Environmental Research and Consultancy Department
Directorate of Airspace Policy
Civil Aviation Authority

ERCD REPORT 1205

Strategic Noise Maps for Gatwick Airport 2011

J Lee
L Edmonds
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Summary

This report presents the year 2011 strategic noise maps for London Gatwick Airport, which have been produced to meet the requirements of the *Environmental Noise (England) Regulations 2006*.

June 2013

The authors of this report are employed by the Civil Aviation Authority. The work reported herein was carried out on behalf of the Department for Transport.

Any views expressed are not necessarily those of the Secretary of State for Transport.

Population data used in this report are supplied by Defra and based on the 2011 Census.

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Glossary

AIP Aeronautical Information Publication.

ANCON The UK civil aircraft noise contour model, developed and maintained by ERCD.

ATC Air Traffic Control.

CAA Civil Aviation Authority – the UK's independent specialist aviation regulator.

CDA Continuous Descent Approach.

dB Decibel units describing sound level or changes of sound level.

dBA Units of sound level on the A-weighted scale, which incorporates a frequency weighting approximating the characteristics of human hearing.

Defra Department for Environment, Food and Rural Affairs.

DfT Department for Transport (UK Government).

END Environmental Noise Directive.

EPNdB Effective Perceived Noise Level in decibels.

ERCD Environmental Research and Consultancy Department of the Civil Aviation Authority.

ILS Instrument Landing System.

$L_{Aeq,16hr}$ Equivalent sound level of aircraft noise in dBA for the 16-hour day (0700-2300 local time) period. For this report, the *annual* average day is used.

L_{day} Equivalent sound level of aircraft noise in dBA for the 12-hour annual average day (0700-1900 local time) period.

L_{den} Equivalent sound level of aircraft noise in dBA for the 24-hour annual average period with 5 dB weightings for $L_{evening}$ and 10 dB weightings for L_{night}.

Leq Equivalent sound level of aircraft noise in dBA, often called 'equivalent continuous sound level'. For conventional historical contours this is based on the daily average movements that take place within the 16-hour period (0700-2300 local time) over the 92-day summer period from 16 June to 15 September inclusive.

$L_{evening}$	Equivalent sound level of aircraft noise in dBA for the 4-hour annual average evening (1900-2300 local time) period.
L_{max}	The maximum sound level measured during an aircraft event.
L_{night}	Equivalent sound level of aircraft noise in dBA for the 8-hour annual average night (2300-0700 local time) period.
MTWA	Maximum Total Weight Authorised.
NPR	Noise Preferential Route.
NTK	Noise and Track Keeping monitoring system. The NTK system associates radar data from air traffic control radar with related data from both fixed (permanent) and mobile noise monitors at prescribed positions on the ground.
QC	Quota Count, the basis of the London airports night restrictions regime.
SID	Standard Instrument Departure.

Executive Summary

This report presents the year 2011 strategic noise maps for London Gatwick Airport that have been produced to meet the requirements of the *Environmental Noise (England) Regulations 2006*. Strategic noise maps were previously produced for the year 2006.

Noise modelling has been performed with the ANCON model, employing the mean flight tracks, average flight profiles and noise emission data associated with the Gatwick 2011 summer period Leq contours.

Noise contours have been produced for the following noise indicators: L_{day}, $L_{evening}$, L_{night}, L_{den} and annual $L_{Aeq,16hr}$. Estimates of area, population and households within the contours are provided.

There were 5% fewer annual 24-hour aircraft movements at Gatwick in 2011 compared to 2006. In 2011 the 55 dBA L_{den} contour area was 85.7 km^2, 9% lower than in 2006 and enclosed a population of 11,300. In 2011 the 50 dBA L_{night} contour area was 40.0 km^2, 17% lower than in 2006 and enclosed a population of 4,100. Population comparisons relative to 2006 are not presented, since counts for 2006 are based on earlier Census data.

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1 Introduction

1.1 Background

1.1.1 The EU Directive 2002/49/EC relates to the assessment and management of environmental noise and is also referred to as the Environmental Noise Directive (END). The END requires member states to produce strategic noise maps for the main sources of environmental noise. This Directive was transposed into UK law by *Statutory Instrument 2006 No. 2238 The Environmental Noise (England) Regulations 2006*.

1.1.2 The Environmental Research and Consultancy Department (ERCD) of the Civil Aviation Authority (CAA) was commissioned by the Department for Transport (DfT) to produce strategic noise maps for Gatwick Airport for the year 2011 to meet the requirements of *The Environmental Noise (England) Regulations 2006*. Strategic noise maps for Gatwick were previously produced by ERCD for the year 2006 to meet these Regulations (**Ref. 1**).

1.1.3 The Environmental Noise Regulations specify that noise maps are to be produced for the following indicators: L_{day}, $L_{evening}$, L_{night}, L_{den} and annual $L_{Aeq,16hr}$. These noise indicators are based on air traffic movements for the 365-day annual period, unlike the conventional Leq noise contours that are based on movements over the 92-day summer period.

1.1.4 L_{day} is the equivalent continuous sound level (Leq) over the time period 0700-1900 (local time). $L_{evening}$ and L_{night} are the average sound levels for 1900-2300 and 2300-0700 respectively (local time). L_{den} is the logarithmic average of L_{day}, $L_{evening}$ and L_{night} but with $L_{evening}$ and L_{night} weighted by 5 dB and 10 dB respectively. The annual $L_{Aeq,16hr}$ (0700-2300 local time) is derived from the logarithmic average of the L_{day} and $L_{evening}$ results.

1.1.5 The L_{day}, $L_{evening}$, L_{den} and annual $L_{Aeq,16hr}$ contours are plotted from 55 to 75 dBA in 5 dB steps. However, L_{night} is plotted from 50 to 70 dBA (also in 5 dB steps).

1.1.6 The objectives of this report are to describe the noise modelling methodology used to produce the year 2011 strategic noise maps for Gatwick Airport, and to present the calculated noise maps and associated area/population/household statistics for each of the required noise indicators.

1.1.7 It should be noted that at Defra's[1] request, this report presents population and household numbers which have been supplied by Defra's consultants. Defra's population figures are based on the outputs of the 2011 Census and differ from

[1] The Department for Environment, Food and Rural Affairs (Defra) is responsible for the publication of noise maps for road, rail, industrial and airport noise sources on behalf of the Secretary of State to meet the requirements of the Environmental Noise (England) Regulations 2006.

the data held by ERCD for 2011 (a 2011 update of the 2001 Census provided by CACI Ltd). In addition, Defra had previously published its own population estimates for the Heathrow 2006 END contours which did not match precisely the numbers in ERCD's report (**Ref. 1**).[2] Because of these differences in the population databases used by ERCD and Defra, it was not considered appropriate to provide comparisons between the 2011 and 2006 population and household results in this report.

1.2 Gatwick Airport

1.2.1 Gatwick Airport is located approximately 28 miles (45 km) south of London and about 2 miles (3 km) north of Crawley. Aside from the nearby towns of Crawley and Horley it is situated in mostly lightly populated countryside.

1.2.2 Gatwick Airport has one main runway, designated 08R/26L, which is 3,316 m long. The Runway 26L landing threshold is displaced by 424 m, and the Runway 08R landing threshold is displaced by 393 m. There is also one standby runway (08L/26R) that can be used if the main runway is out of operation, e.g. due to maintenance work. There are two passenger terminals. The airport layout in 2011 is shown in **Figure 1**.

1.2.3 In the 2011 calendar year there were approximately 251,000 aircraft movements at Gatwick Airport, handling 33.7 million passengers (2006: 263,000 aircraft movements, 34.2 million passengers).[3]

1.2.4 Other major noise sources in the vicinity of Gatwick Airport include the surrounding roads such as the M23 motorway, and the railway linking Gatwick to London and Brighton.

1.3 Noise control measures at Gatwick Airport

Land use planning

1.3.1 The Government's policies for land use planning and noise have for many years been set out in Planning Policy Guidance 24 (PPG24)[4]. This document gave guidance on how the planning system could be used to minimise the adverse effects of noise. Local authorities had to take its guidelines into account when assessing a proposal for residential development near an existing noise source such as an airport.

[2] It is understood that a different population database year was employed by Defra.

[3] Source: CAA Regulatory Policy Group statistics (www.caa.co.uk)

[4] *Planning Policy Guidance 24: Planning and Noise*, published September 1994.

1.3.2 However, March 2012 saw the publication of the 'National Planning Policy Framework'[5] which has replaced previous Government planning policy documents. In reference to noise, it states that:

Planning policies and decisions should aim to:

- avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
- mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;
- recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and
- identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

Operational procedures

1.3.3 Full details of noise controls relating to a range of aircraft operational procedures are set out in statutory notices and published in the UK AIP (Aeronautical Information Package).[6]

1.3.4 Between the hours of 2330 and 0600 (local time), inbound aircraft, whether or not making use of the ILS (Instrument Landing System) localiser and irrespective of weight or type of approach, must not join the centre-line below 3,000 ft closer than 10 nm (nautical miles) from touchdown.

