statutory instrument

Table 1: SCHEDULE 2 Regulation 6 of STATUTORY INSTRUMENTS 2003 No. 1742; CIVIL AVIATION The Aerodromes (Noise Restrictions)(Rules and Procedures) Regulations 2003 which shows the matters to be taken into account when considering operating restrictions at a relevant airport

Clause	Location in consultation
1.1. A description of the airport including information about its capacity, location, surroundings, air traffic volume and mix and runway mix.	See Noise Action Plans (NAPs) for general information and Chapter 3 of this consultation for information on night operations
1.2. A description of the environmental objectives for the airport and the national context.	Chapter 3
1.3. Details of noise contours for the current and previous years–including an assessment of the number of people affected by aircraft noise. Description of the computational method used to develop the contours.	Annex B (for current years) and NAPs (links available in Chapter 3) for previous years
1.4.A description of measures to reduce aircraft noise already implemented: for example, information on land use planning and management; noise insulation programmes; operating procedures such as PANS-OPS; operation restrictions such as noise limits, night flying restrictions; noise charges; preferential runway use, noise preferred routes/track-keeping, and noise monitoring	See NAPs. For Heathrow Aiport -pages 28-41, for Gatwick Airport -pages 37-45, for Stansted Airport -pages 27-36
2.1.Descriptions of airport developments (if any) already approved and in the programme, for example, increased capacity, runway and/or terminal expansion, and the projected future traffic mix and estimated growth.	Chapter 3
2.2. In case of airport capacity extension, the benefits of making that additional capacity available.	Chapter 3 where relevant
2.3.A description of effect on noise climate without further measures	Chapter 5 and Annex B
2.4. Forecast noise contours—including an	Annex B. We do not have data on newly

assessment of the number of people likely to be affected by aircraft noise—distinguish between established residential areas and newly constructed residential areas.	constructed residential areas.
2.5. Evaluation of the consequences and possible costs of not taking action to lessen the impact of increased noise—if it is expected to occur.	Stage 2
3.1 Outline of additional measures available as part of the different options mentioned in regulation 5(1) and in particular an indication of the main reasons for their selection. Description of those measures chosen for further analysis and fuller information on the cost of introducing these measures; the number of people expected to benefit and timeframe; and a ranking of the overall effectiveness of particular measures.	All to be covered in the stage 2 consultation when specific measures are proposed
3.2. Assessment of the cost/effectiveness or cost/benefit of the introduction of specific measures, taking account of the socio-economic effects of the measures on the users of the airport: operators (passenger and freight); travellers and local communities.	As above
3.3. An overview of the possible environmental and competitive effects of the proposed measures on other airports, operators and other interested parties.	As above
3.4. Reasons for selection of the preferred option.	As above
3.5. A non-technical summary.	As above
4.1. When and where noise maps or action plans have been prepared under the terms of the said Directive of 25th June 2002 these will be used for providing the information required in this Schedule.	
4.2. The assessment of noise exposure (i.e. establishment of noise contours and number of people affected) shall be carried out using at least the common noise indicators Lden and Lnight, where available.	

Annex B: Noise contours

Base case assessments and forecasts without new measures

B.1 The noise contours in this annex have been produced by the Environmental Research and Consultancy Department (ERCD) of the Civil Aviation Authority (CAA) using the UK aircraft noise contour model (ANCON 2).

B.2 A description of the method by which the contours are computed and the sources of input data, which include actual monitored data, are contained in The CAA Aircraft Noise Contour Model: ANCON Version 1: DORA Report 9120 and The UK Civil Aircraft Noise Contours Model ANCON – Improvements in Version 2: R&D Report 9842.

B.3 The population data included in the tables use data from a residential population location database developed by Extrium Limited in connection with fulfilling the Government's obligations under the Environmental Noise Directive. Information about residential buildings is combined with population data based on Census Output Areas (COA) from the 2011 census to produce a residential population location dataset. That dataset is combined with the noise exposure data to produce the results shown in the tables.

B.4 Annex vi of Directive 2002/49/EC describes how information about the number of people and the area affected by aircraft noise should be reported. The estimated number of people living in dwellings (rounded to the nearest hundred as required by Directive 2002/49/EC) exposed to the following bands of values of Lden in dB: 55-59, 60-64, 65-69, 70-74 and >75, and the following bands of values of Lnight in dB: 50-54, 55-59, 60-64, 65-69, >70, should be provided. In the case of graphical representation, strategic maps must show at least the 60, 65, 70 and 75 dB contours.

B.5 For the purposes of this consultation we have displayed, on background mapping, contours for the following values: 55, 60, 65, 70 and 75 (Lden) and 50, 55, 60, 65 and 70 (Lnight 8 hour). The corresponding areas, population and household data are also provided for each band of values. For reference, the equivalent results reported for the previous consultation on Night Flying Restrictions (at Stage 1, July 2004) are also shown.

B.6 The Lden and Lnight contours have been calculated using average actual recorded data for the calendar year 2011, and were produced to meet the requirements of the Environmental Noise Regulations[1]. This is also the most recent year for which a full set of data is available to produce contours from. Lden and Lnight contours have been published previously for Heathrow, Gatwick and Stansted for 2006 in ERCD Reports 0706, 0707 and 0708[2] respectively to meet the requirements of the Environmental Noise Regulations.

B.7 These contours should be considered along with Chapter 3 of the main consultation document.

Table 2: Lden and Lnight (8 hours) data for Heathrow, Gatwick and Stansted

	Heathrow 2011 Lden			**Heathrow 2003 Lden**		
Contour band (dBA)	Area (sq km)	Population (1000s)	Households (1000s)	Area (sq km)	Population (1000s)	Households (1000s)
55 – 59.9	142.0	574.6	256.3	160.8	531.2	244.0
60 – 64.9	48.0	138.8	55.4	54.8	161.5	69.6
65 – 69.9	21.0	46.1	16.0	25.3	52.1	21.0
70 – 74.9	7.0	6.5	2.2	10.6	10.8	4.0
> 75	3.9	0.1	<0.1	5.8	1.7	0.6
	Gatwick 2011 Lden			**Gatwick 2003 Lden**		
Contour band (dBA)	Area (sq km)	Population (1000s)	Households (1000s)	Area (sq km)	Population (1000s)	Households (1000s)
55 – 59.9	53.7	9.3	3.7	46.6	7.5	3.0
60 – 64.9	20.0	1.5	0.6	21.3	1.7	0.7
65 – 69.9	7.8	0.4	0.2	9.3	0.5	0.2
70 – 74.9	2.6	<0.1	<0.1	3.4	0.1	0.1
> 75	1.5	<0.1	<0.1	1.7	<0.1	<0.1

[1] Statutory Instrument 2006 No. 2238, The Environmental Noise (England) Regulations 2006, as amended
[2] ERCD reports available on the CAA website at www.caa.co.uk/publications

	Stansted 2011 Lden			**Stansted 2003 Lden**		
Contour band (dBA)	Area (sq km)	Population (1000s)	Households (1000s)	Area (sq km)	Population (1000s)	Households (1000s)
55 – 59.9	36.2	6.1	2.5	41.4	6.9	2.7
60 – 64.9	13.9	1.1	0.4	17.4	1.3	0.5
65 – 69.9	4.9	0.3	0.1	7.8	0.6	0.2
70 – 74.9	1.5	<0.1	<0.1	2.9	0.1	<0.1
> 75	1.0	0.0	0.0	1.5	<0.1	<0.1
	Heathrow 2011 Lnight			**Heathrow 2003 Lnight**		
Contour band (dBA)	Area (sq km)	Population (1000s)	Households (1000s)	Area (sq km)	Population (1000s)	Households (1000s)
50 – 54.9	47.8	144.2	60.7	54.1	180.4	80.4
55 – 59.9	17.6	51.9	18.2	25.1	49.4	19.8
60 – 64.9	5.9	13.7	4.4	8.6	16.6	6.4
65 – 69.9	1.8	1.5	0.5	2.8	2.5	0.8
> 70	1.5	<0.1	<0.1	1.7	<0.1	<0.1
	Gatwick 2011 Lnight			**Gatwick 2003 Lnight**		
Contour band (dBA)	Area (sq km)	Population (1000s)	Households (1000s)	Area (sq km)	Population (1000s)	Households (1000s)
50 – 54.9	25.0	3.3	1.4	26.9	3.4	1.3
55 – 59.9	9.8	0.5	0.2	11.2	0.7	0.3
60 – 64.9	3.4	0.2	<0.1	4.3	0.2	0.1
65 – 69.9	1.0	<0.1	<0.1	1.5	<0.1	<0.1
> 70	0.7	<0.1	<0.1	0.7	<0.1	<0.1
	Stansted 2011 Lnight			Stansted 2003 Lnight		
Contour band (dBA)	Area (sq km)	Population (1000s)	Households (1000s)	Area (sq km)	Population (1000s)	Households (1000s)
50 – 54.9	20.7	3.0	1.2	21.4	2.5	1.0
55 – 59.9	7.5	0.4	0.2	9.3	0.9	0.4

60 – 64.9	2.6	<0.1	<0.1	3.6	0.1	<0.1
65 – 69.9	0.8	<0.1	<0.1	1.1	<0.1	<0.1
> 70	0.6	0.0	0.0	0.6	<0.1	<0.1

Lnight (6.5 hour)

B.8 Also included in the base case assessment are Lnight contours for the 6.5 hour night quota period to demonstrate how the current night restrictions regime affects the night time contour. These contours are displayed at 3 dB intervals from 48 dB. These contours have been calculated using data recorded between 27 March 2011 and 25 March 2012 (a full summer and winter season as described in the current night restrictions regime). The areas, population and household data are also provided for each contour level, on a cumulative basis, in accordance with normal practice.

Table 3: Lnight (6.5 hour, actual usage) data for Heathrow, Gatwick and Stansted

	Heathrow 2011-12 Lnight (6.5 hour, actual usage)			**Heathrow 2002-03 Lnight (6.5 hour, actual usage)**		
Contour (dBA)	Area (sq km)	Population (1000s)	Households (1000s)	Area (sq km)	Population (1000s)	Households (1000s)
48	41.1	132.4	49.8	53.9	123.0	50.9
51	20.8	64.9	22.3	27.9	55.8	21.8
54	11.2	33.2	11.0	14.8	28.0	10.7
57	6.2	11.7	3.6	7.8	10.2	3.6
60	3.4	3.2	1.0	4.0	3.6	1.2
63	1.9	1.1	0.3	2.2	1.4	0.4
	Gatwick 2011-12 Lnight (6.5 hour, actual usage)			**Gatwick 2002-03 Lnight (6.5 hour, actual usage)**		
Contour (dBA)	Area (sq km)	Population (1000s)	Households (1000s)	Area (sq km)	Population (1000s)	Households (1000s)
48	34.1	4.2	1.7	41.3	3.8	1.6

51	18.1	1.2	0.5	23.7	1.2	0.5
54	9.5	0.4	0.2	13.4	0.5	0.2
57	5.0	0.2	0.1	7.3	0.3	0.1
60	2.5	<0.1	<0.1	3.9	0.1	<0.1
63	1.3	<0.1	<0.1	2.0	<0.1	<0.1
	Stansted 2011-12 Lnight (6.5 hour, actual usage)			**Stansted 2002-03 Lnight (6.5 hour, actual usage)**		
Contour (dBA)	Area (sq km)	Population (1000s)	Households (1000s)	Area (sq km)	Population (1000s)	Households (1000s)
48	29.3	3.1	1.3	30.4	3.4	1.4
51	15.7	0.6	0.3	16.8	1.0	0.4
54	8.2	0.2	<0.1	9.3	0.4	0.2
57	4.5	<0.1	<0.1	4.9	<0.1	<0.1
60	2.6	<0.1	<0.1	2.5	<0.1	<0.1
63	1.6	<0.1	<0.1	1.3	<0.1	<0.1

Forecast without new measures

Description of airport developments

Heathrow

B.9 At Heathrow, for many years now the demand for runway capacity has exceeded the available supply for virtually all hours of the day – and there are very stringent controls on the number of flights permitted during the night quota period. Terminal 5 opened in 2008 and the airport is now in the process of redevelopment work that will see the replacement of both Terminals 1 and 2. This is to allow for an increase in passengers using the airport, mainly through an increase in the average size of aircraft using the airport. The terminal capacity of the airport will be more than 90 million passengers once the work is completed.

Gatwick

B.10 With no further major development of the airport, an increase in capacity could be achieved by an increase in the average size of aircraft using the airport and more intensive use of terminal and other facilities, facilitated by additional construction of piers, stands and other airport assets in accordance with the airport's Sustainable Development Agreement.

Stansted

B.11 In 2008, the airport was granted planning approval to cater for up to 35 mppa, subject to an annual aircraft movement limit of 264,000. The airport operator is bound not to seek any relaxation of the night flying restrictions currently in force for the night period or the night quota period.

Forecast without new measures

B.12 Night flying restrictions have been in place at Heathrow since 1962, Gatwick since 1971 and Stansted since 1978. All three airports have shown growth in daytime passenger movements but continued restrictions on movements during the night quota period (or night as variously defined in previous restrictions) has constrained growth during the night. The current night restrictions regime started in October 2006. The movements limits and noise quota available have been virtually fully used at Heathrow each season but usage has fluctuated at Gatwick and Stansted. An analysis of the actual number of movements and the amount of noise quota used each season is shown overleaf.

Table 4: Movement and Noise Quota figures (including carry-over) for Heathrow, Gatwick and Stansted

HEATHROW										
Season	Movement Limit	Actual movements used	% of movements limit used	Movements available from previous period	Flexibility used	Noise Quota	Noise quota used	% of noise quota used	Quota available from previous period	Flexibility used
Winter 2006/07	2,550	2,659	104.3%	191	109	4,140	4,266	103.0%	378	126
Summer 2007	3,250	3,053	93.9%	0	0	5,610	5,236	93.3%	0	0
Winter 2007/08	2,550	2,710	106.3%	197	160	4,140	4,100	99.0%	374.5	0
Summer 2008	3,250	2,922	89.9%	0	0	5,460	4,634	84.9%	39.8	0
Winter 2008/09	2,550	2,715	106.5%	325	165	4,110	3,948	96.0%	546	0
Summer 2009	3,250	2,848	87.6%	0	0	5,460	4,429	81.1%	162.5	0
Winter 2009/10	2,550	2,686	105.3%	325	136	4,110	3,863	94.0%	546	0
Summer 2010	3,250	3,033	93.3%	0	0	5,340	4,505	84.4%	246.8	0
Winter 2010/11	2,550	2,577	101.1%	217	27	4,110	3,735	90.9%	534	0
Summer 2011	3,250	2,958	91.0%	0	0	5,220	4,491	86.0%	374.8	0
Winter 2011/12	2,550	2,583	101.3%	292	33	4,080	3,377	82.8%	522	0
Summer 2012	3,250	2,853	87.8%	0	0	5,100	3,946	77.4%	408	0
GATWICK										

Season	Movement Limit	Actual movements used	% of movements limit used	Movements available from previous period	Flexibility used	Noise Quota	Noise quota used	% of noise quota used	Quota available from previous period	Flexibility used
Winter 2006/07	3,250	2,734	84.1%	282	0	2,300	1,355	58.9%	900	0
Summer 2007	11,200	10,173	90.8%	325	0	6,700	5,329	79.5%	230	0
Winter 2007/08	3,250	2,929	90.1%	1,027	0	2,240	1,542	68.9%	670	0
Summer 2008	11,200	10,618	94.8%	321	0	6,600	5,660	85.8%	224	0
Winter 2008/09	3,250	2,145	66.0%	582	0	2,180	1,169	53.6%	660	0
Summer 2009	11,200	9,099	81.2%	325	0	6,500	4,787	73.6%	218	0
Winter 2009/10	3,250	2,199	67.7%	1,120	0	2,120	1,237	58.3%	650	0
Summer 2010	11,200	9,875	88.2%	325	0	6,400	4,824	75.4%	212	0
Winter 2010/11	3,250	2,160	66.5%	1,120	0	2,060	1,281	62.2%	640	0
Summer 2011	11,200	9,859	88.0%	325	0	6,300	4,999	79.3%	206	0
Winter 2011/12	3,250	1,411	43.4%	1,120	0	2,000	920	46.0%	630	0
Summer 2012	11,200	9,837	87.8%	325	0	6,200	4,994	80.5%	200	0
STANSTED										
Season	Movement Limit	Actual movements used	% of movements limit used	Movements available from previous	Flexibility used	Noise Quota	Noise quota used	% of noise quota used	Quota available from previous period	Flexibility used

				period						
Winter 2006/07	5,000	3,751	75.0%	532	0	3,510	2,514	71.6%	430.5	0
Summer 2007	7,000	7,307	104.4%	500	307	4,900	4,400	89.8%	351	0
Winter 2007/08	5,000	3,612	72.2%	0	0	3,470	2,428	70.0%	490	0
Summer 2008	7,000	6,498	92.8%	500	0	4,850	3,931	81.1%	347	0
Winter 2008/09	5,000	3,196	63.9%	502	0	3,430	2,137	62.3%	485	0
Summer 2009	7,000	5,979	85.4%	500	0	4,800	3,538	73.7%	343	0
Winter 2009/10	5,000	3,429	68.6%	700	0	3,390	2,345	69.2%	480	0
Summer 2010	7,000	6,081	86.9%	500	0	4,750	3,454	72.7%	339	0
Winter 2010/11	5,000	2,595	51.9%	700	0	3,350	1,766	52.7%	475	0
Summer 2011	7,000	6,004	85.8%	500	0	4,700	3,552	75.6%	335	0
Winter 2011/12	5,000	2,298	46.0%	700	0	3,310	1,632	49.3%	470	0
Summer 2012	7,000	5,837	83.4%	500	0	4,650	3,604	77.5%	331	0

B.13 As part of the assessments detailed in Directive 2002/30/EC we have calculated theoretical contours and the numbers of people affected should 100% of the movement limit and noise quota be used. These are shown for the 6.5 hour night period and can be compared with the actual contour for the 6.5 hour night quota period.

B.14 These contours include movements by exempt aircraft but do not include dispensations. A summary of the usage of the movements available and noise quota at each airport, together with the number of exempt movements and those given dispensations is shown at the end of this annex.