1.3.5 After taking off, the aircraft must avoid flying over the congested areas of Horley and Crawley.

1.3.6 Before landing at the aerodrome, the aircraft must maintain as high an altitude as practicable and shall not fly over the congested areas of Crawley, East Grinstead, Horley and Horsham at an altitude of less than 3,000 ft nor over the congested area of Lingfield at an altitude of less than 2,000 ft.

1.3.7 For arriving aircraft, the use of Continuous Descent Approaches (CDA) is encouraged to avoid the need for extended periods of level flight, keeping the aircraft higher for longer and reducing the thrust needed. Levels of CDA achievement are monitored and reported to various committees on a regular basis.

1.3.8 Between 2330 and 0600 (local time), aircraft commanders are requested to avoid the use of reverse thrust after landing, consistent with the safe operation of the aircraft.

[5] *National Planning Policy Framework*, published in March 2012 by the Department for Communities and Local Government.

[6] www.ais.org.uk; EGKK AD 2.21 - NOISE ABATEMENT PROCEDURES

Noise preferential routes

1.3.9 Aircraft departing Gatwick are required to follow specific flight paths called Noise Preferential Routes (NPRs) unless directed otherwise by air traffic control (ATC). NPRs were designed to avoid the overflight of built-up areas where possible. They establish a path from the take-off runway to the main UK air traffic routes and form the first part of the Standard Instrument Departure (SID) routes (**Figure 2**). Associated with each NPR is a swathe extending 1.5 km either side of the NPR centreline, within which the aircraft are considered to be flying on-track.

1.3.10 Aircraft reaching an altitude of 4,000 ft at any point along an NPR may be turned off the route by ATC onto more direct headings to their destinations – a practice known as 'vectoring'. ATC may also vector aircraft from NPRs below this altitude for safety reasons, including in certain weather conditions (for example, to avoid storms).

Night restrictions

1.3.11 Night restrictions have been in force at Gatwick for many years, and the current night restrictions regime was introduced in 2006 following extensive consultation. The restrictions are set by the DfT and detailed in a statutory notice published each summer and winter season in the UK AIP supplement.

1.3.12 Aircraft are assigned different Quota Count (QC) classifications based on their certificated noise levels, for departures and arrivals separately. The QC classifications of individual aircraft are published in the statutory notice.

1.3.13 During the night period (2300-0700 local time) the noisiest types of aircraft classified QC/8 and QC/16 may not be scheduled for landing or take-off. There is also a mandatory scheduling ban for QC/4 aircraft from 2330-0600, known as the 'night quota period'. Any QC/8 and QC/16 aircraft may not take off in the night period, except in the period 2300 to 2330 hours when: (a) it was scheduled to take off before 2300; (b) the take-off was delayed by reasons beyond the control of the aircraft operator; and (c) the airport authority has not given notice to the aircraft operator precluding take-off.

1.3.14 During the night quota period, aircraft movements are restricted by limits on movement numbers along with night noise quotas as a supplementary measure.

1.3.15 Aircraft are exempt from the night restrictions if their certified noise classification level is less than 84 EPNdB.

1.3.16 Up to 10% of a current season's movement limit may be carried over to the next season if a sufficient amount of the limit is left unused, and up to 10% of the next season's movement limit may be anticipated in the event of an overrun. Any excess overrun is penalised in the following season at double the amount of the excess. The same arrangements apply to the noise quotas.

1.3.17 The Secretary of State has the power 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. The airport companies may disregard night movements when: (a) delays to aircraft are likely to lead to serious congestion at the airport, or serious hardship or suffering to passengers or animals; or (b) there are delays resulting from widespread and prolonged disruption of air traffic.

1.3.18 Usage of the movement limits and the noise quotas, including any dispensations or exemptions granted, and any movements by QC/8 and QC/16 aircraft during the night period, are reported to the Gatwick Airport Consultative Committee (GATCOM) and the DfT.

Noise limits

1.3.19 During the night quota period (2330-0600), the departure noise limit is 87 dBA L_{max}. For the remainder of the night period (i.e. 2300-2330 and 0600-0700) the noise limit is 89 dBA L_{max}. The noise limits apply at Gatwick's five fixed noise monitors which are located approximately 6.5 km from start-of-roll. These night time limits are consistent with the night restrictions regime. There is also a daytime noise limit of 94 dBA L_{max}. Airlines that breach the noise limits are fined and the money donated to local community projects. There are no noise limits for arriving aircraft.

Noise monitoring

1.3.20 Gatwick has a noise and track-keeping (NTK) system which takes radar data from ATC radars and combines them with flight information and data from fixed and mobile noise monitors located around the airport. The locations of the fixed monitors, which are positioned at 6.5 km from start-of-roll, take account of the noise preferential routes. Relating the noise limits to a reference distance of 6.5 km from start-of-roll encourages aircraft operators to gain height as quickly as possible and then reduce engine power (and therefore noise) at the earliest opportunity.

1.3.21 There is also a requirement for departing aircraft to attain a minimum height of 1,000 ft above aerodrome level when passing the fixed noise monitors.

Noise charges

1.3.22 Airport charges for Gatwick are published every year by the airport operator and the landing charge is assessed and paid according to the Maximum Total Weight Authorised (MTWA), with weightings for noise emissions and daytime peak periods. The aim is to encourage operators to use the quietest possible fleet.

Noise insulation schemes

1.3.23 The provision of noise insulation at Gatwick can be required on a statutory basis under section 79 of the Civil Aviation Act 1982. In practice, all Gatwick's noise

insulation schemes are provided on a voluntary basis and meet the expectations of the previous Government's white paper on 'The Future of Air Transport'[7].

1.3.24 Specifically airport operators were expected to offer: (a) households subject to high levels of noise (69 dBA Leq or more) assistance with the costs of relocating, and (b) acoustic insulation (applied to residential properties) to other noise sensitive buildings such as schools and hospitals exposed to medium to high levels of noise (63 dBA Leq or more).

1.3.25 To address the impacts of *future* airport growth, airport operators were expected to offer: (a) to purchase properties suffering from both a high level of noise (69 dBA Leq or more) and a large increase in noise (3 dBA Leq or more), and (b) acoustic insulation to any residential property that suffers from both a medium to high level of noise (63 dBA Leq or more) and a large increase in noise (3 dBA or more).

1.3.26 Gatwick's noise insulation schemes have been developed following extensive consultation and aim to reduce the noise impacts on households located closest to Gatwick Airport.

1.3.27 In 2005 a 'Home Relocation Assistance Scheme' was launched to assist homeowners located within the year 2002 69 dBA Leq contour to move to quieter areas.

1.3.28 A 'Community Buildings Noise Insulation Scheme' was also set up in 2005 to provide acoustic insulation to noise sensitive community buildings such as schools and hospitals. The scheme was based on the year 2002 63 dBA Leq contour.

1.3.29 Gatwick launched a 'Noise Insulation Scheme for Homes' in 2008, which was based on forecast noise contours for a future scenario where Gatwick is serving 40 million passengers per annum. Ground noise was also taken into account. There were separate daytime and night-time noise insulation schemes. Under the day scheme, residents could qualify for glazing upgrades in all rooms, whereas under the night scheme, only bedrooms were eligible for glazing upgrades.

[7] *The Future of Air Transport*, published December 2003.

2 Noise contour modelling methodology

2.1 ANCON noise model

2.1.1 Noise contours were calculated with the UK civil aircraft noise model ANCON (version 2.3), which is developed and maintained by ERCD on behalf of the DfT. A technical description of ANCON is provided in R&D Report 9842 (**Ref. 2**). The ANCON model is also used for the production of contours for Heathrow and Stansted airports, and a number of regional airports in the UK.

2.1.2 ANCON is fully compliant with the latest European guidance on noise modelling, ECAC.CEAC Doc 29 (3rd edition), published in December 2005 (**Ref. 3**). This guidance document represents internationally agreed best practice as implemented in modern aircraft noise models.

2.2 Flight tracks, profiles and noise emissions

2.2.1 The departure and arrival mean flight tracks, average flight profiles of height, speed and thrust, and noise emission data employed for modelling were the same as those used for the Gatwick 2011 average summer day Leq contours. Further details on the Gatwick 2011 summer Leq contours are published in ERCD Report 1202 (**Ref. 4**).

2.3 Traffic distributions

2.3.1 The strategic noise maps are based on annual traffic movement data for the following three time periods (all local time):

- 0700-1900 (L_{day})
- 1900-2300 ($L_{evening}$)
- 2300-0700 (L_{night})

2.3.2 The source of this information was the NTK system. Traffic statistics from NTK data were cross-checked with runway logs supplied by NATS[8] and very close agreement was found.

2.3.3 The distributions of Gatwick average daily departure and arrival movements by ANCON aircraft type for the L_{day}, $L_{evening}$, L_{night}, L_{den} and annual $L_{Aeq,16hr}$ periods are summarised in **Tables 1-5** respectively. Descriptions of the ANCON types are provided in **Table 6**.

[8] NATS is the provider of air traffic control services to Gatwick Airport.