Table 5: Lnight (6.5 hour, maximum usage) data for Heathrow, Gatwick and Stansted

	Heathrow 2011-12 Lnight (6.5 hour, maximum usage)			**Heathrow 2002-03 Lnight (6.5 hour, maximum usage)**		
Contour (dBA)	Area (sq km)	Population (1000s)	Households (1000s)	Area (sq km)	Population (1000s)	Households (1000s)
48	45.9	145.5	55.4	55.7	129.3	53.7
51	23.4	70.9	24.5	28.6	57.0	22.4
54	12.7	38.1	12.7	15.1	28.7	11.0
57	7.1	15.2	4.8	8.0	11.1	4.0
60	3.9	4.4	1.4	4.1	3.8	1.3
63	2.2	1.5	0.4	2.2	1.6	0.5
	Gatwick 2011-12 Lnight (6.5 hour, maximum usage)			**Gatwick 2002-03 Lnight (6.5 hour, maximum usage)**		
Contour (dBA)	Area (sq km)	Population (1000s)	Households (1000s)	Area (sq km)	Population (1000s)	Households (1000s)
48	45.2	5.2	2.1	66.1	6.5	2.6
51	23.8	1.6	0.6	38.0	3.7	1.5
54	12.4	0.6	0.3	21.4	1.1	0.4
57	6.2	0.3	0.1	12.0	0.4	0.2
60	3.3	<0.1	<0.1	6.6	0.2	0.1
63	1.8	<0.1	<0.1	3.4	0.1	<0.1

	Stansted 2011-12 Lnight (6.5 hour, maximum usage)			Stansted 2002-03 Lnight (6.5 hour, maximum usage)		
Contour (dBA)	Area (sq km)	Population (1000s)	Households (1000s)	Area (sq km)	Population (1000s)	Households (1000s)
48	40.5	4.2	1.6	37.7	4.1	1.7
51	22.6	1.4	0.5	20.8	1.3	0.5
54	12.0	0.5	0.2	11.7	0.7	0.3
57	6.5	0.1	<0.1	6.3	0.1	0.1
60	3.7	<0.1	<0.1	3.2	<0.1	<0.1
63	2.2	<0.1	<0.1	1.7	<0.1	<0.1

B.15 Maximum usage of the movement limits and noise quotas could lead to a worsening of the noise climate compared to 2011/12 but not beyond that already permitted and taken into account in establishing the restrictions. Year on year growth in the number of flights in the night quota period, as seen at some other European airports, has not and cannot take place at Heathrow as it is already operating near the current limits. However, the current night restrictions regime for Gatwick and Stansted would include significant headroom for growth if left to continue unchanged.

Figure 1: Heathrow 2011 average mode L_{den} contours (55-75 dBA)

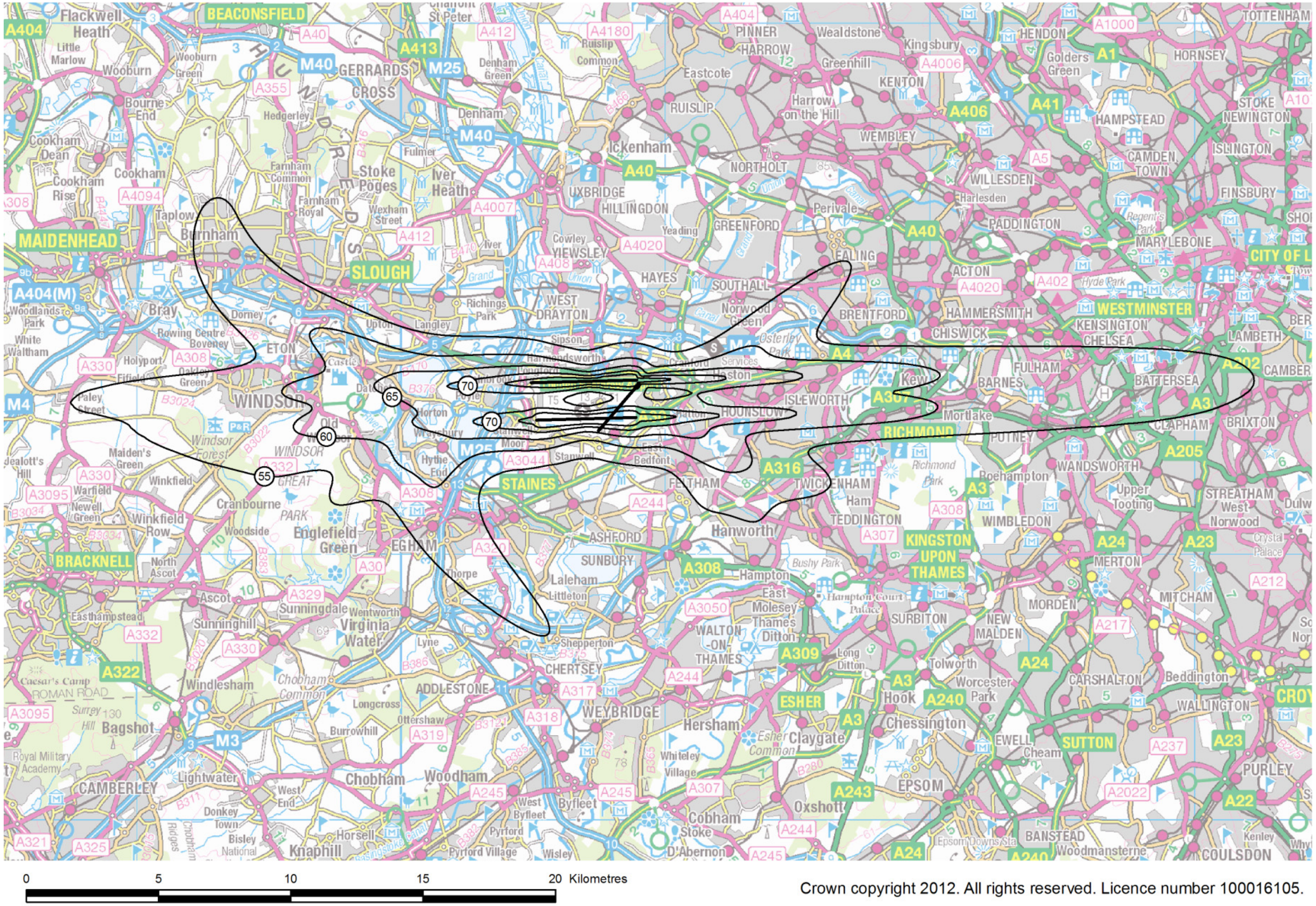


Figure 2: Gatwick 2011 average mode L_{den} contours (55-75 dBA)

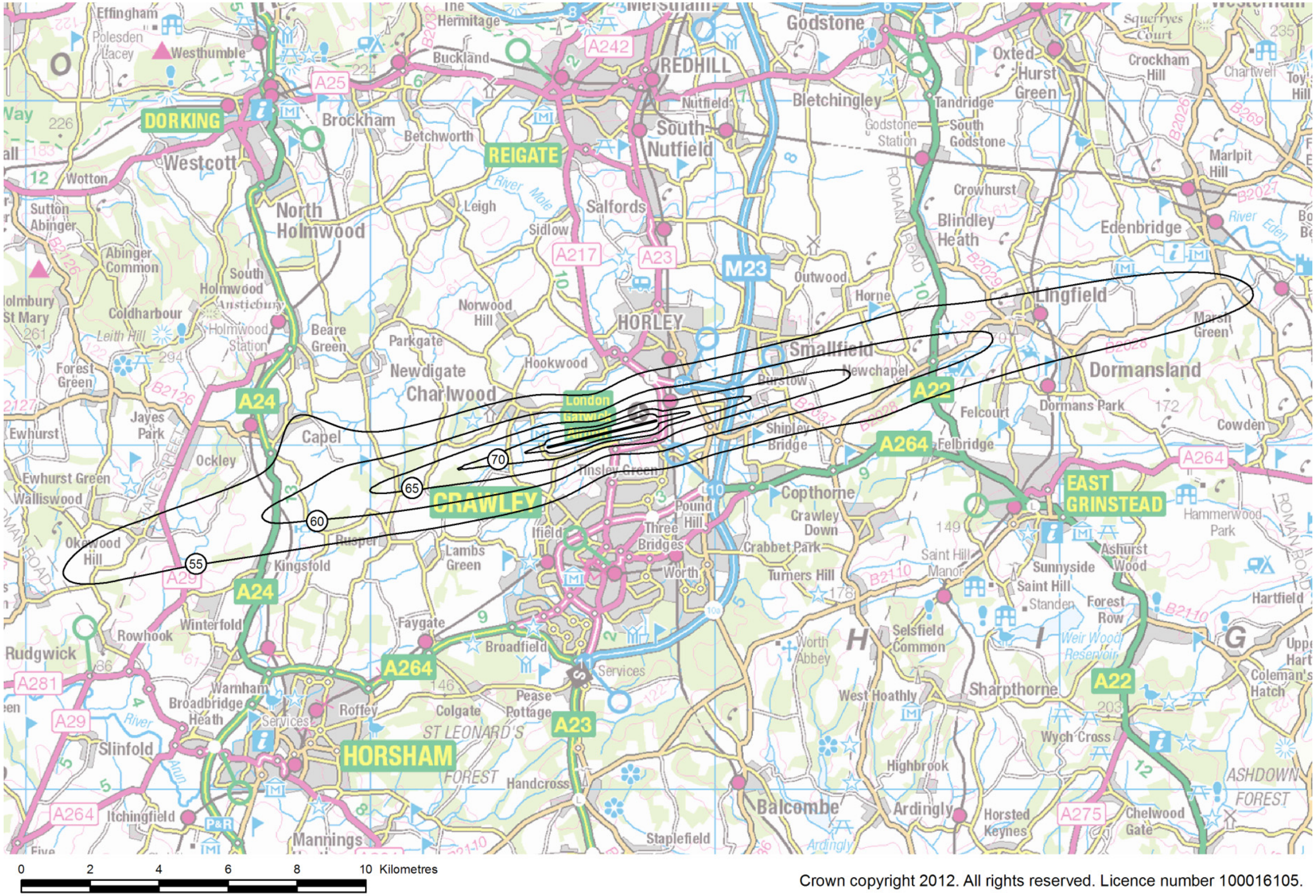


Figure 3: Stansted 2011 average mode L_{den} contours (55-75 dBA)

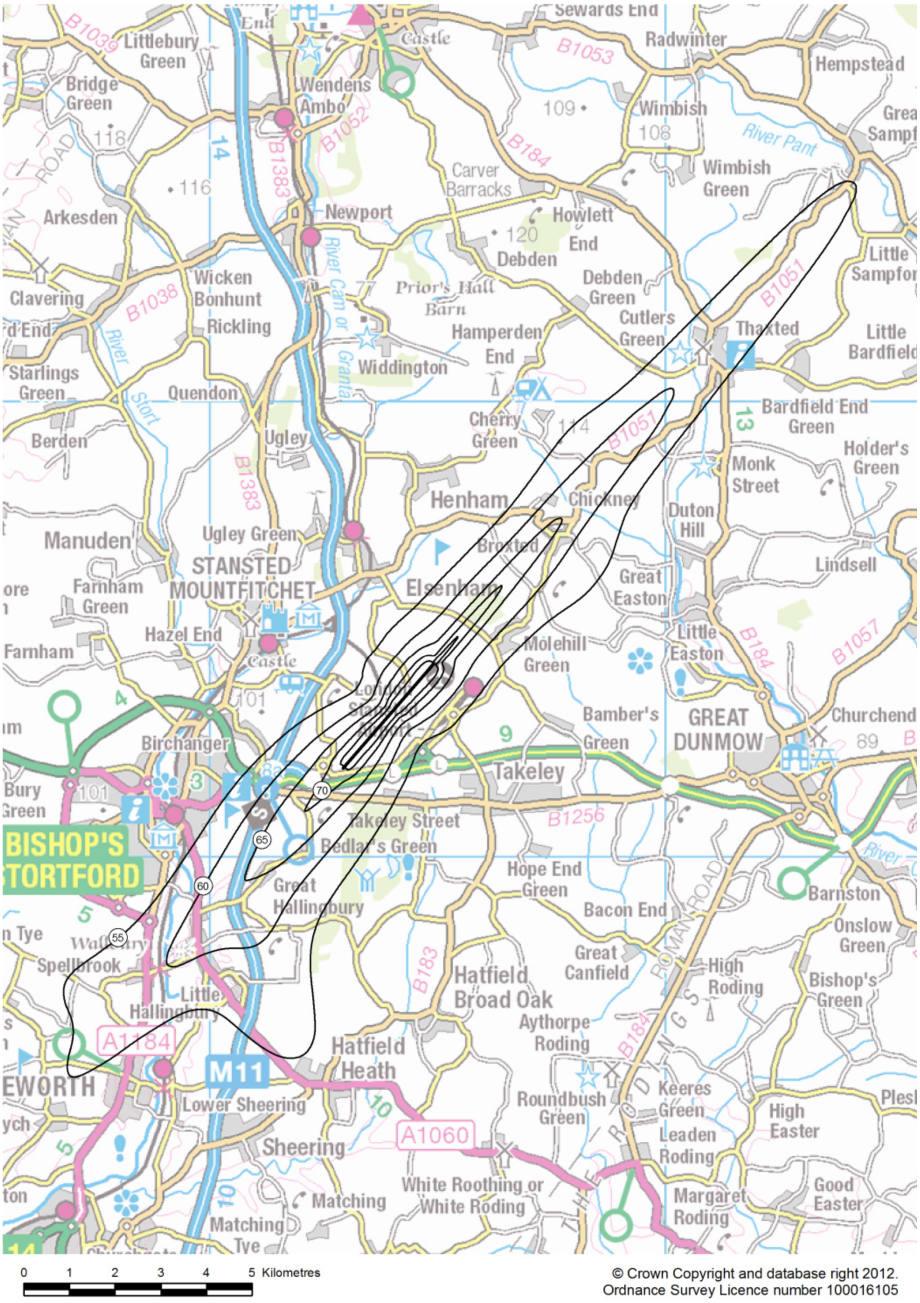
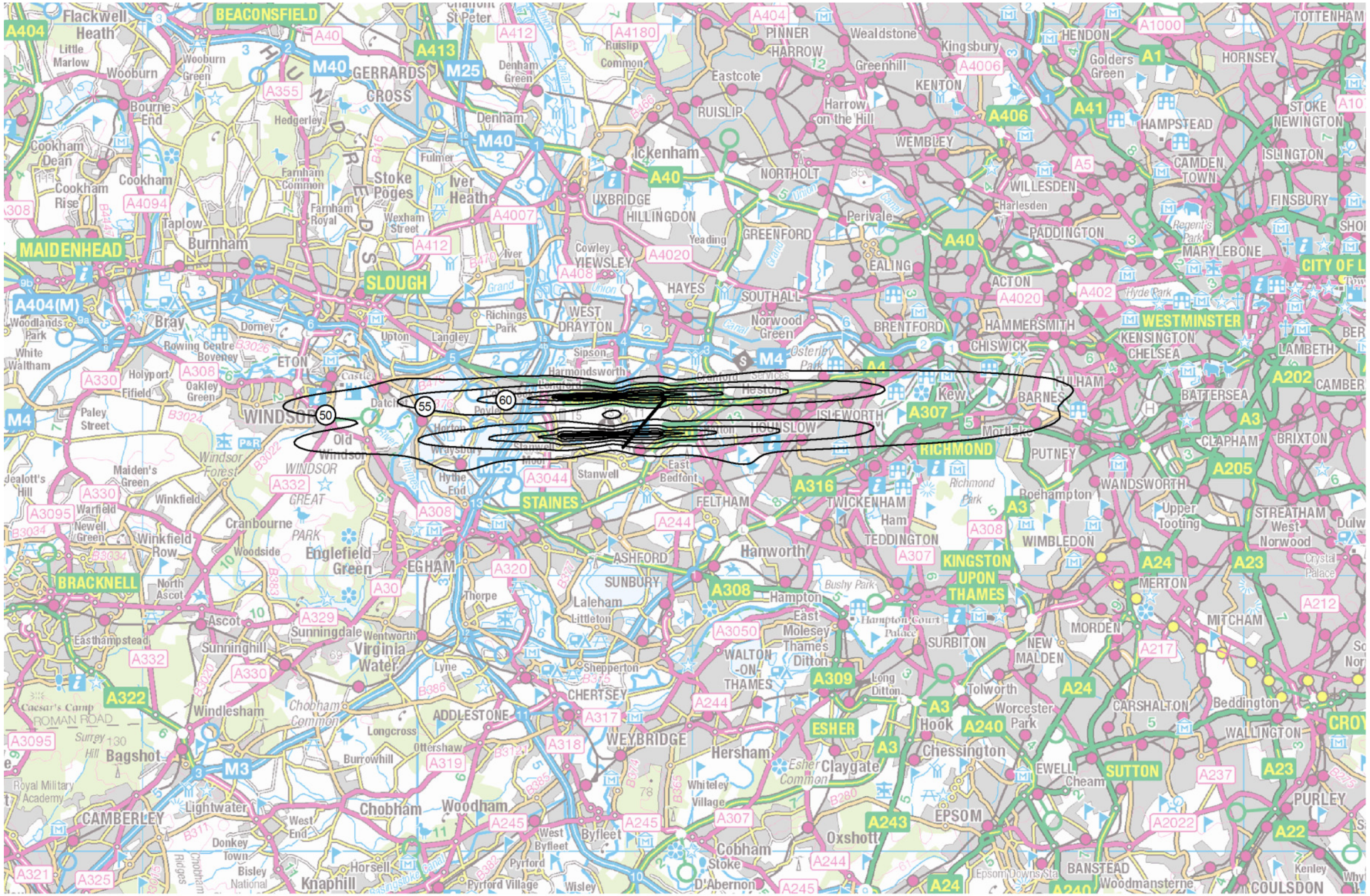


Figure 4: Heathrow 2011 average mode L_{night} (8 hours) contours (50-70 dBA)



0 5 10 15 20 Kilometres

Figure 5: Gatwick 2011 average mode L_{night} (8 hours) contours (50-70 dBA)

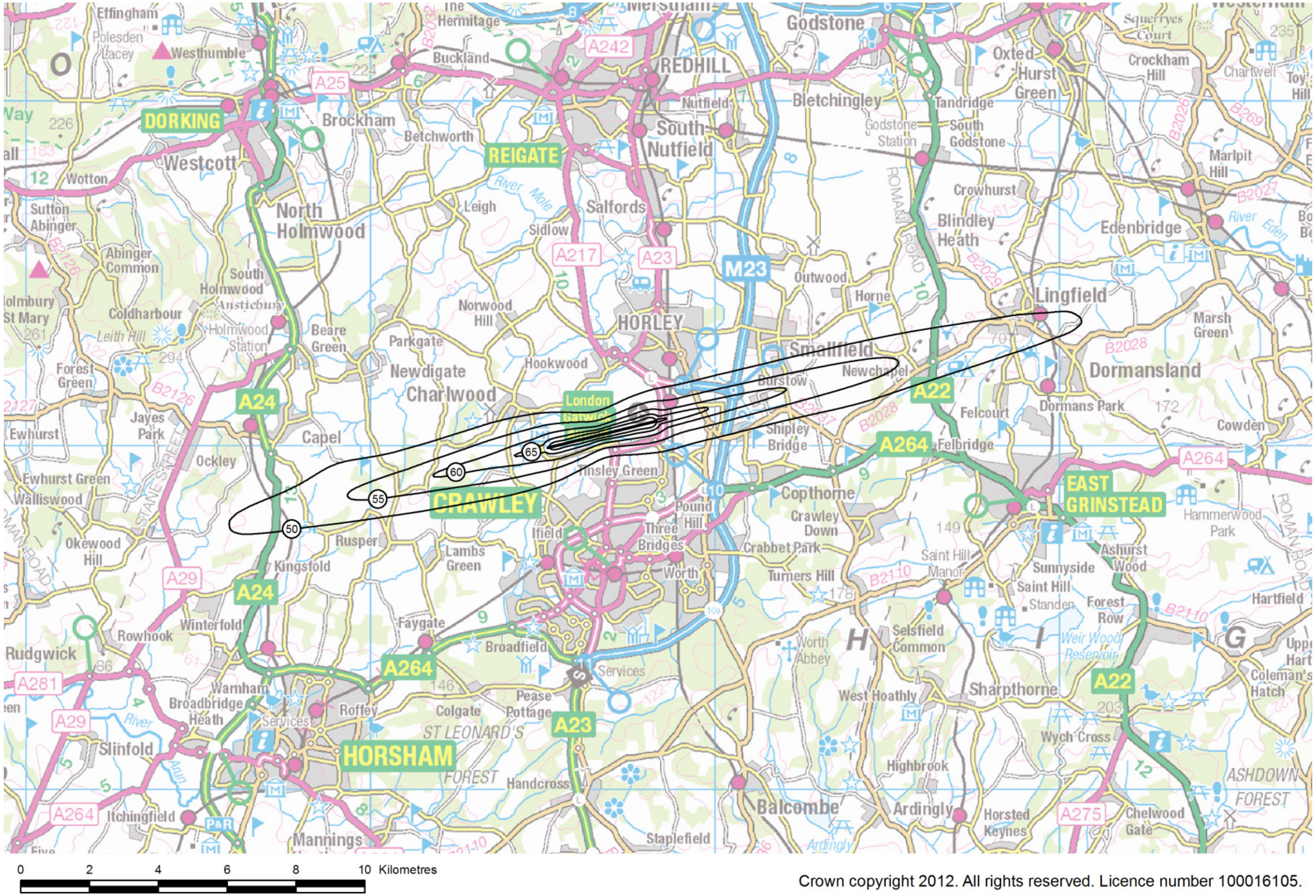
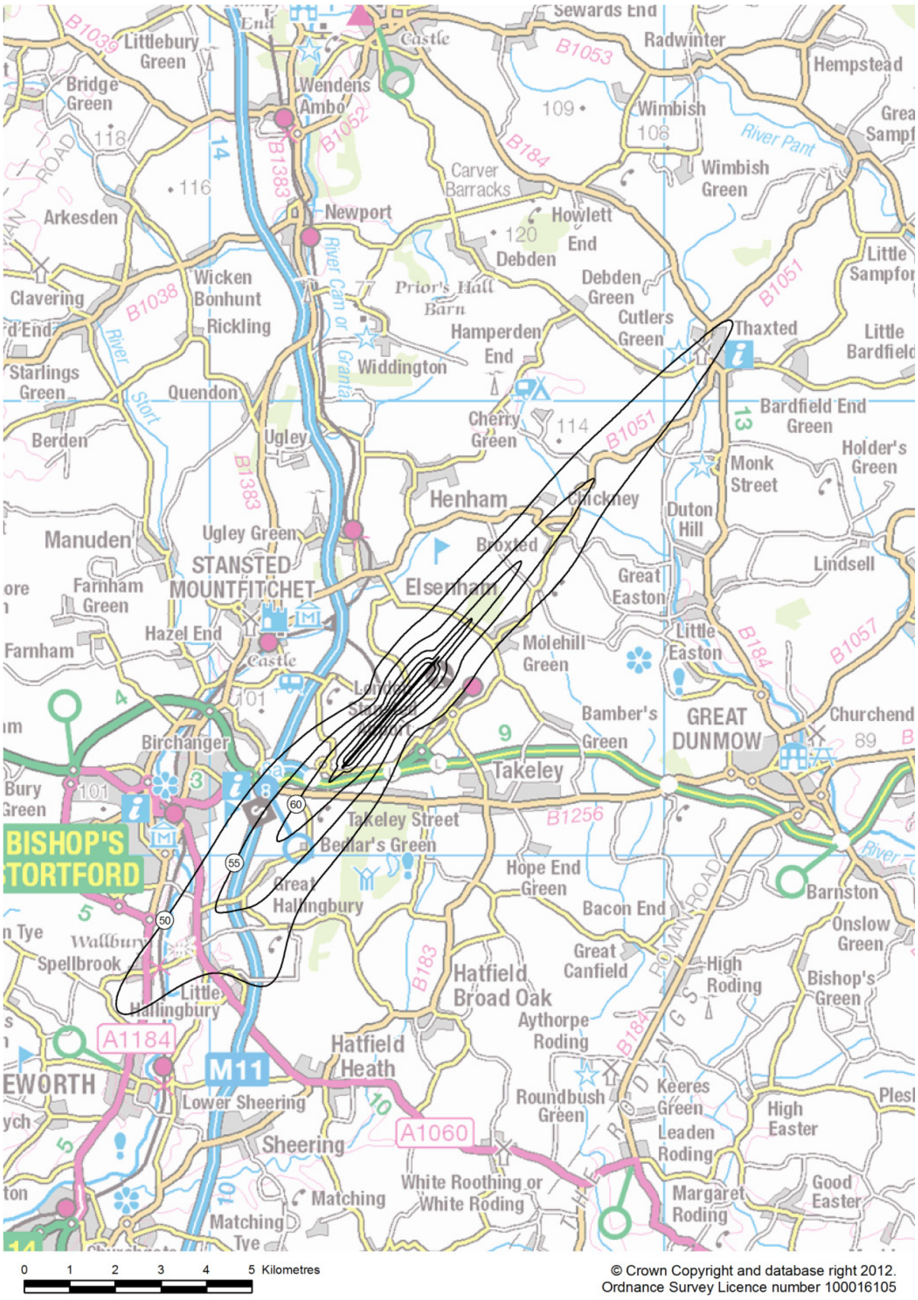


Figure 6: Stansted 2011 average mode L_{night} (8 hours) contours (50-70 dBA)



0 1 2 3 4 5 Kilometres

Figure 7: Heathrow March 2011 - March 2012 average mode L_{night} (6.5 hour) contours (48-63 dBA)

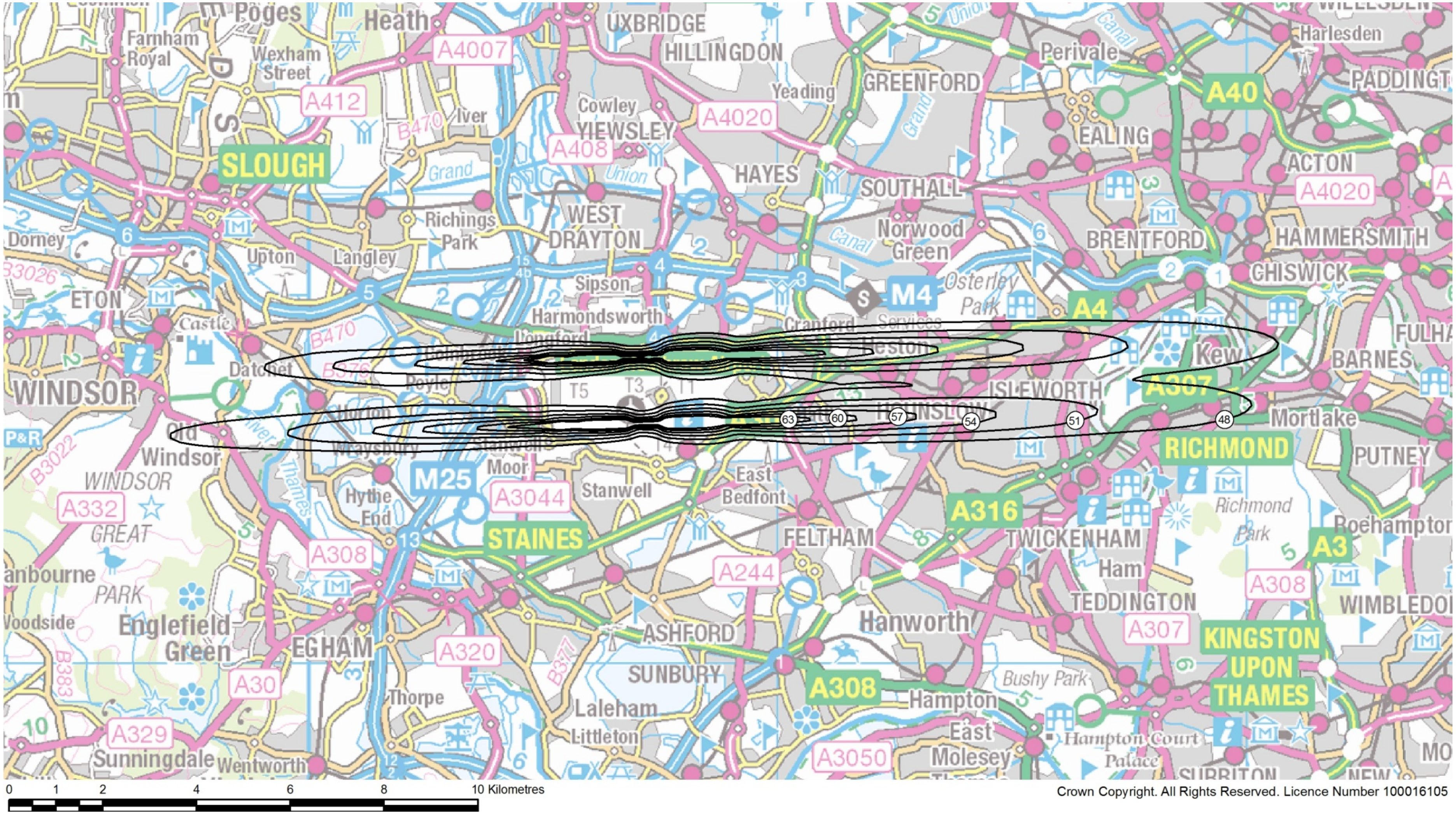
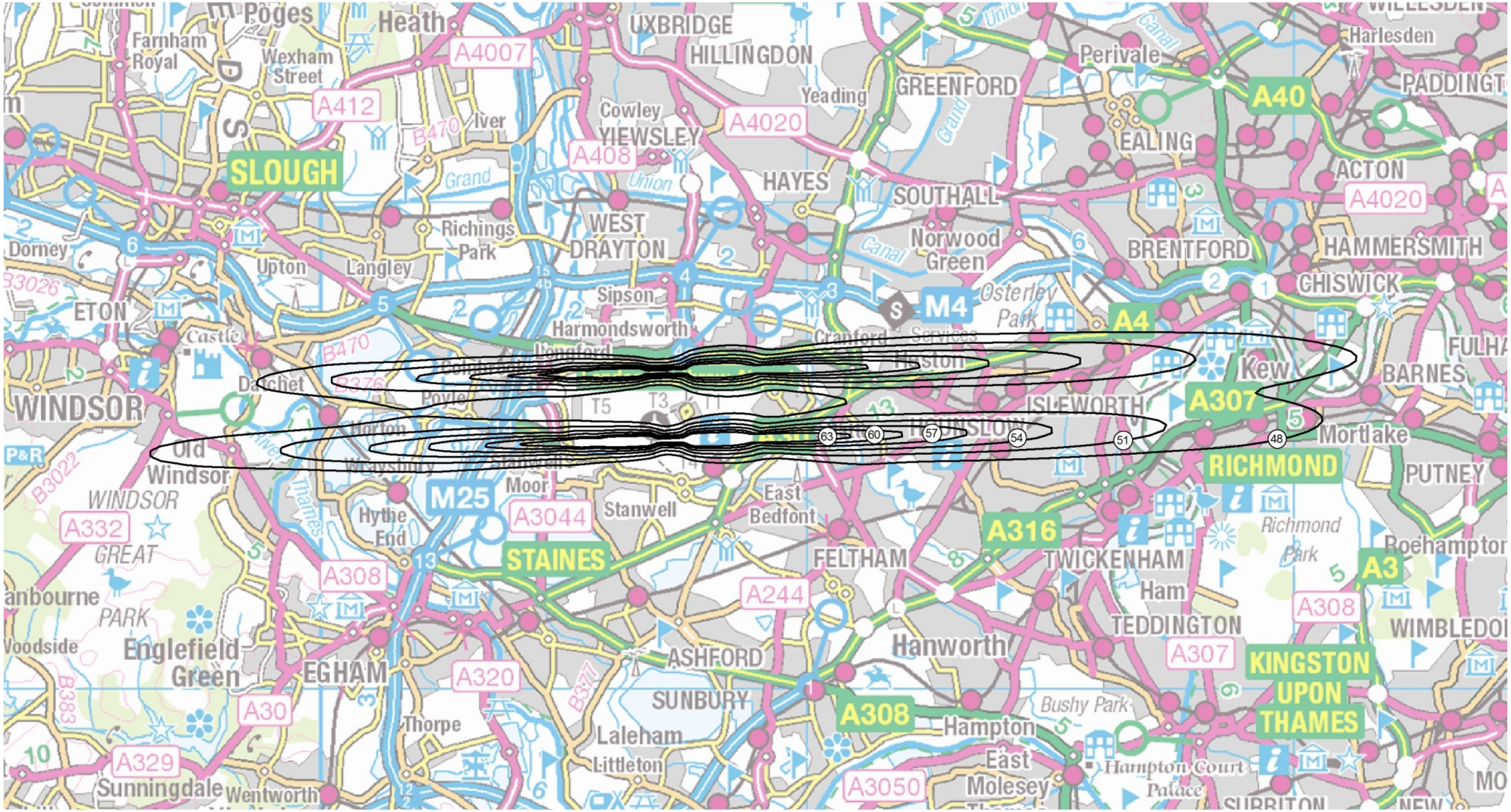
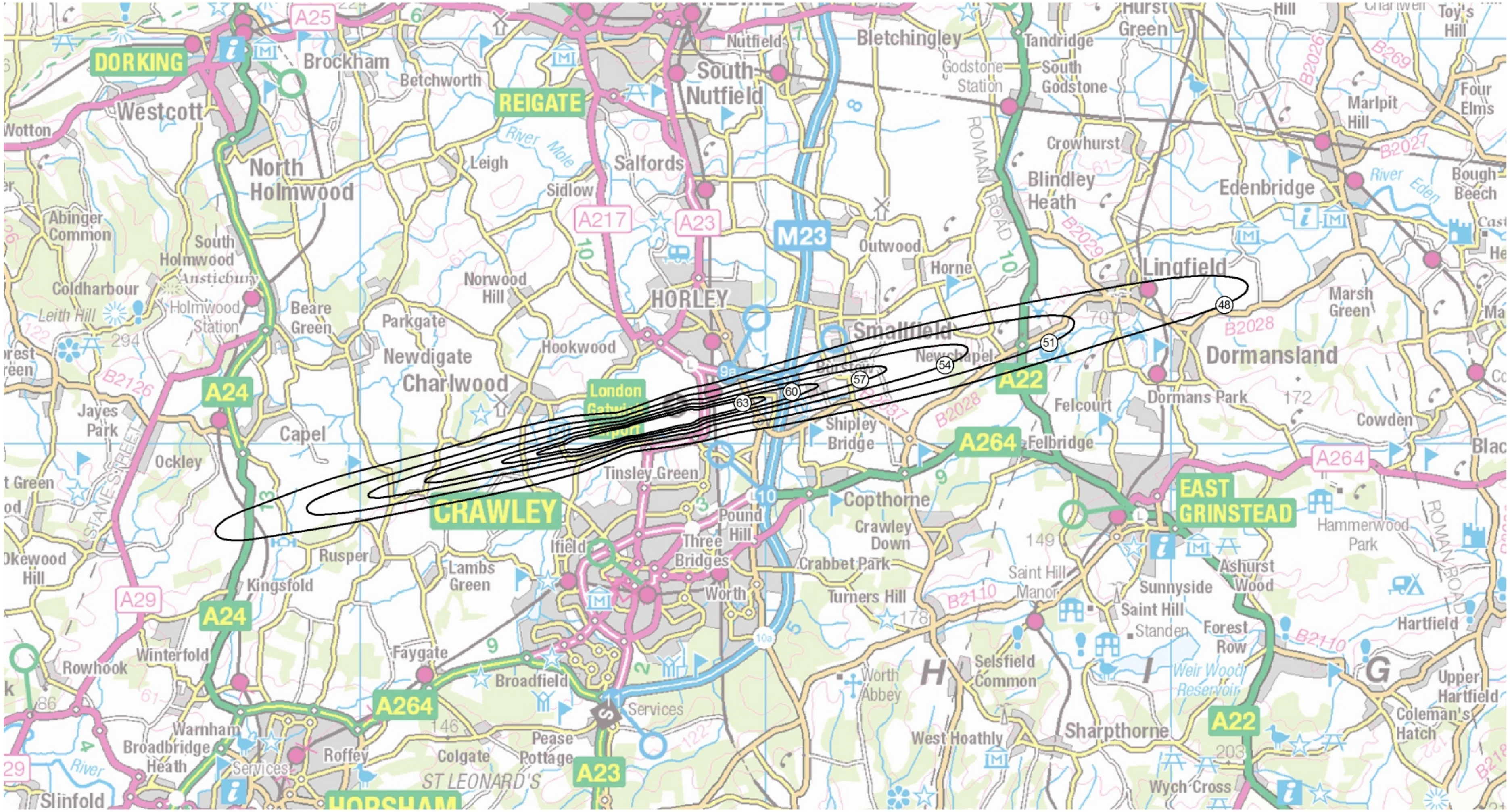