2.3.4 The annual average 24-hour traffic movements for 2011 at Gatwick were 687.9, 5% lower than in 2006 (2006: 722.2 movements).

2.4 Runway modal splits

2.4.1 The actual runway modal splits for the different calculation time periods are summarised in the table below:

Gatwick 2011 annual runway modal splits

Scenario	Time Period (local)	% west / % east (Runway 26L / 08R)
L_{day}	0700-1900	67% / 33%
$L_{evening}$	1900-2300	69% / 31%
L_{night}	2300-0700	70% / 30%
L_{den}	0000-2400	68% / 32%
$L_{Aeq,16hr}$	0700-2300	68% / 32%

2.5 Topography

2.5.1 The topography around Gatwick Airport was modelled by accounting for terrain height, and is of particular relevance on the western side of the airport around the high ground in the vicinity of Russ Hill (near Charlwood). This was achieved by geometrical corrections for source-receiver distance and elevation angles. Other, more complex effects, such as lateral attenuation from uneven ground surfaces and noise screening/reflection effects due to topographical features, were not taken into account.

2.5.2 ERCD holds OS terrain height data[9] on a 200 m by 200 m grid for the whole of England. Interpolation was performed to generate height data at each of the calculation points on the receiver grid used by the ANCON noise model.

[9] Meridian™ 2

3 Noise contour results

3.1 L_{day} contours

3.1.1 The Gatwick 2011 L_{day} noise contours generated with the annual 2011 modal split of 67% west / 33% east (0700-1900) are shown in **Figure 3**. The contours are plotted from 55 to 75 dBA at 5 dB intervals. The areas, populations and households within the contours are listed by contour band (in accordance with the Environmental Noise Directive) in the table below:

Gatwick 2011 L_{day} - area, population and household estimates by contour band

L_{day} contour band (dBA)	Area (km^2)	Population (x1000)	Households (x1000)
55 – 60	35.3	5.4	2.3
60 – 65	14.3	0.9	0.4
65 – 70	5.5	0.3	0.1
70 – 75	1.8	< 0.1	< 0.1
> 75	1.1	0.0	0.0

Note: Population and household estimates have been supplied by Defra and are based on the 2011 Census.

3.1.2 For reference, the L_{day} contour areas, populations and households are also provided in cumulative format in **Table A1** of Appendix A.

3.2 $L_{evening}$ contours

3.2.1 The Gatwick 2011 $L_{evening}$ noise contours generated with the annual 2011 modal split of 69% west / 31% east (1900-2300) are shown in **Figure 4**. The contours are plotted from 55 to 75 dBA at 5 dB intervals. The areas, populations and households within the contours are listed by contour band in the table below:

Gatwick 2011 $L_{evening}$ - area, population and household estimates by contour band

$L_{evening}$ contour band (dBA)	Area (km^2)	Population (x1000)	Households (x1000)
55 – 60	26.8	3.7	1.6
60 – 65	10.4	0.6	0.2
65 – 70	3.6	0.1	< 0.1
70 – 75	1.2	0.0	0.0
> 75	0.8	0.0	0.0

Note: Population and household estimates have been supplied by Defra and are based on the 2011 Census.

3.2.2 For reference, the $L_{evening}$ contour areas, populations and households are also provided in cumulative format in **Table A2** of Appendix A.

3.3 L_{night} contours

3.3.1 The Gatwick 2011 L_{night} noise contours generated with the annual 2011 modal split of 70% west / 30% east (2300-0700) are shown in **Figure 5**. The contours are plotted from 50 to 70 dBA at 5 dB intervals. The areas, populations and households within the contours are listed by contour band in the table below:

Gatwick 2011 L_{night} - area, population and household estimates by contour band

L_{night} contour band (dBA)	Area (km^2)	Population (x1000)	Households (x1000)
50 – 55	25.0	3.3	1.4
55 – 60	9.8	0.5	0.2
60 – 65	3.4	0.2	< 0.1
65 – 70	1.0	0.0	0.0
> 70	0.7	0.0	0.0

Note: Population and household estimates have been supplied by Defra and are based on the 2011 Census.

3.3.2 For reference, the L_{night} contour areas, populations and households are also provided in cumulative format in **Table A3** of Appendix A. The area of the 50 dBA L_{night} contour in 2011 was 17% smaller than in 2006.

3.4 L_{den} contours

3.4.1 The Gatwick 2011 L_{den} noise contours (modal split 68% west / 32% east) are shown in **Figure 6**. The contours are plotted from 55 to 75 dBA at 5 dB intervals. The areas, populations and households within the contours are listed by contour band in the table below:

Gatwick 2011 L_{den} - area, population and household estimates by contour band

L_{den} contour band (dBA)	Area (km^2)	Population (x1000)	Households (x1000)
55 – 60	53.7	9.3	3.7
60 – 65	20.0	1.5	0.6
65 – 70	7.8	0.4	0.2
70 – 75	2.6	< 0.1	< 0.1
> 75	1.5	0.0	0.0

Note: Population and household estimates have been supplied by Defra and are based on the 2011 Census.

3.4.2 For reference, the L_{den} contour areas, populations and households are also provided in cumulative format in **Table A4** of Appendix A. The area of the 55 dBA L_{den} contour in 2011 was 9% smaller than in 2006.

3.5 Annual $L_{Aeq,16hr}$ contours

3.5.1 The Gatwick 2011 annual $L_{Aeq,16hr}$ noise contours (modal split 68% west / 32% east for 0700-2300) are shown in **Figure 7**. The contours are plotted from 55 to 75 dBA at 5 dB intervals. The areas, populations and households within the contours are listed by contour band in the following table:

Gatwick 2011 annual $L_{Aeq,16hr}$ - area, population and household estimates by contour band

Annual $L_{Aeq,16hr}$ contour band (dBA)	**Area (km^2)**	**Population (x1000)**	**Households (x1000)**
55 – 60	33.0	5.0	2.1
60 – 65	13.5	0.9	0.4
65 – 70	5.0	0.3	0.1
70 – 75	1.6	0.0	0.0
> 75	1.0	0.0	0.0

Note: Population and household estimates have been supplied by Defra and are based on the 2011 Census.

3.5.2 For reference, the annual $L_{Aeq,16hr}$ contour areas, populations and households are also provided in cumulative format in **Table A5** of Appendix A.

3.6 Noise grid datasets

3.6.1 Noise results were also produced for a 10 m by 10 m grid (via interpolation of the receiver grid results) for each of the noise indicators. This grid was large enough to cover the extents of a theoretical contour 5 dB lower than the lowest level normally plotted, i.e. 50 dBA for L_{day}, $L_{evening}$, L_{den} and annual $L_{Aeq,16hr}$, and 45 dBA for L_{night}.

4 Conclusions

4.1 Year 2011 strategic noise maps have been generated for Gatwick Airport using the ANCON noise model to meet the requirements of the *Environmental Noise (England) Regulations 2006*.

4.2 Noise contours have been produced for the following noise indicators: L_{day}, $L_{evening}$, L_{night}, L_{den} and annual $L_{Aeq,16hr}$. Estimated areas, populations and households within the contour bands have been provided. Traffic movements for the annual average 24-hour period at Gatwick were 5% lower in 2011 compared to 2006.

4.3 In 2011 the 55 dBA L_{den} contour area was 85.7 km^2, 9% lower than in 2006 and enclosed a population of 11,300. In 2011 the 50 dBA L_{night} contour area was 40.0 km^2, 17% lower than in 2006 and enclosed a population of 4,100. Population comparisons relative to 2006 are not presented, since counts for 2006 are based on earlier Census data.

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Noise Exposure Contours for Gatwick Airport 2011
ERCD Report 1202, September 2012

Table 1 Gatwick 2011 annual average 12-hour day (0700-1900) movements by ANCON aircraft type

ANCON type	Departures	Arrivals	Total movements
B733	44.22	38.47	82.69
B736	2.18	2.28	4.45
B738	18.19	18.69	36.88
B744G	5.28	3.67	8.94
B744P	0.01	0.01	0.01
B753	0.62	0.38	1.00
B757E	13.49	8.00	21.48
B757P	0.04	0.04	0.07
B762	0.07	0.12	0.19
B763G	3.64	2.29	5.93
B763P	0.44	0.27	0.72
B763R	0.01	< 0.01	0.01
B764	0.12	0.02	0.15
B772G	6.23	3.77	10.00
B772P	0.01	0.00	0.01
B772R	1.67	1.66	3.33
B773G	1.21	1.48	2.70
B773R	0.30	0.23	0.53
BA46	0.15	0.16	0.31
CRJ	1.45	1.45	2.90
CRJ900	0.20	0.20	0.40
DC10	< 0.01	< 0.01	0.01
DC9	< 0.01	0.00	< 0.01
EA30	2.02	1.13	3.14
EA31	0.34	0.29	0.63
EA318	0.05	0.05	0.09
EA319C	76.69	67.47	144.16
EA319V	4.10	3.19	7.29
EA320C	34.54	25.84	60.38
EA320V	0.86	0.72	1.58
EA321C	1.50	1.07	2.58
EA321V	5.71	3.63	9.34
EA33	6.18	3.59	9.77
EA34	0.25	0.22	0.47
EA346	0.01	0.01	0.02
ERJ	0.07	0.04	0.11
ERJ170	0.16	0.24	0.40
ERJ190	10.25	13.32	23.56
EXE2	< 0.01	0.01	0.01
EXE3	1.76	1.61	3.37
FK10	0.38	0.33	0.71
L4P	0.02	0.02	0.04
LTT	19.01	20.59	39.60
MD11	< 0.01	0.01	0.01
MD80	0.13	0.12	0.25
SP	0.01	0.02	0.03
STP	0.01	0.01	0.02
STT	0.04	0.03	0.08
Total	**263.61**	**226.75**	**490.35**

Note: Totals may not sum exactly due to rounding.