Figure 8: Heathrow March 2011 - March 2012 average mode L_{night} (6.5 hour) contours (48-63 dBA), assuming maximum usage of quota and movements



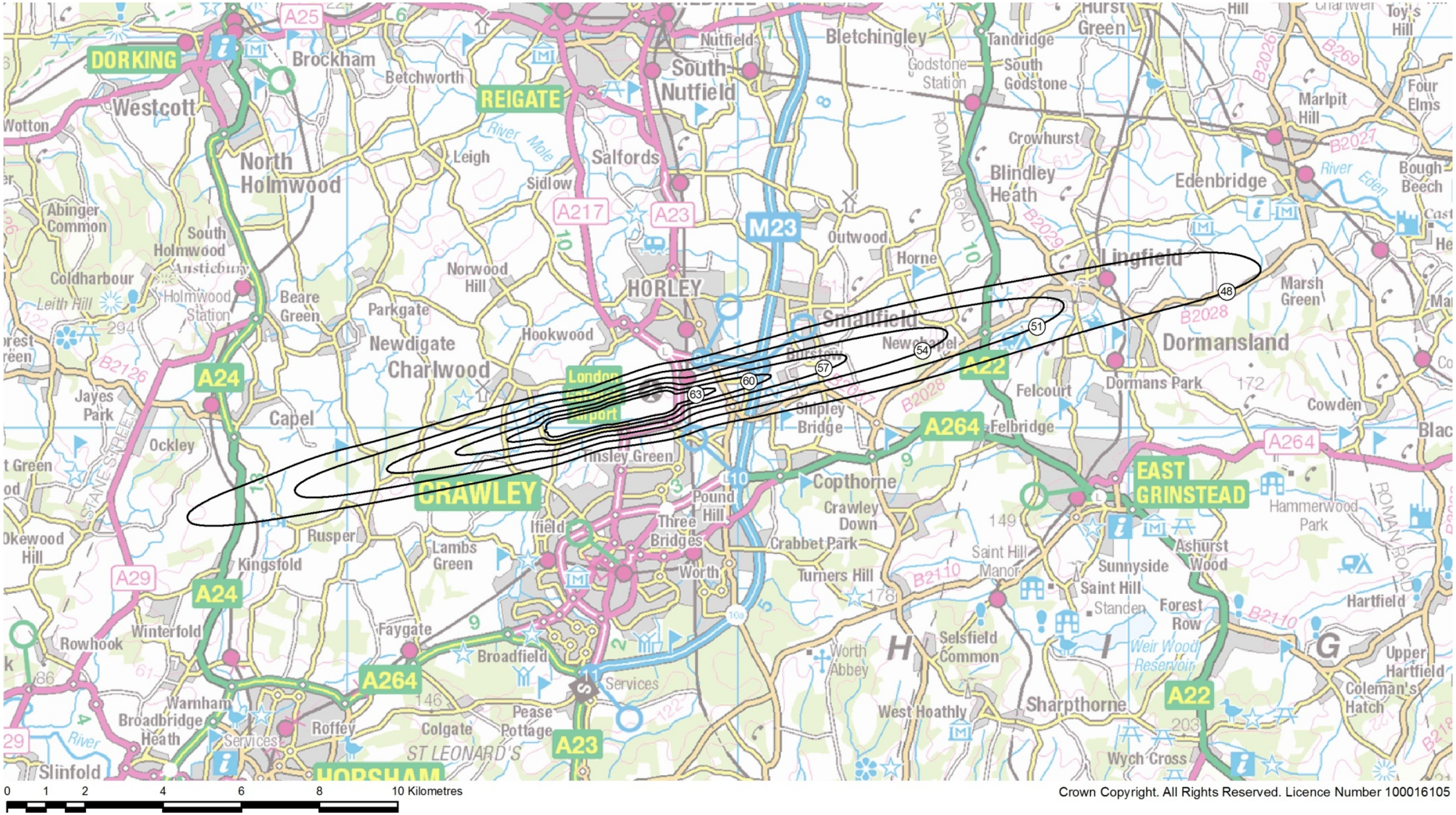
0 1 2 4 6 8 10 Kilometres

Figure 9: Gatwick March 2011 - March 2012 average mode L_{night} (6.5 hour) contours (48-63 dBA)



0 1 2 4 6 8 10 Kilometres

Figure 10: Gatwick March 2011 - March 2012 average mode L_{night} (6.5 hour) contours (48-63 dBA), assuming maximum usage of quota and movements



0 1 2 4 6 8 10 Kilometres

Figure 11: Stansted March 2011 - March 2012 average mode L_{night} (6.5 hour) contours (48-63 dBA)

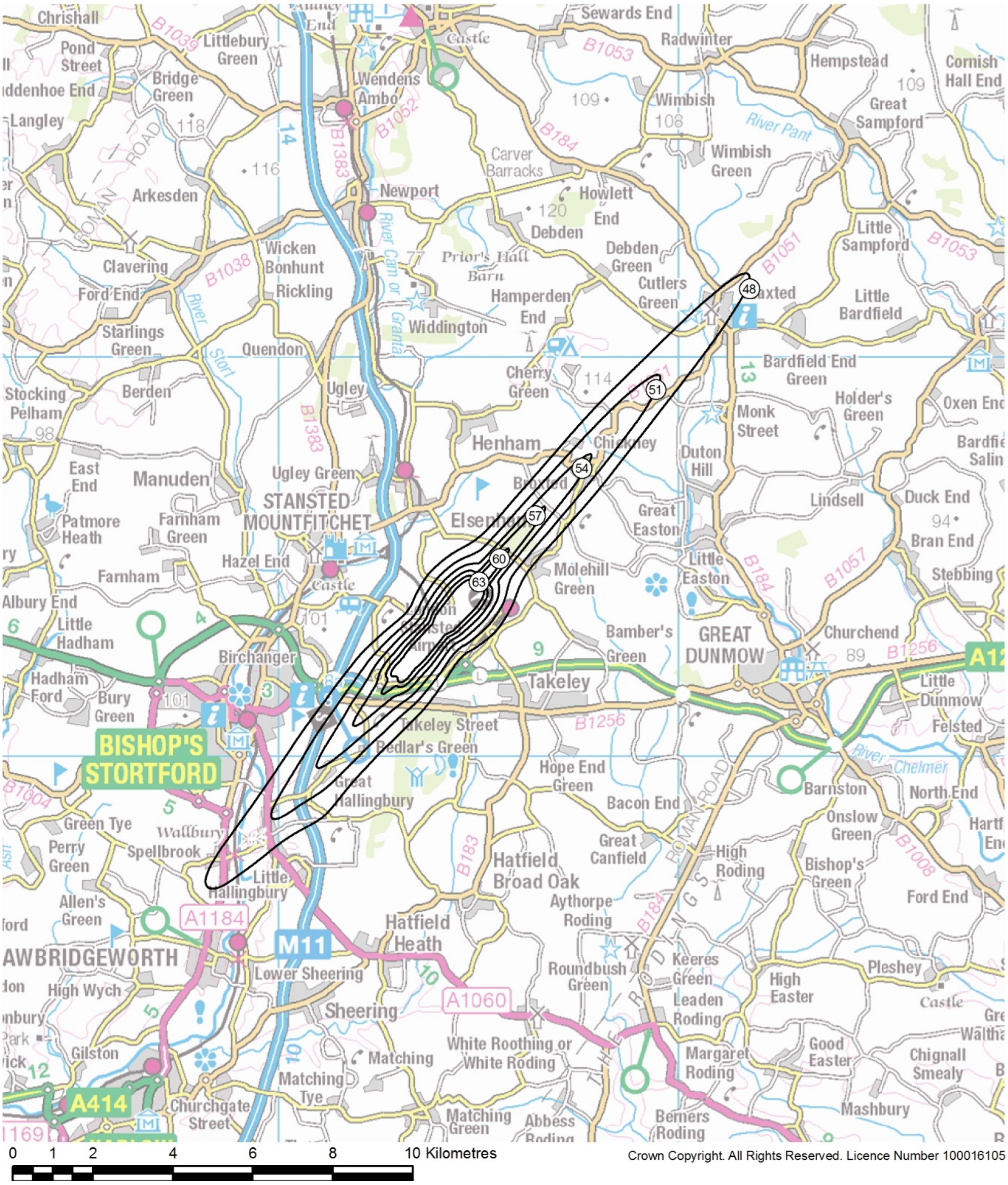
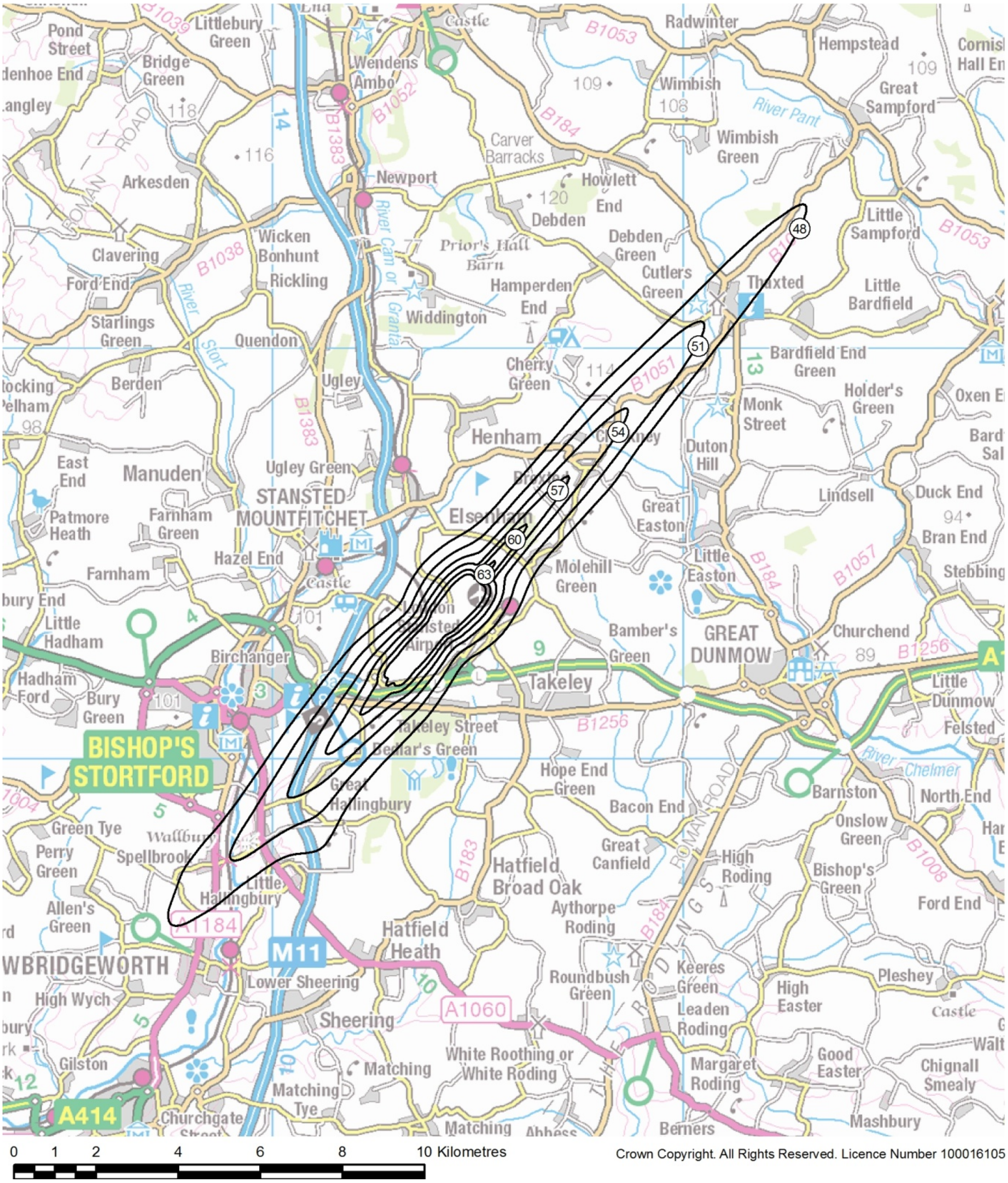


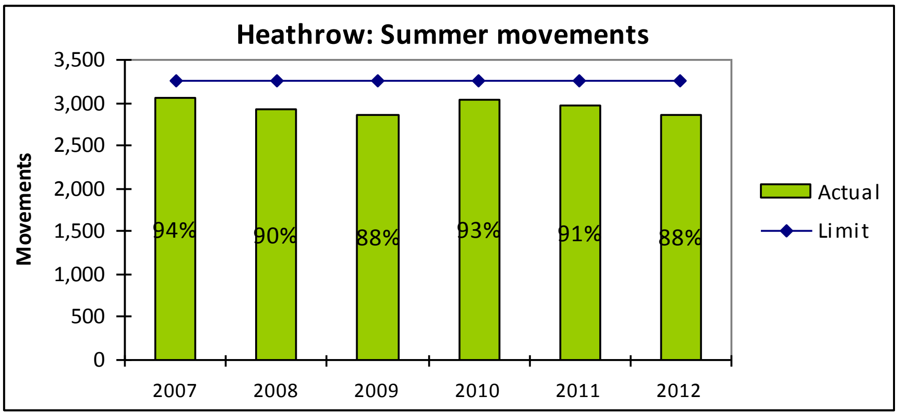
Figure 12: Stansted March 2011 - March 2012 average mode L_{night} (6.5 hour) contours (48-63 dBA), assuming maximum usage of quota and movements

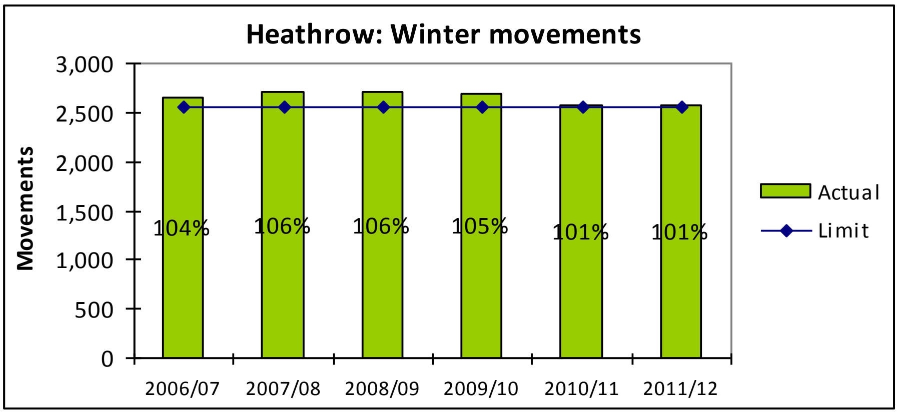


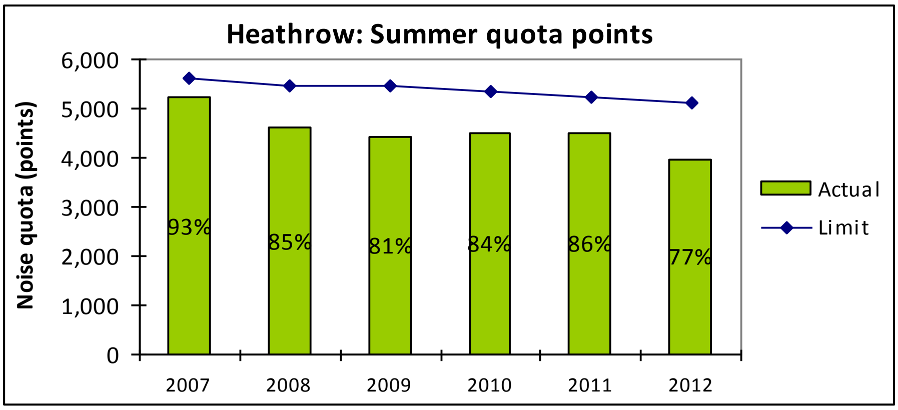
Annex C: Airport movements and quotas

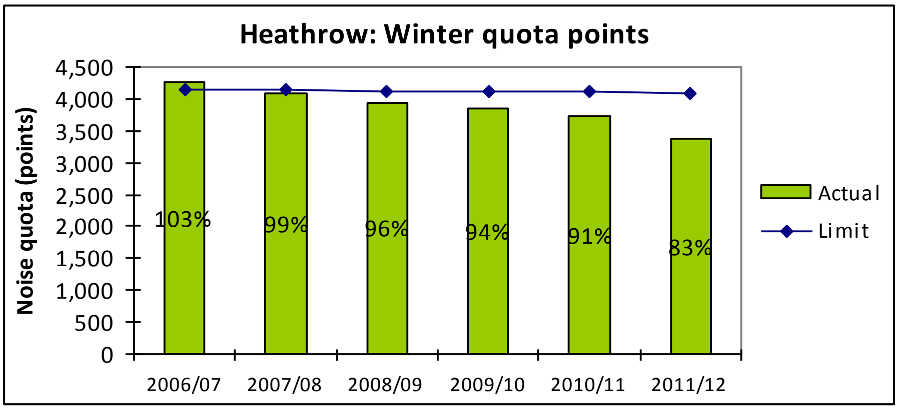
Fig 1: Comparison of actual and limits by season and airport

Heathrow

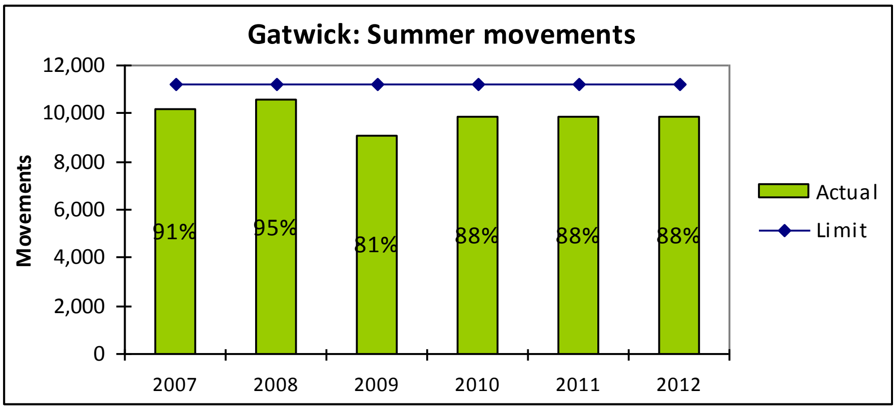


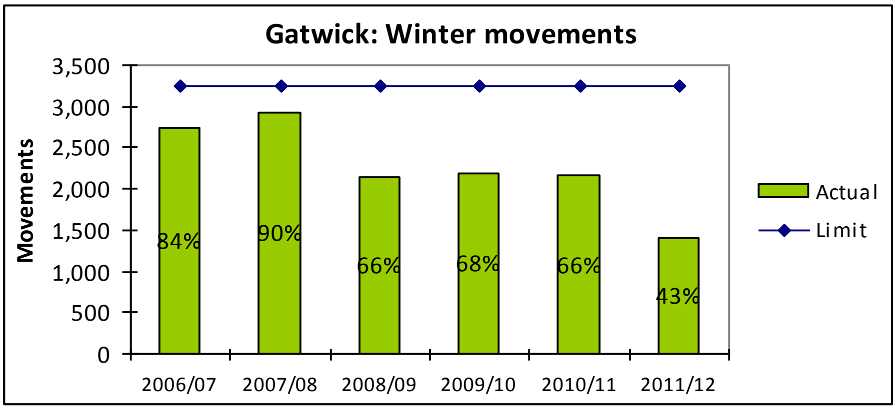


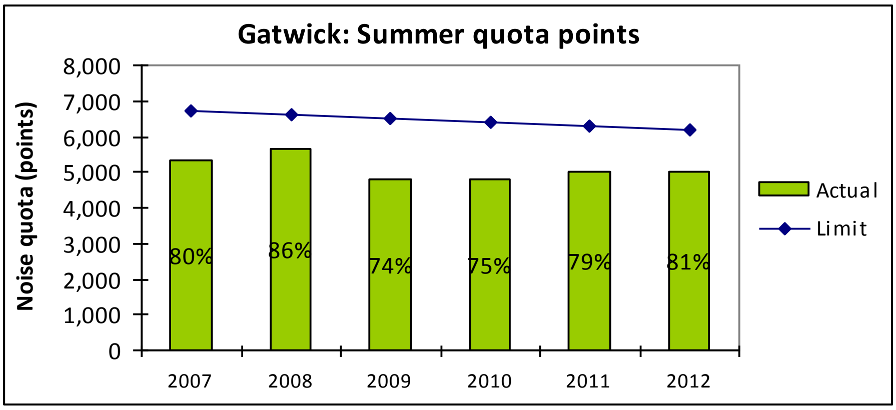


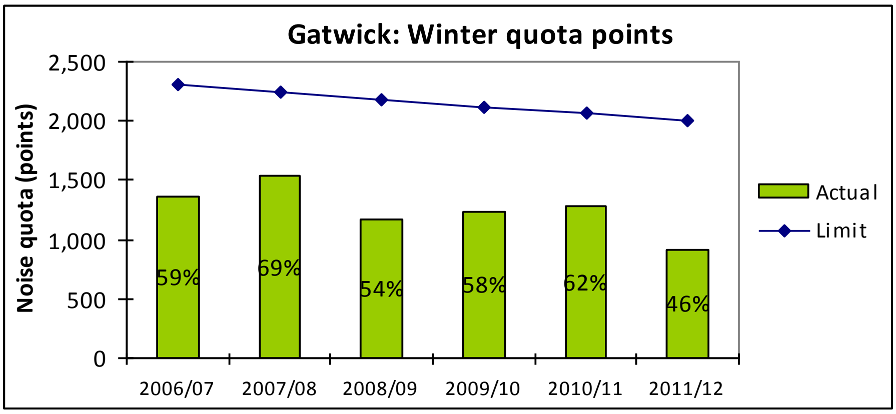

Heathrow: Winter quota points
Noise quota (points)
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
103%
99%
96%
94%
91%
83%
2006/07
2007/08
2008/09
2009/10
2010/11
2011/12
Actual
Limit

Gatwick

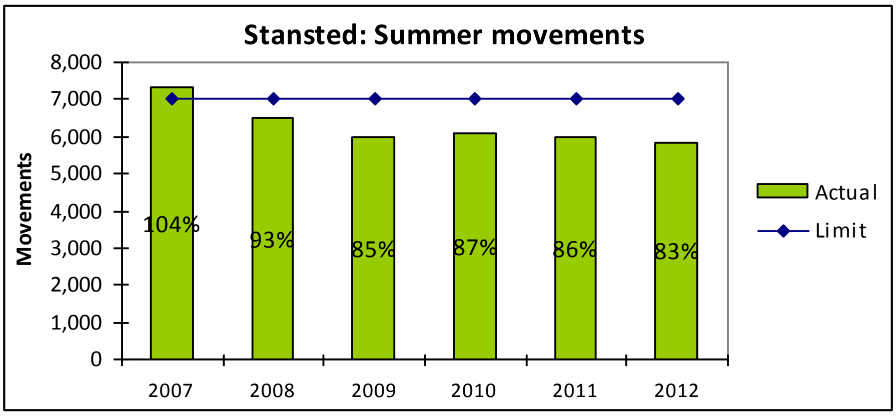

Gatwick: Summer movements
Movements
12,000
10,000
8,000
6,000
4,000
2,000
0
91%
95%
81%
88%
88%
88%
2007
2008
2009
2010
2011
2012
Actual
Limit

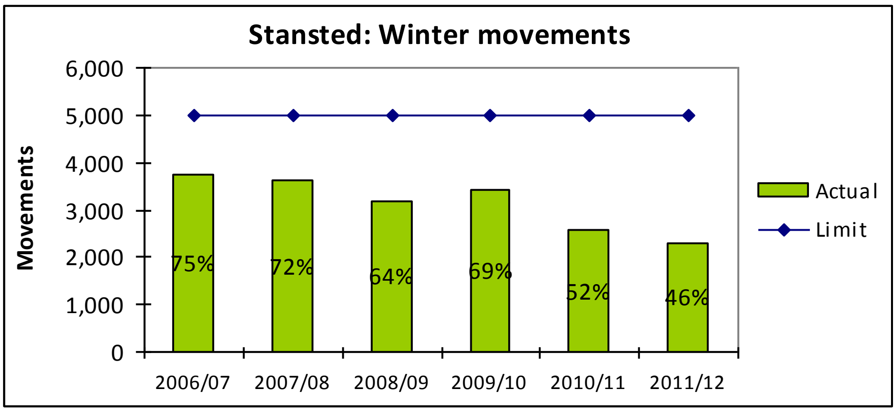

Gatwick: Winter movements
Movements
3,500
3,000
2,500
2,000
1,500
1,000
500
0
84%
90%
66%
68%
66%
43%
2006/07
2007/08
2008/09
2009/10
2010/11
2011/12
Actual
Limit

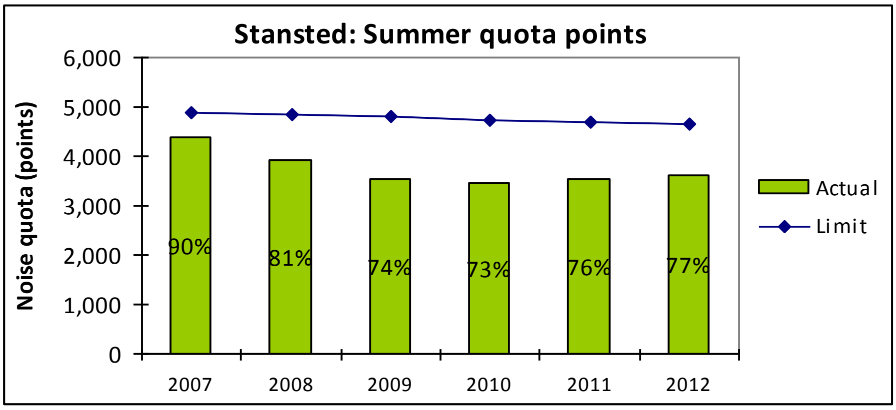

Gatwick: Summer quota points
Noise quota (points)
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
80%
86%
74%
75%
79%
81%
2007
2008
2009
2010
2011
2012
Actual
Limit

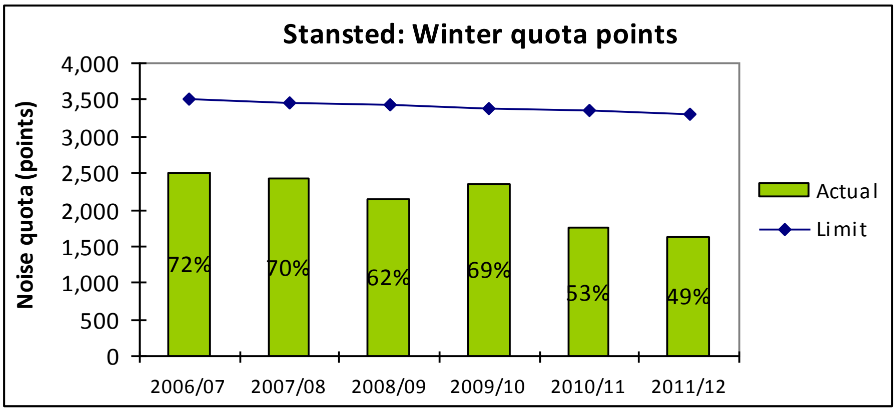

Gatwick: Winter quota points
Noise quota (points)
2,500
2,000
1,500
1,000
500
0
59%
69%
54%
58%
62%
46%
2006/07
2007/08
2008/09
2009/10
2010/11
2011/12
Actual
Limit

Stansted


Stansted: Summer movements
Movements
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
104%
93%
85%
87%
86%
83%
2007
2008
2009
2010
2011
2012
Actual
Limit


Stansted: Winter movements
Movements
6,000
5,000
4,000
3,000
2,000
1,000
0
75%
72%
64%
69%
52%
46%
2006/07
2007/08
2008/09
2009/10
2010/11
2011/12
Actual
Limit


Stansted: Summer quota points
Noise quota (points)
6,000
5,000
4,000
3,000
2,000
1,000
0
90%
81%
74%
73%
76%
77%
2007
2008
2009
2010
2011
2012
Actual
Limit



Stansted: Winter quota points
Noise quota (points)
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
72%
70%
62%
69%
53%
49%
2006/07
2007/08
2008/09
2009/10
2010/11
2011/12
Actual
Limit

Annex D: Current exempt movements

Table 6: Numbers of exempt movements during the current night noise regime

	Heathrow			Gatwick			Stansted		
Season	**Number of Exempt Movements**	**Available Quota**	**Available Movements**	**Number of Exempt Movements**	**Available Quota**	**Available Movements**	**Number of Exempt Movements**	**Available Quota**	**Available Movements**
Winter 2006-07	95*	154.00	53	50	1844.75	798	294	996.25	1249
Summer 2007	150	374.50	197	107	1601.50	1352	317*	851.50	193
Winter 2007-08	87*	413.75	37	50	697.75	321	183	1041.75	1388
Summer 2008	109	826.00	328	83	940.00	582	266	1093.00	1002
Winter 2008-09	80	988.50	163	62	1011.00	1105	150	1293.50	1804
Summer 2009	108	1030.75	402	74	1713.50	2101	246	1604.75	1521
Winter 2009-10	110	683.75	189	103	883.25	1051	238	1047.25	1574

Summer 2010	120	832.25	217	74	1576.00	1325	306	1635.25	1419
Winter 2010-11	67	946.75	190	58	779.25	1090	230	1583.75	2405
Summer 2011	116	729.00	292	85	1301.50	1341	292	1483.00	1496
Winter 2011-12	75	1462.00	259	62	1079.75	1839	221	1678.00	2702
Summer 2012	72	1153.75	397	92	1206.50	1363	331	1377.50	1663

Number of exempt operations exceeds the number of available (unused) movements for that season

Annex E: Existing guidelines

DETR GUIDELINES ON FLIGHTS WHICH MAY BE GIVEN DISPENSATIONS FROM THE NIGHT RESTRICTIONS

1. The Secretary of State has the power under Section 78 of the Civil Aviation Act 1982 to specify circumstances in which movements may be disregarded from the night restrictions by the airport managers and the power to authorise that specific flights should be disregarded.

EMERGENCIES

2. Flights involving emergencies where there is an immediate danger to life or health, whether human or animal, are excluded automatically from night restrictions irrespective of the type of aircraft involved.

EXCEPTIONAL CIRCUMSTANCES

3. The airport companies may disregard night movements in the following exceptional circumstances:-

a) delays to aircraft which are likely to lead to serious congestion at the aerodrome or serious hardship or suffering to passengers or animals;

b) delays to aircraft resulting from widespread and prolonged disruption of air traffic.

GUIDELINES

4. The following guidelines should be borne in mind in considering requests for disregarding movements from the provisions of the night restrictions. They are not intended to cover every situation which might conceivably arise, but they do cover most of the situations which have arisen over many years.

HARDSHIP

5. Airport managers are expected to use their own judgement as to what constitutes serious hardship or suffering for the purposes of paragraph 3(a) above. Serious hardship or suffering is intended to cover cases where passengers are subjected to long delays when the terminal buildings are overcrowded and their facilities strained and insufficient hotel accommodation is available. Only the minimum number of flights required to reduce overcrowding to a tolerable level should be disregarded. Inconvenience to passengers does not constitute hardship. The same considerations apply if serious hardship at an originating airport is to be a reason for disregarding a landing.

6. Delays giving rise to serious hardship occur infrequently but they may occur at any time during the season. Dispensations for hardship may therefore be given at any time during the season.

7. Delayed cargo flights (other than those carrying animals and meeting the criteria in paragraph 3(a) above) and extra night shuttle flights to meet demand may not be disregarded.

All such movements must count against the movements limit and the noise quota according to their QC classification.

AIR TRAFFIC DISRUPTION

8. This is intended to cover widespread and prolonged disruption affecting air traffic flow in several countries, and not a localised, short-lived problem. It would include strikes, by Air Traffic controllers in other countries, but not strikes by baggage handlers or delays arising from additional security checks which should be taken into account when planning operations. Such occurrences are not abnormal and adequate provision should be made within the night restrictions to cover these and other operational difficulties which cannot be predicted precisely but which experience indicates can be expected to occur.

9. It also includes initial air traffic disruption arising from major political difficulties abroad. Dispensations would not be appropriate when aircraft operators have time to rearrange their schedules.

10. All dispensations in times of air traffic disruption (whether ATC, political crisis, etc.) are NET; i.e. any movements scheduled for the night period but which do not occur (or occur in the daytime) because of that disruption, must be offset against this, with only the excess counting as dispensations from the movements limits and the noise quotas.

11. Unscheduled landings in the night period due to ATC congestion at an airport arising from fog or when low visibility procedures are in operation, and diversions from other airports for the same reason, are accepted as emergencies, provided an aircraft had taken off unaware that its intended destination was unavailable (here again only the NET extra movements above the number already scheduled may be counted as emergencies). Problems arising from snow and ice are not in themselves sufficient reason for dispensations, especially for departures, when the likelihood of adverse weather conditions should be taken into account in operations planning.

FURTHER EXEMPTIONS

12. The Secretary of State retains the right to give exemptions from the night restrictions to specific flights. This right has been exercised mainly where the aircraft is carrying VIP passengers or cargo intended for emergency relief. The following guidelines are followed.

VIPs

13. These include:-

- senior members of the Royal Family;
- UK Government ministers and Service Chiefs of Staff;
- senior members of foreign Royal Families, Heads of State, and senior ministers on an official visit or business where the person is being met by a Government representative; (status to be checked with the FCO when in doubt); but exclude show business and sports celebrities. Repositioning flights preceding or following the use of that aircraft for carriage of a VIP will not be disregarded if the aircraft is classified as QC/8, QC/16 or is a VC10.

Relief Flights

14. These include flights carrying cargoes such as medical supplies required urgently for the relief of suffering during a period of emergency, as, for example, during a refugee crisis or following an earthquake. They do not automatically include medical or other supplies intended for humanitarian purposes where there is no particular urgency. They do not include the carriage of the media and their associated equipment to trouble spots.

MILITARY AIRCRAFT WAR/HOSTILITIES

15. Movements by military aircraft should not take place at night in peacetime unless the aircraft has been classified for night operation or special prior approval has been given by the Department of the Environment, Transport and the Regions.

16. Dispensations have been given where the outbreak of war or similar hostilities requires contingency arrangements, as occurred during the Gulf War when troop movements took place through Heathrow. Similarly, dispensations have been given for civil aircraft affected by hostilities, for example as a result of the Kosovo crisis. Dispensations in such instances would not be appropriate once airlines have had time to assess the situation and make alternative arrangements.

MONITORING

17. All dispensations will be subject to monitoring.

TESTING AND CALIBRATION OF INSTRUMENT LANDING SYSTEMS

18. Airborne safety calibration checks of the instrument landing systems (ILS) used by arriving aircraft at the three London airports are carried out on behalf of the Civil Aviation Authority usually twice a year and generally at night. Currently the aircraft normally used for this purpose are exempt from the night restrictions (i.e. they are classified QC/0). Landings and take offs for the purpose of testing the ILS or other navigation equipment, by aircraft classified

QC/0.5 or above, are not given dispensations but count against the movements limits and noise quotas.