Table 2 Gatwick 2011 annual average 4-hour evening (1900-2300) movements by ANCON aircraft type

ANCON type	Departures	Arrivals	Total movements
B733	9.58	12.70	22.28
B736	1.70	1.20	2.90
B738	8.30	7.64	15.94
B744G	0.02	0.02	0.04
B753	0.16	0.23	0.39
B757E	1.79	4.62	6.41
B762	0.15	0.38	0.52
B763G	0.56	0.39	0.95
B763P	0.01	0.01	0.02
B772G	0.07	0.03	0.10
B772R	0.45	0.02	0.46
B773G	0.92	0.51	1.43
B773R	0.06	0.03	0.09
BA46	0.01	0.01	0.02
CRJ	0.82	0.83	1.65
CRJ900	0.03	0.03	0.06
DC9	0.00	< 0.01	< 0.01
EA30	0.20	0.70	0.90
EA31	0.04	0.07	0.10
EA319C	14.61	28.87	43.48
EA319V	0.49	0.92	1.41
EA320C	2.65	8.89	11.55
EA320V	0.19	0.32	0.51
EA321C	0.15	0.36	0.50
EA321V	0.57	2.05	2.62
EA33	0.39	0.38	0.77
EA34	0.10	0.12	0.22
EA346	< 0.01	< 0.01	0.01
ERJ	0.03	0.05	0.07
ERJ170	0.08	0.01	0.08
ERJ190	3.51	0.48	3.99
EXE2	< 0.01	0.00	< 0.01
EXE3	0.29	0.42	0.71
FK10	0.01	0.06	0.07
L4P	< 0.01	0.00	< 0.01
LTT	4.99	3.40	8.39
MD11	0.01	0.00	0.01
MD80	0.03	0.02	0.05
STP	< 0.01	< 0.01	0.01
STT	0.02	0.03	0.05
Total	**52.95**	**75.82**	**128.77**

Note: Totals may not sum exactly due to rounding.

Table 3 Gatwick 2011 annual average 8-hour night (2300-0700) movements by ANCON aircraft type

ANCON type	Departures	Arrivals	Total movements
B733	1.45	4.10	5.56
B736	0.06	0.45	0.51
B738	0.58	0.73	1.31
B744G	0.00	1.62	1.62
B744P	< 0.01	< 0.01	0.01
B753	0.09	0.26	0.35
B757E	2.90	5.56	8.46
B762	0.32	0.03	0.35
B763G	0.34	1.86	2.20
B763P	0.02	0.19	0.20
B763R	0.00	< 0.01	< 0.01
B764	0.00	0.10	0.10
B772G	0.01	2.51	2.51
B772P	0.00	0.01	0.01
B772R	0.01	0.45	0.46
B773G	< 0.01	0.15	0.15
B773R	< 0.01	0.11	0.11
BA46	0.02	0.01	0.03
CRJ	0.03	0.01	0.04
CRJ900	< 0.01	0.00	< 0.01
DC10	< 0.01	< 0.01	0.01
EA30	0.27	0.66	0.93
EA31	0.09	0.11	0.20
EA319C	11.89	6.87	18.75
EA319V	0.14	0.63	0.77
EA320C	6.86	9.35	16.22
EA320V	0.15	0.15	0.30
EA321C	0.38	0.59	0.97
EA321V	1.04	1.64	2.68
EA33	0.18	2.77	2.95
EA34	0.03	0.02	0.05
ERJ	0.04	0.04	0.07
ERJ170	< 0.01	0.00	< 0.01
ERJ190	0.05	0.01	0.06
EXE2	< 0.01	0.00	< 0.01
EXE3	0.21	0.22	0.42
FK10	0.01	0.00	0.01
LTT	0.11	0.13	0.24
MD11	< 0.01	< 0.01	0.01
MD80	0.02	0.02	0.04
SP	0.01	0.00	0.01
STP	0.00	< 0.01	< 0.01
STT	0.02	0.03	0.05
Total	**27.33**	**41.39**	**68.72**

Note: Totals may not sum exactly due to rounding.

Table 4 Gatwick 2011 annual average 24-hour (0000-2400) movements by ANCON aircraft type

ANCON type	Departures	Arrivals	Total movements
B733	55.25	55.28	110.53
B736	3.93	3.93	7.86
B738	27.06	27.06	54.13
B744G	5.30	5.31	10.61
B744P	0.01	0.01	0.02
B753	0.87	0.87	1.74
B757E	18.18	18.18	36.36
B757P	0.04	0.04	0.07
B762	0.53	0.53	1.06
B763G	4.53	4.55	9.08
B763P	0.47	0.47	0.94
B763R	0.01	0.01	0.01
B764	0.12	0.12	0.24
B772G	6.30	6.31	12.61
B772P	0.01	0.01	0.02
B772R	2.13	2.13	4.25
B773G	2.14	2.14	4.28
B773R	0.37	0.37	0.74
BA46	0.18	0.18	0.36
CRJ	2.30	2.30	4.60
CRJ900	0.23	0.23	0.46
DC10	0.01	0.01	0.01
DC9	< 0.01	< 0.01	0.01
EA30	2.49	2.48	4.97
EA31	0.47	0.47	0.93
EA318	0.05	0.05	0.09
EA319C	103.19	103.21	206.40
EA319V	4.73	4.74	9.47
EA320C	44.05	44.09	88.14
EA320V	1.19	1.19	2.39
EA321C	2.02	2.02	4.05
EA321V	7.32	7.32	14.64
EA33	6.75	6.75	13.49
EA34	0.37	0.37	0.74
EA346	0.01	0.01	0.02
ERJ	0.13	0.13	0.25
ERJ170	0.24	0.24	0.48
ERJ190	13.81	13.81	27.62
EXE2	0.01	0.01	0.02
EXE3	2.26	2.25	4.50
FK10	0.39	0.39	0.78
L4P	0.02	0.02	0.04
LTT	24.11	24.12	48.23
MD11	0.01	0.01	0.02
MD80	0.17	0.17	0.34
SP	0.02	0.02	0.04
STP	0.01	0.01	0.03
STT	0.08	0.09	0.18
Total	**343.88**	**343.96**	**687.85**

Note: Totals may not sum exactly due to rounding.

Table 5 Gatwick 2011 annual average 16-hour (0700-2300) movements by ANCON aircraft type

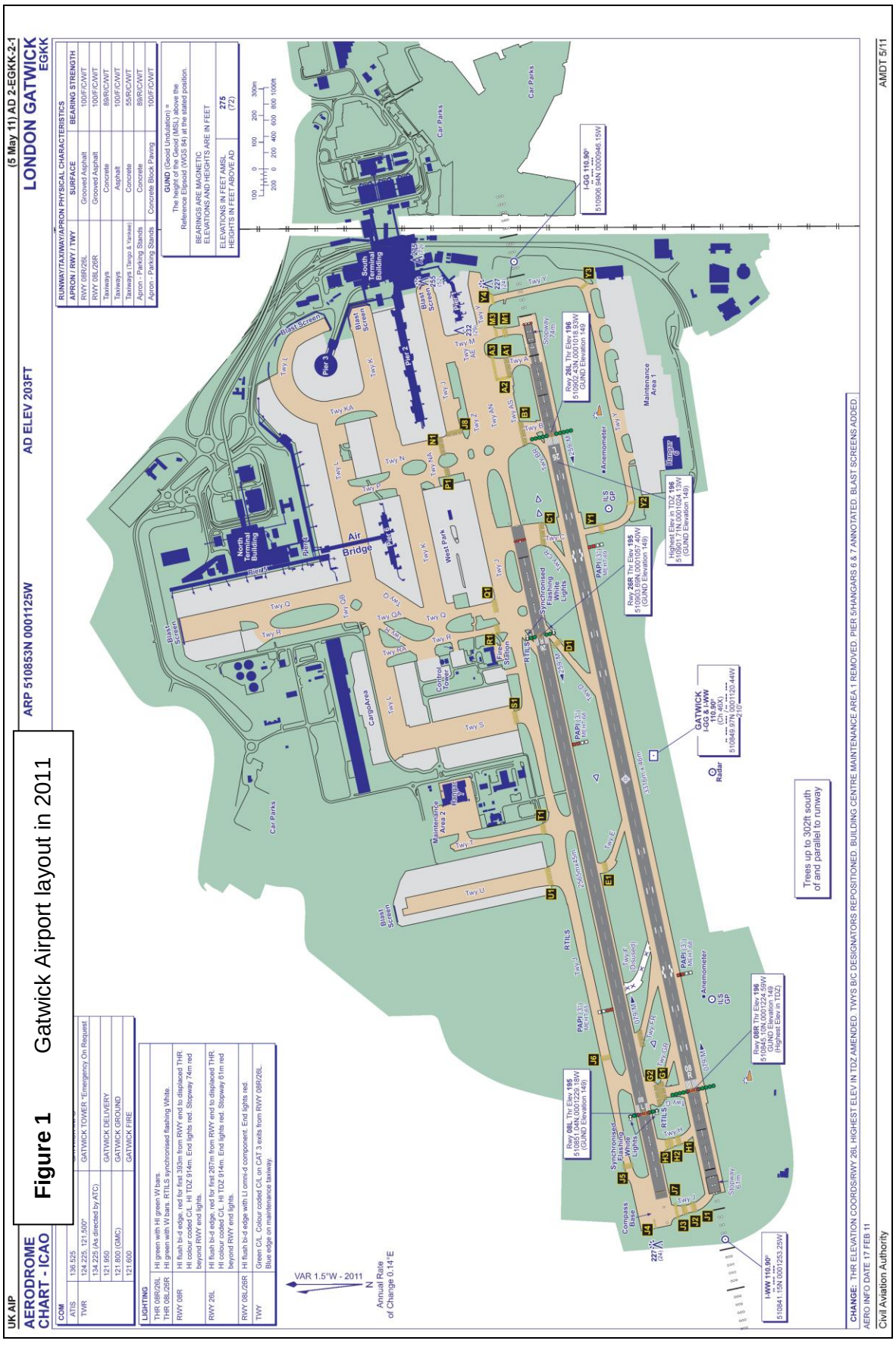
ANCON type	Departures	Arrivals	Total movements
B733	53.80	51.17	104.97
B736	3.87	3.48	7.35
B738	26.48	26.34	52.82
B744G	5.30	3.68	8.99
B744P	0.01	0.01	0.01
B753	0.78	0.61	1.39
B757E	15.28	12.62	27.89
B757P	0.04	0.04	0.07
B762	0.22	0.50	0.71
B763G	4.19	2.69	6.88
B763P	0.45	0.28	0.74
B763R	0.01	< 0.01	0.01
B764	0.12	0.02	0.15
B772G	6.30	3.80	10.10
B772P	0.01	0.00	0.01
B772R	2.12	1.68	3.79
B773G	2.14	1.99	4.13
B773R	0.37	0.26	0.63
BA46	0.16	0.17	0.33
CRJ	2.27	2.28	4.55
CRJ900	0.23	0.23	0.46
DC10	< 0.01	< 0.01	0.01
DC9	< 0.01	< 0.01	0.01
EA30	2.21	1.82	4.04
EA31	0.38	0.36	0.73
EA318	0.05	0.05	0.09
EA319C	91.30	96.34	187.65
EA319V	4.59	4.11	8.70
EA320C	37.19	34.73	71.92
EA320V	1.05	1.04	2.09
EA321C	1.65	1.43	3.08
EA321V	6.28	5.68	11.96
EA33	6.57	3.97	10.54
EA34	0.34	0.35	0.69
EA346	0.01	0.01	0.02
ERJ	0.09	0.09	0.18
ERJ170	0.24	0.24	0.48
ERJ190	13.76	13.80	27.56
EXE2	0.01	0.01	0.01
EXE3	2.05	2.03	4.08
FK10	0.39	0.39	0.78
L4P	0.02	0.02	0.04
LTT	24.00	23.98	47.99
MD11	0.01	0.01	0.02
MD80	0.15	0.15	0.30
SP	0.01	0.02	0.03
STP	0.01	0.01	0.02
STT	0.07	0.06	0.13
Total	**316.56**	**302.57**	**619.13**

Note: Totals may not sum exactly due to rounding.

Table 6 ANCON aircraft type descriptions

ANCON Type	Type Description
B717	Boeing 717
B727	Boeing 727 (Chapter 2&3)
B732	Boeing 737-200 (Chapter 2&3)
B733	Boeing 737-300/400/500 series
B736	Boeing 737-600/700 series
B738	Boeing 737-800/900 series
B747	Boeing 747-100 & 200/300 series (certificated to Chapter 3)
B744G	Boeing 747-400 series with General Electric engines
B744P	Boeing 747-400 series with Pratt and Whitney engines
B744R	Boeing 747-400 series with Rolls-Royce engines
B747SP	Boeing 747SP series
B753	Boeing 757-300
B757C	Boeing 757-200 series with RB211-535C engines
B757E	Boeing 757-200 series with RB211-535E4/E4B engines
B757P	Boeing 757-200 series with Pratt and Whitney engines
B762	Boeing 767-200 series
B763G	Boeing 767-300 series with General Electric engines
B763P	Boeing 767-300 series with Pratt and Whitney engines
B763R	Boeing 767-300 series with Rolls-Royce engines
B764	Boeing 767-400 series
B772G	Boeing 777-200 series with General Electric engines
B772P	Boeing 777-200 series with Pratt and Whitney engines
B772R	Boeing 777-200 series with Rolls-Royce engines
B773G	Boeing 777-300 series with General Electric engines
B773R	Boeing 777-300 series with Rolls-Royce engines
BA46	BAe 146/Avro RJ series
CRJ	Bombardier Regional Jet 100/200
CRJ700	Bombardier Regional Jet 700
CRJ900	Bombardier Regional Jet 900
DC8	McDonnell Douglas DC8 series
DC87	McDonnell Douglas DC8-70 series
DC9	McDonnell Douglas DC9 series
DC10	McDonnell Douglas DC10 series
EA30	Airbus A300 series
EA31	Airbus A310 series
EA318	Airbus A318 series
EA319C	Airbus A319 series with CFM-56 engines
EA319V	Airbus A319 series with AE-V2500 engines
EA320C	Airbus A320 series with CFM-56 engines
EA320V	Airbus A320 series with AE-V2500 engines
EA321C	Airbus A321 series with CFM-56 engines
EA321V	Airbus A321 series with AE-V2500 engines
EA33	Airbus A330 series
EA34	Airbus A340-200/300/500 series
EA346	Airbus A340-600
EA38GP	Airbus A380 with Engine Alliance GP7000 engines
EA38R	Airbus A380 with Rolls-Royce Trent 900 engines
ERJ	Embraer EMB135/145 series
ERJ170	Embraer E-170
ERJ190	Embraer E-190

ANCON Type	Type Description
EXE2	Chapter 2 executive jets
EXE3	Chapter 3 executive jets
FK10	Fokker 70/100 series
L101	Lockheed L1011-TriStar series
L4P	Large four-engined propeller
LTT	Large twin-turboprop
MD11	McDonnell-Douglas MD11 series
MD80	McDonnell-Douglas MD80 series
MD90	McDonnell-Douglas MD90 series
SP	Single piston
STP	Small twin-piston
STT	Small twin-turboprop
TU54	Tupolev Tu-154 series


UK AIP
AERODROME CHART - ICAO
Figure 1
Gatwick Airport layout in 2011
ARP 510853N 0001125W
AD ELEV 203FT
(5 May 11) AD 2-EGKK-2-1
LONDON GATWICK
EGKK
COM
ATIS 136.525
TWR 124.225, 121.500* GATWICK TOWER *Emergency On Request
134.225 (As directed by ATC)
121.950 GATWICK DELIVERY
121.800 (GMC) GATWICK GROUND
121.600 GATWICK FIRE
LIGHTING
THR 08R/26L Hl green with Hl green W bars.
THR 08L/26R Hl green with W bars. RTILS synchronised flashing White.
RWY 08R Hl flash bi-d edge, red for first 393m from RWY end to displaced THR. Hl colour coded C/L. Hl TDZ 914m. End lights red. Stopway 74m red beyond RWY end lights.
RWY 26L Hl flash bi-d edge, red for first 267m from RWY end to displaced THR. Hl colour coded C/L. Hl TDZ 914m. End lights red. Stopway 61m red beyond RWY end lights.
RWY 08L/26R Hl flash bi-d edge with Ll omni-d component. End lights red.
TWY Green C/L. Colour coded C/L on CAT 3 exits from RWY 08R/26L. Blue edge on maintenance taxiway.
RUNWAY/TAXIWAY/APRON PHYSICAL CHARACTERISTICS
APRON / RWY / TWY | SURFACE | BEARING STRENGTH
RWY 08R/26L | Grooved Asphalt | 100/F/C/W/T
RWY 08L/26R | Grooved Asphalt | 100/F/C/W/T
Taxiways | Concrete | 80/R/C/W/T
Taxiways | Asphalt | 100/F/C/W/T
Taxiways (Tango & Varsiee) | Concrete | 55/R/C/W/T
Apron - Parking Stands | Concrete | 80/R/C/W/T
Apron - Parking Stands | Concrete Block Paving | 100/F/C/W/T
GUND (Geoid Undulation) = The height of the Geoid (MSL) above the Reference Ellipsoid (WGS 84) at the stated position.
BEARINGS ARE MAGNETIC
ELEVATIONS AND HEIGHTS ARE IN FEET
ELEVATIONS IN FEET AMSL 275 (72)
HEIGHTS IN FEET ABOVE AD
VAR 1.5°W - 2011
Annual Rate of Change 0.14°E
Trees up to 302ft south of and parallel to runway
CHANGE: THR ELEVATION COORDS/RWY 26L HIGHEST ELEV IN TDZ AMENDED. TWYS B/C DESIGNATORS REPOSITIONED. BUILDING CENTRE MAINTENANCE AREA 1 REMOVED. PIER 5/HANGARS 6 & 7 ANNOTATED. BLAST SCREENS ADDED.
AERO INFO DATE 17 FEB 11
AMDT 5/11
Civil Aviation Authority