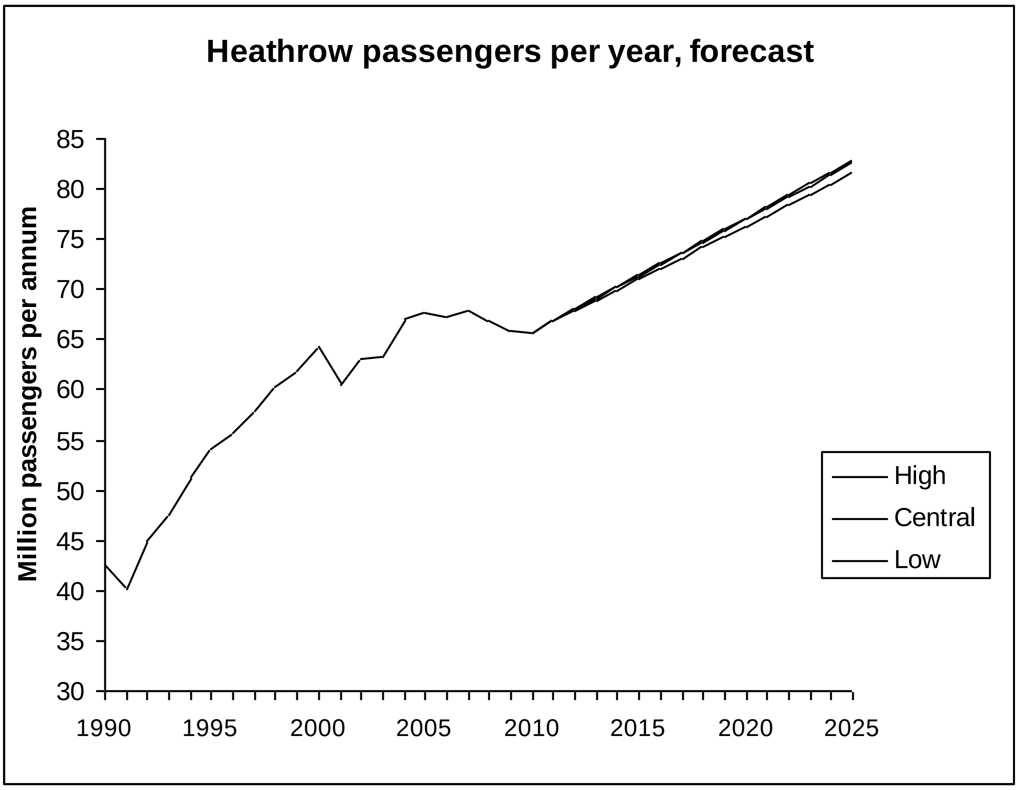
Department of the Environment, Transport and the Regions

10 June 1999

Annex F: Passenger forecasts

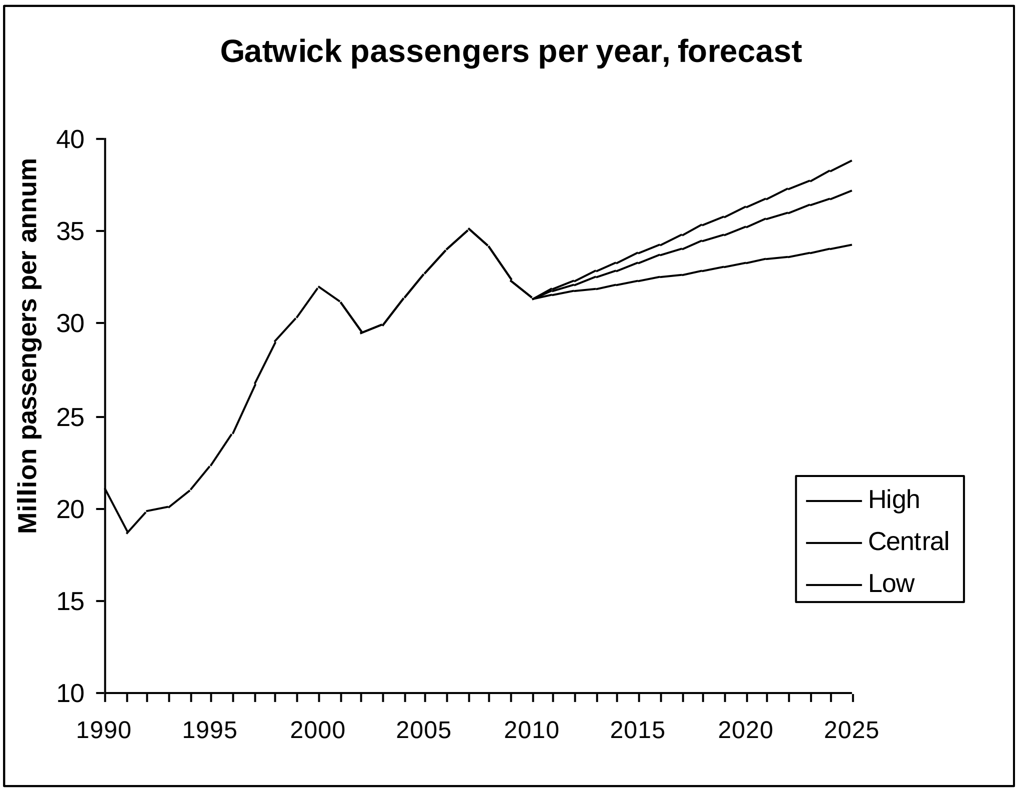
DfT UK Aviation Forecasts 2011

Fig. 2: Forecast growth in Heathrow passenger numbers to 2025



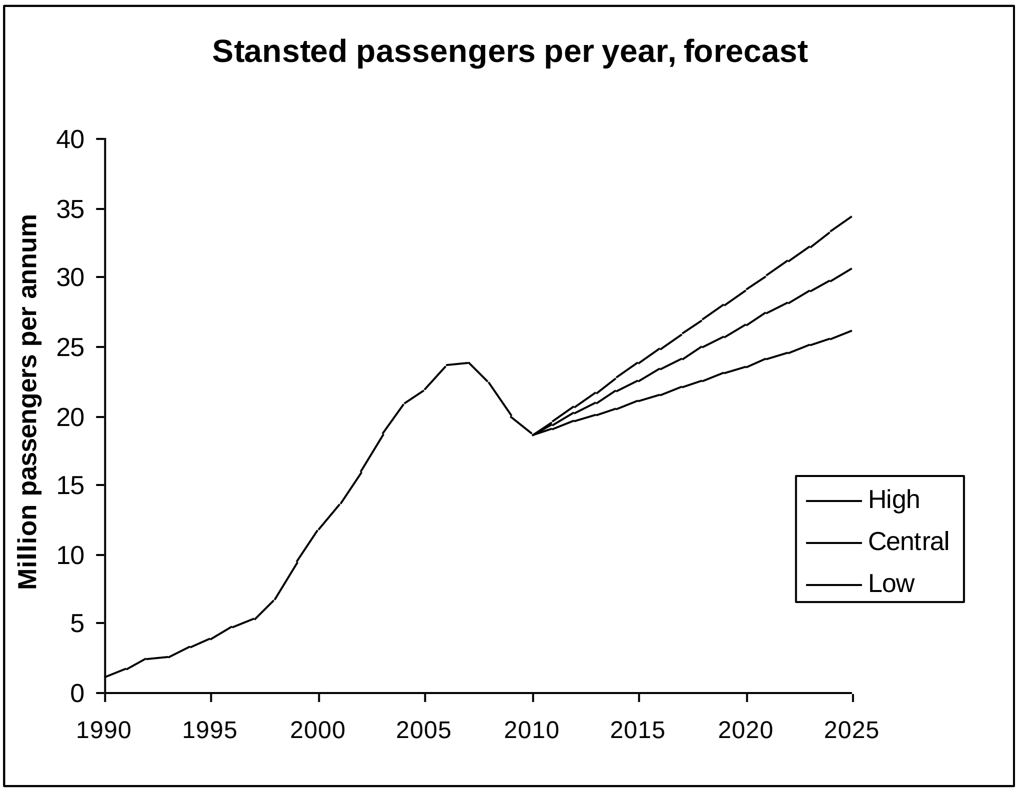
F.1 The number of air passengers using Heathrow is forecast to recover from the recent downturn, rising from 66 million passengers per annum (mppa) in 2010 to 82mppa in 2025. These forecasts imply average annual growth in passenger numbers of 1.4%, compared to an average 2.2% seen over the past twenty years. There is very little difference between the 'high' and 'low' demand forecast scenarios, since Heathrow is at its ATM capacity for the forecast period. It is generally the case that more people wish to travel through Heathrow than can be accommodated.

Fig 3: Forecast growth in Gatwick passenger numbers to 2025



F.2 The number of air passengers using Gatwick is forecast to recover from the recent downturn, rising from 31 million passengers per annum (mppa) in 2010 to 37mppa in 2025. These forecasts imply average annual growth in passenger numbers of 1.1%, compared to an average 2.0% seen over the past twenty years.

Fig 4: Forecast growth in Stansted passenger numbers to 2025



The number of air passengers using Stansted is forecast to recover from the recent downturn, rising from 18.5 million passengers per annum (mppa) in 2010 to 30.5mppa in 2025. These forecasts imply average annual growth in passenger numbers of 3.4%, compared to an average 14.9% seen over the past twenty years.

Annex G: Current aircraft fleet

Current fleet mix

G.1 As noted in Chapter 3 of the main consultation document, arrivals make up the vast majority of movements during the night quota period. In summer 2011 and winter 2011/12, the proportion of arrivals at each airport was as follows: Heathrow, 92%; Gatwick, 86%; and Stansted, 72%. The tables below provide further details of the fleet[3] mix at each airport.

G.2 The majority of night-time movements at Heathrow are early morning arrivals (0400-0600) of long-haul wide-body aircraft such as the B747-400 (QC/2 on arrival), B777-200 (QC/0.5 or QC/1), A380 (QC/0.5) and A340-500/600 (QC/1). The majority of night-time departures at Heathrow are unscheduled late-running operations from the previous day.

G.3 At Gatwick, short-haul narrow-body aircraft, including the A320 and B737 families of aircraft and the B757, account for more than 75% of all movements during the night-quota period (a high proportion of which are charter traffic). These are classified QC/0.25 to QC/1 on arrival and QC/0.5 to QC/1 on departure, depending on aircraft type and engine fit.

G.4 At Stansted, short-haul narrow-body aircraft from the A320 and B737 families, operated mainly by low-cost and charter carriers (but also some cargo), account for nearly two-thirds of all movements during the night-quota period. Other cargo services at Stansted include the BAe-146 (classified QC/0.25 on arrival and departure), the A300 (QC/1 on arrival and QC/2 on departure), and the B767-300 (QC/0.5 on arrival and QC/2 on departure), which account for a further fifth of all movements.

[3] Excluding a small number of helicopter movements at Gatwick and Stansted

Table 7: Common aircraft types in use at Heathrow (2330-0600)

Arrivals	Arrival QC Classification	Count	% of night-time Movements		Departures	Departure QC Classification	Count	% of night-time Movements
B747-400 with RR engines	QC/2	2063	36.0%		**B747-400 with RR engines**	QC/4	61	1.1%
B777-200 with RR engines	QC/1	544	9.5%		**A340-500/600**	QC/2	44	0.8%
B747-400 with PW engines	QC/2	528	9.2%		**B777-200 with GE engines**	QC/1	33	0.6%
A380	QC/0.5	527	9.2%		**Executive jet**	Exempt	31	0.5%
A340-500/600	QC/1	369	6.4%		**Twin-turboprop**	Exempt	24	0.4%
B777-200 with GE engines	QC/0.5	349	6.1%		**A330**	QC/2	23	0.4%
A330	QC/0.5	256	4.5%		**B777-200 with RR engines**	QC/2	22	0.4%
B777-300 with GE engines	QC/1	144	2.5%		**B767-300 with RR engines**	QC/2	21	0.4%
B767-300 with PW engines	QC/1	140	2.4%		**B777-300 with GE engines**	QC/2	20	0.3%
Executive jet	Exempt	87	1.5%		**A380**	QC/2	20	0.3%
Other	-	270	5%		**Other**	-	156	3%
Grand Total		5277	92%		**Grand Total**		455	8%

Table 8: Common aircraft types in use at Gatwick (2330-0600)

Arrivals	Arrival QC Classification	Count	% of night-time Movements		Departures	Departure QC Classification	Count	% of night-time Movements
A320 with CFM engines	QC/0.25	2241	19.6%		**A319 with CFM engines**	QC/0.5	582	5.1%
B757-200 with RR engines	QC/0.25	1694	14.8%		**B757-200 with RR engines**	QC/0.5	222	1.9%
A319 with CFM engines	QC/0.25	1484	13.0%		**A320 with CFM engines**	QC/1	174	1.5%
B737-300/400/500	QC/1	1256	11.0%		**A321 with IAE engines**	QC/1	124	1.1%
B747-400 with GE engines	QC/2	371	3.3%		**A320 with CFM engines**	QC/0.5	79	0.7%
A330	QC/0.5	360	3.2%		**B737-300/400/500**	QC/0.5	68	0.6%
B777-200 with GE engines	QC/0.5	296	2.6%		**B767-200**	QC/1	35	0.3%
A321 with IAE engines	QC/0.25	285	2.5%		**A300**	QC/2	34	0.3%
B737-800/900	QC/0.5	241	2.1%		**B767-300 with GE engines**	QC/2	28	0.2%
A320 with CFM engines	QC/0.5	221	1.9%		**Twin-turboprop**	Exempt	25	0.2%
Other	-	1330	12%		**Other**	-	264	2%

Grand Total		9779	86%		**Grand Total**		1635	14%

Table 9: Common aircraft types in use at Stansted (2330-0600)

Arrivals	**Arrival QC Classification**	**Count**	**% of night-time Movements**		**Departures**	**Departure QC Classification**	**Count**	**% of night-time Movements**
Boeing 737-800/900	QC/0.5	2232	25.4%		**B737-300/400/500**	QC/0.5	1034	11.8%
A319 with CFM engines	QC/0.25	1103	12.5%		**BAe 146/Avro RJ series**	QC/0.25	259	2.9%
B737-300/400/500	QC/1	894	10.2%		**A300**	QC/2	259	2.9%
BAe 146/Avro RJ series	QC/0.25	710	8.1%		**Twin-turboprop**	Exempt	207	2.4%
A300	QC/1	263	3.0%		**B767-300 with GE engines**	QC/2	82	0.9%
B767-300 with GE engines	QC/0.5	255	2.9%		**A340-300**	QC/2	65	0.7%
A320 with CFM engines	QC/0.25	190	2.2%		**B737-800/900**	QC/1	61	0.7%
B767-200	QC/1	160	1.8%		**MD11**	QC/2	55	0.6%
Executive jet	Exempt	116	1.3%		**Executive jet**	Exempt	54	0.6%
A320 with CFM	QC/0.5	87	1.0%		**Executive jet**	QC/0.25	41	0.5%

engines								
Other	-	367	4%		**Other**	-	304	3%
Grand Total		6377	72%		**Grand Total**		2421	28%

Annex H: Operations at Heathrow

ASSESSMENT OF A NIGHT-TIME EASTERLY PREFERENCE AND DISPLACED WESTERLY LANDING THRESHOLDS AT HEATHROW

H.1 This annex provides up-to-date assessments of two potential operational changes that could help to reduce the impact of night-time aircraft noise in the vicinity of Heathrow airport. The effect of introducing (i) an easterly runway preference at night, and (ii) displaced landing thresholds on runways 27L and 27R have both been examined.

Night-time easterly preference at Heathrow

H.2 On 21 December 2000 the DfT announced changes to the use of Heathrow's runways at night that were intended to provide respite for local residents affected by arriving aircraft on final approach. The then current system of westerly preference was to be replaced, at night, by a weekly rotation between westerly and easterly arrival operations whenever weather conditions permit.

H.3 The new arrangements, introduced at Heathrow on 26 March 2001, were expected to produce a more even modal split (the split between westerly and easterly operations). Prior to the change, approximately 80% of early morning arrivals landed in a westerly direction over London in an average year (based on an analysis of NTK[4] operations between July 1997 to March 2001).

H.4 The pattern for selecting the direction of the landing runway follows the sequence in Table 10. The runway shown in brackets is to be used if weather conditions (including low visibility) and/or external factors preclude selection of the preferred runway.

[4] Noise and Track Keeping system

Table 10: Weekly alternation of landing runway

	Landing runway to be used during the night period (after the last departure until 0600 hrs)
Week 1	09L (27R)
Week 2	27R (09L)
Week 3	09R (27L)
Week 4	27L (09R)
Week 5	As per week 1

H.5 The runway alternation is subject to the following overriding conditions: the tailwind component does not exceed 5 knots; and the associated crosswind component does not exceed 12 knots; and the runway surface is dry.

H.6 An analysis of Heathrow meteorological (METAR) data for the 10-year period 2002-2011 between 0400 to 0600 hrs indicated that the weather conditions were such that the runways could have been operated as follows (assuming no variations from the weekly alternation pattern): in a westerly direction 59% of the time; in an easterly direction 41% of the time.

H.7 However, an examination of NTK operations data for early morning arrivals during the same period indicated that, in practice, Heathrow's runways were used in a westerly direction approximately 72% of the time. It is clear therefore that the direction of operations before 0600 hrs is being influenced by other operational factors (possibly, for example, by the forecast wind direction after 0600 hrs), meaning that alternation cannot always be adhered to. One way of achieving a more even (50:50) split of actual operations, which was the original intention of the current night-time arrangements, might therefore be to introduce an easterly preference scheme, subject to the same overriding weather conditions.

H.8 In order to predict the theoretical modal split associated with an easterly preference, an analysis has been undertaken of Heathrow meteorological data for the same 10-year period described above. The analysis sought to predict the change in modal split were the current scheme of night-time runway alternation to be replaced with an easterly preference. This change in modal split was then applied to the 10 year average modal split of early morning arrivals to estimate the effects of an easterly preference on overall night-time noise exposure.

H.9 The percentage of easterly and westerly arrival operations under each scenario are shown in Table 11. The analysis concluded that there would be a large shift in the 10 year average modal split were the airport to move to an easterly preference. Year to year variation would likely result in individual years with higher proportions of easterly operations and some with less.