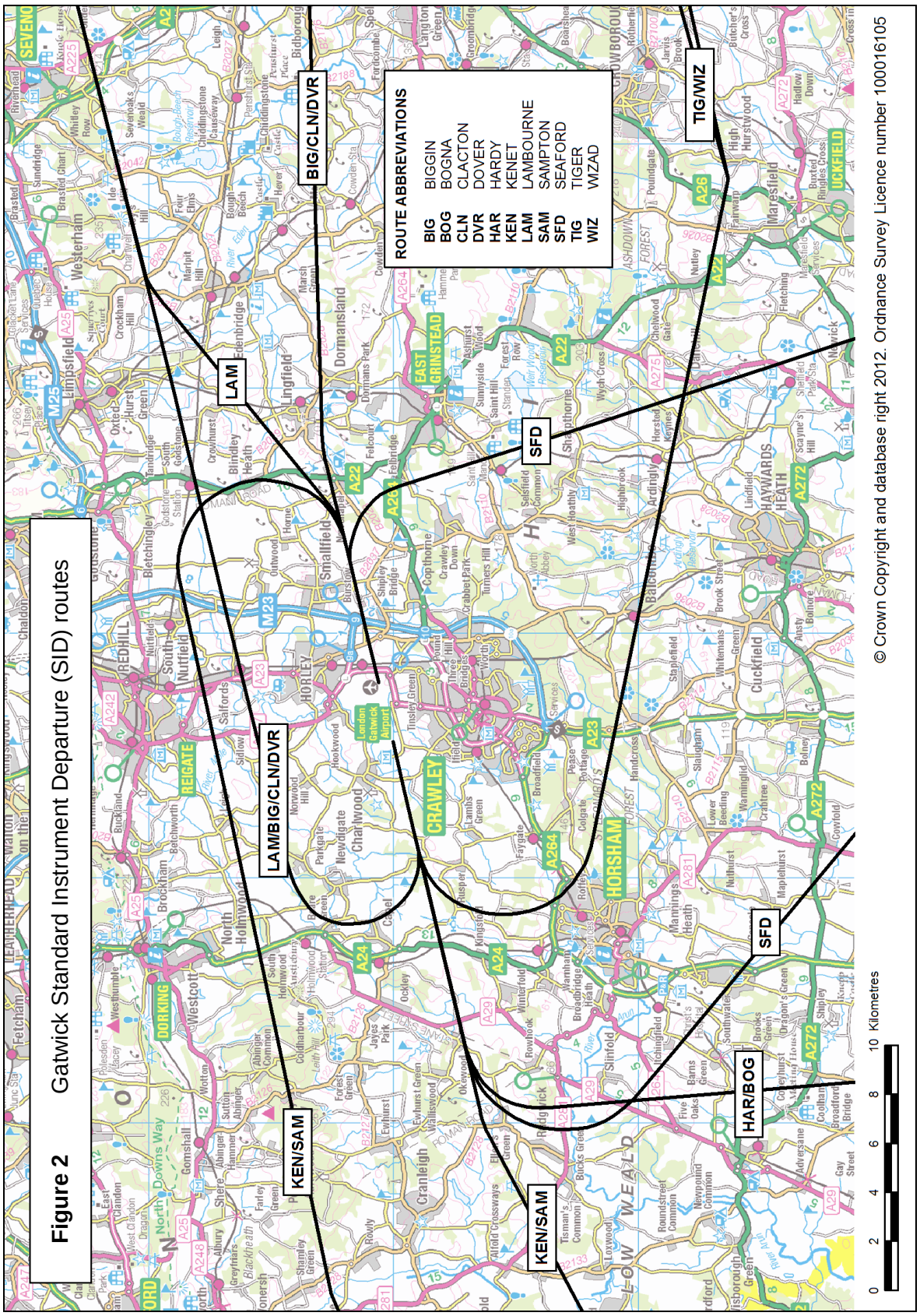


Figure 2 Gatwick Standard Instrument Departure (SID) routes

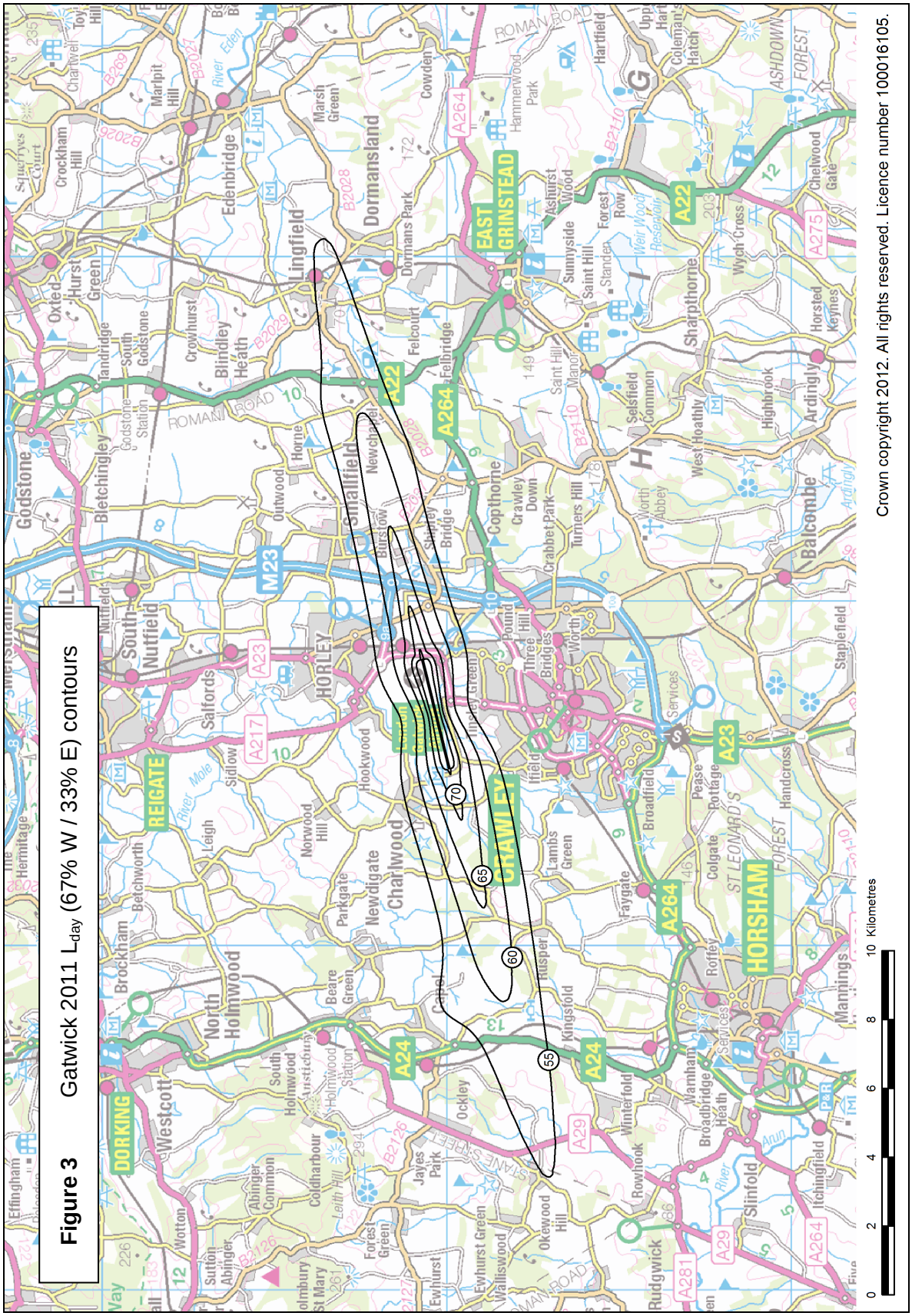

Gatwick 2011 Lday (67% W / 33% E) contours
55
60
65
70
0 2 4 6 8 10 Kilometres
Crown copyright 2012. All rights reserved. Licence number 100016105.

Figure 3

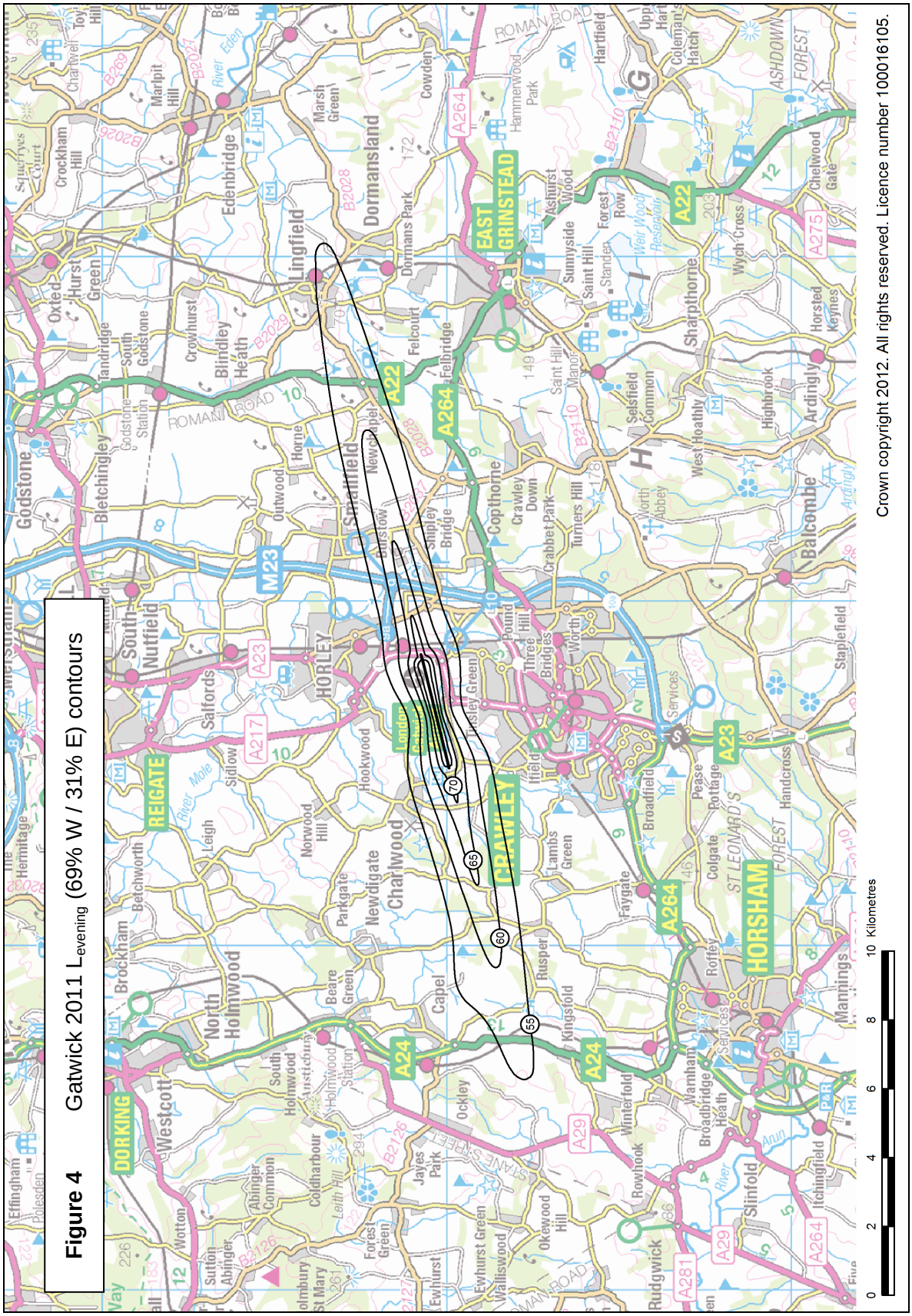


Figure 4 Gatwick 2011 $L_{evening}$ (69% W / 31% E) contours

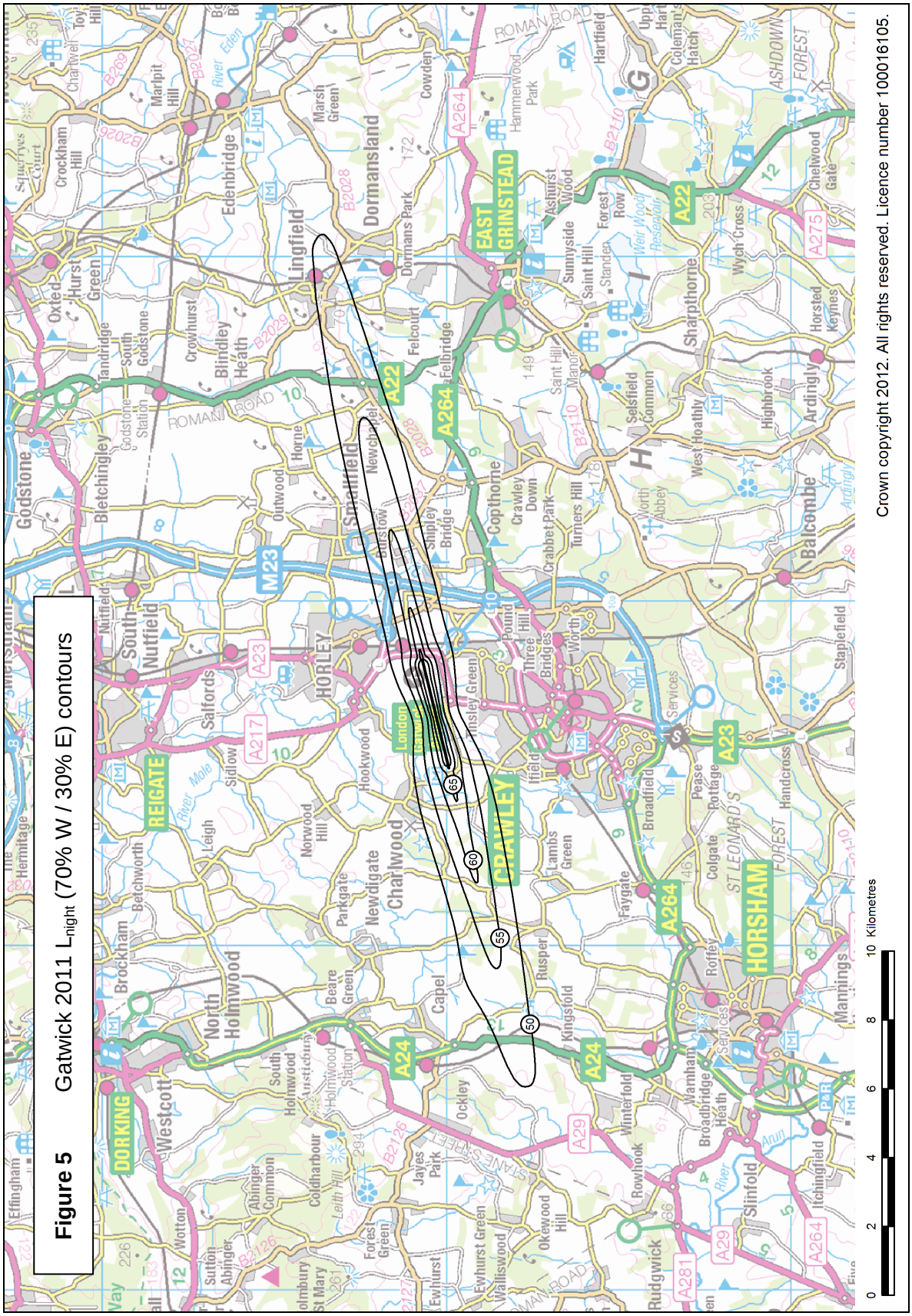


Figure 5 Gatwick 2011 L_{night} (70% W / 30% E) contours

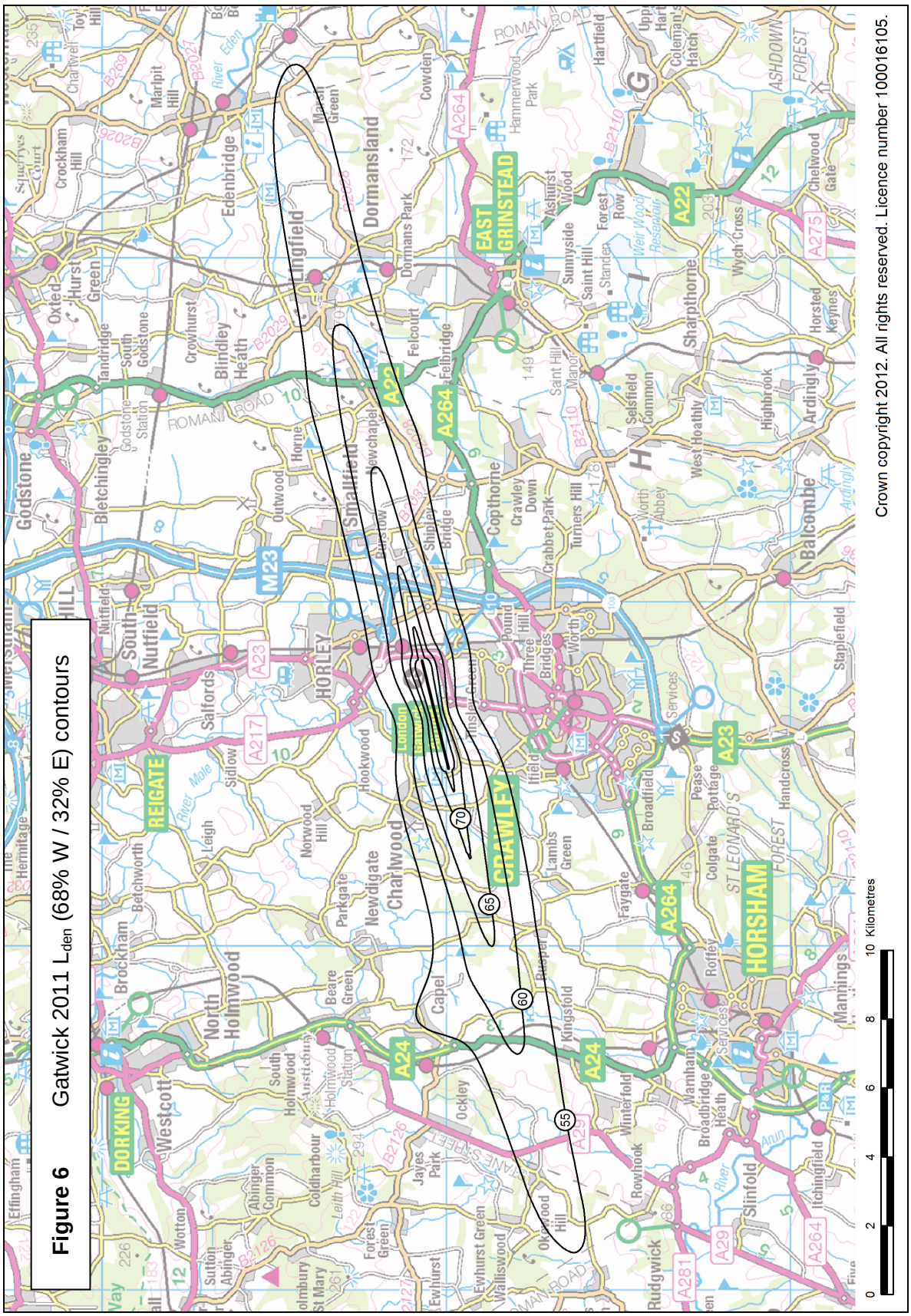


Figure 6 Gatwick 2011 L_{den} (68% W / 32% E) contours

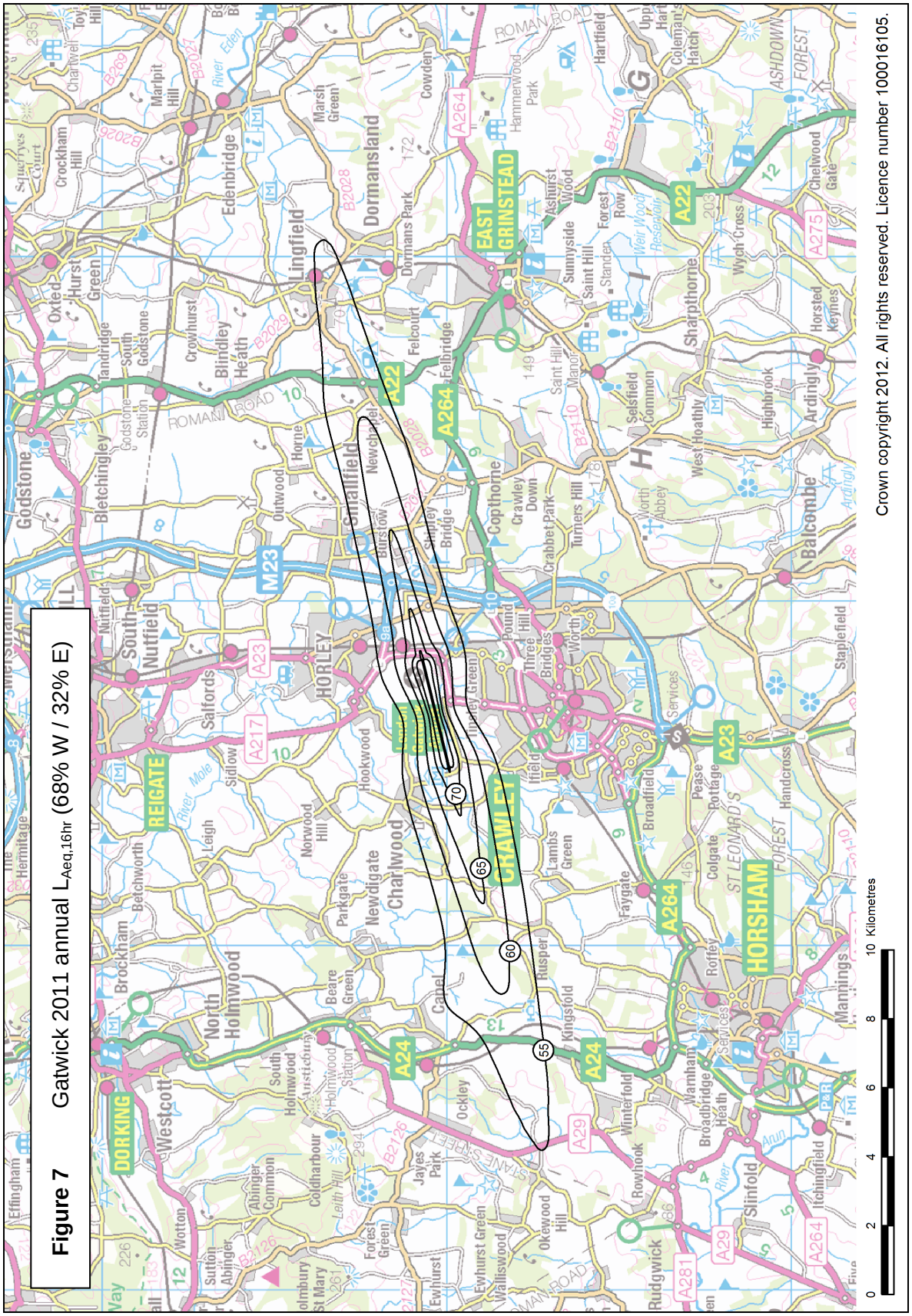


Figure 7 Gatwick 2011 annual $L_{Aeq,16hr}$ (68% W / 32% E)

Appendix A – Results in Cumulative Format

Table A1 Gatwick 2011 L_{day} - area, population and household estimates in cumulative format

L_{day} contour (dBA)	Area (km^2)	Population (x1000)	Households (x1000)
> 55	57.9	6.6	2.8
> 60	22.7	1.2	0.5
> 65	8.3	0.3	0.1
> 70	2.9	< 0.1	< 0.1
> 75	1.1	0.0	0.0

Note: Population and household estimates have been supplied by Defra and are based on the 2011 Census.

Table A2 Gatwick 2011 $L_{evening}$ - area, population and household estimates in cumulative format

$L_{evening}$ contour (dBA)	Area (km^2)	Population (x1000)	Households (x1000)
> 55	42.7	4.4	1.9
> 60	16.0	0.7	0.3
> 65	5.6	0.1	< 0.1
> 70	2.0	0.0	0.0
> 75	0.8	0.0	0.0

Note: Population and household estimates have been supplied by Defra and are based on the 2011 Census.