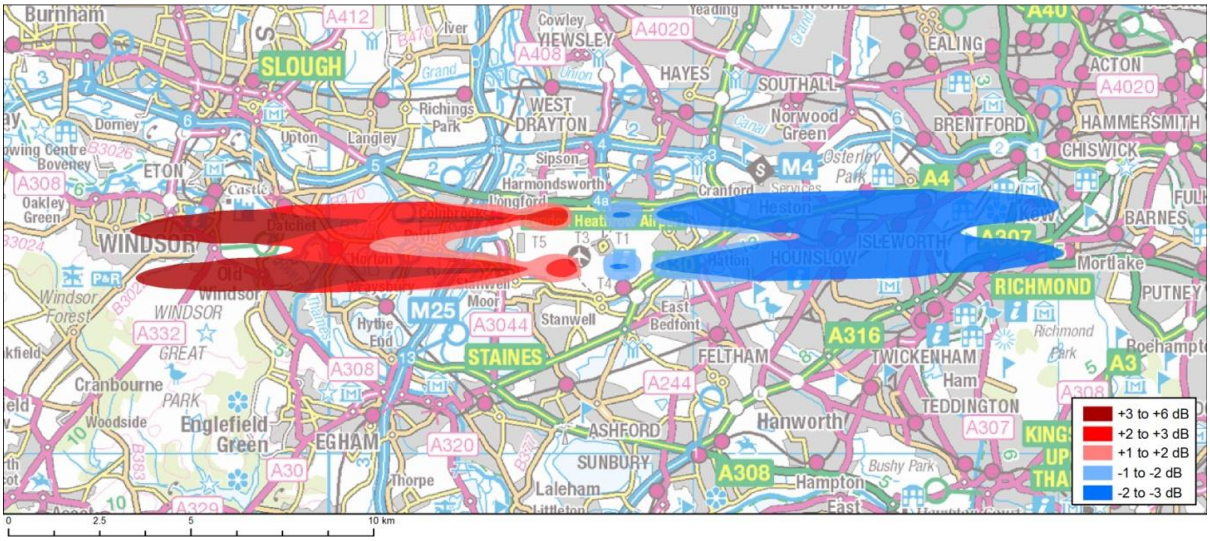
Table 11: Percentage of easterly and westerly early morning arrivals as a function of operating preference

Operating Preference	% East	% West
Current weekly alternation	28	72
Easterly preference	60	40

H.10 To illustrate the predicted change in noise exposure as a result of a large shift in the long-term arrival modal split at night, difference contours have been plotted comparing the easterly preference scenario with the current weekly alternation - see Figure 5. The contours represent the numeric difference in noise exposure between the two scenarios, using colour shading to show the areas where noise levels either increase or decrease. For this analysis, both scenarios assume the same overall number of night time movements during the night quota period as for 2011/12, with equal numbers of arrivals on the northern and southern runways.

H.11 In theory, differences can occur at any absolute noise exposure level. However, presenting changes in contour level at very low exposures would have little meaning, thus the difference calculation needs to be cut off at some point. For this analysis the difference calculation was cut off at 48 dBA Leq. The difference contours are presented as recommended in CAP 725[5], in this case covering increases or decreases (±) of 1 to 2 dB; 2 to 3 dB, and 3 to 6 dB where applicable. For each range of differences, the area covered and the total enclosed population and number of households is reported in Table 12.

Fig 5: Noise exposure changes for night-time easterly preference relative to current weekly alternation at Heathrow



[5] Civil Aviation Authority (2007), CAP 725, CAA Guidance on the Application of the Airspace Change Process

Table 12: Night-time easterly preference relative to current weekly alternation at Heathrow

Leq difference (dB)	Area (sq km)	Population (000s)	Households (000s)
+3 to +6	9.7	11.0	5.0
+2 to +3	9.0	3.5	1.5
+1 to +2	3.6	1.1	0.5
-1 to -2	2.7	2.1	0.8
-2 to -3	20.8	107.1	43.2

H.12 Removing the current runway alternation scheme for night-time arrivals and replacing it with an easterly preference scheme would result in a re-distribution of noise exposure to the west of the airport under the easterly arrival flight paths. Whilst more than 15,000 people are predicted to experience more noise, on average, under an easterly preference scheme, nearly 110,000 people are predicted to experience less noise overall. This is due to the differences in population distribution to the east and west of Heathrow.

Displaced landing thresholds for westerly arrivals at Heathrow

H.13 Whilst displaced landing thresholds are generally introduced for operational or safety reasons, they can also help to reduce noise exposure in the immediate vicinity of an airport by increasing the altitude at which aircraft on final approach over-fly local communities. Those living closest to the airport, who are currently worst affected by aircraft noise, would receive the greatest benefit.

H.14 At Gatwick, the landing thresholds at both ends of the runway are displaced, as are the landing thresholds for runway 04 at Stansted and runways 09L and 09R at Heathrow. In common with other operational changes, displaced threshold operations need to satisfy a number of safety tests before being introduced. Furthermore, dependent on current configuration, airports may need to undertake significant re-engineering work in order to accommodate the altered landing procedures.

H.15 To illustrate the predicted change in night-time noise exposure as a result of a 1000 m displacement of the landing thresholds on runways 27L and 27R, difference contours have been plotted comparing the displaced threshold scenario with the current airport configuration - see Figure 6. For this analysis, both scenarios assume the same overall number of night time movements during the night quota period as for 2011/12. For each range of differences, the area covered and the total enclosed population and number of households is reported in Table 13.

Fig 6: Noise exposure changes for a 1000 m displacement of the landing thresholds on runways 27L and 27R relative to current airport configuration

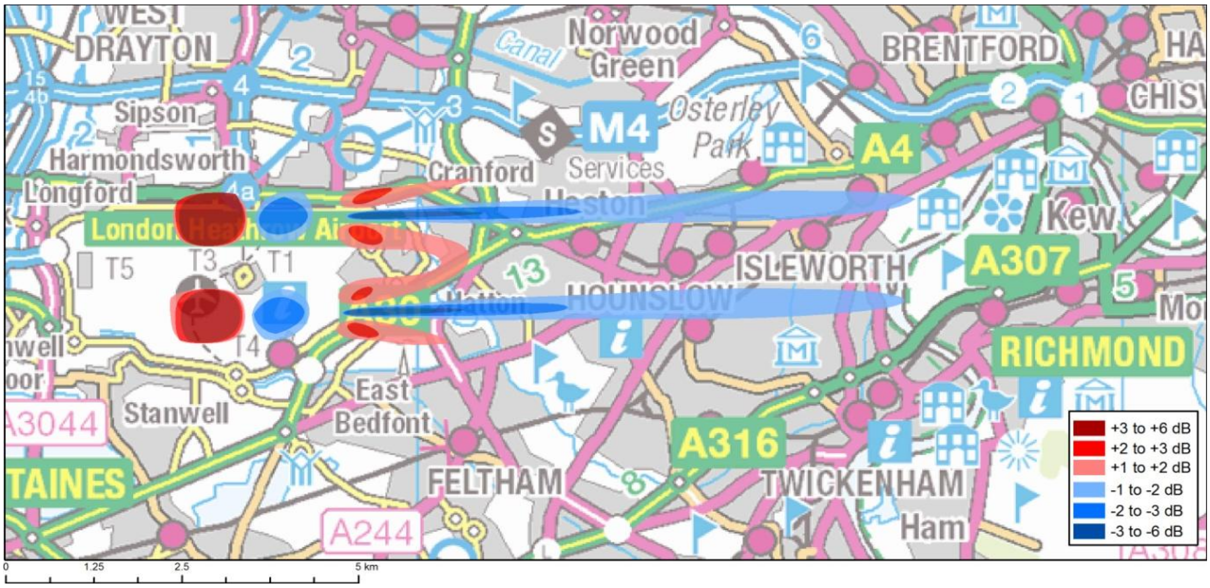


Table 13: 1000 m displacement of the landing thresholds on runways 27L and 27R relative to current airport configuration

Leq difference (dB)	Area (sq km)	Population (000s)	Households (000s)
+3 to +6	1.1	0.0	0.0
+2 to +3	0.4	0.2	0.1
+1 to +2	1.7	0.6	0.3
-1 to -2	4.7	26.3	10.4
-2 to -3	1.2	2.8	0.9
-3 to -6	0.3	0.5	0.2

H.16 Displacing the landing thresholds on runways 27L and 27R by 1000 m would help reduce overall noise exposure, during the day and at night, in the immediate vicinity of Heathrow under the westerly arrival flight paths. Whilst approximately 800 people are predicted to experience more noise, on average, as a result of the displaced landing thresholds, nearly 30,000 people are predicted to experience less noise overall.

Annex I: Other approaches to assessing responses to a change in the night flights regime

Other sources' approaches to assessing airline and air transport user response to a change in the current night flights regime

I.1 This annex summarises the approach taken to assessing the behavioural response of airlines and/or air transport users in a range of recent studies, Each of the studies estimate the change in aircraft movements, passenger numbers and, where possible, cargo implied by the response scenarios they define before using these numbers to estimate the scale of the various impacts (e.g. on air transport users, noise levels) of a specified change in the night flights regime.

CE Delft (2011)

I.2 CE Delft acknowledge the importance of airline and air passenger response in determining the nature and scale of impacts in its assessment of the impacts of a ban on night flights at Heathrow Airport.

I.3 They assess the following three "extreme" response scenarios to a ban on night flights between 11.30pm and 6.00am at Heathrow Airport: (1) all flights are rescheduled and the original passengers opt for other arrival times; (2) all flights are rescheduled but 65% of the original passengers accept other arrival times and the others no longer fly at Heathrow[6]; and (3) all flights are cancelled and passengers no longer travel to Heathrow[7].

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[6] CE Delft assumes under this scenario that all night flights are rescheduled and that passengers are distributed among all these flights, rather than identifying selected flights on which passengers would no longer fly at Heathrow. This is explained in footnote 7 of page 15 of CE Delft (2011). The effect of this is that these flights are assumed to be 35 per cent less full than before they are rescheduled CE Delft makes no explicit assumption about what happens to those passengers no longer travelling to Heathrow under scenarios 2 and 3, although it identifies the following three possible options for such passengers (as described on page 14 of the report): (1) they choose not to make the journey (in the case of leisure passengers); (2) they opt for a different destination; or (3) they decide to fly via another airport (in the case of transfer passengers).

[7] Note that CE Delft assume that if one passenger is lost on a night flight, this results in a return trip passenger to/from the UK being lost.

I.4 CE Delft does not identify any one of these scenarios as the most likely scenario; rather it suggests the response would most likely fall somewhere in between the extremes reflected by the scenarios. At the same time it presents selected flight movement data to demonstrate that it would be possible to reschedule certain night flights to daytime arrivals.

Oxford Economics (2011)

I.5 Like CE Delft, Oxford Economics also assess the impacts of banning night flights at Heathrow Airport. They assume that, in the event of a total ban on night flights between 11.30pm and 6.00am at Heathrow Airport, a proportion of these flights would be rescheduled to the daytime at Heathrow, a proportion would be rescheduled to Gatwick Airport and the remainder would be cancelled altogether.

I.6 We have met with the authors of the Oxford Economics report to discuss their report in detail. On our request, the authors outlined the approach taken to estimating the number of flights that would fall within each of the above response categories. The approach taken was to initially examine individual airlines' operating presence at Gatwick Airport and at Heathrow Airport during the day. From this a judgement was made about the practical ability of individual airlines to reschedule their night flights to either Gatwick Airport or to the daytime at Heathrow, in the event of a ban on Heathrow night flights.

I.7 In order to convert the estimated impact on flights into the impact on passenger and cargo numbers, judgements were made by Oxford Economics about the extent to which the current demand for passenger and cargo services on these flights would continue once these flights had been rescheduled.

I.8 The latter judgement was informed by the characteristics of the passengers travelling on Heathrow night flights – for instance, transfer passengers were assumed on the whole to be less likely to demand a rescheduled flight on the basis that their current demand for Heathrow night flights is likely to be based heavily on the time of the flight and the range of destinations served by Heathrow.

I.9 Oxford Economics indicated to us that their assessment of the airline response to a ban on Heathrow night flights was presented to, and verified by, industry representatives.

Optimal Economics (2011)

I.10 Optimal Economics assess the impacts of a ban on night flights at Gatwick Airport. They assess the response of airlines and air passengers to a ban by use of two distinct scenarios. The scenarios are:

- (1) 50 per cent of Gatwick night passengers are lost while the remaining passengers are able to use rescheduled or other daytime flights from Gatwick; and

- (2) 90 per cent of Gatwick night passengers are lost while the remaining passengers are able to take up spare capacity on daytime flights at Gatwick.

I.11 These scenarios are hypothetical and are not based on any specific intelligence about the likely response of the airline industry to a ban on Gatwick night flights.

Annex J: Other approaches to assessing impacts

Other sources' approaches to assessing the various impacts of changes to the night flights regime

J.1 In the following sections, for each of the key impacts of night flights, we summarise the approach to assessing the impacts of a change in the night flights regime employed in relevant recent studies.

Air transport users

J.2 CE Delft (2011) presents an estimate of the impact on air passengers of a ban on all night flights at Heathrow Airport by putting a value on the disutility (in terms of inconvenience) experienced by those passengers assumed to accept a rescheduled flight at Heathrow in the event of a Heathrow night flights ban. CE Delft only consider the impact on passengers resident in the UK, on the basis that they regard the impact on non-UK residents to be out of the scope of their analysis. Annex I describes how CE Delft estimate the number of passengers that would accept a rescheduled flight. Their analysis assumes that the split of UK residents (60% of arriving passengers[8]) versus non-UK residents (40% off arriving passengers) is the same for night flights as for all flights.

J.3 For those passengers assumed to accept a rescheduled flight at Heathrow, CE Delft attach a monetary value to hourly deviations from passengers' desired arrival times. CE Delft assume that non-transfer leisure passengers' would prefer to arrive in the afternoon, while all other passengers preferred time is their current arrival time[9]. They then assume that half of the total passengers accepting a rescheduled flight at Heathrow would arrive 12 hours earlier than currently scheduled while the other half would arrive 12 hours later than currently scheduled. The monetary value applied to each hourly deviation is an estimate of the value different types of passengers place on their own time[10]. CE Delft justify placing a greater value on hourly deviations for late arrivals than for early arrivals by arguing that people dislike arriving later more than arriving early.

[8] Based on CAA data for all passengers.
[9] Based on M.G.Lijesen (2006): A mixed logit based valuation in civil aviation from SP-data.
[10] The time values applied are (per hour): £31 for business passengers; £5.20 for transferring leisure passengers; and £17 and £24.90 for terminating leisure passengers for every hour arrived earlier and later respectively.

J.4 CE Delft do not put a value on the disutility to those passengers whose flights are assumed to be rescheduled in the event of a Heathrow night flight ban but who are assumed not to accept a rescheduled flight at Heathrow. They justify this by arguing that there was insufficient evidence available to allow them to reach a view as to what such passengers would do instead (i.e. whether they might fly to a different destination, to the same destination from an alternative airport or decide not to travel by air). The same applies to the adverse impacts on passengers who would have transferred from one flight to another at Heathrow but who choose to travel through a different European hub following the additional restrictions on Heathrow night flights.

J.5 Oxford Economics (2011) does not present an assessment of air passenger impacts in the analysis of the economic value of night flights at Heathrow Airport.[11] However, as part of its critique of CE Delft (2011), Oxford Economics support the principle of assessing the impacts on air passengers due to flight rescheduling, while proposing alternative values of time[12] and questioning the assumption that non-transfer leisure passengers prefer afternoon arrivals. Oxford Economics also criticise the analysis for not adequately capturing the value to passengers of changes in flight frequency and for omitting any valuation of the adverse impacts on the air passengers CE Delft assume would no longer fly to Heathrow as a result of a night flights ban.

Airline and airport profits

J.6 CE Delft (2011) presents an assessment of the impact on airline profits of a ban on night flights at Heathrow Airport. The approach taken is to combine estimates of the change in total passenger kilometres travelled between Heathrow and different world regions with estimates of the average airline profit generated per passenger kilometre to/from each region. CE Delft estimate the total passenger kilometres currently travelled on Heathrow night flights by taking the total number of passengers[13] travelling to and from different world regions[14] on Heathrow night flights and multiplying these passenger numbers by the distance in kilometres[15] from Heathrow to a 'reference' destination[16] within each of these regions. The assumed change in total passenger kilometres travelled following a ban on Heathrow night flights is based on the total reduction in passenger movements implied by the various response scenarios considered by CE Delft (see Annex I for a description of these scenarios). CE Delft's estimate of airline profits per passenger kilometre is based on the estimated airline revenues earned per

[11] This is because the focus of the report is on estimating the (loss of) economic value of night flights, rather than on producing a full cost-benefit analysis of a change in the night flights regime.
[12] A single value of £41 per hourly deviation per passenger is proposed by Oxford Economics for taking account of the impact on air passengers of flight rescheduling.
[13] Passenger numbers are obtained from www.flightstats.com.
[14] CE Delft uses the following world regions: Europe, North America, the Far East, the Near East, the Indian subcontinent and Africa.
[15] These distances are obtained from ICAO (2010).
[16] The reference destinations used by CE Delft for each world region are not specified. The distances (one-way, from Heathrow) however are as follows: Europe – 700km; North America – 7,500km; Far East – 8,000km; Near East – 5,500km; Indian subcontinent – 9,000km; Africa – 6,500km.

passenger kilometre[17] provided in AEA (2010)[18] and an assumed average profit margin of 2.4%, which derives from an earlier CE Delft report.

J.7 In line with their approach to assessing air passenger impacts, CE Delft only estimate the change in profits to UK airlines. In addition, CE Delft only consider the change in profits to UK airlines associated with a change in distance travelled by non-UK residents. They argue that payments from UK passengers to UK airlines are simply a question of distribution of welfare and not an increase in welfare, and so any loss in UK airline profits resulting from a reduction in distance travelled by UK passengers can be ignored. The assumption is that UK passengers will spend the fare savings elsewhere in the UK economy, and that both the producer and consumer surplus are transferred from air travel to other sectors of the UK economy. CE Delft use similar reasoning to justify considering any reduction in ticket revenue resulting from a reduction in distance travelled by UK residents on foreign airlines as a benefit to the UK.