Table A3 Gatwick 2011 L_{night} - area, population and household estimates in cumulative format

L_{night} contour (dBA)	Area (km^2)	Population (x1000)	Households (x1000)
> 50	40.0	4.1	1.7
> 55	15.0	0.7	0.3
> 60	5.2	0.2	< 0.1
> 65	1.8	0.0	0.0
> 70	0.7	0.0	0.0

Note: Population and household estimates have been supplied by Defra and are based on the 2011 Census.

Table A4 Gatwick 2011 L_{den} - area, population and household estimates in cumulative format

L_{den} contour (dBA)	**Area (km^2)**	**Population (x1000)**	**Households (x1000)**
> 55	85.7	11.3	4.5
> 60	31.9	2.0	0.8
> 65	11.9	0.5	0.2
> 70	4.1	< 0.1	< 0.1
> 75	1.5	0.0	0.0

Note: Population and household estimates have been supplied by Defra and are based on the 2011 Census.

Table A5 Gatwick 2011 annual $L_{Aeq,16hr}$ - area, population and household estimates in cumulative format

Annual $L_{Aeq,16hr}$ contour (dBA)	**Area (km^2)**	**Population (x1000)**	**Households (x1000)**
> 55	54.1	6.2	2.6
> 60	21.1	1.1	0.5
> 65	7.7	0.3	0.1
> 70	2.6	0.0	0.0
> 75	1.0	0.0	0.0

Note: Population and household estimates have been supplied by Defra and are based on the 2011 Census.