J.8 CE Delft also identify impacts on freight operations, airlines operating efficiency and airports non-aeronautical revenues (e.g. parking, concessions etc) but do not quantify these impacts, citing a lack of evidence.

J.9 Oxford Economics (2011) challenges various aspects of the approach to assessing airline and airport profits described in CE Delft (2011). Firstly, Oxford Economics question the rational for omitting changes in UK airline profits from UK passengers from the analysis. In particular they question the assertion made by CE Delft that payments of UK passengers to a British airline are simply a question of redistribution of benefits (Oxford Economics refer to a simple 'transfer') from one group in society to another. Oxford Economics also criticise the assumption that any change in air fares paid by UK residents would result in changes in expenditure elsewhere in the economy. They argue that this ignores the benefits to air passengers' associated with their being able to fly, and does not take account of the possibility that passengers might transfer their expenditure to imported goods. Finally, Oxford Economics suggest that the impact on freight revenues of a change in the night flights regime would be material (whilst accepting that CE Delft's approach was understandable given a lack of data).

J.10 Oxford Economics (2011) does not present an estimate of the impact of a ban on Heathrow night flights on airline profits. It would, however, be possible to obtain an estimate of the change in airline profits associated with a change in night flights at Heathrow employing the same methodology used by Oxford Economics to estimate the economic value (contribution to UK GDP) of such flights. Indeed, whilst they don't present it, Oxford Economics must have estimated the impact on airline profits as an interim step in estimating the impact of a change in Heathrow night flights on corporation tax receipts (discussed under the public accounts section below).

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[17] 13.2 Euro cents for European flights and 6.7 Euro cents for long haul (non-European) flights
[18] Passenger statistics regarding PLF from www.aea.be/research/traffic/index.html

J.11 Oxford Economics' first step in estimating the economic value of Heathrow night flights is to use financial results for UK airlines[19] to construct an estimate of the total economic value added by UK airlines (calculated as the sum of airlines' operating profits, staff costs and earnings less depreciation costs), before dividing this figure by airlines' total 'workload units' (a unit equal to either one passenger or 100kg of cargo carried) to obtain an estimate of the economic value added per airline workload unit. Oxford Economics then multiply this figure by their estimate of the change in the number of workload units associated with a ban on Heathrow night flights to obtain an estimate of the impact on economic value added.

J.12 To estimate the impact of a change in Heathrow night flights on airline profits, the same methodology can be employed except for replacing the estimate of the total economic value added by UK airlines with an estimate of airlines' total operating profits.

J.13 CE Delft acknowledge the potential impacts on airlines and freight companies associated with changes in the amount of freight transported, but do not attempt to value it due to a lack of data.

Noise

J.14 Please refer to the literature review "ERCD Report 1208 - Aircraft Noise, Sleep Disturbance and Health Effects: A Review" being published alongside this consultation by the CAA.

Air quality

J.15 CE Delft (2011) presents an assessment of the air quality impacts of a ban on Heathrow night flights using a methodology which mirrors DfT's webTAG[20] methodology for assessing air quality impacts. The approach taken by CE Delft is to apply NOx damage costs[21] to the estimated change in NOx emissions caused by a ban on Heathrow night flights. The change in NOx emissions is estimated using an estimate of the average NOx emissions per night flight landing and take off event (LTO), derived from an earlier CE Delft report[22]. Estimated LTO events are based on CE Delft's assumptions about how airlines would reschedule (or cancel) night flights in the event of a ban on Heathrow night flights (see annex I). The damage cost figures used by CE Delft are much higher than those used in webTAG, which is partly because they were developed for the Netherlands, and NOx damage cost is not

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[19] Financial results are for 2007 on the basis that this is "the last 'normal', i.e. pre-recession, year for which data is available" (p. 61 of Oxford Economics' report). Oxford Economics reference this data as obtained from the Civil Aviation Authority.
[20] www.dft.gov.uk/ webtag/documents/expert/pdf/U3_3_3-air-quality-120723.pdf
[21] Damage costs are described by CE Delft as representing the amount that people would in principle be willing to pay for an additional unit of 'environmental quality', which in this case is the environmental benefit associated with a kilogram less of oxides of nitrogen (NOx) being emitted. The damage cost value used by CE Delft is £5.23 per kg (or £5,230 per tonne) change in NOx emissions. This compares to webTAG NOx air quality damage cost values of £744 (low), £955 (central) and £1085 (high) per tonne (2010 prices and values).
[22] CE Delft, Indelingen van vliegtuigtypen in milieuklassen: Verslag voor de werkgroep differentiatie vliegbelasting, 2008.

uniform across different locations, and partly because they include a wider range of impacts than are reflected in the webTAG value.

J.16 Optimal Economics (2011) does not present an assessment of the air quality impacts as part of its analysis of the economic impact of night flights. However, Optimal Economics propose that the webTAG methodology for assessing local air quality impacts be used for assessing changes to the night flights regime.

Public accounts

J.17 Oxford Economics (2011) presents an estimate of the public accounts impact of a ban on night flights at Heathrow Airport. The approach employed accounts separately for the impacts on air passenger duty, income tax, national insurance contributions (NIC) and corporation tax receipts.

J.18 Oxford Economics calculate the direct benefit of the air passenger duty revenue arising from activities both in the Night Quota Period and the Total Night period using the rates in force in November 2010 and making the following assumptions:

- that 75% of passengers travel in standard class; 25% travel in “other than standard class” and hence were liable to the higher rate of APD;
- that only departing passengers who commenced their journey in the UK generated APD; and
- that arriving passengers who transferred onto non-UK flights did so within 24 hours and therefore were not liable to APD.

J.19 Oxford Economics estimate the impact on income tax and NICs receipts by applying the ONS’ average tax rate for non-retired families[23] to their own estimate of the change in employment associated with a ban on Heathrow night flights[24]. Oxford Economics’ approach to estimating the employment impacts of the ban in night flights is described in Annex K.

J.20 Oxford Economics (2011) also presents an estimate of the impact of a ban in Heathrow night flights on Corporation tax receipts. The estimate is produced by applying the average corporation tax rate to an estimate of the impact of the ban on airline operating profits. The approach taken by Oxford Economics to estimating the impact of a ban on airline operating profits is described earlier in this annex.

Wider economic impacts

[23] ONS, Effects of taxes and benefits on household income 2009/10.
[24] Oxford Economics’ approach to estimating employment impacts is described in Annex K of this document.

J.21 A number of sources assess the wider economic impacts of changes to the current night flights regime.

J.22 Oxford Economics (2011) identifies a range of wider economic impacts that would result from a ban on Heathrow night flights. These include the impact on: the number of foreign in-bound tourists to the UK; business efficiency and productivity; the volume of UK international trade; and the level of foreign in-bound and domestic investment in the UK. Oxford Economics note that these impacts are closely interlinked, and that the way most of these impacts feed through to the UK economy is through the impact on productivity. As a result they assess these impacts by estimating the impact of a ban on Heathrow night flights on UK productivity and the subsequent impact on the UK's national income (measured as gross domestic product).

J.23 In order to estimate the impact on UK productivity, Oxford Economics use an estimate, developed as part of a previous Oxford Economics study[25], of the relationship between business usage of aviation (represented by business passengers and cargo) and UK productivity[26]. The approach taken by Oxford Economics is to initially estimate the change in UK cargo and terminating business passengers that would be caused by a ban on Heathrow night flights (this estimate is based on Oxford Economics' assumed response of airlines to a ban on Heathrow night flights, described in Annex I) before applying their estimate of the relationship between business usage of aviation and UK productivity to this figure.

J.24 Optimal Economics (2011) assesses the impacts of a ban on night flights at Gatwick Airport on the UK's productivity and tourism, which it presents in terms of the impact on gross value added and employment. To estimate the productivity impact, Optimal Economics apply the same estimated relationship between business usage of aviation and productivity as that used by Oxford Economics to their estimate of the reduction in the business air passengers that would be caused by a ban on Gatwick night flights. Optimal Economics estimate the reduction in business passengers caused by a ban on Gatwick night flights based on their assumed response of airlines to a ban, as described in Annex I.

J.25 For the impacts on tourism, Optimal Economics multiplies the ONS UK Travel Trends' estimate of the average spend per visit to the UK by overseas air travellers of £651 by their estimate of the reduction in the number of foreign in-bound passengers that would be caused by a ban on Gatwick night flights[27] in order to initially obtain an estimate of the total value of tourism expenditure that would be lost in the event of a ban on Gatwick night flights. Optimal Economics then convert this into an estimate of the impact on UK economic output (measured as gross value added) and employment due to

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[25] *The Economic Contribution of the Aviation Industry in the UK*, Oxford Economic Forecasting (now Oxford Economics) (2006).
[26] Oxford Economics (2006) estimated that a 10 per cent increase in business usage of aviation (defined as business passengers and/or cargo) leads to a 0.6 per cent in productivity.
[27] Optimal Economics estimate the number of foreign in-bound passengers on Gatwick night flights by applying CAA passenger survey data to Gatwick Airport data on passenger movements.

impacts on tourism[28]. Optimal Economics estimate the reduction in foreign in-bound passengers caused by a ban on Gatwick night flights based on their assumed response of airlines to a ban, as described in Annex I.

J.26 CE Delft (2011) presents an assessment of the tourism impacts of a ban on night flights at Heathrow Airport. CE Delft combine estimates, derived from Jones et al (2004), of the total value of tourism consumption in the UK attributable to in-bound foreign tourists and the value added per pound of their expenditure in order to obtain an estimate of the total value added to the UK economy by in-bound foreign tourists. CE Delft then reduces this figure in line with its estimate of the reduction in in-bound foreign tourists to the UK in order to arrive at an estimate of the loss of value added by foreign in-bound tourists to the UK in the event of a ban on Heathrow night flights. CE Delft estimates the reduction in in-bound foreign tourists that would occur in the event of a ban on Heathrow night flights by applying CAA survey data on passenger characteristics to its modelled scenarios of how airlines would reschedule (or cancel) night flights in the event of a ban on Heathrow night flights (the scenarios modelled by CE Delft are described in Annex I).

J.27 Oxford Economics criticise CE Delft for incorporating an estimate of the loss of value added by foreign in-bound tourists to the UK in their cost benefit analysis for a ban on Heathrow night flights. Oxford Economics note that value added comprises both gross operating surplus and employees' wages and that only the former should be included in a cost benefit analysis.

J.28 As part of its assessment of the impacts of a Heathrow night flights ban on tourism, CE Delft also point out that there would be a positive impact on the UK economy in the event of a ban to the extent that any current UK leisure passengers on outbound Heathrow night flights chose to spend their holidays in the UK. However, it does not assess this impact quantitatively.

J.29 Though not referred to by either source as a wider economic impact, Oxford Economics (2011) and Optimal Economics (2011) also present assessments of the employment impacts of night flights at Heathrow and Gatwick airports respectively. The approach taken by Oxford Economics to estimating the employment impact of Heathrow night flights is described in Annex K.

J.30 In order to estimate the employment impact of Gatwick night flights, Optimal Economics multiplies an estimate derived from a separate Optimal Economics study[29] of the number of direct employees per passenger at Gatwick Airport by the number of passengers carried on Gatwick night flights. This gives an estimate of the direct on-airport employment impact of Gatwick night flights. Direct off-airport[30] employment is estimated by multiplying direct on-airport employment by approximately 10%. In order to estimate the

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[28] Lost tourism expenditure is converted to employment using output per employee in the hotel and catering sector from ABI data. The impact on economic output (as Gross Value Added) is estimated by applying GVA per employee in hotels and catering in London and the South East to the employment estimate.
[29] Optimal Economics, 2011 "The Economic Benefits of Gatwick Airport: Masterplan Update"
[30] People working in businesses whose activity is directly and solely related to the Airport, but who are located outside the Airport boundary

indirect[31] employment impact of Gatwick night flights, Optimal Economics multiplies its estimate of the direct employment of Gatwick night flights by approximately 12 per cent, on the basis that the indirect employment impact of Gatwick Airport is estimated by the separate Optimal Economics study to be approximately 12 per cent of the direct employment impact of Gatwick Airport. Optimal Economics estimates the induced[32] employment impact of Gatwick night flights by multiplying its combined estimate of the direct and indirect employment impact of Gatwick night flights by approximately 60 per cent, on the basis that the induced impact of Gatwick Airport is estimated by the separate Optimal Economics study to be approximately 60 per cent of the direct and indirect employment impact.

J.31 CE Delft (2011) does not identify any employment impacts in its assessment of the impacts of a ban on Heathrow night flights, on the basis that in a well-functioning job market jobs lost in one sector would be offset by jobs created in other sectors. CE Delft further argues that employment effects should only be taken into account when the accompanying welfare effect is additional, and that additional welfare effects of any changes in employment would only likely occur in the event of changes in structural unemployment.

[31] Employment in firms supplying goods and services to the businesses at the Airport who are located in the South East and London
[32] Employment supported by people employed directly and indirectly who would spend part of their incomes in the assessment area of the South East and London.

Annex K: Oxford Economics

Oxford Economics' approach to estimating the employment impact of a change to the night flights regime

K.1 We summarise here the approach taken by Oxford Economics to estimating the impacts on employment of a ban on Heathrow night flights, based on the description on pages 56-60 of Oxford Economics' report and following a discussion with the report's authors.

K.2 Oxford Economics estimate the impacts of a ban on Heathrow night flights on employment based on their initial estimate, presented in the same source, of the employment generated by Heathrow night flights. Accordingly, this annex initially describes the approach taken by Oxford Economics to estimate the employment generated by Heathrow night flights before describing how Oxford Economics use this to estimate the impacts of a ban on Heathrow night flights on employment.

Direct employment generated by Heathrow night flights

K.3 Oxford Economics estimate the total number directly employed at Heathrow Airport using the 2007 Heathrow Airport Staff Census, which is an annual census of employers based at Heathrow carried out by BAA. The survey reveals employment by company type (e.g. airlines, retail concessionaries etc.). Two of these categories – hotels and non-airport related companies – are excluded from Oxford Economics' total employment figure as they are not considered to provide 'direct' employment, defined by Oxford Economics as jobs which exist only because the airport exists. This then gives a figure for the total direct employment at Heathrow in 2007. 2007 census results are used by Oxford Economics on the basis that it "represents a more 'normal' period in air transport before the economic downturn temporarily affected activity at Heathrow"[33]. In order to estimate total direct employment for 2010/11, Oxford Economics multiplies their estimate of total direct employment for 2007 by the percentage change in workload units[34] between 2007 and 2010/11, in doing so assuming that Heathrow workers' productivity remains constant during this period.

[33] Page 56 of the *Economic Value of Night Flights at Heathrow*, Oxford Economics (2011).
[34] A workload unit is a unit used to measure airline activity equal to either one passenger or 100kg of cargo carried.

K.4 To work out what proportion of total direct employment at Heathrow relates to night flights, Oxford Economics estimates the proportion of total manpower hours that are worked during the night period. This is done using the Sinclair Knight Merz 2008/09 survey, which shows the percentage of employees reporting for and finishing work at different times during an average 24 hour period. As the survey does not reveal the shift length of the workers surveyed, Oxford Economics makes an assumption that workers' shift lengths correspond to the average shift length at Heathrow, which Oxford Economics reports is 8 hours. This assumption is necessary in order to estimate the proportion of total manpower hours worked during the night period.

K.5 Oxford Economics then multiply their estimate of the percentage of total manpower hours worked during the night by their estimate of total direct employment at Heathrow airport in 2010/11 in order to obtain an estimate of night time-based employment which is directly related to Heathrow night flight activity.

In order to account for employment which is related to night flight activity but takes place outside of the night period, Oxford Economics estimates the employment resulting from night transfer traffic, on the basis that (p. 60): "Transfer passengers (and the same applies to transhipment freight) who arrive on a night flight and then continue their journeys outside the night period onto a linked departure require additional employment resources relating to the transfer and to the following flight. In the same way as the revenue for the full journey encompasses the two sectors, so too in economic terms do the employment and other resources to achieve the full journey."

K.6 Oxford Economics divide their estimate of night time-based direct employment at Heathrow by the number of workload units during the night in order to obtain an estimate of the direct employment required per workload unit. This is done separately for longhaul and shorthaul flights on the basis that they are likely to have different employment requirements. Using CAA survey data, Oxford Economics then estimates the number of transfer passengers to/from shorthaul and longhaul destinations travelling on each Heathrow night flight, before applying their estimate of direct employment required per shorthaul or longhaul (depending on the characteristics of the passenger) workload unit to each transfer passenger.

K.7 Oxford Economics combine their estimates of night time-based employment directly related to Heathrow night flight activity and additional employment resulting from night transfer traffic to obtain an estimate of the total direct employment at Heathrow generated by night flights.

Indirect and induced employment generated by Heathrow night flights

K.8 Oxford Economics describe the indirect employment generated by Heathrow night flights as the employment generated in the supply-chain by Heathrow night flights, as airlines, airport operators and other companies purchase goods and services from suppliers in the wider UK economy.

K.9 Oxford Economics estimates the indirect employment generated by Heathrow night flights using the Office of National Statistics' (ONS) input-output tables, replicating the approach taken by Oxford Economics in an earlier, separate study into the economic contribution of the aviation sector[35].

K.10 Oxford Economics describe the induced employment impact of Heathrow night flights as the employment generated by the spending of those directly or indirectly employed by Heathrow night flights. This household spending is said to support jobs and activity in the industries that provide these goods ands services, and includes jobs in companies producing consumer goods and a range of service sector industries.

K.11 Oxford Economics estimates the induced employment impact of Heathrow night flights again using the ONS input-output tables, by identifying the value of household (consumer) spending by individual industries employed by Heathrow night flights.

Impact of a ban on Heathrow night flights on employment

K.12 Though not explicitly stated in their report, the approach taken by Oxford Economics to estimating the impact of a ban on Heathrow night flights on employment as confirmed in our discussions with the report's authors is essentially to scale down their estimate of the direct employment generated by Heathrow night flights, as described above, in line with their estimate of the reduction in airline workload units that would be caused by a ban on Heathrow night flights. The latter estimate is based on Oxford Economics' assumed response of airlines and air transport users to a ban on Heathrow night flights (described in Annex I).

[35] *The Economic Contribution of Aviation in the UK*, Oxford Economic Forecasting (2006).